Geopolitical Perspectives and Technological Challenges for Sustainable Growth in the 21st Century

Frontmatter

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Geopolitical Perspectives and Technological Challenges for Sustainable Growth in the 21st Century

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June 15-16, 2023
Bucharest University of Economic Studies, Romania

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The 6th International Conference on Economics and Social Sciences
Geopolitical Perspectives and Technological Challenges for Sustainable Growth in the 21st Century
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Foreword

Alina Mihaela DIMA[1*]

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Abstract

The 6th international Conference on Economics and Social Sciences (ICESS) was organized by the Bucharest University of Economic Studies (BUES) between the 15-16 of June 2023, face to face and online.

This year's conference theme "*Geopolitical Perspectives and Technological Challenges for Sustainable Growth in the 21st Century"* resonates deeply with the rapidly changing landscape of our world and was inspired by new trends and technological developments to ensure sustainable growth and innovation.

Nowadays, we find ourselves navigating through a world marked by post-pandemic recovery, political and economic conflicts, geopolitical tensions, and global crises. In the face of these challenges, the concepts of resilience, digitalization, and sustainability have emerged as the cornerstones not only for our business environments but also for academic research and innovation.

This international conference is a scientific event based on the collaboration and commitment of the faculties, departments and partner universities to shape this event. Together, we have crafted 12 parallel sessions dedicated to exploring the multifaceted challenges faced by various sectors, including education, entrepreneurship, business, the public sector, and civil society in a very complex world of post pandemic, political and economic conflicts, war and global crises where resilience, digitalization and sustainability become the key words and cornerstone for business environment but also for the academic research area.

The 6th edition of this conference is challenging, attracting nearly 200 papers authored by esteemed contributors from approximately 60 countries. It is truly heartening to witness the diversity of perspectives and experiences represented here, with participation from countries such as the United States of America, Germany, Italy, France, the United Kingdom, Spain, Greece, Slovakia, Ireland, the Czech Republic, Bulgaria, Hungary, Moldova, Turkey, Albania, Qatar, and many others.

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This global engagement underscores the universality of the issues we aim to address and the importance of forging international collaborations in our pursuit of sustainable growth and innovation.

The substantial contribution of an international scientific committee, consisting of many foreign academics who offer feedback to authors and select the most relevant research, highlights ICESS's unwavering commitment to fostering international collaboration.

Within the conference proceedings lie a wealth of research findings and solutions that address pressing contemporary challenges. There are various topics explored in these articles, spanning areas like adapting to the dynamic VUCA environment, analyzing key indicators of the Romanian educational system, sustainable development in the metaverse era through digital leadership, and assessing labor market needs across seven Romanian development regions, collectively enhance our comprehension of vital issues. These contributions collectively enrich our understanding of critical issues while offering innovative insights and potential solutions.

The presentation of the papers was organized in the following sections:

- Service Learning, Civic Engagement and Sustainable Education;
- Resilient Agri-food and Environmental Systems for Sustainable Development and Agile Entrepreneurship;
- Applied Economics and Statistics & Data Science;
- Accounting for Sustainable Development;
- Digital Leadership and Resilient Entrepreneurship in the Metaverse Era;
- Economy and Economics under the Influence of the New Scientific and Technological Revolution;
- Geopolitical Current Changes and Perspectives in Sustainable Business and Tourism;
- Global World under Crisis: Towards a New Economic Model;
- New Challenges for a Sustainable Financial Ecosystem;
- New Geopolitical Perspectives and Technological Challenges for Sustainable Marketing;
- Technological Challenges for Sustainable Development of Public and Private Organizations in the 2st Century;
- Transforming the Future of Labor: Mapping the Route to a Digitally Transformed Workforce.

The academic partners Sapienza University of Rome, EM Strasbourg Business School, the Higher Education and Research in Management of European Universities (HERMES) network, the Romanian Academy fully support and foster the research initiatives of our university, beyond collaboration towards sustainable partnership for excellence.

The topics and ideas could provide valuable insights for both the business and social communities, contributing to the strengthening of the partnership between the university and the business environment, thereby fostering sustainable growth and society development.

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Students' Perceptions of the Changes Specific to the VUCA World: Online and Traditional Teaching System

Mihaela MINCIU[1*], Răzvan Cătălin DOBREA[2], Adina PRIOTEASA[3], Madalina MONCEA[4]

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Abstract

The business environment in which organisations conduct their activities is constantly changing, so today there is an increasing focus on preparing students for a volatile, uncertain, complex, and ambiguous (VUCA) world. The epidemic caused by the SARS-CoV-2 virus was an extreme situation, specific to the VUCA world, in which both teachers and students had to develop new skills to be able to continue their activity, adapting almost every day to a new situation. In such contexts, characterised by challenging situations, it remains the responsibility of higher education institutions to prepare students to manage uncertain and insecure events so that they have the necessary skills and abilities to integrate into the labour market after graduation. Therefore, this article aims to present the preparedness of students for the VUCA environment, an environment marked by rapid change. In this sense, a quantitative research was carried out among students of the psycho-pedagogical module, second year, Teacher Training Department, Bucharest University of Economic Studies, investigating the main factors that determine the appearance of changes in teaching activities, the connection between teaching style and the way of adapting to unexpected situations, as well as the way of combining theoretical information with practical situations. The results obtained reveal that promoting a participatory teaching style during class time, where students are involved in the teaching-learning process, especially in working teams, helps them to accumulate new information more quickly, as they adapt more easily to unexpected events caused by various factors (schedule/programme changes, force majeure situations, etc.). Additionally, research indicates that the presence and active participation of students in courses and seminars has a significant influence on the ability to adapt to new contexts, allowing them to develop certain skills that will help them in their future professional activity.

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Keywords: VUCA, teaching, education, pandemic, COVID-19.

JEL Classification: A22, D81, I21.

1. Introduction

In a volatile, uncertain, complex, and ambiguous working environment (VUCA), there is increasing emphasis on how higher education institutions promote active learning among students. The OECD and UNESCO have highlighted the importance of preparing students for the VUCA world (Hadar et al., 2020), thus the role of universities is to develop the competences and skills needed by future employees, even in a turbulent and competitive world.

Although the concept of the "VUCA world" was originally used only to characterise post-Cold War US military strategies, it can also be used successfully for the contemporary context in which we all face many overlapping " difficult problems"(Van Berkel, Manickam, 2020; Stein, 2021). For a company to be successful, it must first and foremost be made up of employees who have the ability to understand and monitor changes in order to quickly support internal and external customers (Nowacka, Rzemieniak, 2022). Since orientation can be cultivated from an early age, educational institutions have a particularly important role to play (Canzittu, 2020), because the experiences they face have a significant impact on their future choices (Guichard, 2012). In a volatile, uncertain, complex and ambiguous environment (VUCA), educational institutions as well as training providers need to explore different pedagogical approaches in the delivery of courses (Juera, 2022). At the same time, the VUCA world can represent a great opportunity for both teachers and students, as it calls for innovative processes, so students can learn how to develop agile, efficient methods, and flexible strategies (Fernandes, Afonso, 2021). In conditions of volatility and complexity, information and knowledge accumulated in the past as well as rational behaviours prove to be ineffective, thus higher education institutions must focus on cultivating among its students multidisciplinary qualities, from critical thinking to the full development of an educated personality (Mielkov, et al., 2021).

The VUCA environment reflects a world of change, of innovation, where data frequently changes at high speed, so future employees – today's students – need to be prepared, from university, to manage and solve problems that may arise in their area of work quickly. Thus, this article aims to investigate how students perceive the educational changes they have faced (sudden transition from physical to online system and vice-versa), as well as the influence of teaching style in students' adaptation to the new context. Therefore, in the first part we will present information on the VUCA world and its connection with the educational environment and implicitly with higher education institutions, and in the next part we will detail and analyse the results obtained from the research conducted among students of the psycho-pedagogical module of the second year (Bachelor) of the Teacher Training Department, Bucharest University of Economic Studies.

2. Problem Statement

The VUCA world characterises a world of dilemmas, where organisations need to act quickly on changes coming from inside and outside to be effective. Each of the four components of the VUCA world describes specific challenges: volatility (unstable situations that change rapidly), uncertainty (lack of control over what will happen next), complexity (difficulty in understanding the interdependent, often chaotic relationships between the components of a system), ambiguity (approaching situations from multiple perspectives because the cause-effect relationship is not well defined) (Nowacka, Rzemieniak, 2022). It is not surprising, therefore, that thinking about the VUCA environment and understanding the situations people face today under conditions of volatility, uncertainty, complexity, and ambiguity is a great challenge for higher education, particularly for understanding and interpreting its own mission (Mielkov et al., 2021).

The coronavirus outbreak has also had an impact on the education sector, which has been badly affected but not brought to its knees due to the online education and internet revolution (Qadir, Al-Fuqaha, 2020). Many sociologists and political scientists have been of the opinion that at the end of this pandemic the world will not be the same, so higher education is no exception, and the ways and possibilities of online learning and the economic consequences for higher education institutions have been analysed (Dennis, 2020; Marinoni et al., 2020; Mielkov et al., 2021). Online courses, like physical courses, must provide relevant education even in an uncertain context, training students to learn from past experiences, analyse the present and navigate an uncertain future (Gous, 2019). Although universities face many uncertainties and chaotic situations, teachers must update and remodel the courses they are responsible for to make them as interesting and captivating as possible for students (Fernandes, Afonso, 2021).

Sensitive situations, specific to the VUCA environment, in addition to health issues such as the coronavirus pandemic, include many other challenges, which require special attention: social (water and food shortages, involuntary migration) ecological (extreme weather, climate change, loss of biodiversity), economic (unemployment, crisis), political (crises of state authority/legitimacy, inter-state conflicts) (Earth, 2020; Stein, 2021).

Therefore, Bauman (2011) suggested that the purpose of education is to "prepare for life", meaning to train learners to respond to global challenges and learn to perform in the VUCA world. In this sense, Wrigley and Straker (2017) consider that new learning approaches are needed to meet the need for adaptation required by the VUCA world in order to prepare future employees. In a VUCA society, labour market organisations expect employees to be capable, to respond to complexity, and to find quality solutions that act on continuous changes that may represent a threat to organisational activity (Hasgal, Ahituv, 2017; Canzittu, 2020). In this context, higher education institutions have a responsibility to teach learners valuable and equitable knowledge, instilling in them a lifelong desire to learn, including from the experiences of others, so that they can apply what they learn to their future careers and continuously improve the quality of their work (Puncreobutr, 2021).

3. Research Questions / Aims of the Research

During the coronavirus pandemic, students were faced with a series of constantly changing situations (the rapid transfer from physical to online learning) which led them to fundamentally change their learning to continue their studies. The teaching style also suffered significant changes, considering that for certain periods of time, in Romania, in the university environment, the teaching process was strictly online, and a series of support platforms were developed. Bucharest University of Economic Studies has its own moodle which it uses in communicating with students. Thus, the present research aims to reveal which are the main advantages/disadvantages of the online teaching style compared to the traditional one, as well as the students' understanding and adaptation to the new changes. In order to investigate how the students' presence in the courses influences their ability to adapt to the rapid changes coming from the external environment, a unifactorial anova was applied and the following hypotheses were studied:

H_0: Student attendance does not influence the perception of change.

H_1: Students' attendance significantly influences their perception of change, as they understand the importance of continuous training to manage change correctly.

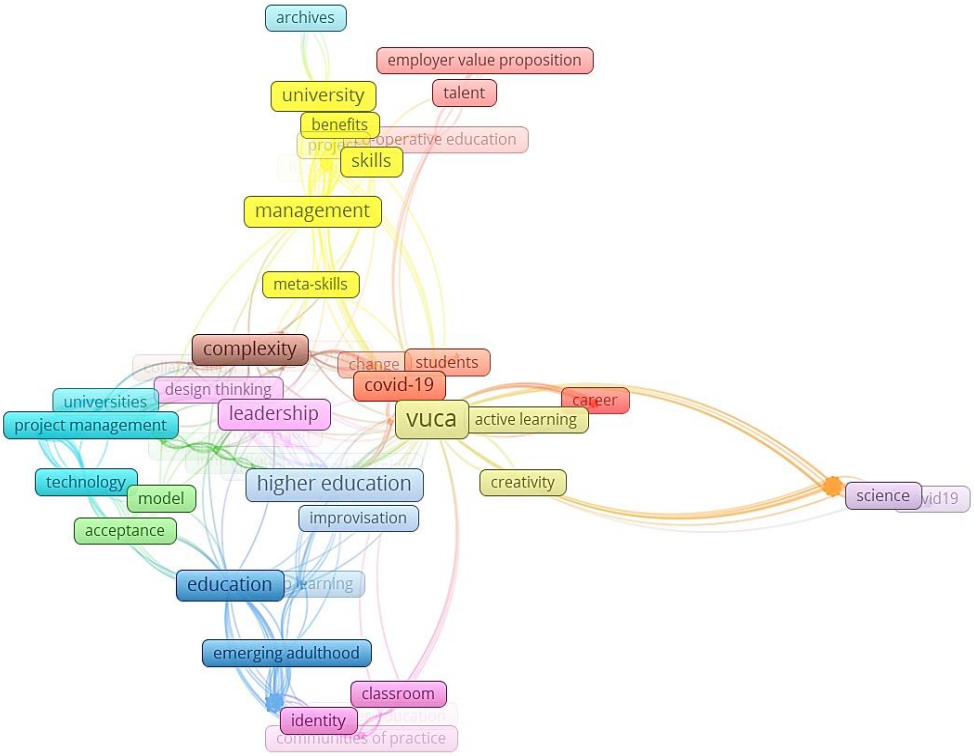
Depending on attendance, students were divided into three categories: low attendance (0-30 %), medium attendance (31-75 %), and high attendance (76-100 %). Students' degree of preparedness for managing changes specific to the VUCA world was scored on a Likert scale from 1 to 5 (1, meaning that students do not need additional instruction, and 5 representing that the students need additional preparation to a very great extent).

At the same time, the effects of using interactive methods during courses/ seminars (role-play, simulation, thinking hats method, etc.) and the promotion of a participatory teaching style in delivering information during the lessons were also studied.

4. Research Methods

In order to study how students are prepared for the VUCA world, respectively, their ability to adapt to constantly changing contexts, a research was carried out among students of the psycho-pedagogical module, second year, Bachelor, Bucharest University of Economic Studies. Thus, the first part consisted in studying articles from the Web of Science database that were written on topics such as: the influence of the VUCA world on the educational system, the link between the VUCA world and students' preparedness for the labour market, education during the coronavirus epidemic, the impact of the SARS-CoV-2 virus on the teaching/learning process. We chose the web of science database, as it contains the most current and relevant articles for the researched topics. After processing the resulting articles (97 articles) using the VOSviewer software, as can be seen, according to the intensity of the colours, in the figure below (Figure 1), the most used concepts with the terms "VUCA" AND "EDUCATION" are: skills, COVID-19, complexity, employer value proposition, project management, science, creativity, leadership.

Figure 1. Most used terms with "VUCA" and "EDUCATION"



Source: Authors' own contribution.

Thus, starting from the theoretical information, the second part consisted in carrying out a quantitative research, the statistical population being represented by all the second year students of the psycho-pedagogical module of the Bucharest University of Economic Studies, respectively, 433 students. To highlight their opinion as clearly as possible about the specific effects of the VUCA world and the teaching system (online and traditional), a questionnaire consisting of 15 closed questions was distributed. The questionnaire was distributed online and emailed to all students who attended the courses. Approximately 300 emails were sent, resulting in a total of 137 responses (a response rate of approximately 46 %). Therefore, the final sample was represented by 137 students, whose responses were analysed and interpreted.

The period during which the questionnaire was distributed was the second semester of the academic year 2022-2023, i.e., February-March. We opted for second-year Bachelor students, because they experienced a number of changes last year, quickly transitioning to the online teaching system, even though they were first year: they started their studies physically, on campus, then after a week the courses moved online and suddenly returned physically after the second semester had already started (3 weeks after the beginning of semester 2). They are also preparing

themselves to become future teachers, so they should especially be prepared to handle any exceptional situations that may arise. At the same time, the manner in which the courses/seminars are conducted during the online university will help them in their future teaching career, as they are already aware of the benefits of online teaching and the difficulties that may appear. Thus, this article is a starting point for future research regarding the impact of the VUCA world on the education system.

5. Findings

After interpreting the results obtained, most students considered that the main advantages of the online system compared to the classic, traditional system are: activities are easier to conduct, commuting time to university is eliminated, the activities are more accessible, students can use different materials or interactive platforms (adapted to the online system) to solve exercises (Table 1). Students had to choose from a predefined list of one or more advantages and could also add other benefits if they were not among those listed.

Table 1. Advantages of online teaching

Response variants	**Number of responses**	**Percent (%)**
activities are easy to carry out and no time is wasted travelling to university	118	86.13
activities are more accessible, students can access different interactive materials or personalised worksheets adapted for the online system	94	68.61
while I am learning I can also do other activities without losing my attention from what is being taught;	58	42.34
learning activities are more flexible this way;	57	41.61
the grades obtained in the online system were higher than those obtained in the traditional teaching system	53	38.69
the pleasure of using educational platforms (ase.online, zoom, google meet) while learning;	40	29.20
the number of hours allocated to study in the online system is less.	38	27.74
improved relationships between students because activities can be carried out even in teams	18	13.14

Source: Authors' own contribution.

Regarding the disadvantages of online teaching, the students questioned were able to choose from a predefined list, or indicate, the main difficulties / deficits of the online teaching system. As can be deduced from Table 2, among the main disadvantages revealed by the students are: lack of interaction between students, loss of attention and concentration, loss of signal.

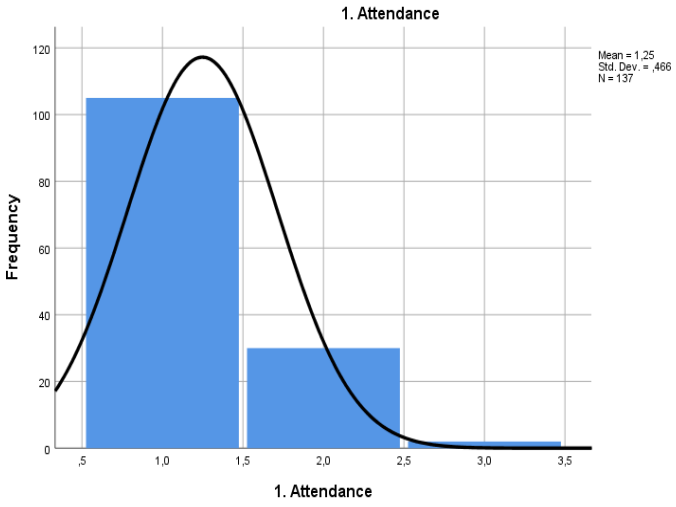
Table 2. Disadvantages of online teaching

Response variants	Number of responses	Percent (%)
the communication relationship between students is almost non-existent, students interact very little and usually only online	100	72.99
students lose patience, concentrantion and attention much faster when being taught online	91	66.42
activities are difficult to carry out because some students or teachers frequently lose internet signal or do not have access to devices	88	64.23
the communication process between teacher and students is inefficient, with students often not being connected and video	80	58.39
the grades obtained in the online system were lower than those obtained in the traditional teaching system	21	15.33
the number of hours allocated to study in the traditional system is higher	21	15.33
Other: examples and exercises are very slow	1	0.73

Source: Authors' own contribution.

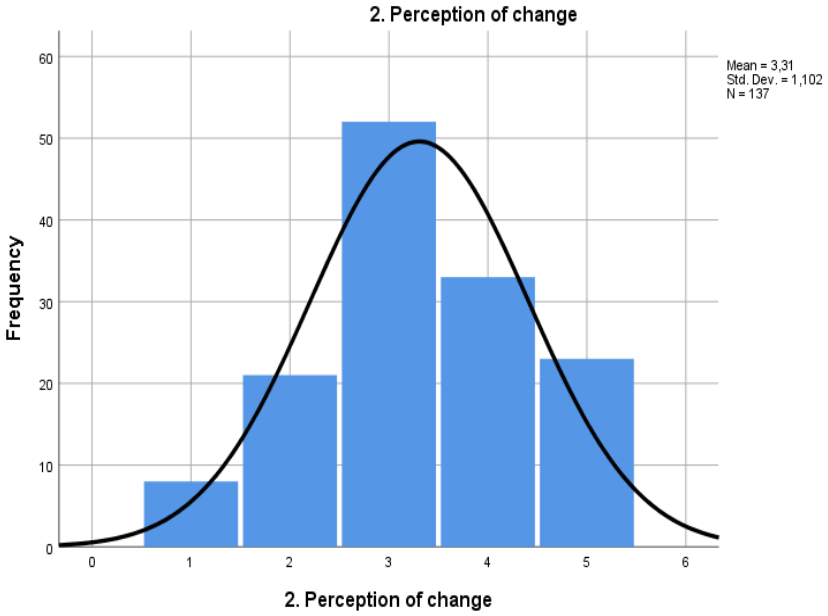
In order to study the influence of attendance on students' perceptions of life-long learning in order to correctly manage the changes they are facing, the following variables were established: independent variable (student attendance), dependent variable (perception of change). The data distribution as can be seen in the figures below (figure 2 and figure 3) is not normally distributed. Moreover, the Kolmogorov-Smirnov test also reveals this, with a significance level <0.05 (Table 3).

Figure 2. Data distribution: Attendance



Source: Authors' own contribution.

Figure 3. Data distribution: Perception of change



Source: Authors' own contribution.

Table 3. Data distribution: Kolmogorov-Smirnov Test

One-Sample Kolmogorov-Smirnov Test			
		1. Attendance	**2. Perception of change**
N		137	137
Normal Parameters [a,b]	Mean	1.25	3.31
	Std. Deviation	0.466	1.102
Most Extreme Differences	Absolute	0.469	0.201
	Positive	0.469	0.201
	Negative	-0.297	-0.179
Test Statistic		0.469	0.201
Asymp. Sig. (2-tailed)		.000[c]	.000[c]

Source: Authors' own contribution.

Regarding the homogeneity of the data, the Levene test revealed a significance level >0.05, which means that the dispersions within the three groups are homogeneous (Table 4).

Table 4. Data homogeneity

Levene Statistic				
		df1	**df2**	**Sig.**
Based on Mean	1.669	2	134	.192
Based on Median	1.216	2	134	.300
Based on Median and with adjusted df	1.216	2	130.703	.300
Based on trimmed mean	1.760	2	134	.176

Source: Authors' own contribution.

Taking into account the results obtained, the next step was the application of one-way ANOVA using SPSS software. The results showed that there was a significant influence between the two variables (Table 5).

Table 5. Influence of course attendance on perceptions of change

Anova: Single Factor				
SUMMARY				
Groups	**Count**	**Sum**	**Average**	**Variance**
high attendance	105	331	3.15	1.20
medium attendance	30	116	3.86	0.94
low attendance	2	6	3	0

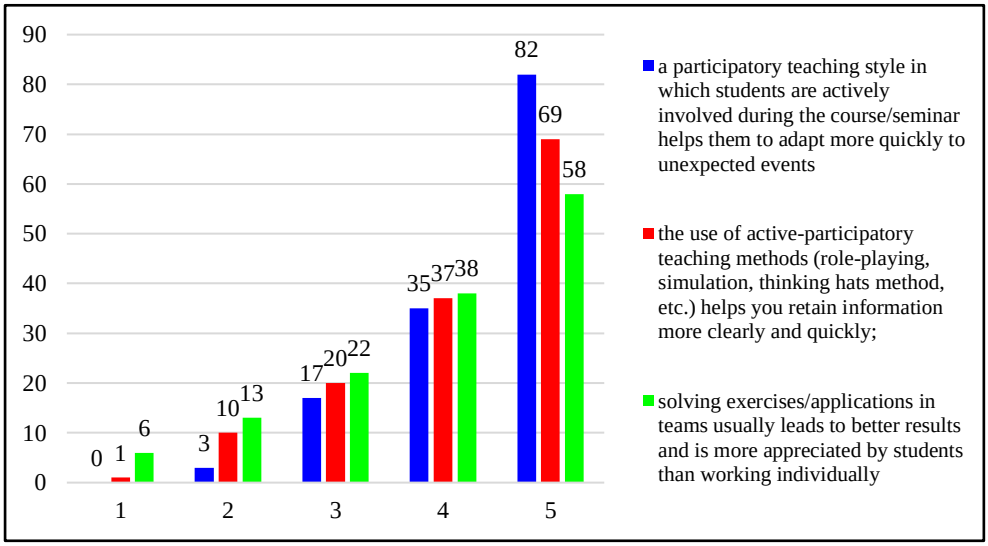
ANOVA						
Source of Variation	**SS**	**df**	**MS**	**F**	**P-value**	**F crit**
Between Groups	12.09	2	6.04	5.29	0.0061	3.0637
Within Groups	153.02	134	1.14			
Total	165.11	136				

Source: Authors' own contribution.

Based on the analysis of the results obtained, it can be concluded that $F > F_{crit}$ (5.29>3.06), thus the null hypothesis (H_0) will be rejected and the alternative hypothesis (H_1) will be accepted. This means that the presence of the students in the courses has a significant influence on the students' perception of the characteristic changes in the VUCA world; in other words, the more active the students are in the courses/seminars by participating in solving different case studies/critical situations in practice, the more they are aware of the importance of additional preparation to a large and very large extent in order to successfully manage all the changes that occur. In terms of changes occurring in the educational system, among the most common factors listed by the students who took part in the research were: changes in the timetable/programme/structure of the discipline (36.49 %), force majeure situations (pandemics, floods, etc.) (23.36 %), poor communication between students (21.17 %), and the existence of an insufficiently detailed management plan for handling critical situations at university level (18.98 %).

In order to adapt rapidly to different unexpected events specific to the VUCA world, which may occur during the studies, the interpretation of the students' responses showed that a participative teaching style, which involves the use of interactive methods and promotes teamwork, plays a significant role in helping the students to retain the information much better and faster. In order to identify possible solutions to respond effectively to the VUCA world, students had to choose between several possible options by expressing their agreement or disagreement on a scale from 1 to 5 (1 – total disagreement, 5 – total agreement) (Figure 4). The most significant responses received are represented by the following modes of action.

Figure 4. Possible responses in education to the VUCA world



Source: Authors' own contribution.

The VUCA world reflects a world of rapid change, often not having the time to prepare as you need to act as quickly as possible, so instructing students on how to correctly and adequately manage critical events is essential (through play, using applications/case studies they may encounter in real life).

6. Conclusions

Considering the increasing demand in the labour market for employees who can adapt quickly to changes in their work and who can manage all situations that could threaten the achievement of organisational goals, there is an increasing emphasis on preparing students for the VUCA world, right from university. Students' attendance at courses significantly influences their perception of change, as they understand the importance of continuous preparation to properly manage all the changes that may occur both in the university environment and in their future career (Table 5). As can be seen in Figure 4, students find that the transition to an interactive teaching system with different participatory teaching methods and games helps them in quickly

understanding theoretical concepts. A participatory teaching style, where all students are encouraged to respond and express their opinion on a given topic, helps them to become more confident and even manage possible unexpected situations that may appear in their work (rapid transition from the traditional teaching system to the online one). Regarding the online teaching system, it has its advantages, but one of the most notable disadvantages is the communication relationship between students, which in the online environment is almost non-existent, because, as the students said, in the online teaching system this is strictly limited to working hours, whereas at university during university breaks they still have time to interact and even ask for help if they do not understand some information (Table 2). Also, during online classes students lose their interest much faster. Promoting active, continuous learning by the university environment, as well as the ability to adapt to new situations, among students is particularly important because they will gain new skills and competences by becoming visionaries, reacting quickly to every problem for which at first sight there is no solution. Considering the changes in the education system which are becoming more and more frequent and more accentuated, this study is a valuable source of information for the effective management of the changes specific to the VUCA world. Also, after the coronavirus pandemic, there has been a lot of research regarding the best way to combine traditional and online teaching styles in order to improve the teaching-learning process, in order to improve the teaching-learning process, thus the advantages and disadvantages of the online teaching system, presented by students are starting points for future analysis.

The limitations of this article are related to the reduced number of responses collected, the short time period in which the research was conducted, and the statistical models used. At the same time, they also represent excellent future research directions, as the survey can be repeated on a much larger sample, bringing together students from several universities to more accurately reflect the impact of the VUCA world in the education sector.

Acknowledgment

The authors would like to express their gratitude to all the second year students of the psycho-pedagogical module from Bucharest University of Economic Studies who participated in this research. Many thanks!

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Service Learning – based Pedagogical Approach and Students' Perceptions

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Abstract

Universities in Europe have more opportunities to develop teaching and learning strategies in the framework of ERASMUS + projects. Several development directions in innovative pedagogy focus on societal challenges. Service learning has proven to be an efficient mechanism to increase the level of civic engagement of students and graduates, where they learn, act, and reflect on the lessons learnt from the service to community. Service learning is currently more applied than theoretical, diverse in the way of implementation, and the level of the decision-making process. Several guides describe what service learning is, but universities still do not have a unique and clear way of promoting it. Open labs in universities provide an adequate context for promoting service learning through projects. Therefore, promoting service learning through teaching has much room for improvement. The objectives of this paper are: to describe the service learning approach; to analyse the opportunities to develop service learning in universities; to analyse students' perceptions on the service learning pedagogy. The methodology includes: the literature review on service learning, descriptive research on service learning opportunities and research based on a questionnaire to identify students' openness towards such a pedagogical approach. The findings show that service learning is a pedagogical methodology which can be integrated into teaching and learning strategy, but needs more time to be tested, accepted, and understood by the community of professors and students.

Keywords: service learning; teaching and learning strategy; societal challenges; ERASMUS+; students' perceptions.

JEL Classification: A10, I20, I24, D71.

1. Introduction: Understanding the Service-Learning Approach

Service-learning is a way of engaging participants into community actions in a variety of ways, for the benefit of learners and communities. It is a specific approach

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very well managed in higher education institutions, where students can either develop projects / activities or work within a course / discipline with curricular or extracurricular tasks.

1.1 Service-Learning as an Innovative Pedagogy in Higher Education

Service-learning (SL) is a teaching and learning approach which connects three processes – learning, action, and reflection, in a way which generates opportunities for students to participate in a real service meeting a real need of a particular local community. Resch and Schrittesser (2021) state that in a service learning-based teaching, students better understand the course content and increase their civic engagement. Moreover, authors explain the importance of this pedagogy by strengthening its advantages, for example, students have the opportunity to enhance their personal development, they engage in real cases, and have the time to reflect on the process.

Service-learning pedagogy is an experiential learning, where students have opportunities for civic engagement and also community-based learning with impact on sustainability (Boland, 2014). Data generated from reflection show how the learning experience contributes to gaining insights in knowledge, students being engaged in real cases to solve local needs of specific communities (Carrington, 2011).

Service-learning can be defined as both an educational philosophy and a pedagogical technique for combining community service with academic objectives. Academic Service-Learning is a teaching methodology which utilises a community involvement component as a means for students to gain a deeper understanding of disciplinary course objectives and to gain a deeper understanding of civic life and participation through structured reflection.

According to Chenarani (2017), service-learning is not only a pedagogy but an educational philosophy which combines community service with academic objectives. In a service-learning process, students become active learners, having the opportunity to apply their what they learnt to actual community issues (Chenarani, 2017).

Service-learning can be defined in the narrow and broad sense. In a narrow sense, service learning refers to an experiential learning process based on a course or a project with rules clearly set at an institutional level. In this case, service learning is a methodology which makes students engaged directly providing a needs-and context-adapted service, including also reflective activities consisting in a diversity of forms, for example, group discussions and journals (Folgueiras et al., 2020; Moffat, Decker, 2000). In a broad sense, service learning is a set of activities built on learning-through-service, when students are invited to provide services organised in an extracurricular format (Sandekian, 2007).

Service-learning, as a pedagogy used in higher education, supports students in developing citizenship capabilities and local citizenship, reflection and reciprocity being very important in this approach (Mtawa, Nkhoma, 2019).

Service learning is clearly described in applied guides, most of them in digital format. A simple understanding of the service-learning concept is provided in Table 1.

Table 1. Service-learning categories

Service-learning mode	Description	Examples
Direct service-learning	Students connect with the community on an interpersonal level.	- tutoring, - activities for the elderly, such as reading, - working with youth.
Indirect service-learning	The community partner is the one who identifies a need and gets students engaged in addressing it.	- fundraising activities for an organisation, - creating posters or other visuals for a community organisation, - planting trees in a community space.
Research-based service-learning	Collaborative research where community agents, such as nongovernmental agencies, manage a research dedicated to fulfil the community needs.	- auditing energy, consumption, - data collection in a community project.
Advocacy-based service-learning	Students contribute to generate awareness and educate different groups about public topics of interest to the community.	- organising public forums on local community issues, - communicating information on relevant aspects to the community, - addressing social issues.

Source: author's contribution
(adapted from the: https://www.suffolk.edu/student-life/student-involvement/community-public-service/service-learning/what-is-service-learning).

The examples provided represent concrete solutions to different local needs and get the form of a service to that community, in a collaborative manner.

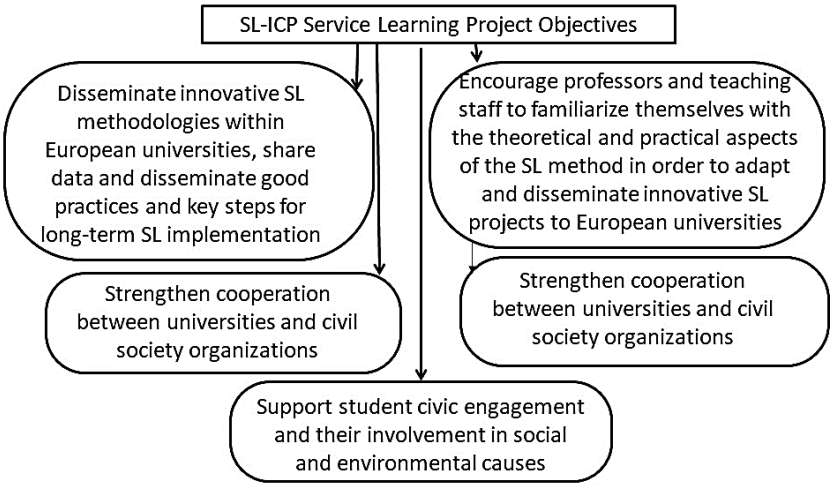
1.2 Service-Learning as a Collaborative Practice of Stakeholders

Service learning involves different stakeholders in joint actions for the benefit of the community. It generates a real-world learning for students, and several benefits for community groups, agencies, and organisations (Rutti et al., 2016).

In the project entitled "Service Learning: Intersectoral Collaboration Practices for the development of the students' soft skills and socially engaged universities", project type: ERASMUS + Call 2022 Round 1, number: KA22022-1-FR01-KA220-HED-00008974, (SL-ICP Project), innovative learning and teaching practices are developed to support students to gain soft skills and field experience from

community engagement (Project website, 2023). This project has several objectives related to service-learning awareness, as observed in Figure 1.

Figure 1. Main objectives of the SL-ICP Project



Source: Author's contribution
(adapted from the Project website, 2023: https://eurasianet.eu/service-learning/).

The abovementioned project is coordinated by Eurasia Net, a nongovernmental organisation promoting European and international cooperation in several areas, such as educational, intercultural, or environmental domain, through youth exchanges and involves 6 European universities (Eurasia Net website: https://eurasianet.eu/qui-sommes-nous/). The collaboration is done for the implementation of the work packages referring to mapping and analysis of existing service-learning initiatives, training of professors on service-learning methods, organising local events in all territories involving local stakeholders, creating an implementation guide for such projects and promotion of service-learning actions.

Under this Erasmus project, several workshops in local territories were organised in 2023 to share the best practices of civic engagement and to explain the concept of service-learning and its benefits. Three workshops organised at the University of Bucharest put together 33 professors, students, and civil society representatives to support students in their learning process with innovative methods and field experiences. In one of the debates, the participants revealed their perceptions on what makes a civic project successful, as shown in Figure 2, while the main weaknesses of a service-learning project include the lack of some students' engagement, the lack of motivation, some giving up of volunteers, not enough promotion of the project, the need for proper logistics (just a good idea is not enough), clear and effective recognition of the student work (curricular recognition).

Figure 2. Features of a Successful SL Project

Source: Author's contribution (SL-ICP Project workshop of March 2023).

Moreover, studies have shown that service-learning actions are directly linked with employer promotion of corporate social responsibility, while service-learning responsibility and desire to learn of students are connected to a perceived value for project coordinator (Lester et al., 2005). It is a common understanding of the fact that the service-learning approach is a collaborative practice where different stakeholders work together, sharing the same objectives; service-learning initiatives connect students, academics, and the local community in a way which can be referred to as a teaching and learning through engaging, becoming problem solvers and effective partners. In addition, the service-learning approach could be considered a real contributor to social and civic engagement and of university reform (Aramburuzabala et al., 2019).

2. Problem Statement

Several guides on how to develop service-learning courses or projects in universities must be considered from the literature review, some of them being more visual than others, more general, or more local orientated. Some put an emphasis on the benefits for the university, students, and community partners, such as the Service Learning: A Guide prepared by Sheila Cordner and the Center for Teaching and Learning at Boston University (Website of the Guide: https://www.bu.edu/ctl/guides/service-learning/), while others put an emphasis on the course development, such as in the Service-Learning Course Design Guide at the University of Tennessee (Website of the Guide: Service-Learning Course Design Guide: https://teaching.utk.edu/wp-content/uploads/sites/78/2018/04/442930-Service LearningGuide-v2.0accessible.pdf).

A synthesis of relevant university guides is provided in Table 2.

Table 2. Service-learning guides

Title of the guide	Institution	Relevant approach
Service Learning: A Guide	Boston University, Centre for Teaching and Learning	Service-learning is incorporated in a course.
Service Learning Teacher Training Manual	University of Nebraska	Phases described from concept to project evaluation
Service Learning Handbook	Regis University	Several methods for critical reflection
Practical guide on e-Service-Learning in response to COVID-19	European Association of Service-Learning in Higher Education	Good practices are revealed

Source: Author's contribution (adaptation from the Guides webpages)

Many universities develop and implement engaging activities for students, but not all of them are incorporated into the curriculum, and not all of them are service-learning actions. In many cases, service-learning actions coordinated in universities to get students engaged do not match the students' perceptions, but there is a student recognition of the service-learning contribution to the retention of the course material and achievement of the learning materials, as well as for service-learning is valuable for personal and professional development (Currie-Mueller, Littlefield, 2018; Mann, Schroeder, 2019. Research suggests that students' perceptions are very important in understanding how they can benefit more from the service-learning actions, through a good observation of the students' feelings and perceptions (Colvin, 2020).

Therefore, the current state of the service-learning initiatives is differently institutionalised in universities. Statistics show that 95 % of students consider that their attitude toward service has become more positive and that 90 % of students declare that they made a meaningful contribution to the community, according to the Service Learning Institute at California State University (Service Learning Quick Facts, https://csumb.edu/service/service-learning-quick-facts/). The paper addresses the gap between the level of awareness towards the service-learning and the effective service to the community provided by the students. The question is how are the students' knowledge/awareness on community engagement and the students' willingness, with the effectiveness of the service-learning related?

3. Research Questions / Aims of the Research

The objectives of this paper consider the description of the service-learning approach, the analysis of the opportunities to develop service-learning in universities, and the analysis of the students' perceptions about the service-learning pedagogy. The methodology includes: the literature review on service learning, descriptive research on service-learning opportunities, and research based on a questionnaire to identify the students' openness towards such a pedagogical approach. Two hypothesis and their alternate hypothesis have been considered:

H1 0. The students' awareness on civic engagement has no effect on their effective civic engagement in service-learning projects.
H1 a. The students' awareness on civic engagement has a positive effect on their effective civic engagement in service-learning projects.
H2 0. The students' willingness for civic engagement has no effect on their effective civic engagement in service-learning projects.
H2 a. The students' willingness for civic engagement has a positive effect on their effective civic engagement in service-learning projects.

4. Research Methods

The methodology includes: the literature review on service learning, descriptive research on service-learning opportunities, and a research based on a questionnaire to identify the students' openness towards such a pedagogical approach. The questionnaire was piloted and improved in the first semester of the 2022-2023 academic year. It revealed that using the concept of service-learning directly in the survey, might be confusing for students. They addressed additional questions, for example: If I worked for a company would that be SL?; If I bring an evidence of volunteering activity, does it count?; If I get involved in environmental issues (cleaning an area) does it mean SL?; How many hours should I be active in the community?; What does a community mean? Therefore, the questionnaire was then improved with a clarified paragraph on SL, and before the students filled it in, they were already having a face-to-face explanatory meeting.

The survey was conducted during January-May 2023 (in a Google form document) at the Faculty of Business and Administration, within the University of Bucharest, and the entire population of students was considered. 178 valid responses were collected, the response rate being 73 %. The students' awareness on civic engagement, their willingness on civic engagement has a positive effect on their effective civic engagement in service-learning projects. The questionnaire included open and closed questions for which the Likert scale with 5 levels was considered (1 being the minimum level and 5 the maximum level of awareness, engagement, etc).

5. Findings

The measured variables of the Likert scale, generate the same statistical coefficients, as observed in Table 3.

Engagement message from students to motivate other students: Now is the time!; Help others and you will be helped, too!; Do better and become better!; Be yourself what others were not!; Help, so we can save the planet!; Engage yourself, so you get to know yourself better!

Table 3. Statistical coefficients

Result details and calculations	**The correlation between students' awareness on civic engagement and their effective civic engagement in service-learning projects**	**The correlation between students' willingness for civic engagement and their effective civic engagement in service-learning projects**
No. of entries	178	178
R calculation	- 0. 1346	- 0. 1623
p-value	Although technically a negative correlation, the relationship between your variables is only weak (nb. the nearer the value is to zero, the weaker the relationship). The P-Value is .074547. The result is not significant at p < .05.	Although technically a negative correlation, the relationship between the variables is only weak (nb. the nearer the value is to zero, the weaker the relationship).

Source: Authors's contribution (statistical p- value calculations).

Therefore, between students' awareness and their engagement in the community, there is a weak negative correlation. Same, in the case of the correlation between students' willingness for civic engagement and their effective civic engagement in service-learning projects.

The students' perceptions prove that: Level of student engagement in civic engagement (49 % – no); Reasons for not being more engaged (64 % – lack of time) the correlation between students' willingness for civic engagement and their effective civic engagement in service-learning projects.

6. Conclusions

SL is an innovative teaching and learning strategy which allows students to actively learn and not to engage in actions during their presence on campus. Universities are open to community engagement and provide training for professors to support youth engagement. Students' perceptions reveal an interest in doing service- learning, for all stakeholders practice. The more aware they become, the less effectively they get engaged. Moreover, the higher the willingness for civic engagement and their effective civic engagement in service-learning projects.

Universities need to learn from each other, and so do the stakeholders, too. A strategy for the SL development and implementation within universities under the framework of either some credits allocated from the total number of a specific subject, or a SL projects demonstrates the role of universities in the community developments through the human resources.

Acknowledgment

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Policy Gaps and Financial Barriers Impeding Deep Energy Renovations in Cyprus and Greece

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Abstract

Deep energy renovations (DER) are key for the European Union to turn climate goals into concrete actions and cut carbon emissions by 55% by 2030 as well as to help Europe's economic recovery following the pandemic outbreak. Buildings became society's focal point, structures under severe strain that had to adapt to changes as millions of people use their homes not only as resting places, but also as their working spaces. However, to significantly reduce carbon emissions by 2030 and achieve a carbon neutral building stock by 2050 a better understanding of the impediments to the application of energy-efficient solutions in buildings is required, which in turn will boost deep energy renovations. Within the framework of UPGREAT project, a targeted survey for building experts has been conducted, aiming to identify policy gaps and financial barriers for energy efficiency implementation methods to further boost building renovations in Cyprus and Greece. According to the findings, more than half of the respondents stated that very few ambitious policy packages have been defined but there's not enough development whereas the main policy gap is the poor national legislative framework for renovation of existing buildings. A mix of high capital costs, poor financial incentives, and lack of funds hinder DER while based on the results, improved financing solutions coupled with consultancy and training are deemed from the majority as necessary tools to step up the pace of building renovations in these two countries indicating the role universities may play in this complex environment.

Keywords: buildings, renovations, policy gaps, financial barriers, survey.

JEL Classification: I25, J24, K32, L74, O18.

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1. Introduction

Society is currently grappling with two critical issues: challenges related to climate change and the socioeconomic crisis caused by recent events, the outbreak of COVID-19, and the conflict-triggered hydrocarbon crisis. Rising costs, financial instability, and the increased demand for energy, all highlight the benefits of energy efficiency in buildings as a practical approach to reducing greenhouse gas emissions, promoting sustainability through the decrease of natural resources' consumption, and ultimately lowering individual utility bills (Santamouris, Vasilakopoulou, 2021). As housing, offices, retail establishments, and other buildings make up about 40 % of final energy consumption and 36 % of greenhouse gas emissions (Commission Recommendation (EU), 2019), the European Union during the last decades has adopted a number of directives focusing on the energy efficiency of public and private buildings in order to develop a sustainable, energy secure, and carbon-free built environment. Since 2002, in order to encourage building renovations that will pave the way for the green transition, European policies have focused on encouraging energy retrofits in buildings.

One of the most cost-effective methods to remove obstacles to energy efficiency is to implement relevant policies. Because of this, energy efficiency policies have been crucial components of energy sector reform for many nations since the late 1970s. Still, in many studies, the need for robust policies that make capital resources available and remove upfront investment costs is highlighted (Yeatts et al., 2017). Nevertheless, barriers to energy efficient renovation exist at various points along the value chain, from the decision to start renovating to financing and finishing the project. For instance, benefits from energy savings may not be clear or may not be well explained and understood, especially by end users, when considering a renovation as these might be challenging to be quantified and monetised (Shnapp et al., 2020). Renovations can also be expensive, challenging to plan, and time-consuming to complete. It can be challenging to raise money, particularly at the local and regional levels. Due to regulatory hurdles and a lack of capacity in public administrations, public funds are frequently scarce and challenging to blend.

Since the primary research focus frequently lies on the cost-effectiveness and payback period of renovation investments, the lack of adequate access to financing is frequently ignored (Tuominen, 2012). Multiple studies have revealed that the most significant barriers to energy renovations, particularly for homeowners of young age, are primarily economic constraints and the household's budget limitations (Yeatts et al., 2017; Jakob, 2007; Stieß, Dunkelberg, 2013). Albrecht and Hamels in their 2021 notable study, showed through a 'stochastic sampling' approach of 100.000 households in the Flemish region, Belgium, that about half of the home-owning households are not able to financially support the required energy retrofits towards the 2050 standard whereas for the other half the real short-term challenge may be resolved through successful policy measures that motivate homeowners with sufficient resources (Albrecht, Hamels, 2021).

With the weighted annual energy renovation rate being rather small, around 1 %, and with only 0.2 % of the building stock in the EU undergoing extensive

renovations every year that reduce energy consumption by at least 60 % (Commission Recommendation (EU), 2019), urgent action is required to be taken not only in the form of sophisticated policy making, but also in the form of extensive research toward unveiling hidden policy gaps and financial barriers in order of a carbon neutral society to be realised in the next decades.

In this context, this article is based on the joint European research project: "UPGREAT – Upskilling Professionals for deep energy efficiency Renovations: A Tool for better schools" part of the European Climate Initiative (EUKI) of the German Federal Ministry for Economic Affairs and Climate Action (BMWK), in which the National and Kapodistrian University of Athens, Hellenic Passive House Institute, Cyprus Energy Agency and Da-Di-Werk municipal enterprise in Darmstadt – Dieburg, Germany, are involved. The overall capacity development in UPGREAT includes the upgrade of knowledge and experience on energy efficiency measures in building renovations with a focus on schools, as well as the strengthening of national and international interaction between stakeholders in the building sector.

2. Problem Statement

In order to address the climate crisis and accelerate Europe's economic recovery following the pandemic outbreak, deep energy renovations (DER) in buildings are now necessary to meet the low carbon emission efficiency standards set by the European Union. The building sector is anticipated to undergo significant change in order to meet ambitious energy efficiency targets by 2050, with annual energy renovation rates expected to double over the next 10 years according to the European Commission's communicated policy "A Renovation Wave for Europe - Greening our Buildings, Creating Jobs, and Improving Lives" in 2020 (Communication, 2020). More recently, a legislative proposal to revise and recast the Energy Performance of Buildings Directive – EPBD, was adopted by European Commission officials on December 15, 2021, as part of an overall revamp in EU climate and energy legislation, which is known as the "Fit for 55" package. The implementation of DER is, however, greatly hampered by both policy and financial issues in national level and it has become clear over time that the majority of EU Member States encountered numerous challenges in transposing the EPBD, the main EU's legislative instrument for improving the energy efficiency of the European building stock, into national laws since 2010, and some are still having difficulties (Zangheri, 2021). In this study, the main policy gaps and financial barriers that hold back the delivery of successful deep energy renovations in Cyprus and Greece are investigated in an attempt to map the hindrances that may hamper the renovation wave in these countries.

3. Research Questions / Aims of the Research

The aim of this study is to identify financial and policy gaps that may put challenges on implementing deep energy renovations in buildings in Cyprus and Greece. The research questions, targeted at building professionals, include inquiries about their perception of national energy efficiency policies, the most important gaps

that exist in Cyprus and Greece regarding the implementation of national energy efficiency (EE) policies, the most prominent barriers for financing deep energy renovation of buildings as well as the drivers that may boost deep energy renovations in these countries.

4. Research Methods

For the identification of the aforementioned gaps and barriers, an online survey was conducted from April 2022 until September 2022, addressed to white and blue collar professionals of the building sector from Cyprus and Greece. This purposeful sampling technique was used to identify information-rich cases for the most effective use of limited resources.

The survey was distributed from the beginning of April until the end of September 2022. The questionnaires were disseminated through i) by-weekly social media posts, ii) dissemination in international and national conferences, iii) blog articles in project's website, iv) social media posts in project's social media and v) email's to the consortium's partners mailing lists. Online versions of the questionnaire surveys were created on LimeSurvey (2023). The responses were processed using Microsoft Excel (2018) and IBM SPSS (2015) software.

The questionnaire included multiple-choice questions in which participants of the survey had some possible options to choose from. A two-proportion z-test was used for testing the proportions between the responses of participants from the two countries, whereas a significance level to either reject or accept the alternative hypothesis is set at 0.05.

Out of a total of 830 who opened the survey, 501 answered at least one deep energy renovation-specific question and were considered valid. Of the 501 participants, 107 were from Cyprus and 394 were from Greece.

5. Findings

In this chapter, the main findings of this study are presented. Respondents' perception of their national energy efficiency policies in deep energy renovations (DER) is illustrated in Figure 1, the most important energy efficiency policy gaps in Greece and Cyprus according to the participants are listed in Figure 2, the most prominent barriers for financing deep energy renovations are shown in Figure 3, whereas the determining factors that may support and further push up DER are presented in Figure 4.

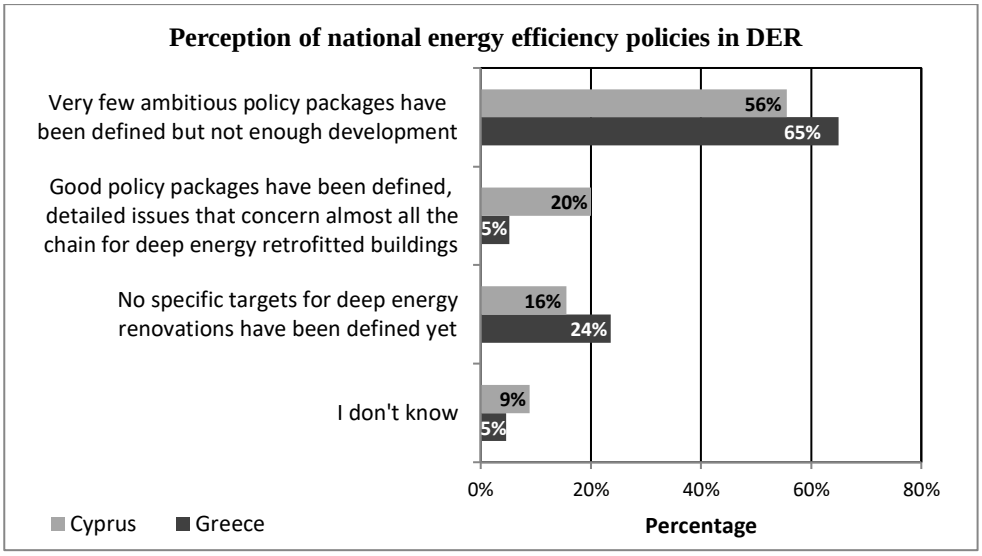
5.1 Perception of Energy Efficiency Policies and Respective Gaps

Survey participants were asked how they consider the energy efficiency policies in their countries regarding the encouragement of deep energy renovations in existing buildings. The results are presented in Figure 1.

The majority of respondents in Cyprus and Greece stated that "Very few ambitious policy packages have been defined but not enough development" with 56 % and 65 % respectively. Interestingly, statistically significant different shares

of respondents stated "Good policy packages have been defined, detailed issues that concern almost all the chain for deep energy" with a difference of 15 % (20 % Cyprus, 5 % Greece, $z = 3.228$, $p < 0.01$). Sixteen percent (16 %) of the participants in Cyprus and 24 % in Greece reported that "No specific targets for deep energy renovations have been defined yet". Finally, 9 % from those surveyed in Cyprus and 5 % in Greece didn't know if energy efficiency policy packages were defined in their country.

Figure 1. Perception of national energy efficiency policies in deep energy renovations



Source: Authors' own contribution.

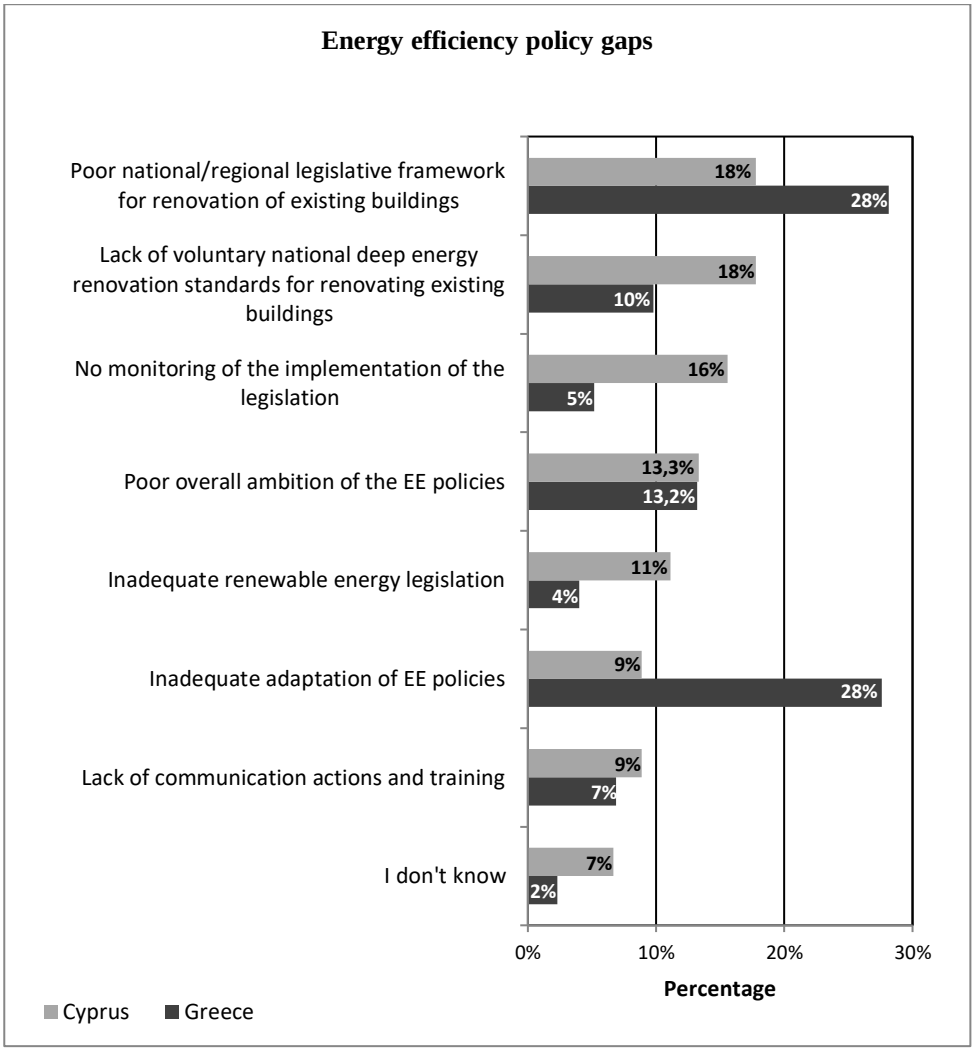
Consequently, survey participants were asked to select the most important gap in their country's policy on the implementation of energy efficiency (EE) policies. The results are illustrated in Figure 2.

According to the findings, the three most important policy gaps for the applicability of energy efficiency policies in Cyprus were "Poor national/regional legislative framework for renovation of existing buildings" (18 %), "Lack of voluntary national deep energy renovation standards for renovating existing buildings" (18 %) and "No monitoring of the implementation of the legislation" (16 %). Slightly higher than 13 % considered "Poor overall ambition of the EE policies" as a gap in Cyprus. Interestingly, 9 % of the participants in Cyprus stated that the "Lack of communication actions and training" was another policy gap and this share might be coupled with that 9 % who did not know if energy efficiency policy packages were defined in their country in the previous question.

In Greece, an equal share of 28 % reported that the top two energy efficiency policy gaps were "Poor national/regional legislative framework for renovation of existing buildings" and "Inadequate adaptation of EE policies". About 13 % considered that the "Poor overall ambition of the EE policies" was another gap in

energy efficiency policies, whereas 10 % said that the "Lack of voluntary national deep energy renovation standards for renovating existing buildings", was an important gap for the implementation of energy efficiency policies in Greece.

Figure 2. Most important policy gaps for the applicability of energy efficiency policies



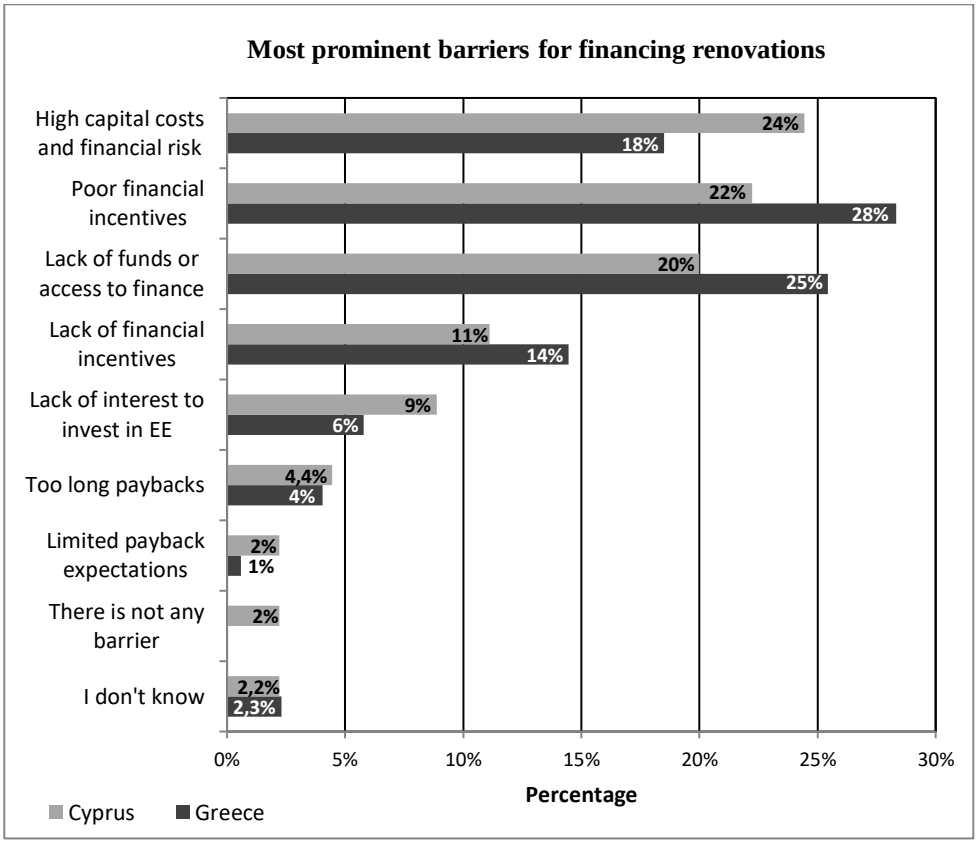
Source: Authors' own contribution.

Statistically significant differences in the responses of the participants between Cyprus and Greece were observed with regard to "Inadequate adaptation of EE policies" with a difference of 19 % (9 % Cyprus, 28 % Greece, $z = -2.627$, $p = 0.004$) and "No monitoring of the implementation of the legislation" with a difference of 11 % (16 % Cyprus, 5 % Greece, $z = 2.386$, $p = 0.009$).

5.2 Financial Barriers

Those surveyed were asked about the most prominent barrier to financing the deep energy renovation of buildings in their countries. The results are presented in Figure 3.

Figure 3. Prominent barriers for financing building energy renovations



Source: Authors' own contribution.

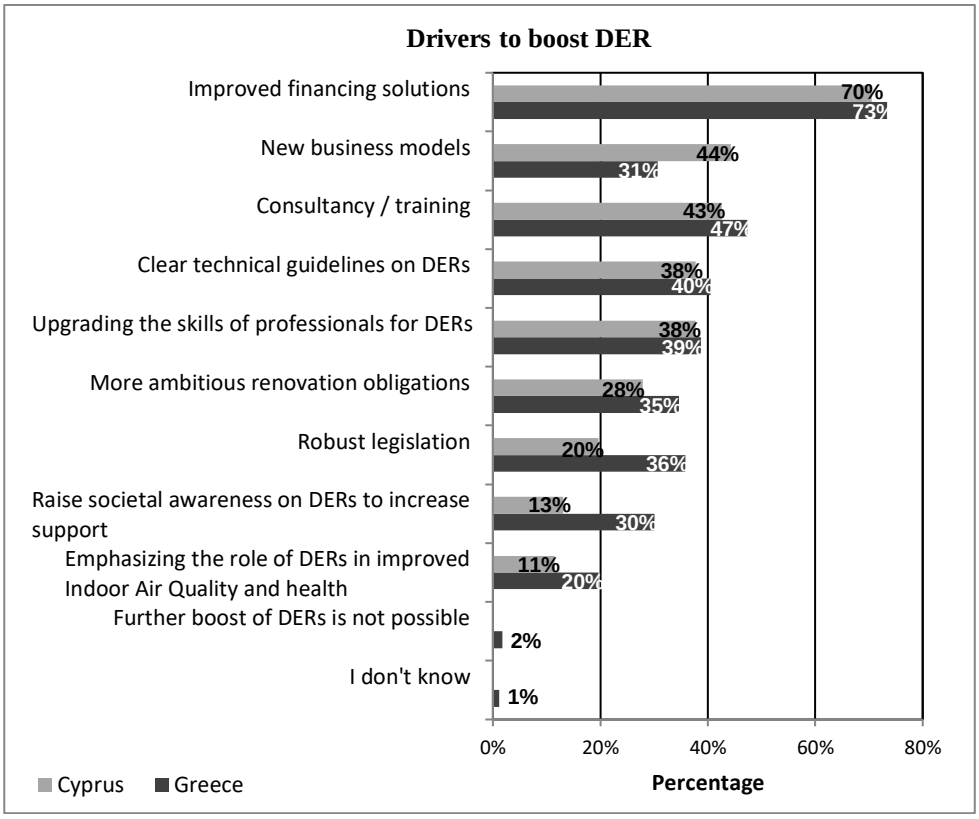
In Cyprus, "High capital costs and financial risk", was considered as the most prominent barrier selected by 24 %. "Poor financial incentives" followed with 22 % while "Lack of funds or access to finance" was chosen by 20 % making it the third most important barrier for financing deep energy renovations in Cyprus.

In Greece, the given answers were similar to those in Cyprus. Participants reported "Poor financial incentives" with 28 % as the top financial barrier for energy renovations followed by "Lack of funds or access to finance" with 25 % and "High capital costs and financial risk" with 18 %. Lack of financial incentives is considered as a barrier for a 14 % in Greece and 11 % in Cyprus showcasing the importance of incentives for deep energy renovations.

5.3 Drivers to Boost DER

Finally, those who participated in the survey were asked about the drivers that could boost the deep energy renovation market in renovation projects in their country. The results are presented in Figure 4.

Figure 4. Drivers that may boost the deep energy renovation projects. A comparison between Cyprus and Greece



Source: Authors' own contribution.

The majority, 70 %, of those surveyed in Cyprus selected "Improved financing solutions" followed by "New business models" with 44 %. The third most popular driver that could boost the market, according to respondents in Cyprus, was "Consultancy / training" receiving 43 %. "Clear technical guidelines on DERs" and "Upgrading the skills of professionals for DERs" received 38 % each. In addition, 28 % of participants in Cyprus stated that "More ambitious renovation obligations" could empower the deep energy renovation market, as well as "Robust legislation" which gathered 20 %.

The most frequent answer given in Greece, as in Cyprus, was "Improved financing solutions" with 73 %. "Consultancy/ training" followed with 47 % whereas the third and fourth most popular responses received similar shares. "Clear

technical guidelines on DERs" and "Upgrading the skills of professionals for DERs" were selected by 40 % and 39 % respectively. "Robust legislation" was chosen by 36 % closely followed by "More ambitious renovation obligations" that was selected by 35 %.

6. Conclusions

This research leads to a better understanding of the policy and financial impediments to the application of energy-efficient solutions in buildings. However, due to the sample size, generalisations should be frugal and the findings should be considered as indicative of the entire building professionals' universe in Cyprus and Greece. According to the results, progress toward more energy-efficient buildings is hampered not only by building professionals' inadequate knowledge depicted in higher than 43 % share of respondents perceiving consultancy and training as a driver that may boost deep energy renovations, as well as a lack of innovative financial services. A mix of high capital costs and financial risks associated with deep energy renovations, poor financial incentives, and lack of funds hinder the renovation wave in both countries, and it is of no surprise that more than 70 % of those surveyed in each country stated that improved financing solutions may enhance the rate of deep energy renovations. Inadequate legislation and bureaucratic procedures compound these issues, creating roadblocks that are only likely to be surmounted with considerable personal effort by building professionals. It requires a combination of training, financial incentives, organisation, as well as sophisticated policy making based on an in-depth comprehension of each player and how they interact, to effectively resolve this problem.

As a result, there is an urgent need to instruct building experts not just on the technical elements of a significant renovation, but also on the effects of energy costs on project profitability and how to convey this to end users. Universities may play an important role in this context by continuously improving the abilities of professionals through up-to-date lifelong educational programs and specialised technical workshops. As a result, the creation of innovative learning methods, the delivery of educational seminars and the revision of existing knowledge to follow recent technological advances, the development of guidelines for deep energy renovations based on experience gained through relevant pilot project, and the effective communication of information to all actors of the renovation market, with public authorities and the general public included, are all considered essential.

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Social Platformisation of the University: Criticalities and Opportunities on the Use of Social Networks by Italian Academies

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DOI: 10.2478/9788367405546-005

Abstract

As in the rest of the world, universities in Italy have expanded their communication channels by adding social platforms to their institutional web portals. Their first colonisation occurred about ten years ago when they entered Facebook, YouTube, Twitter, and Instagram. Today Italian universities are increasingly 2.0. Researchers have already examined academia's use of social media and their innovation of online services and interaction with their 'users.' This article explores this diffusion of in Italian Universities with these objectives: what are the consequences on reputation and socialisation among teachers, students, and people outside the academies? And, also, what are the challenges in education?

Keywords: University, Social Media, Social Platform, Social Network, Digital, Italy.

JEL Classification: A14, I23, L8, L86.

1. Introduction

We find ourselves immersed in a digital society (Lupton, 2015). New digital technologies have significantly impacted daily life, including social relationships, governance, commerce, and the economy. These technologies meticulously track people's movements, shopping habits, and online communications, making us increasingly subjected to digital data, regardless of our preferences or choices. Thus, the Internet and social networks have become integral components of the knowledge economy. The influence of these technologies extends to areas such as diverse patterns of digital usage, digital politics, citizen engagement, surveillance practices,

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privacy concerns, the shaping of individuality through digital devices, and numerous other subjects. Consequently, this transformation profoundly redefines the landscape of university research and education.

Advancement in technology has the potential to foster connectivity and minimise communication and socialisation barriers. While this is true, a significant part of our modern lifestyle tends to disconnect us from genuine human interactions and instead connect us to virtual representations of people. Platforms like Facebook, for example, make it easier to interact with the concept of "human contact" and simultaneously allow us to avoid real-life interactions. As a result, these new tools significantly transform the dynamics of our social life (Couldry, 2015; Turkle, 2011). The consequences of these changes are many and also concern the economic dimension. It is worth mentioning that numerous platforms, initially run by amateurs, have grown into large global enterprises in just five years. These companies now use extensive information and data mining, capitalising on user connectivity for revenue (Van Dijck, 2013).

However, everyone (maybe) knows Facebook, Twitter, Instagram, and YouTube; some even remember Myspace or Messenger. Nevertheless, defining them is difficult because these social network are constantly changing. However, a brief definition could be: "digital tools or applications that enable the creation, sharing, and exchange of information" (Oppici et al., 2014). In other words, social platforms are spaces where many users produce audio, visual, textual, or multimedia content. These lasts are shared in a public way (accessible to all users of the network or, in any case, to the general public) or privately (accessible only to "friends," "followers," or similar) or something in between (Manca, Ranieri, 2014). Thus, these platforms probably reduce the limits of communication inherent in the "real world," where a significant part is constituted by schools and universities (Jeopen, 2012).

Italian universities are increasingly 2.0. Numerous pieces of research detect this trend. For example, Lovari and Giglietto (2014) analysed the positioning of Italian academies on social media, focusing on Facebook and Twitter. Ten years ago, 80 % and 76 % of universities used them, respectively. Looking at the present day, it emerges that, in particular, in an era in which web users are 73.7 % of Italians and 95.9 % of young people under 30, smartphone users are 64, 8 % of Italians, and 89.4 % of young people between 14 and 29 years old (CENSIS, 2022), universities can no longer do without communicating with their students (and others) through social networks.

In this regard, the CENSIS Report Universities and Social Media 2022 analyses 74 Italian universities (58 publics and 16 private), revealing that many Italian universities are innovating their online services and paying more attention to interaction with their users using social networks. More than 50 % of the universities surveyed respond within a day to messages posted on Facebook or Twitter and use official mobile apps. Almost all public universities (96.5 %) are on at least one social media outlet with official pages, mainly on Facebook and Twitter, followed by Instagram and YouTube. Their topics include institutional events, teaching, research, career guidance, administrative issues, and scholarships (Moran, Seaman, 2012).

Several departments, in particular, manage the channels via the Communication Office, the Guidance Office, the Web Communication Office, the Social Network Communication Office, and the Public Relations Office (Lovari, Ducci, 2022). This last aspect reveals a significant investment in the human resources and capital employed.

Italian universities increasingly focus on mobile devices, incorporating responsive design techniques into their websites and adapting graphic content to various devices. Moreover, they are actively developing official university applications to enhance the mobile experience of their users. As far as state universities are concerned, about 67 % have created an official application made available to students (Oppici, 2013). These applications permit students to consider their syllabus and university transcript, book examinations, search for contacts via the university address book, search for classrooms, and many other functions). Additionally, some universities have created apps for students with disabilities to facilitate their orientation on campus. Others target prospective students to help them choose a university path (Manca, Ranieri, 2014).

2. Background Data

2.1 #SocialUniversity

The trend has been growing for more than a decade; in particular, it emerges that for several years, Facebook has been the most used social network for forming opinions and gathering information (Pearson, 2011).

The #socialUniversity research by the Nexa Center on Internet & Society of the Polytechnic of Turin fits this scenario that analysed the presence of 96 Italian universities on social networks, focusing on two at the moment leading platforms: Facebook (the first network by popularity, with 75% of Italians with Internet access registered, equal to 45 % of the population) and Twitter (8 % of Italians with Internet access, equal to 5.4 % of the population) (CENSIS, 2022). The data collection for this research revealed the first phase of the census of the social profiles of the universities, followed by a phase of analysis of the communication choices of the universities on social networks (Fini, Cigognini, 2009). The #socialUniversity research is the first mapping of the panorama of the 'university 2.0' in Italy and also intends to highlight both good practices and aspects that can still be improved, allowing each University to deal with similar realities (Aquilani, Lovari, 2012; Arata, 2012, 2013).

2.2 Focus on Instagram

Instagram is one of the most popular social networks in Italy, with Facebook, WhatsApp, and YouTube. There are 19 million users, of which just over half are women (51 %). Furthermore, the most represented age group on Instagram is between 19 and 24 (20.6 %). The design is intuitive and essential and immediately reflects fashion, holidays, and lifestyles. It attracts young people because there are

young people, not 'old people,' like on Facebook (Lovari, Ducci, 2022; Lovari, Giglietto, 2013).

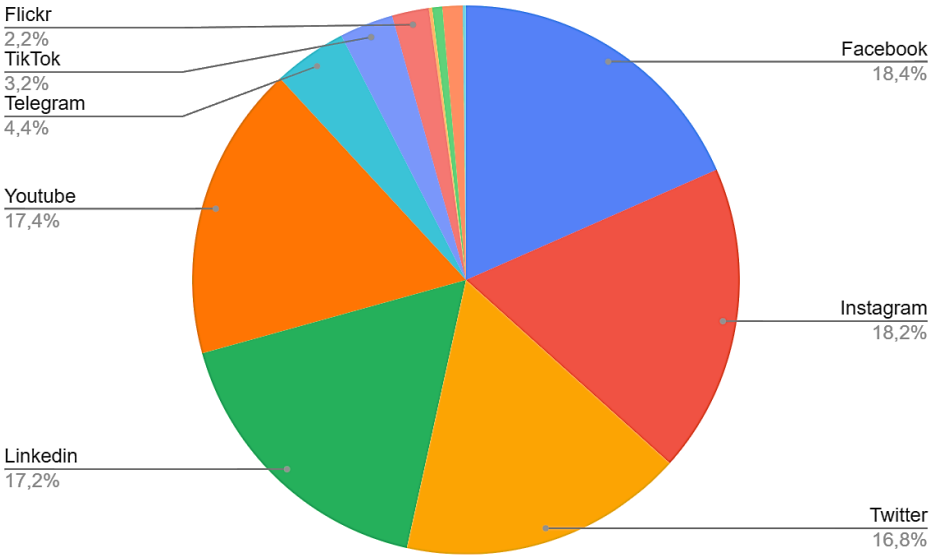
Universities use Instagram extensively because it fits various needs: spreading information about the University and courses, or even about related events and initiatives taking place inside or outside the academies; improving visibility and 'brand'; furthermore, for education goals, inspire students. It is also a channel of institutional relations and communication (Jeopen, 2012).

Three essential Italian academies, such as Alma Mater University of Bologna, Politecnico di Milano, and Roma Sapienza, use Instagram massively. Regarding the official profile of the oldest University in the world, we note that it is set up from an 'institutional' point of view (Wilson et al., 2012). In the foreground are stories, chronicles, images of ceremonies, and prominent personalities; IGTV is active; the images published on the home page are very suggestive (Ivala, Cachago, 2012). The Instagram profile of the Politecnico di Milano stands out for a mix of institutionality, lightness, and creativity. It is a relatively active profile with a lot of interaction, thanks to a dynamic use of featured stories, such as the one dedicated to the hashtag #askastudent (mini-interviews with international students). Interesting IGTV and the column #POLIMIrisponde in which teachers answer students' questions. Finally, the Instagram social profile of the Sapienza University of Rome has many posts, a sign that it intends to give an idea of the daily proximity to students (Oppici et al., 2014). The themes are varied, from service information to the celebration of graduates; a precise communicative style often uses texts accompanied by non-trivial images.

3. The Use of Social Networks by Italian Universities: First Results of a Mapping

In the summer of 2023, we conducted a first direct exploratory survey on the use of social media by 96 Italian public and private, traditional, and telematic universities. Precisely, we have navigated the institutional homepages and verified whether the Universities indicate their positioning on social platforms via direct links on the homepages themselves. This first survey shows that Facebook is the most used social network (18.4 %), followed by Instagram (18.2 %), YouTube (17.4 %), and LinkedIn (17.2 %). Interestingly, some universities are also starting to use and promote the Chinese TikTok (3.2 %) and Weibo (0.2 %). The next phase of this research will concern the collection of data referring to users belonging to each platform and the related traffic of information and digital content, as well as the distinction between the types of universities about the variables: Size (minor, medium, large University); Governance (public, private); Category (traditional, telematic); Geographical positioning (North Italy, Centre Italy, South Italy).

Figure 1. The use of social networks by Italian universities



Source: Our survey, 2023.

4. Discussion

4.1 Social Platforms and Consequences of Reputation and Socialisation of Universities

The empirical investigation shows that universities are often afraid to manage the critical voice of students on public platforms, as well as the need for specialised personnel for strategic communication management of these digital media (Oppici, 2013).

The process of colonisation of the social web differs from University to University. Each one has experienced the "domestication" of the social web differently from the others, with innovation paths characterised by complex and articulated assembly practices between digital technologies and communicative cultures of each University (Jordan, 2014). In some cases, we witness a proliferation of social presences of the University itself: institutional pages, profiles of offices and departments, and facilities managed by personnel outside the communication offices highlight the wild west climate of social media that characterises the early stages of the process institutionalisation of social networks in an institutional setting (Mergel, Bretschneider, 2013). Thus, we note how the official social presences are not visible in the official university portals, almost as if some universities were afraid to show a strategic investment in social media to communicate with students. Except for a few cases of excellence, we note how the use of social media by Italian universities

is still purely one-way, focused on image promotion, without trying to activate engagement and relationships (Jeopen, 2012).

For academies using social media, it is vital to identify the office managing the official social media presence and to ensure the consistent positioning of the institution from the earliest stages of the project development. For them, it is vital to choose the appropriate human resources and professional figures (for example, social media managers) to form a social media task force to oversee the platforms and feed institutional storytelling. Managing this activity internally rather than outsourcing it to external agencies is preferable (Kinal, Rykiel, 2013).

Outsourcing communication on social media could lead to difficulties / dystonias regarding image coherence and accuracy of the information, especially in cases of crisis where intense supervision of the institution is necessary. Therefore, to better manage the strategy, universities should adopt a social media plan and harmonise it within the University's communication strategies in dialogue with the communication and information offices (McAllister--Spooner, 2012).

Second, the strategic use of social media implies the choice of objectives and the editorial strategy for institutional safeguards. Among the possible objectives: Improve the University's reputation; Build and consolidate a relationship of loyalty with its users; Collect feedback from connected audiences; Develop a sense of pride and belonging in students; Listen to their needs to improve and optimise service management.

From the strategic planning side, defining a policy to optimise the University's presence on the social web is essential. For example, it is crucial to define the ways and times of response to users to guarantee these platforms' dialogue and engagement potential. It is also necessary to decide whether or not to open the official page to user posts and comments and to identify the actions in the event of critical or even offensive messages toward the University (Oppici et al., 2023).

Third, to avoid possible confusion with fake university profiles, the social media communication manager should carefully draft the description section, confirming that it is the official presence of the University also through the use of the university logo. However, more than these actions are needed to determine if a page is official: for this reason, it is crucial to insert a social media bar on the institutional portal so that students can easily recognise and connect to the official social networks by clicking these icons (Griffith, Liyanage, 2008). Furthermore, it is strategic to provide feedback to users to improve the dialogic relationship or the quality of services. For this reason, universities should first focus on channeling student voices by clearly explaining how digital voices have been used in university decision-making processes and by creating ways to visualise, distribute, and disseminate this feedback, including infographics (Moran et al., 2012).

These actions help build trust, demonstrate careful listening to user needs, and facilitate the development of dialogical relationships. At the same time, cyber-scanning could help collect feedback and comments on the University's reputation from other social network, not only for calibrating communication strategies but

also for monitoring the perception of the university-student relationship on the social network (Lovari, Ducci, 2022).

4.2 Social Media and Challenges in the Educational Field

We are always connected and always in communication, both teachers and students. And so are colleges and universities: in the United States, for example, one hundred percent of institutions offering four-year degree programs have been on social networks for several years (McAllister--Spooner, 2012). However, social media have integrated teaching, and their integration into curricula in any field needs to be improved. We are not techno enthusiasts; we comprehend that technologies have significant limits and many dark sides (Clayton, Macdonald, 2013). We also know that there are many barriers to access and that digital inequality and digital poverty (Attewell, 2011; DiMaggio, Hargittai, 2001; DiMaggio et al., 2001; Dutton, Reisdorf, 2020) afflict many students and teachers in many parts of the world.

However, technologies have greatly assisted learning during the COVID-19 pandemic (Di Maggio, 2022). This evidence confirms that social media platforms should be a more massive part of university-level educational provision and practice for teaching and learning at undergraduate and master's levels. What matters, however, is to underline that social media are not alternative systems to traditional ones. They, on the other hand, are tools that increase the learning experience and enhance what a de-visu relationship allows to obtain.

Social media can connect the physical classroom with a broader cultural community than the traditional one because they broaden the training experience outside the typical scenarios (Wilson et al., 2012) of the so-called "four walls." This new hybrid and augmented environment allows students to practice new experiences during and after class. Through social media, he can be immersed in relevant social situations and have authentic and organic exchanges that benefit his learning process. In this new relational space, teachers have a central role. The latter can encourage students to review their beliefs about the language of origin and their own culture and can stimulate students to question their beliefs, filter fake news, to produce authentic content, thus reducing the constant closures ideologies that often exist and contributing to why not, to increase the quality of the contents present on the social networks themselves. Active social presence would stimulate fruitful reflections and comparisons with the direct result of increased creativity and the critical spirit in a convivial and collaborative spirit (Esposito, 2011).

Social interaction is vital in facilitating students' learning, adaptability, knowledge development, and social engagement. Simultaneously, social media platforms allow students to connect, network, and communicate. Some research findings state that they foster social interaction, but can also inadvertently create physical distance among friends during certain situations, such as meetings or specific events (Yohanna, 2020).

In this sense, and in line with Bronfenbrenner's (2006) theory, we emphasise the importance of the 'educability' of social media environments from an ecological perspective. Indeed, it is possible to improve the social media environment through

specific educational activities and innovative tools that help students to analyse the effects of personalisation of web content, understand the algorithms that control social media mechanisms, and comprehend how toxic content spreads on the Web. Universities have an essential role to play in this regard and can support the training of students in the conscious use of social media through specific activities.

Students use social media primarily to interact with their peers and those they already know. Gradually, if properly stimulated, they can grow and transform this existing community into an ongoing learning community. In short, in a natural evolution (Hugget, 2010), it would be possible to structure social communities of digital natives in continuous learning.

5. Conclusions

For several years, universities have adjusted their communication course, with an evident "digital drift" characterised by a mix of institutional communication on official web portals and massive use of Facebook, Instagram, and YouTube (Aquilani, Lovari, 2008, 2009). This multi-channel approach confirms that a growing number of university institutions are integrating 2.0 tools and social networking sites in their communication strategies to disseminate information without the intermediation of the mass media, to develop a dialogical relationship with students throughout the life cycle academic, from prospective students to first-year students, from undergraduates to alums (Aquilani, Lovari, 2010; Lovari, Giglietto, 2012).

Using social media for training institutions is crucial to communicating their activities, conquest, and maintaining spaces in the training market and teaching (Capriotti et al., 2023). This second aspect is vital and, at the same time, very necessary because social media are learning contexts that are always in flux. Today, students require a (re)mix of educational models, including social media, and focused on collaborative, creative, and self-managed activities (Oppici et al., 2023). Digital learning mediated by platforms like Facebook and Instagram has become more engaging and effective. However, educators must know how to manage the dual channel (virtual and physical) without stressing too much about one or the other.

To effectively cater to students' needs, educators must grasp their perspectives on social media and the integration of social media skills development. It is common for students to need complete awareness of the implications of social media use, even if they engage with it regularly (Benson, Morgan, 2016). The potential of social media is infinite and equally dangerous to the quality of the content that is also self-produced. Therefore, it is up to teachers to clarify objectives and expectations for using social media in the University (Aquilani, Lovari, 2009) and to know how to identify risks and opportunities.

It is, therefore, indispensable to monitor and measure the impact of social media on university-student relations. In addition to adopting quantitative metrics-related tools (e.g., number of fans, retweets, video views, etc.), universities can use polls and surveys to evaluate specific issues (Lovari, 2013). For example, they can analyse the content of posted messages (even through advanced forms of sentiment analysis)

or experiment with digital ethnography techniques to analyse the communicative behaviour of students in the social spaces colonised by universities. Monitoring and impact assessment then become fundamental not only for the reputation of the University but also for recalibrating the objectives and strategies related to the pursuable educational objectives (Oppici et al., 2023).

In conclusion, to make the most of the dialogical potential of social platforms, universities need to adopt outward communicative and inward educational strategies that are always up-to-date and well-calibrated; otherwise, there is the risk of promoting mere rhetoric of technological innovation.

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Kahoot! A Bibliometric Analysis Using Web of Science Data

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Abstract

Gamification has become widely spread in classrooms at all educational levels during the COVID-19 pandemic. Through integrating game elements (such as points, chronometers) into teaching, educators have enhanced students' experience both during online as well as in physical classes. Integrating easy to use gamification platforms such as Kahoot! has become increasingly popular during higher education courses, as they made learning more fun, engaging, and interactive for the new generation of students, emphasising a global cultural phenomenon. There is an increasing body of research in this area. The current paper focuses on Kahoot!, one of the most popular gamification platforms. The main objective of the research is to perform a meta-analysis of the scientific papers related to this gamification platform. Data from Web of Science was retrieved and a database comprising of all Clarivate research papers on Kahoot topic was used. To reveal the main topics covered by the papers, the word cloud and graph-collocation techniques were used. The obtained results answer the research questions on how the number of research papers on Kahoot! evolve over the years in terms of bibliometric parameters such as number of authors, pages, and citations and what are the covered topics. The outputs indicate that the highest number of research papers concerning Kahoot was recorded in 2019 and the share of research papers with three or more authors in the total figures increased during the pandemic. The analysis indicates that these research papers are oriented towards the usage of Kahoot as a platform rather than on technicalities.

Keywords: Kahoot, gamification, learning.

JEL Classification: I2.

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1. Introduction

Switching from face-to-face classes to online teaching in the beginning of the COVID-19 pandemic led to a high level of uncertainty among students in terms of the quality of teaching (Buzatu et al., 2020). Students often pointed out several issues of the online teaching process: inadequate teaching materials, lack of quality control, lack of engaging student-centred learning activities (Zeshan, 2021).

The scientific literature points out several strategies for enhancing students' experience during online classes. For example, Mishra et al. (2020) states that providing students with a variety of activities is essential in order to minimise monotony. Mahmood (2021) concludes that interactivity is a key element for a successful online class. Flores et al. (2022) stresses the impact of teachers' choice of teaching instruments on the positive adaptation of students. Moreover, literature suggests that teaching strategies and materials should be further integrated in classes in the COVID-19 aftermath (see, for example, Turnbull et al., 2021).

2. Problem Statement

Gamification is an excellent tool for online teaching (Nieto-Escamez, Roldán-Tapia, 2021) ensuring interactivity and providing an engaging experience for students. There is a vast scientific literature covering this field.

However, bibliometric studies are rather scarce and generally focus on broad issues of the topic or are limited to certain subareas or time frames. For example, Encarnação et al. (2021) used the keywords "gamification" and "motivation" to retrieve papers, narrowing the search to the business sub-area. Kamarrudin et al. (2022) used the "active engagement" and "science education" queries to retrieve papers between 2016 and 2020.

Miranda and Tolentino (2023) performed a bibliometric analysis on how Information Communication Technology is applied in health education. Other papers focus only on gamification, game-based learning, serious games, or educational games (see Guerrero-Alcedo et al., 2022; Irwanto et al., 2023; Aragonez et al., 2020; Zeng, Shang, 2018; Reuter et al., 2020; Hebebci, Alan, 2022; Nadi-Ravandi, Batooli, 2022; Chugh, Turnbull, 2023).

Concerning the databases used to retrieve papers for the bibliometric analysis, a variety of approaches can be observed. Many studies use Scopus (Encarnação et al., 2021; Guerrero-Alcedo et al., 2022; Irwanto et al., 2023; Kamarrudin et al., 2022; Akbar and Rajulain, 2022). Some of the studies use Web of Science: the Social Sciences Citation Index sub-database (Zeng, Shang, 2018); the education educational research, education scientific disciplines, and education special categories (Hebebci and Alan, 2022); the entire database (Nadi-Ravandi, Batooli, 2022; Aragonez et al., 2020; Chugh, Turnbull, 2023). Few studies use Web of Science as well as Scopus (Reuter et al., 2020) or other databases such as "Dimention.ai" (Assidik, 2022).

The present study aims to provide value added to the existing literature in two ways. First, it focuses only on Kahoot! as a gamification tool, which to our knowledge, no such bibliometric analysis has been performed. Second, it provides a bibliometric analysis as well as a topic analysis on papers from all databases in Web of Science without a time frame or domain restriction.

3. Research Questions

The paper aims to answer the following research questions: Q1. How did the number of research papers on Kahoot! evolve over the years? Are there any patterns concerning the number of authors, the number of pages, or the number of citations? Q2. What topics do the papers on Kahoot! cover? Are there any interesting connections between these topics?

4. Research Methods

For the purpose of this paper, data from Web of Science was used. In order to extract the data, a research query on the keyword "kahoot" was conducted for all Web of Science databases. Data was extracted on March 13th 2023 and comprises of records on 481 documents.

In order to answer the first research question, a graphical analysis was conducted.

Furthermore, two techniques are used to address the second research question. First, a wordcloud based on the abstracts of all 481 papers was performed in order to display the most frequently used words. This technique provides insights of the topics covered by the papers (see, for example, Mirică, Petcu, 2022; Scwacha, 2022). Second, a graph-collocation for the word "kahoot" using Lancsbox v.4.5 was constructed (Brezina et al., 2018). The graph provides powerful insights on how the word "kahoot" collocates with other words in the text, suggesting possible research topics. In order to display collocations, the following parameters were set: word span = 5 to the right and left; the minimum frequency of the collocation occurring = 50.

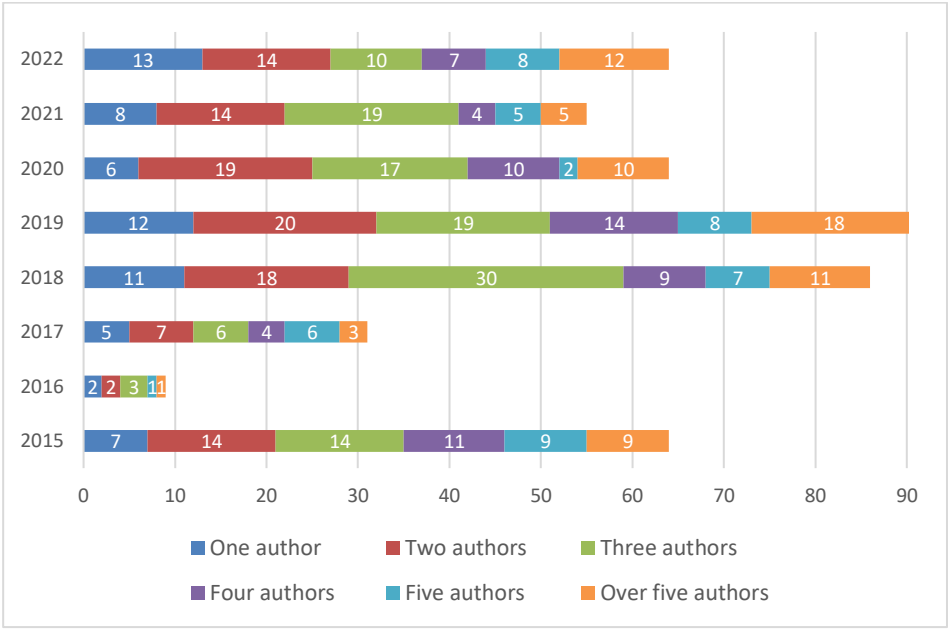
Limitations of the study derive from the data made available by Clarivate as the dataset was constructed based on the data extracted on 13th of March 2023 and comprises of records on 481 documents. Such an aspect is of importance as Clarivate indexes with delay in WOS the published papers or may omit some of the already published ones. As such, the dataset does not reflect the exact number of published papers on Kahoot topic-indexed WOS, more specifically for the year 2022 as only reflects the status at the time of the data extraction. Further limits are the ones introduced through the usage of Lancsbox v.4.5 and word-cloud package. Mitigation of the later limits may be done through the usage of newer releases of both the Lancsbox and word-cloud package. The first limitation is intrinsic and accepted as is, as a consequence of using products owned by Clarivate.

5. Findings

Figures 1, 2 and 3 provide answers to the first research question. The oldest paper in the database was published in 2015 while the newest dates from 2023. However, due to the fact that there was only one paper registered, 2023 was not included in the graphical analysis.

Figure 1 displays the number of papers by the number of authors and publication years. The highest number of papers was recorded in 2019. In addition, the number of papers published during the pandemic years was quite high. Moreover, the share of papers with 3 or more authors in the total number of papers increased. This is not surprising, as online classes based on gamification were perceived as fun and engaging (Nieto-Escamez, Roldán-Tapia, 2021), thus sparking academic dialogue.

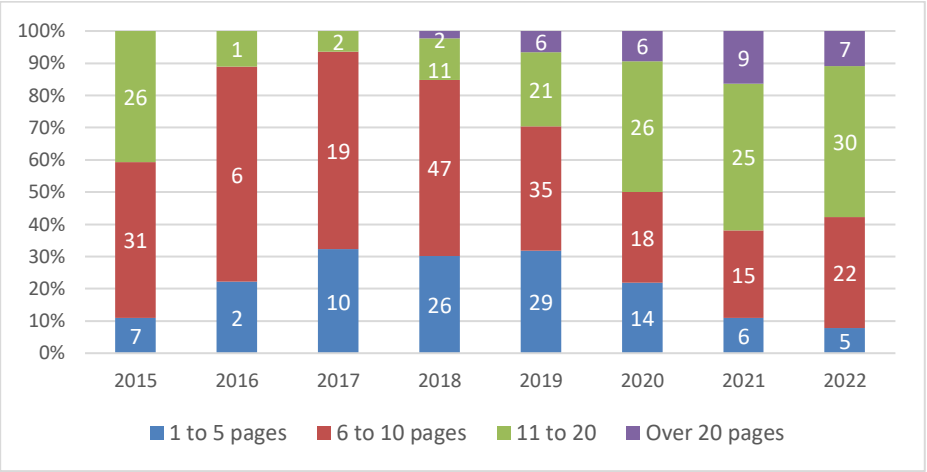
Figure 1. Number of papers by number of authors and publication year



Source: Designed by the authors based on Web of Science data.

Figure 2 shows the share of papers by the number of pages during the analysed period. Between 2015 and 2019 papers with 1 to 10 pages were predominant. Since 2020, the length of the papers increased, suggesting a more in-depth analysis of the topic. Several innovations introduced by the platform during the pandemic years (Hanoa, 2022) may have contributed to the growth of the body of literature.

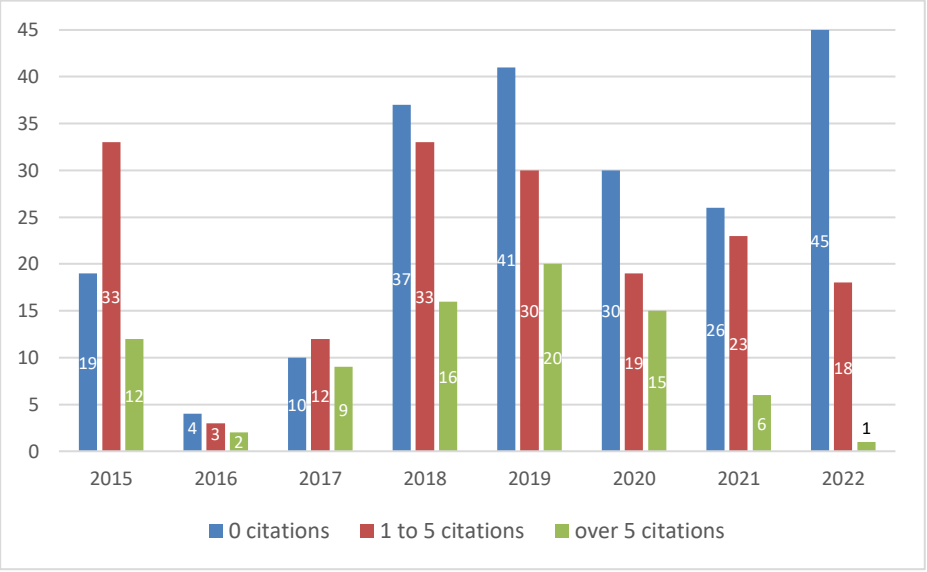
Figure 2. Share of papers by number of pages between 2015 and 2022



Source: Designed by the authors based on Web of Science data.

Figure 3 displays the number of papers by the year of publication and the number of citations. While most papers do not have any citations, the number of cited papers is increasing. This suggests that the topic is just beginning to be in focus.

Figure 3. Number of papers by year of publication and number of citations

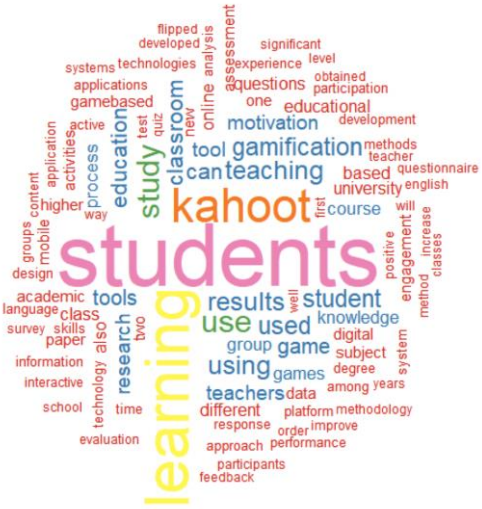


Source: Designed by the authors based on Web of Science data.

Figures 4 and 5 provide answers to the second research questions. As presented in Figure 4, the words with the highest frequencies are students/student, learning,

study, tool/tools, gamification/game, kahoot. Furthermore, we also see words such as knowledge, teaching, education, research, classroom, motivation, using, and teachers. As well with red colour are presented words such as online, questions, engagement, evaluation, activities, platform, and positive. Based on results of the word-cloud analysis, in terms of the usage of "kahoot" in the dataset with abstracts of research papers Web of Science, interesting connections are obtained. Motivation and engagement are an interesting confirmation of Kahoot's utility, while questions, evaluation, activities in online education classrooms present the positive reception among students.

Figure 4. Word-cloud of the analysed corpus



Source: Designed by the authors based on Web of Science data.

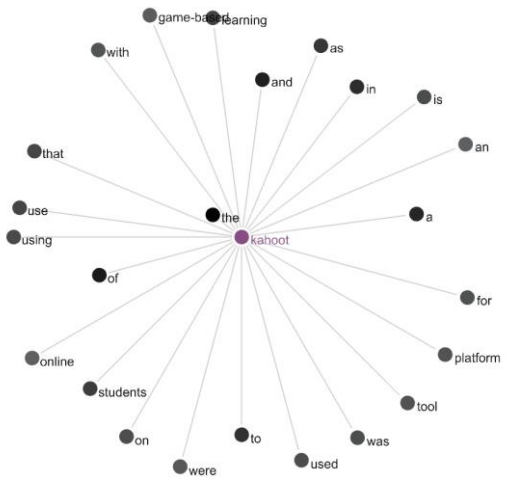
Figure 5 presents collocation graph of "Kahoot" within the analysed corpus for a collocation frequency of 50 and a 5-word span. Collocation graph displays three dimensions: strength of collocation, frequency collocation and position collocates. The strength of collocation is indicated by length of the line between the node and collocates, therefore the closer the collocate is to the node the stronger the strength of the association between the two. The frequency is indicated by the colour intensity of the collocate, the darker the shade of the colour the more frequent the collocation. The Position of the collocates around the node reflects the position of the collocates in the text.

Based on the stated information on collocation graphs, "connection words" such "the", "and", "a", "of", "to" are excluded in terms of interpretation as they weigh more strength in terms of collocation but reveal less meaning for the second question. Of relevance in order of strength magnitude are the links between word "kahoot" and its obtained collocates "students", "platform", "learning", "using", "game-based" and "online". In terms of descending frequency of the collocation are the

links between “kahoot” node and “students”, “learning”, “using”, “game-based”, “platform”, “online”. Reflecting the collocation position, the collocates “students”, “online”, “game-based”, “were”, “using”, and “learning” are situated to the left of the node "kahoot", while on the right side the collocates “platform”, “tool”, “was”, “used” are obtained.

Results presented in Figure 5 show that the collocations between the word “kahoot” and the words “students”, “learning”, “platform”, “tool” and “game-based” have meaning in terms of strength and frequency, thus suggesting possible research topics and that Kahoot is seen in the scientific community as a useful platform for students in online environment set-up for game-based learning.

Figure 5. Collocates of “Kahoot” within the analysed corpus for a collocation frequency of 50 and a 5 words span



Source: Designed by the authors using Lancsbox 4.5 based on Web of Science data.

These findings suggest that the research papers are focused on Kahoot as a tool to enhance learning, create game-based classes, and student-centered environments. Thus, the research papers are oriented toward the uses of the platform rather than on technicalities.

6. Conclusions

The research paper contributes to the field and offers a meta-analysis of the scientific papers concerning Kahoot! gamification platform. Data from Web of Science was employed in our study with a database of all research papers on Kahoot! from Clarivate.

Our results indicate that the highest number of papers concerning this topic was recorded in 2019 and the share of papers with 3 or more authors in the total figures increased during the pandemic years. A more in-depth analysis of the topic is pointed

out by the increasing length of the papers since 2020 and also by the increase in citations. This finding is in line with the recent innovations brought to the platform.

Moreover, to reveal the main topics covered by the papers on this topic, the word cloud and graph-collocation techniques are used, revealing that Kahoot! is properly addressing student-centered environments. Such findings suggest that existing Clarivate published papers on this topic are targeting to more extent the game-based learning approaches and integrate different engagement methods of teaching to improve completion rate.

Innovative technology has the benefit of improving the experience both during online as well as in physical classes. In this respect, integrating gamification platforms such as Kahoot! makes learning more fun, increase engagement and interaction as the new generation of students tend to use more often digital instruments in contrast to traditional ones. Contributions to education are linked to 1st and 4th of the Sustainable Development Goals (UN, 2023; Biermann et al., 2017). Such implications have a positive impact through reducing school drop-out rates and having better student yearly outcomes as a result of their increased engagement.

Two limitations of the study are identified, the first being intrinsic and accepted as is due to using products owned by Clarivate and the second sourcing from employing Lancsbox v.4.5 and using the word-cloud R package. The first limitation involves that the dataset does not reflect the exact number of published papers on Kahoot topic indexed WOS, more specifically for the year 2022 it reflects the status at the time of the data extraction, as Clarivate indexes with delay in Web of Science the published papers. The dataset may be extracted once more in two to three years, having a more refined image with the exiting figures for Web of Science indexed papers in Clarivate. Mitigation of the second type of limits closely related to the visualisations may be done through the usage of newer releases of both Lancsbox and word-cloud package.

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Exploring the Usefulness of ChatGPT in Understanding and Promoting the Concepts of Sustainability: A Comparative Study

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Abstract

This study explores the potential benefits of using the ChatGPT artificial intelligence chatbot, an advanced natural language processing model, to structure information, improve clarity and understanding, and promote the concepts of sustainability and carbon footprint. While ChatGPT was released to the public in November 2020, the scientific community, and not only, is already exploring its potential, limitations, capabilities, biases, copyright issues, and implications for legislation or EU regulation of the technology in various articles, books, and studies. This study compares ChatGPT responses to questions on sustainability, sustainable development, sustainability measurement, and economic viability with randomly selected responses from researchers on the Research Gate platform. It also compares its responses to findings from several studies. The aim is to determine in which situations ChatGPT can be more efficient than traditional research to understand the concepts of sustainability and carbon footprint, considering its known limitations. The research methodology is qualitative analysis where the results from ChatGPT were validated by cross-referencing with reliable sources, a critical step to ensure the reliability and validity of the findings. The conclusions of this study validate the potential of using ChatGPT to help enhance environmental awareness and sustainability efforts. Its capacity to provide quick, understandable, and accurate responses to various questions related to sustainability or carbon footprint offers a novel and accessible method to be utilised for educating the public and promoting eco-friendly practices. The purpose of the paper is to present the innovative application of ChatGPT and provide insights into the benefits of using AI-driven tools that could potentially transform the way we approach today's complex environmental challenges.

Keywords: ChatGPT (Chat Generative Pre-Trained Transformer), sustainability, Carbon footprint, environmental awareness.

JEL Classification: Q01, C8.

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1. Introduction

Understanding sustainability has become increasingly critical in today's context of climate change and environmental degradation. Sustainability represents a complex concept, including not only environmental protection, but also economic viability and social equality.

While traditional methods of disseminating knowledge on these topics involve education, media, and expert discussions, the emergence of artificial intelligence offers a new channel for learning and understanding such complex concepts. In particular, ChatGPT, developed by OpenAI, has shown promise in generating human-like text based on provided prompts.

The objective of this study is to evaluate the utility of ChatGPT in understanding and promoting sustainability concepts. We aim to compare the accuracy of the answers provided by ChatGPT with those given by researchers or established scientific studies.

2. Problem Statement

The entire media is talking about the ChatGPT Tool and the exams it passed especially in law (University of Minnesota) (Business Insider, 2023), Google coding interview for the level three engineer (Dreibelbis, 2023), or business management course (Wharton School of the University of Pennsylvania). The documented studies in academic environment started to appear and some literature examples related the possible domains where applicable will be listed below.

The Case Study of ChatGPT presented by Alshater (2022) has a significant potential to enhance academic performance research, economics, and finance in particular. The areas identified were assisting "researchers in data analysis and interpretation, scenario generation, and communication of findings" with the limitations the chatbots have: generalisability, dependence on data quality and diversity, lack of domain expertise, and limited ability to generate original insights.

In her study Fostikov (2023) is presenting very compact the application fields of ChatGPT with different examples and their sources from "humanoid interactive conversation" or universal language translator", admission of tests, deliver code in different programming languages, to the impact this technology can have on future jobs, the risk of misuse inclusively in research, negative impact in political conflicts, risk of disinformation or unemployment. McGee (2023) was investigating the political impact of the answers provided by ChatGPT, concluding that it "was heavily biased in favour of liberal politicians".

There are voices mentioning that the layoffs big Technology companies announced starting November 2022 are connected with the ChatGPT presence as presented in the Fortune article (The Fortune, 2023).

The questions raised by Hand and Khan (2020) related to the validation and verification of an AI are nowadays more actual than ever: "(1) Has the objective been properly formulated? (2) Is the AI system free of software bugs? (3) Is the AI

system based on properly representative data? (4) Can the AI system cope with anomalies and inevitable data glitches? (5) Is the AI system sufficiently accurate?"

Another artificial intelligence tool (Chrome Extension: Waldo – see the appendix) was used to identify the relevant literature in this case. Direct search was also performed on platforms like Academia and Research Gate to assure that the search results of AI Tool are correct.

Kuhlman and Farrington (2010) are presenting the history of the concept, the Triple Bottom Line concept together with the well-being concept.

Georgescu-Roegen's Bioeconomics as discussed in the article of Gowdy and Mesner (1998), served as an initial introduction to the concepts necessary for comprehending sustainability measurement indicators.

3. Research Questions / Aims of the Research

Research Question 1: What is the accuracy level of the answers provided by ChatGPT compared to researchers and scientific studies?

Research Question 2: To what extent can ChatGPT contribute to the dissemination of knowledge about sustainability and carbon footprint?

Research Question 3: What are the potential advantages and limitations of using ChatGPT in the context of sustainability and carbon footprint?

The objectives of this research are guided by two key hypotheses:

Hypothesis 1: The answers provided by ChatGPT are comparable in accuracy to those provided by researchers and scientific studies.

Hypothesis 2: ChatGPT can significantly contribute to the dissemination of knowledge about sustainability.

4. Research Methods

The article is an experiment, without intending to make a complete analysis of all the questions. It will only exemplify 3 of the key questions (Biswas, 2017) "What is sustainability? How can we make sustainable development a reality? How can sustainability be measured?") and will present some ChatGPT answers to exemplify the synthetising power the tool has.

The research methodology of analysing the answers for the selected questions from different perspective (AI tool, Researchers as users in Research Gate platform or scientific studies) and compare and analyse the output it's a mixed-methods, which involves a qualitative component of selecting the questions, a semi "crowd researched" method as an aleatory fraction of the researcher answers will be documented and a cross-validation of the results obtain from the AI tool with the ones extracted from studies and researcher.

5. Findings

Biswas (2017) asked the Questions "What is sustainability? How can we make sustainable development a reality? How can sustainability be measured?"

For the first 3 questions there were 5009 answers provided by a great diversity of researcher. Just two pages (1, 39) out of 51 containing their answers were selected to be analysed.

All, the AI technology, research studies, and the researchers are identifying in the definition of sustainability the importance of the three pillars: environmental, social, and economic, they are mentioning the Triple Bottom Line (TBL) framework.

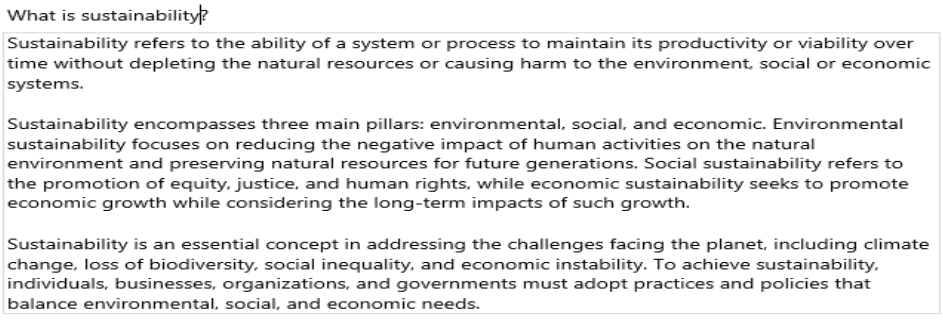
The studies are presenting the historical evolution of sustainability concept and the 3P (People, Planet, Profit).

The answers provided by the ChatGPT Tool were clear structured and short, identifying the consequences and the actors that are expected to take action. It identified ways to be followed by everybody, provided facts-based actions and listed indicators to be applicable to entire society (Ecological Footprint, Life Cycle Assessment (LCA), Social Impact Assessment (SIA), Triple Bottom Line (TBL), Sustainability Reporting).

The researchers were becoming emotional, were identifying particular cases which are supposed to be considered and were looking for solutions involving moral, behaviour-control, and self-responsibility. Finally, they are identifying the need of getting certain indicators (e.g. energy return on energy investment – ERoEI and Triple Bottom Line –TBL) and considered biological-physical factors (water, soil, biodiversity, atmospheric composition, sea level, availability, and cycle of nutrients, etc.) and human triggering factors (demographics, socio-political context, science, technology, education, culture, etc.) They were more precise in identifying the education as an important change factor to measure the sustainability of biophysical or human-triggered factors.

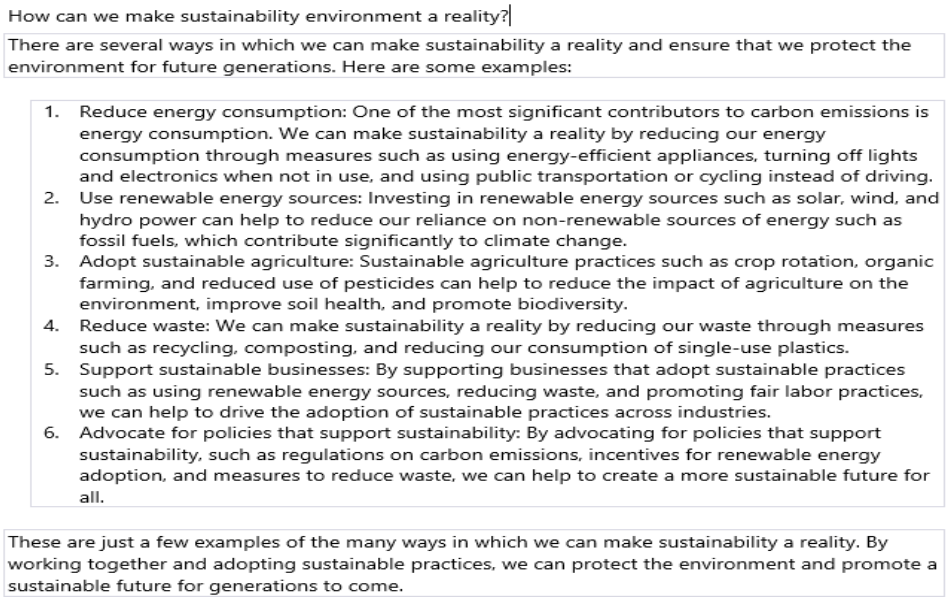
It is essential to mention that while the ChatGPT tool's speed in answering a large number of questions has significant potential, it must be used with caution and any hallucination must be identified and eliminated. This is because artificial intelligence tools can provide erroneous information or make false assumptions. It is also important to consider the sources of data which is analysed. Therefore, it is required to apply a rigorous approach to validate the accuracy of the ChatGPT's responses, ensuring that the study establishes a solid foundation for future efforts to promote sustainable practices.

Figure 1. ChatGPT Answer to the Question: What is sustainability?



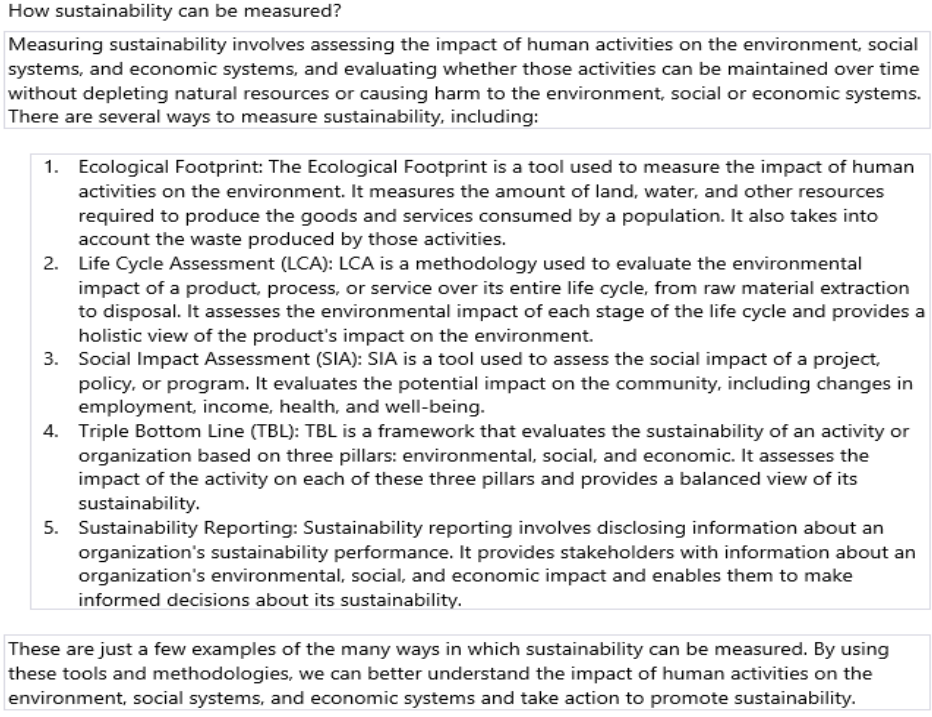
Source: Openai, ChatGPT; https://chat.openai.com/chat.

Figure 2. ChatGPT Answer to the Question: How can we make sustainability environment a reality?



Source: Openai, ChatGPT; https://chat.openai.com/chat.

Figure 3. ChatGPT Answer to the Question: How sustainability can be measured?



Source: Openai, ChatGPT; https://chat.openai.com/chat.

The usage of the ChatGPT tool and its advantage of speed in answering a large number of questions have made it possible to utilise the chat method to generate the table below. This table provides a structured overview and lists the sources where the identified tools can be found.

Table 1. Are there any tools the state can use? Put the information in a table: Ways, Description, Tools, Website of the tool.

Ways	Description	Global Tools	Global Website
Develop sustainability policies	Develop policies that promote sustainability, such as regulations on carbon emissions, incentives for the adoption of renewable energy, and measures to reduce waste.	Sustainability policy frameworks	United Nations Sustainable Development Goals
Implement regulatory frameworks	Implement regulatory frameworks that ensure that businesses comply with sustainability standards. This can include regulations on environmental impact, labour practices, and human rights.	Regulatory frameworks for sustainability	Global Reporting Initiative (GRI)
Encourage sustainability reporting	Encourage businesses to report on their sustainability performance. This can provide transparency and allow the state to monitor and assess the sustainability and cost-effectiveness of businesses.	Sustainability reporting guidelines	Sustainability Accounting Standards Board (SASB)
Evaluate life cycle assessments	Evaluate life cycle assessments (LCAs) to assess the environmental impact of businesses. This can help identify areas for improvement and promote sustainable practices.	Life cycle assessment tools	Life Cycle Assessment (LCA) software - SimaPro
Use cost-benefit analysis	Use cost-benefit analysis to evaluate the cost-effectiveness of businesses. This can help to determine whether businesses are operating in a sustainable and cost-effective manner.	Cost-benefit analysis tools	Cost-Benefit Analysis Toolkit - World Bank
Use certification schemes	Use certification schemes such as Fairtrade, Rainforest Alliance, and Forest Stewardship Council, to ensure that businesses operate in a sustainable and socially responsible manner.	Sustainability certification schemes	Fairtrade International, Rainforest Alliance, Forest Stewardship Council (FSC)

Ways	Description	Global Tools	Global Website
Monitor and report on progress	Monitor and report on progress towards sustainability goals. This can provide transparency and accountability and allow the state to identify areas for improvement.	Sustainability monitoring and reporting tools	Global Reporting Initiative (GRI), United Nations Global Compact, Carbon Disclosure Project (CDP)

Source: Based on Openai, ChatGPT downloaded Table; https://chat.openai.com/chat.

6. Conclusions

Regarding the accuracy level of the answers provided by ChatGPT compared to researchers and scientific studies, the conclusion is that AI provides structured and objective answers that can serve as a starting point for further research. However, for detailed work and fine-tuning of the results, the skills of researchers are essential. Human input tends to focus on specific aspects of a problem, often representing ethical and moral considerations. However, despite this narrower perspective, I believe that the human role in reviewing AI results and making decisions based on the corrected outcomes will remain crucial in the future.

In terms of the role ChatGPT can play in disseminating knowledge about sustainability, it can be seen as a valuable tool for rephrasing findings and presenting them in a way that aligns with the knowledge level of the intended audience. By leveraging the AI's capabilities, it can bring clarity to individuals who may find it challenging to comprehend the concepts of sustainability and its measurement.

Regarding the question about the advantages and limitations of using ChatGPT within the context of sustainability, advantages are rather generic ones like accessibility and availability of the answers, possibility to handle multiple queries simultaneously and rapidly with no risk of fatigue, contribute to interactive learning experience by responding to user queries in real-time, offers tailored information customised on user's level of knowledge or interest, able to democratise knowledge. Limitations are the dependence of training data, lack of contextual understanding, difficulty with ambiguity (hallucinations), risk of oversimplification, dependence on electricity, ethical and privacy consideration.

Further research can help to better understand these aspects and develop strategies to maximise the benefits while mitigating the limitations.

The first hypothesis that ChatGPT's responses could mirror the accuracy of researchers and scientific studies is somewhat confirmed. While the AI can provide comprehensive details based on existing information and can propose objective KPIs for assessing sustainability, it does not yet have the capacity to generate novel ideas or innovation within this field.

The second hypothesis saying that ChatGPT can significantly contribute to the dissemination of knowledge about sustainability, especially when it comes to differentiated messages based on qualification level of the audience, is validated. Undoubtedly, researchers possess specialised knowledge in this domain, and their input provides a higher level of detail. However, the question remains whether this

level of detail can effectively reach regular citizens, and it is in this context that the valuable capabilities of ChatGPT come into play.

An interesting experiment could involve publishing the answers provided by ChatGPT to the questions posed by Biswas (2017) on ResearchGate and observing the response of researchers to them.

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Appendix

Links to used Tools:

ChatGPT Version 3.5: Carbon Footprint Q&A. (openai.com).
Waldo Extension for Chrome: https://www.waldo.fyi/.

sciendo

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Beauty and the Beasts: Looking at the Cultural Economy in Times of Climate Change, Pandemic and War

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Abstract

Arts, as distillates of cultures, capture assorted feelings spurring from disruptive/ distorting events – environmental, sanitary, or warmongering, which, in some cases, are twisting and turning the sense(s) of "beauty" as well. The present article starts from the reality of calamities depicted in arts, pursuing the economic processes germane to the artistic/creative sector in times of societal debacle, preparing for the detection of qualitative and quantitative transformations in cultural production and consumption. The current societal state of affairs, that of a multilayered crisis, is scanned against a brief historical record. The stake of this study is to get a glimpse of "the state of the arts", noticing the limitations of economic verdicts in art fiefdoms, and opening an original research avenue on the robustness, resilience, and antifragility of the cultural and creative industries/sectors.

Keywords: art, cultural/creative sectors, climate change, pandemic, war.

JEL Classification: L80, Z11, Z13, Q54.

1. Introduction

The three crises chosen for this essay on the "economy and economics of culture" are representative for the contemporary age; thus, culture/arts could not escape from

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being affected by and absorbing their both material / physical and spiritual / intellectual offspring:

- the *climate crisis*, acknowledged as such globally, yet subject for contesting views, is critical for human species' relation with the "planet";
- the *pandemic crisis*, somehow fading away, stays relevant for our grasp on how to wield any trade-offs between freedom and (health) security;
- the *Russian-Ukrainian crisis/war* is quintessential for our understanding on the need to depart from barbarity and from the risks of extinction.

The concern for the human-nature relationship is part of the human nature itself, because the environment is the provider of critical resources for survival and thrive. Art captured this concern, as depictions of nature experiencing mutations over time – from Renaissance's revelation of the inspirational character of natural surroundings, as well as its revolution of perspective and spatial representation, to the immersive Impressionist seemingly sloppy strokes, emancipatedly sprawled *en plein air*, not in the confines of clogged workshops, to Land Art, with man giving up his hegemonic-industrial attitude towards environment in favour of a humble-toned and harmony-chasing hook-up. But no matter how ecstatic or revering the attitude of painters (see Titian or Cezanne) or composers (hear Vivaldi or Enesco) looked with regard to our natural givens, Picasso (Stonard, 2018) seems to best describe the, otherwise, tensed encounter: "Through art we express our conception of what nature is not". A sense of apartness from the other living creatures and the neighbouring cosmos exhales from almost all representations of natural landscapes, especially in relation to human personages, and it is said that, within and through Art(s), one of the most important unifying movements humans critically need to assume is the one with the rest of the created (or chance-born) nature, for our entropic exchanges with it, erratically economic, uncoordinatedly competitive, will only secure a "Pyrrhic victory". Even if economists do not consensually agree whether free markets or political hierarchies are the best equipped to tackle environmental crisis, the latter is a fact.

Intermeshed with our environmental conundrums, the pandemic crisis left its mark on the cultural and creative economy. Gradually going through the stages of suspension, cancellation, and postponement of the characteristic interaction with the public, the cultural sector had to lose during the pandemic years, in addition to an inherently creative component, the real sources of validation and financing. The restriction of the dynamics of the consumption of arts in all its forms, the closing of performance halls, theatres, cinemas and museums, their sluggish and hesitant reopening and transition to the so-called form of normality, were doubled, in some cases, by the public's reluctance to (re)acquire consecrated freedoms, something that faded timidly and gradually, until the collective consciousness was regained (UNESCO, 2021). Although strongly affected by the pandemic, the cultural sectors have joined the creative ones, playing a leading role in maintaining the stability and mental health of the people, against the background of the extensive measures of isolation and social distancing, managing to strengthen recurrent communication channels and reach to the public through the digital medium (European Commission,

2021). Quantifying the impact of the pandemic on societies as a whole, the European Commission's *Single Market Report* 2021 showed that the cinema industry in the EU reported a 70 % drop in box office receipts in 2020, while music halls saw a decline of revenues by 64 %, and museums faced revenue decreases of up to 75-80 %, while UNESCO noted losses within the cultural and creative industries, in 2020, of 20-40 %.

On top of all this climate of (un)natural uneasiness, there is the threat of a widespread/worldwide war, having as inception point Russia's aggression on Ukraine. "*Inter arma silent musae*": this may be the first impulse in associating war with arts. The social definition of art, as the product of the indivisible work of the creator who is defined by its uniqueness, is a legacy of the tormented 19th century (Létourneau, 2022). This tensed period in the history of humanity, as well as the following 20th century, was strongly blistered by the interstate military conflicts which took place, in their most intense developments, in Europe, deeply marking our civilisation. From Napoleon to Hitler, the European continent experienced many periods of abusive appropriation of foreign heritage when artistic looting was being part of the "law of war" of the time. Unfortunately, the Napoleonic wars arrived at a period in the history of humanity when there was not necessarily an awareness of the cultural importance of goods and works of art and this practice was exported outside the continent with colonial expeditions and imperialist policies (Jora et al., 2018). It took the Nazis' obsession with the hoarding of cultural objects and goods and works of art to wake up the West. First with the creation of *Monuments, Fine Arts and Archives Program* (Kirrily, 2021) during the Second World War to recover property stolen by the German army and then with the *1954 Hague Convention for the Protection of Cultural Property in the Event of Armed Conflict*, the international community finally acknowledged the role of heritage and the risks for art(s) in times of wars.

The proposed discussion starts by acknowledging the (economically) complicated framework for artistic expression (Throsby, 2001; Jora, 2016) and tries to address a fundamental question, without having the pretense of providing the answer in the following pages, but rather of igniting a research route that the current literature did not cover, this to the detriment of cultural/creative sectors' stakeholders: is art necessarily at loss in times of crisis (when people seem to restrict themselves to satisfying more material needs) or, on the contrary, artists and their ecosystems can capitalise on crises, since the very essence of the artistic world/communities is to critically and creative deal with realities (as opposed to inertias and inflexibilities common to other social fields)?

After a brief statement of the problem and a short point on the methodological choice, the essay is streamlined to three theme-based case studies, devoted to a certain "art"/industry and scrutinising the way in which individuals or organisations from it responded to one of the three above-noted societal crises.

2. Problem Statement

The intersections between societal crises (environmental, pandemic, military) and artistic expressions, reviewed from an economic perspective, though not necessarily abundant in the (economics and business) literature, reveal to us at least some insights with the potential to become the starting point of our own inquiry.

2.1 Environment-Friendly Messages and Materials

Climate change is the ultimate form of environmental derangement (Nordblad, 2021), and humans are supposedly its main source or at least the escalator factor. Artists, much more convincingly than industries and governments, pay their fair share to the restoration of the natural equilibria or, at least, not to add to the imbalance. Their messages are intended to be strong. For instance, drawing attention to the phenomenon of "ghost forests", as dead remnants of once-green woodlands due to rising sea levels and extreme weather events (hurricanes, drought), artist Maya Lin "planted" 49 dead, leafless, branchless cedar trees, each being around 13 meters tall, in the middle of the Madison Square Park (Choi et al., 2023).

The "forest grave" has a reply in the form of a "sunk forest", created by the eco-artist Jason de Caires Taylor, at the Ayia Napa Underwater Sculpture Museum, where snorkelers and divers can admire 93 works of submerged art, including hybrid trees and life-size human figures designed to facilitate the repopulation with coral formations in a portion of Mediterranean that currently is devoid of marine life. Such pro-climate change awareness manifestos are legion, even if the artistic sensibility is not always in phase with scientific sense in identifying unambiguously the true culprits and the right remedies. One of the main risks with regard to the appeals against climate change inaction is related to calculating and modelling the cost of "climate action", mainly when "action" is based on coercive measures rather than on securing the consent of the actors (Jora et al., 2022), with the anti-market camp claiming intellectual victory – see Fremstad and Paul (2022) vs. counterarguments from Zitelmann (2023).

2.2 Physical Quarantine, but Digitalised Contagion

As Bonin-Rodriguez and Vakharia (2020) pointed out, the arts and the rest of the cultural realm were one of the leading sectors negatively impacted by recent crises, more notably the COVID-19 pandemic, as lockdowns all around the world confirmed its status as "non-essential". "Non-essential" is a crucial term describing the impact of recent instability on the cultural economy. Cox et al. (2020) stress, in a quantifiable manner, the decline in spending on non-essential goods and services in the United States, following the proliferation of pandemic sentiments. The authors cover the behavioral economics of consumers who, on the backdrop of the pandemic, shifted their focus toward essential goods and services (such as basic groceries, fuel, utilities, and health), while so-called "non-essential" goods such as restaurant meals, accommodation, clothing, or art/culture-related goods or services have taken a backseat in terms of priority in the average consumption baskets.

For instance, cinematography, the "seventh art", is no stranger to the socio-economic changes that described the pandemic state of the world. However, with the help of technology, more and more artistic and/or cultural activities made their way into the quarantined homes of consumers. One of the most important recent trends in technology is considered to be video streaming. The market for video streaming services also increased considerably in terms of value: USD 59.14 billion in 2021 (Grand View Research, 2021), with competition among players such as Netflix, Amazon Prime, Disney Plus, and HBO Max. And the best term for this is "Technoculture", the mix between technology and culture, coined by Penley and Ross (1991) in their homonym book. Such technological innovations transformed the landscape of the cinema, since more and more consumers have access to a larger and freer market, which can be accessed from anywhere and at a competitive price.

2.3 Art Galleries, Ethical Canons, and Cannonades

There is a constant trend that appears on the art market during wartime periods. With the risk of physical damage increasing in the occupied countries, as more and more objects were targeted, their economic value ended up rising, inciting more transactions. Nevertheless, during times of crisis, this kind of assets become safer to invest in than financial assets or real estate, as their value is not affected directly by the events of the outside world.

For instance, in the case of the Netherlands, during the World War II, "in real terms, the price of paintings increased more than fivefold between 1940 and 1945" (Euwe, Oosterlinck, 2017). The Dutch art market had a boom as the demand for old masters and Dutch art increased (Jeroen, 2018). This paradox occurs as "the cultural economy is more complicated including both the monetary and non-monetary aspects of the way culture is produced, disseminated, and exchanged" (De Buekelaer, Kim-Marie, 2018).

On the short term, the price and the demand are falling because of the non-liquid character of this asset class, but on the medium and long term, the situation is reversed. It remains to be seen if this phenomenon is recurring also in today's case of Russian-Ukrainian war. Another intriguing aspect, all the more that there is basically no centralized data that observes the evolution of the market in this regard, is related to what happens with the artistic/cultural markets on the aggressor state's side. In the light of Russia's "special operation" (that is, aggression) against Ukraine, how will the Russian art markets be affected?

3. Research Questions / Aims of the Research

As stated from the outset, the present essay/study aims to open up the pathway for a more thorough research that, ultimately, will be indicative and instructive for those involved not only heuristically, but economically in the cultural sector. Such questions/inquiries are on the "radar" of cultural entrepreneurs and policymakers, too. They will not necessarily be answered as such in the present investigation; still, this essay is insightful for systematic, follow-up approaches intended to meet them:

- Q1 – Are crises (whether they are ignited by natural disasters alone, or of a mainly anthropic origin, such as wars, political disputes, economic/financial crisis, or of mixed origin, such as pandemics and inadequate countermeasures to them, etc.) detrimental/propitious for (certain and rather which?) cultural-artistic industries?
- Q2 – Being noted the ambivalent impact (positive and negative) of crisis episodes on artistic creatorship and its commerciality/marketability, which (re)actions, coming from the main categories of stakeholders, could be found responsible for the maximisation of opportunities, as well as for the minimisation of challenges?
- Q3 – Could the lessons derived from the successful responses to crisis situations provided by the cultural/creative industries, as, allegedly, the most dense fields in terms of innovative approaches/actors, be translated in other sectors or are they rather idiosyncratic, non-replicable and non-scalable in the rest of the economy?

4. Research Methods

This study uses a qualitative research methodology and is structured around a case study framework. A comparative approach is taken to analyse and compare three different cases (one for each problem statement assumed in the research) in order to gain insights into the research topic. In the end, the studies are compared to answer the general problematic of the investigation. Therefore, we employ an analytical framework to create understanding to the given situations and explore key topics. The data for the study was gathered from secondary desk research, which relied on empirical evidence obtained from research on cultural economics. This method involved reviewing previously published sources of information on the subject matter, including scientific journals, newspaper articles, and industry reports. ConnectedPapers and Litmaps were used as tools to reference relevant academic research in the field.

5. Findings

Case Study no. 1: Antiques Markets – "The" Vanguard Cultural and Creative Industry?

Despite the quarrels between the (vast majority of) pro-government intervention economists backing "Green Deal" approaches (see the EU and the US law packages) and (the fringe minority of) market supporters, there are at least some uncontroversial avenues for those who want to embrace and emulate an eco-responsible stance: the (voluntary version of) *circular economy*. Artists and artisans are much closer than any other economic category in practicing the market-based version of circular economy, for they enroot their option for "reduce, reuse, and recycle" on the consented participation of the "green" customers. From an art(istic) point of view, circular economy is the restorative-and-regenerative-by-design economic model.

One of the most lucrative segments of the artistic circular economy are the antiquities markets (Cuomo et al., 2021). At the bottom of the supply chain there are the "flea markets", present today in most capitals and big cities of the world and

credited to be reminiscences of the marketplaces of Antiquity (Korsunova et al., 2021; Machado et al., 2019). They are part and parcel of the profound community fabric, interweaving cultural diversities, of social values and norms, and being an arena in which different people or groups interact and negotiate not only products, but also identities (Preda, 2010). Through trading arts items, flea markets create a sense of community, bringing people together regardless of their backgrounds, while also providing a unique shopping experience, where one can discover rare and one-of-a-kind items while supporting small artists, crafts, businesses, or local entrepreneurs. The labyrinthine space of the fairs invites explorations of interconnected worlds, topologies of intimacy, and affectivity. On the upper end of the value chain there are the famed antiques restorers/dealers, like Drew Pritchard, the British star of the TV series *Salvage Hunters*.

Around Europe, some of the most appreciated antiques/flea markets (Moldoveanu, 2023) are those in Berlin, Germany (rare books and war tokens), Bilbao, Spain (collectible coins and vintage vinyl), Copenhagen, Denmark (cheap designer clothes and kitchenware), Edinburgh, Scotland (chic charity shops and special events), Helsinki, Finland (Finnish fabrics and iconic tableware) or Paris, France (French designer fashion and fine food). In a sense, commonalities of the past are the art of the present/future, and many "oldies" end-up integrated in upscale new products, when preservation and restoration in not enough to catch the eye and the pocket. Romania also proposes its medieval relic flea market in Negreni, Cluj county (old paintings, furniture, or communist memorabilia) (Răcășan, Egresi, 2020; Stănică, Stănică, 2020).

And, definitely, circular economy is a much more decent and elegant response to environmental/climate concerns than "symbolically" vandalizing (even if not physically irremediably) classical works of art. In 2022, environmental activists from "Just Stop Oil" threw tomato soup at Vincent van Gogh's *Sunflower* painting, exhibited at the National Gallery in London, while activists from the German-Austrian environmental group New Generation threw mashed potatoes in Claude Monet's *Les Meules* painting, worth more than $110 million, on display at the Barberini Museum in Potsdam (Luke, 2023). The message: "What is more valuable, art or life? Is it worth more than food? More than justice? Are you more concerned about protecting a painting than the planet and people?". The cause-effect logic requires "no comment" to such radicalistic manifestos and manifestations.

Case Study no. 2: Tehnocultural Revolution: Did Telework Reshape "Home Cinemas"?

The economy of arts is more dynamic thanks to the technological innovations of the last years, cinema in the form of movies and TV shows making no exception. The era of actively being present in the cinema is slowly fading away, the same being true for the other means of consuming cinematography such as DVDs or Blu-Rays. In fact, video streaming is the dominant means of consuming content (Gaustad, 2019). The recent socio-economic conditions (especially the pandemic) may have

helped the video streaming sector, as lockdowns forced consumers to participate in the cultural economy from the comfort of their homes (Jia, 2022).

With Netflix, Amazon Prime, Hulu, HBO Max and Disney Plus, the global streaming services sector becomes increasingly competitive. These platforms manage not only to disseminate content to their customers, but to create it as well, even acquiring or merging with other companies or studios, such as HBO, Discovery and Warner Bros. being fused formerly under the umbrella of telecom goliath AT&T (CNBC, 2022). Producers all over the world can create art under the aegis of a streaming platform, location not being a prerequisite. It can be argued that the „brave new free market" of streaming is eroding Hollywood's "old order".

A PwC (2022) Global Entertainment & Media Outlook 2021-2025 (GEMO) report shows that, globally, the video streaming services market has grown at rates between 12.4% and 34.5% over the past five years, to 58.3 billion euros in 2021, with the trend expected to continue, to a global market worth of 81.3 billion euros. 2022 came with new shows worth tens of millions of dollars, new players and massive merger potential. However, while reassuring investors that they will report profits in the next 2-3 years, most streaming services have announced investment cuts this year, adding a new feeling of prudence within this market.

Case Study no. 3: Is The Free Production and Distribution of Russian Art South Down?

Protesters gathered in San Francisco on March 6th 2022 to demand peace in Ukraine. They painted a replica of a 1982 work titled *A dove has spread her wings and asks for peace*, by Ukrainian artist Maria Primachenko, a self-taught painter which Picasso once called an artistic miracle. The week prior, a small museum that housed her paintings burned to the ground, destroying up to 25 of her major works, according to some accounts. Satellite images show that none of the surrounding structures was damaged, indicating that the attack was premeditated. Also, other locations were completely razed by military attacks, including the Babyn Yar Holocaust memorial complex and the Kuindzhi Art Museum. The Garage museum in Moscow, founded by socialite art collector Dasha Zhukova (Azizzade, Jular, 2021; Tarasova, Putz, 2021), is facing exhibit cancellations by artists due to Zhukova's ties to sanctioned oligarch Roman Abramovich, her ex-husband (Jackson, Hannah, 2022; Art Monthly, 2022). Despite Zhukova's efforts to distance herself from Abramovich and Garage's board of directors, and to create an identity of her own, some artists feel it is not enough and are choosing to pull their artistic exhibits from the museum.

While during the Napoleonic wars and the World War II artistic looting took place in a "logic of trophy or de-nationalization of European patrimony" (Gacon, 2015), the looting of cultural objects and property as a systemic action of appropriation and destruction of heritage can have a completely different purpose: to erase the identity of the adversary. To Buckland (2013), cultural heritage is significant as it shapes our identity, loyalties, and behaviour. Cultural heritage can be understood as a legacy which is passed across generations and which reflects the

traditions, beliefs, values, or customs of a given society, defining who its members are and which are their roots, both in terms of identitarian recognition. Therefore, preserving the cultural heritage is a form of fostering social cohesion. Demolishing a culture's psychological and intellectual components comes also with destroying the physical manifestations or artefacts of what defines a community, country, nation. Protecting the cultural heritage and passing it on to future generations is a condition for preserving the traditions upon which future generations will be able to anchor themselves in the shared identity of the community and, thus, maintain this bequeathed identity.

On the other side of the battlefield, the Russian government has been urging the country's cultural communities to visibly demonstrate their support for both the military and Putin regime (Coalson, 2022). Large banners featuring the symbolic Z logo have been adorning theatres, museums, and other cultural spaces nationwide. This push is reflective of the government's desire to showcase unwavering patriotism and to publicly align the country's creatives with its military efforts. The international art community issued a range of measures intended to restrain as much as possible the means of Russian oligarchs to evade the sanctions through art trade, as part of the Western economic crusade against the Russian plutocracy. However, the manifest difficulty of enforcing decisions of this kind shows once again the lack of transparency in the art trade. Jackson and Hannah (2022) noted that, in 2020, a Senate investigation found that art intermediaries bought over USD 18 million in high-value art in the US via shell companies tied to Russian oligarchs, thus trying to dribble the sanctions following the 2014 takeover of Crimea. For artists, as citizens of a country that is at war, the stigmata on their art is, no matter how (un)just/(un)fair, a pervasive fact.

What is certain is that the longer the sanctions of the international art world, as, for example, the decision of the biggest auction houses in the art market to ban sales of Russian art from the beginning of June 2022 are going to last, the bigger are the chances of them leading the artistic communities into cultural precariousness. For instance, sales of Russian art have been cancelled by top fine art auctioneers such as Sotheby's, Christie's or Bonhams (The Guardian, 2022). This view of the matter is ignorant to some extent to the role that art could represent in such conditions for politically uninvolved Russian artists and collectors, who still need visibility, a chance of "mental salvation" and/or an act of resistance. Bringing the sanctions imposed, in principle, on critical sectors and industries for the warfare effort of the villain-state towards the personal level of certain individuals having Russian citizenship, but with no other proven link to Russian government aggressive actions (such as public endorsements or cautioning), is inconclusive in terms of helping the international cultural community in metabolizing the "right" sentiments and attitudes and blocking the dangerous financial flows that fuel the unprovoked and unlawful military intervention.

6. Conclusions

In this essay, we tried to explore how arts and the creators of arts fare at the intersection of three currently ongoing crises: the climate crisis, the pandemic crisis, and the military crisis between Russia and Ukraine. The qualitative results indicate that there is no generally viable rule to be applied, as crises can either be detrimental or beneficial for arts and their main characters. Crises can be a challenge for many art creators or cultural brands, but some find opportunities in them. The ability of the cultural sector to adapt to unforeseen circumstances and find creative solutions (which should actually be self-evident and without too many problems for such a sector) is not only critical to the survival of the cultural sector, but, more than that and, probably, more than it is the case for any other business sector, culture and arts can even strive from and get the so-needed inspiration in crises.

Therefore, we shall argue, cultural entrepreneurship ought to manifest itself in the same way as the wider, general, common-sense business entrepreneurship. By adopting an entrepreneurial stance in response to crises, art producers can create opportunities from crises, reduce challenges, and extract benefits therefrom, since the increase of value (artistic or monetary) is still a desiderate, irrespective of the harshness of times. We argue for the adoption of an entrepreneurial mindset in the cultural sector when it comes to dealing with crises of any sort, whether it is about running cultural businesses more efficiently, or about finding inspiration for artistic depiction. A mix of contextual factors and entrepreneurial skillsets can make crises becoming inspirational for new (managerial, technological) ideas and make art more robust, resilient, anti-fragile (transforming shocks into energies).

As we have shown, many times in history, crises have been the subject of artistic creation, and to name just a few well-known paintings: Diego Velázquez with *The Surrender of Breda*, Peter Paul Rubens with *Consequences of War*, Pablo Picasso with *Guernica*, or Nicolae Grigorescu with *Atacul de la Smârdan*, testimony of Romanian state-building and independent destiny, or painters who have made war scenes one of their preferred topics, such as Stoica Dumitrescu, Paul Molda, or Ion Bărbulescu. To name the plethora of movies created on war subjects or other crises would be futile. Not to mention that ecclesiastical paintings, as well as the secular paintings, abound in scenes of religious crises, from the Expulsion from the Garden of Eden to the Crucifixion of Jesus and many others. All in all, cultural entrepreneurship can, as argued, capitalise "on" and "in" crises.

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The Impact of New It&C Technologies on Academic Performance: An Analysis of How Web 2.0 and Large Language Models Affect the Educational and Research Processes in Universities

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Abstract

Digital technology is an integral part of the research and educational processes in universities. Hybrid education has already overtaken the traditional model used prior to 2020. Virtual classes have evolved into a space where the educational process begun in physical classes can be continued and expanded. The use of digital educational platforms such as Moodle or Google Classroom is on the rise and facilitate the use of assessment automation on an ever-increasing scale. Evaluation methods must be remodeled in such a way that they are less vulnerable to artificial intelligence programs such as ChatGPT. The emergence of large language models, as well as other aspects of technological evolution, are putting increasing pressure on the academic world, forcing it to become significantly more adaptable and resilient. The intense use of the IT&C technologies in the education sector began with the introduction of web 2.0 tools. With the pandemic, societies faced a revolution in the IT&C sector. Websites and applications that make use of user-generated content, the increased network connectivity, and enhanced communication channels started becoming tools used in education to enhance the quality of the entire process. The Universities had to adapt then just like they have to now, even though specific challenges may be different. This paper presents a comparison of how Web 2.0 and the evolution of large language models affected the educational and research processes in universities and how everything adapted to their specific reality.

Keywords: education, digitalisation, large language models.

JEL Classification: I21, I23, O33.

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1. Introduction

Digital technology has become an integral part of research and educational processes in universities, with hybrid education growing more and more (Xie et al., 2020). The COVID-19 pandemic has accelerated the adoption of virtual classes and digital educational platforms, such as Moodle and Google Classroom (Chinie et al., 2022), which have facilitated the continuation and expansion of the educational process (Ionescu et al., 2020). However, the increasing use of digital technologies, including large language models and artificial intelligence, has posed challenges to the academic world, necessitating adaptability and resilience (Yan et al., 2023) .

The emergence of Web 2.0 tools and the evolution of large language models have significantly impacted the educational and research processes in universities. Web 2.0 tools, characterised by user-generated content and enhanced communication channels (Jones, Iredale, 2009), have been utilised to enhance the quality of the educational process (Usluel, Mazman, 2009). These tools have facilitated collaboration, knowledge sharing, and active participation among students, teachers, and researchers (Dahlan et al., 2010). On the other hand, the evolution of large language models, such as ChatGPT, has raised concerns about the vulnerability of evaluation methods to artificial intelligence programs (Yu, 2023).

The COVID-19 pandemic has further highlighted the importance of digital technologies in education. Online education has provided unprecedented access to learning opportunities and has the potential to democratise and evolve the teaching act (Gorina et al., 2023). However, challenges such as technological constraints, lack of engagement, or a sense of belonging need to be addressed to ensure the success of online education (Peacock et al., 2020). The effective usage of digital communication platforms, including social media and digital PR models(Busu et al., 2020), has played a crucial role in maintaining the sustainability of universities during the crisis (Ayman et al., 2020).

The paper analyses the similarity between the launch of ChatGPT and the development of digitalisation during the COVID-19 period from a bibliometric point of view. The emergence of large language models, such as ChatGPT, has revolutionised the way information is generated and processed (Usluel, Mazman, 2009). These models have the ability to generate human-like text and have been used in various applications, including chatbots, text generation, and sentiment analysis (Gómez Cano et al., 2023). The launch of ChatGPT represents a significant milestone in the field of natural language processing and artificial intelligence.

The COVID-19 pandemic has accelerated the adoption of digital technologies in various sectors, including healthcare, communication, and education (Petracca et al., 2020). The reliance on digital health technologies and the use of digital platforms to support mental health and provide resources to healthcare workers have become increasingly important during the pandemic (Mata-Greve et al., 2021). The integration of these technologies has transformed the educational and research processes in universities, enabling remote learning, collaboration, and access to information (Dima et al., 2020). These tools have facilitated collaboration, knowledge sharing, and active participation among students, teachers, and

researchers. On the other hand, the emergence of large language models, such as ChatGPT, has raised concerns about the vulnerability of evaluation methods in Higher Education Institutions.

2. Problem Statement

The advent of Large Language Models (LLMs) represents a substantial milestone in contemporary research and education. These advanced artificial intelligence systems have not only transformed the way information is processed and disseminated but have also reshaped pedagogical practices and research methodologies. While their potential for catalysing a new era of digitalisation is considerable, the implications of such transformative technologies necessitate thorough investigation and understanding, which is why Chat GPT, for example, is a common discussion and research topic in the last period. However, this type of change is not entirely new to society. The COVID-19 pandemic served as a tipping point as well, pushing many public and private institutions to expedite their digital transformation strategies. This urgent shift introduced a range of challenges and opportunities, leaving institutions navigating uncharted territory in terms of implementing new digital tools and platforms, maintaining quality service delivery, and addressing issues of equity and access. Both of these quick transition periods were carefully analysed by the academic community, but there remains a question of "How different are they and what can we learn from their comparison?"

3. Aims of the Research

The primary objective of this paper is to investigate the similarities and differences between the digital transformation necessitated by the COVID-19 pandemic and the introduction and utilisation of Large Language Models, such as ChatGPT, in the realm of research and education. This endeavour involved the following specific aims:

- **Historical Analysis:** To provide an in-depth analysis of the events that triggered the rapid digitalisation during the COVID-19 pandemic, highlighting the key challenges faced, the solutions adopted, and the lessons learned. Similarly, we aimed to trace the development and deployment of ChatGPT, focusing on its impact on research and education, and addressing the challenges and opportunities it presents. This was done through a thorough literature review.
- **Comparative Study:** To draw parallels and contrasts between the digital transformation during the COVID-19 period and the launch of ChatGPT, based on a Latent Dirichlet Allocation (LDA) analysis.
- **Impact Assessment:** To assess the short-term and long-term impacts of both the pandemic-induced digitalisation and the introduction of ChatGPT on research and education. This will involve the evaluation of the advantages and limitations of each in terms of improving research productivity, enhancing educational delivery, and shaping future trends.

Ultimately, the objective of this study is to use these insights to better understand the dynamics of digitalisation in the research and education sectors and to guide future policy and practice in the era of artificial intelligence.

4. Research Methods

i. Data Collection: The first step in this research involved data collection from two separate periods – the initial six months of the COVID-19 pandemic (the COVID-19 period) and the first six months after the launch of ChatGPT. Our data primarily consists of academic papers and reports published during these periods. We have amassed a number of 604 papers on Chat GPT and 979 papers on the COVID-19 period. For the Covid period, we focused on collecting articles that discuss digital transformation, particularly those that concentrate on education and research fields. In the case of ChatGPT, our focus will be on articles that evaluate, critique, or discuss the implications and applications of ChatGPT in the same sectors. The main source of analysed data was the arxiv database, which is a free distribution service and an open-access archive for over two million scholarly articles.

ii. Data Preprocessing: Following data collection, we preprocessed the data to prepare it for analysis. This process included steps such as removing stop words (e.g., 'the', 'a'), stemming (reducing words to their root form), and lemmatisation (ensuring the root word belongs to the language). We also converted the text to a machine-readable format and implement tokenisation, converting sentences into individual words or 'tokens'.

iii. Topic Modeling Using Latent Dirichlet Allocation (LDA): We employed Latent Dirichlet Allocation (LDA) to conduct topic modeling on the preprocessed data from both periods. LDA is a probabilistic topic model that assumes documents are a mixture of topics and that each word in the document is attributable to one of the document's topics. By analysing the distribution of topics and the frequency of words within those topics, we can identify the dominant topics in the research and discourse from each period. The model hyperparameters were chosen using a grid search methodology, with over 540 models trained for each period, optimising for coherence as a performance management measure.

iv. Comparison of Topic Models: When generating the topic models for the two periods, we compared them to identify similarities and differences in the dominant themes of the two periods. This will involve a careful review of the topic keywords, their distribution, and their representation within the documents.

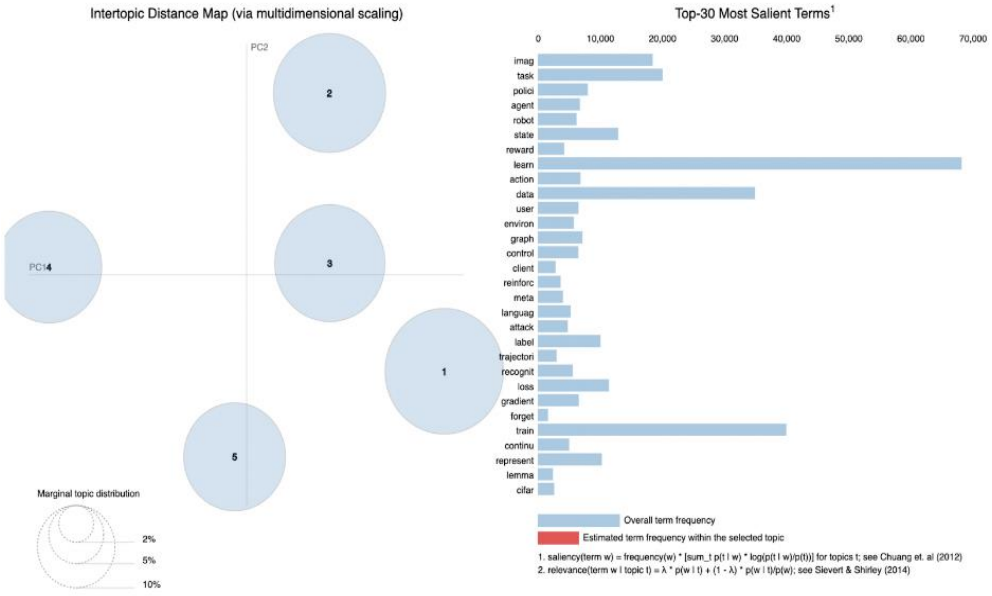
v. Interpretation and Analysis: Finally, we interpreted the results, placing them in the context of the broader digital transformation in research and education. This step involved analysing how the discourse evolved from the Covid period to the introduction of ChatGPT, noting the trends, shifts, and continuities.

The methodology outlined above provided a comparative analysis of the main topics discussed during the initial digitalisation period during the COVID-19 pandemic and the first six months after the ChatGPT launch.

5. Findings

For the COVID period, the best performing LDA model identified five topics inside the full text corpus.

Figure 1. LDA Analysis – Covid Period Research



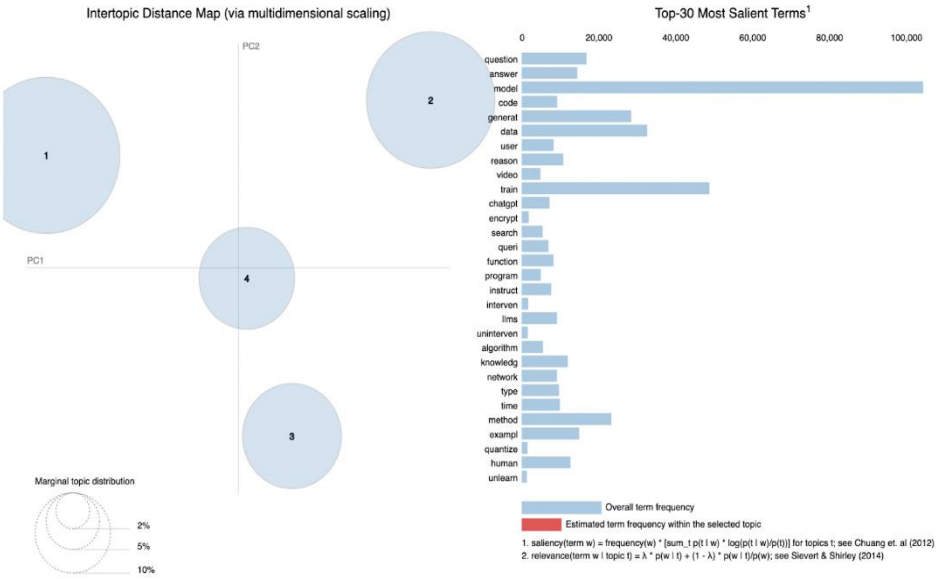
Source: Author's own.

Topics 1, 3 and 5, each refer to different methodological approaches used to study the different types of data that were available during the COVID pandemic. Topic 1 can be titled as "Deep Learning Research", containing terms such as "image, recognition, speech, natural, language, deep, model, vision, supervised, attention, text, etc.". Topic 3 can be summarised as "Network Effects Researrch", with the most salient terms such as "lemma, network, robustness, domain, sample, graph". Topic 5 can be summarised as "Shallow Machine Learning Research" with the most salient terms being: "lemma, theorem, gradient, layers, task, learn, forget".

The other two topics present in the LDA representation of the COVID 19 papers, are both referring to specific research conducted in the pandemic period. Topic 2 refers specifically to education and research in education, with the most salient terms being: "education, communication, online, surveys, students, participation", while topic 4 refers to a broader topic, namely "Policy Making", with the most salient terms being: "state, policy, uncertainty, learn, control, trajectory".

For GPT, there were mainly four topics present inside the best model that was trained given the data.

Figure 2. LDA Analysis – Chat GPT Launch period



Source: Author's own.

The first group can be characterised as "Quantitative Research done on ChatGPT" with the most salient terms being: "data, model, train, task, learn, text, encode, represent", the second group can be characterised as "ChatGPT Response Evaluation", with terms such as: "question, answer, human, performance, argument, evaluation". The third group can be characterised as "ChatGPT impact in education", with the most salient terms being: "education, student, learn, function, retract, refer, privacy". The last group can be characterised as "The future of Large Language Models" with the most salient terms being: "quantum, cloud, computing, cryptography, particle".

There are more or less obvious similarities and differences between the core topics identified for these two periods. First of all, we can see that in both periods, different types of quantitative research was being conducted. In the COVID period, all of the areas of statistical modeling where present, while in the ChatGPT period there seems to be a limitation of quantitative methods, that can be attributed to the lack of data and computing power that is needed to conduct research in the area of Large Language Models.

Second of all, the area of research and education was present in both of the studied periods, especially because of the choice of search terms that were used in data collection, but this area seems to be studied through different lenses. While in the COVID-19 period, the most salient terms contain "communication", "online" and "survey", in the GPT period, they contain "student", "education" and "function". The terms are linked with the most important areas of research conducted in the specific periods, namely the impact of online education in the educational processes

in the COVID-19 period and the impact of Large Language Models in the area of education for the ChatGPT period.

Last but not least, there were two topics that are highly specific to each of the studied periods. For the COVID-19 period, this was the topic of policy making, and for the ChatGPT period, this was the topic regarding the future of large language models, with specific topics such as quantum computing, cloud computing, cryptography, etc.

6. Conclusions

Based on the Latent Dirichlet Allocation (LDA) analysis conducted on research produced during the first six months of the COVID-19 pandemic and the first six months after the launch of ChatGPT, each period was characterised by distinctive themes reflective of the specific context and challenges. During the COVID-19 period, "Policy Making" emerged as a key theme, capturing the urgent need for strategic decisions in an unprecedented global crisis. In contrast, the post-ChatGPT period saw a surge in discourse around the "Future of Large Language Models", reflecting the anticipation and speculation about the potential advancements and challenges in the era of AI, with emphasis on concepts like quantum computing, cloud computing, and cryptography.

In conclusion, despite the differences in the thematic focus of the two periods, there are underlying similarities that present opportunities for cross-learning. The consistent reliance on quantitative methods suggests that a data-driven approach will remain critical as we navigate the GPT era. Meanwhile, the shifting focus within the research and education theme underscores the need for continual adaptation and reevaluation in these fields as technology evolves. Finally, the period-specific themes highlight the importance of contextually grounded research that addresses the unique challenges and opportunities of each period. Taken together, these insights provide valuable guidance for researchers, educators, and policy makers navigating the integration of Large Language Models like ChatGPT into the digital transformation landscape.

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SDG4: Digitising Education, Training, and Skills in the Context of the 2030 Agenda for Sustainable Development

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Abstract

In the context of sustainable development and the SDGs of the 2030 Agenda, quality education remains a priority. Undoubtedly, in the age of technology, digital competences and skills are essential to offer everyone equal opportunities to learn and develop, to build sustainable careers linked to the jobs of the future, and to become active citizens. In this regard, digitising education and ensuring the availability of digital infrastructure and equipment became even more relevant after the outbreak of the COVID-19 pandemic, which changed the international order. However, on average, two out of five Europeans aged between 16 and 74 still lack these skills (Digital Economy and Society Index). Moreover, school drop-out is still a reality, with an EU average of 10%. Therefore, this paper aims to analyse SDG4 on quality education, namely the digitisation of education and lifelong learning, as a response to the challenges of the future in the context of Agenda 2030. To achieve this objective, conceptual qualitative research through content analysis was conducted based on international writings, publications, and articles from various authors, specialists, and entities in the field. In addition, the research was further explored by means of a case study on Romania. The results show us that, basically, all forms of learning and jobs in the future will require a certain level of digital skills and competences. Moreover, the constant technological changes demand continuous exponential training and efficient practices for Romania / EU to remain economically competitive, politically stable, and prosperous. In this respect, reducing social disparities, ensuring access to quality education, and securing equality during society's digital transition are of crucial importance.

Keywords: EU, education, digitisation, sustainable development, skills.

JEL Classification: I20, Q01.

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1. Introduction

Undoubtedly, humanity is going through challenging times in an overwhelming reality, currently facing the second major crisis in the last four years, the war in Ukraine, preceded by the COVID-19 pandemic, which has caused global economic shocks. In this context, mobilising efforts to stabilise the situation, streamlining the activities and processes involved, and concentrating forces to achieve sustainable development goals are part of the actions that set the European Union's future course.

Sustainable development is thus a basic principle, firmly anchored in the European treaties, in particular the *Treaty on European Union*, but also a priority objective for the European Union's internal and external policies. In September 2015, Romania and the other 192 member states of the United Nations adopted the 2030 Agenda for Sustainable Development, which includes 17 Sustainable Development Goals (SDGs), 169 targets and 232 indicators in key areas such as industry, labour, health, education, gender equality, and others, designed to be universally applied in all member countries (both developing and developed) and to outline a European pathway to 2030. The 17 SDGs replace the 8 Millennium Development Goals (MDGs) and promote balance between the 3 dimensions of sustainable development: economic, social and environmental. Moreover, the *United Nations 2030 Agenda* is a commitment to eradicate poverty, to protect the planet by fighting climate change intelligently and sustainably, and to give people the security of tomorrow, prosperity, and peace that are so necessary today.

In this context, *SDG 4 – Quality Education* remains a priority. This goal aims to "ensure quality, inclusive and equitable education and promoting lifelong learning opportunities for all".

2. Research Questions / Aims of the Research

Education has always been an integral part of the sustainable development agenda, seen as an enabler of the transition to sustainability. As a result, there is growing international recognition of Education for Sustainable Development (ESD) worldwide. ESD is closely linked to international discussions on sustainable development, which have grown in scope and importance since the 1987 World Commission on Environment and Development report "Our Common Future", which provided the first widely used definition of sustainable development as "development that meets the needs of the present without compromising the ability of future generations to meet their own needs" (World Commission on Environment and Development, Brundtland Report, 1987).

The importance of promoting education for sustainable development and the active integration of sustainable development into education was also highlighted in paragraph 233 of the "Future We Want", the outcome document of the 2012 United Nations Conference on Sustainable Development, Rio+20 (United Nations, 2012). In 2005, UNESCO launched the United Nations Decade of Education for Sustainable Development, which reaffirmed the key role

of education in shaping values that support sustainable development and in building sustainable societies.

Nowadays, 103 million young people worldwide have no access to primary education or are illiterate. Of these, the most significant percentage (60%) are young women or girls, as per the United Nations *2022 Annual Report* (United Nations, 2022). According to recent studies, more than 70 million Europeans have inadequate reading, incomplete writing skills, poor mathematical thinking, and insufficient digital skills, all of which catalyse problems such as poverty, unemployment, or social exclusion (IMD World Competitiveness Center, 2022). There are 12 million unemployed in the EU, half of whom are low-skilled (Union Monitoring report on progress towards the SDGs in an EU context, 2022). Moreover, on average, two out of five Europeans aged between 16 and 74 still lack these skills (Digital Economy and Society Index). The skills gap and mismatches are striking. Many people work in jobs that do not match their talents. At the same time, 40% of European employers have difficulty finding employees with the appropriate skills needed for future jobs (World Bank Group, 2021). Access to education and training remains a key indicator of quality of life, according to a survey of more than 40 countries (OECD, 2020).

The EU economy is constantly evolving. The demand for relevant knowledge, skills, and abilities is changing at lightning speed. To cope with these changes, people need to be equipped with a set of key competencies, including functional literacy and digital skills. UNESCO defines the formal education as an ”institutionalised, intentional and planned education through public organisations e.g. relevant national educational authorities (UNESCO, 2010). Additionally, formal education consists mostly of initial education. In addition to basic/functional education including writing, reading, and numeracy, intelligent programming languages are also needed. Critical thinking, creativity, STEM (Science, Technology, Engineering, Mathematics), SMAC (Social Computing, Mobility, Analytics and Cloud Computing) and cross-disciplinary skills are eminently necessary to become active citizens, to build sustainable jobs and careers, so basic conditions for economic growth. Hence the actuality of this topic of analysis.

Therefore, the present paper aims to analyse SDG4 on quality education, namely the digitisation of education and lifelong learning, as a response to the challenges of the future in the context of Agenda 2030, with Romania as a case study in this respect, including the problems it faces, reported educational disparities and prospects.

3. Research Methods

This research is based on a theoretical methodology, which aims to synthesise the available information on the research questions through the analysis of several articles, technical reports, the results of studies and surveys. The literature comes mainly from international journals, business publications, websites of public institutions at local and international level, and government websites.

Moreover, in order to get closer to the objectives stated in the introduction, I considered the use of the case study method as appropriate. A case study refers to both an analytical technique and a specific research methodology to explore a problem in the social sciences, both of which can be used to generalise findings to the whole population. Case study research intends to investigate an individual, a community, a society, a location, an event, or another type of study topic to extrapolate main themes and findings that help better predict patterns, bring important subjects into focus, and/or provide a clearer understanding of a research topic.

The methods used to investigate a case can be classified as quantitative, qualitative, or mixed. In this paper, qualitative and conceptual research has been carried out with the support of various articles and studies. Among the main advantages of using the case study method are: the possibility of conducting intensive research, improving analytical capacity, and deepening knowledge of a social phenomenon. However, the case study method, like any other method, also has some disadvantages such as: the possibility of errors, the subjective nature, and the lack of fixed limits of the investigation.

Google is considered the principal online search engines for the purposes of this paper. Moreover, the following tools were used to locate (a) grey literature relevant to the research problem and (b) key researchers' work: Google Scholar, Google Academics, Connected papers, Dimensions.

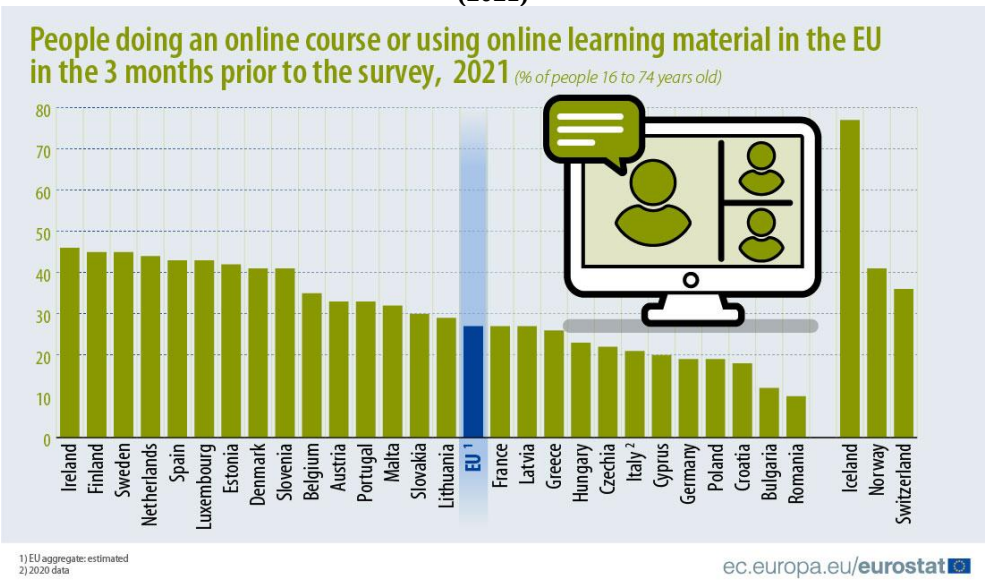
The main limitations of the case study are recall bias, its retrospective nature, and the need for a careful collection of measured variables.

4. Problem Statement

There is no doubt that the COVID-19 pandemic has accelerated digitisation in education. Educational institutions have had to switch to digital channels for teaching. Students, learners, and teachers have started using platforms such as Zoom, Microsoft, Teams, Meet, Google Classroom, Discord, Skype, Webex, and others to meet educational challenges (INACO, 2022).

However, in addition to the need to adapt to distance learning, imposed by the pandemic situation, online schooling is an innovative, convenient, and safe alternative to education and training. According to Eurostat data, in 2021, 27 % of 16-74-year-olds in the EU said they had taken an online course or used online learning materials in the three months prior to the survey, which is an increase of 4 percentage points (pp) from 23 % in 2020 (Eurostat, 2022). In 2021, among the EU Member States, Ireland had the highest share (46 %), followed by Finland and Sweden, both at 45 %, followed by the Netherlands at 44 %, as illustrated in the figure below.

Figure 1. People doing online course or using online learning material in the EU (2021)



Source: Eurostat (2022).

At the other end of the ranking are Croatia (18 %) and Bulgaria (12 %), with Romania at the bottom by 10 pp. Thus, compared to 2019 (before the pandemic), the share of people who practice distance learning and use online materials has increased in all Member States except Romania, where it has decreased by 4 percentage points to 10 %.

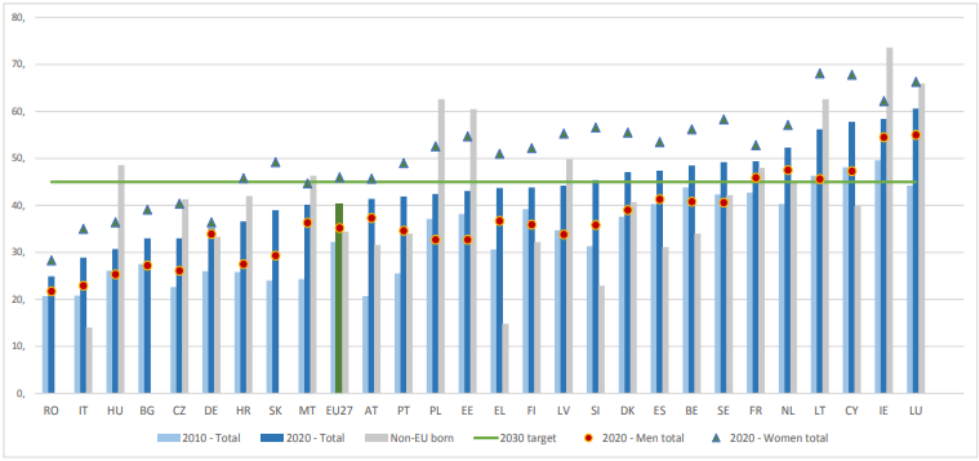
According to the same study, young people aged 16 to 24 have made more use of online learning than the average adult population. In 2021, 39 % of young people said they had taken an online course and 49% used online learning materials, compared to 23 % and 27 % among adults aged 25-34 and 20 % and 23 % among adults aged 35-44. The rates continue on a downward trend as age increases, reaching their lowest point among older people (aged 65-74), where 3 % have taken an online qualification, and 4 % have used materials available on the Internet.

I can therefore ascertain that young people are more likely to develop digital skills, but contrary to the general view that today's young people are a generation of 'digital natives', the results of the International Computer and Information Literacy Study indicate that youth do not develop above-average digital skills just by using digital devices, they need continuous training and effective practice (ICILS, 2020).

On another note, quality tertiary education plays a key role in the labour market prospects and social mobility of citizens. In this regard, the Member States have agreed on an EU-wide target for a European education area, which foresees that by 2030 at least 45 % of 25-34-year-olds will have completed tertiary education. In 2020, this share was 40.5 % in the EU, 8.3 percentage points higher than in 2010 (figure below). But there are marked differences between countries. Eleven states

have already reached the EU level target, and of the countries with tertiary completion rates below 45 %, only Romania and Italy have not reached 30 % in 2020. Taken together, these factors point to persistent difficulties in terms of equity and access to education and training.

Figure 2. Tertiary completion rate by country, gender, and citizenship (2010-2020), and the area European Education Area target for 2030 (in %, 25-34 years)



Source: Eurostat (2020).

As per the Eurostat data, in 2020, there was a greater decline in terms of employment rate of recent graduates aged 20-34, which fell by 4.7 percentage points for the low-skilled and by 4.5 percentage points for those with general secondary education. Employment rate of new high school graduates aged 20-34 decreased by 3 percentage points, from 79.1 % in 2019 to 76.1 % in 2020, with three countries recording a decrease of more than 10 percentage points (Spain, Cyprus, and Lithuania).

Moreover, the shock of the COVID-19 pandemic has reversed the six-year trend of declining numbers of young people who are not involved employment, education, or training (NEET). Reducing the share of NEET aged 15-29 from 12.6 % in 2019 to 9 % in 2030 is one of the complementary EU targets set out by the European Commission in its Action Plan for the EU's Employment Pillar of Social Rights (Joint Employment Report, 2023).

5. Case Study / Findings: Education in Romania

In 2022, on average, 10 % of young people (aged 18-24) in the EU were early leavers from education and training, in other words, they had completed at lower secondary education and had not pursued further education or training of any kind, and the target for this indicator is to fall to less than 9 % by 2030 (Education and Training Monitor, 2022).

In the case of Romania, more than 254,000 young people aged 18 to 24 (15 %) will have completed 8th grade or less in 2022, up from 15.3 % in 2021 and 15.7 % in

2020, according to Eurostat. In comparison, in 2018 the share was 16.4 % (268 235 young people) and in 2017 - 18.1 % (297 436 young people). Every year more than 300 000 children drop out of school, and half of them live on the edge of subsistence. In addition, Romania ranks first in the EU ranking of functional illiteracy (42 % of 15-year-olds). In another vein, Eurostat data show that Romania has the lowest share of the national budget allocated to education, almost twice the European average (Romania Country Report, 2022).

The identified barriers to accessing educational services in the post-pandemic context are economic and material. Poverty, social problems, and school segregation are the main drivers of the education gap. Thus, children from poor families are among those most affected. In many cases, income levels do not allow prioritising the purchase of equipment and tools for their digital use, nor of internet subscriptions.

Regional educational disparities in Romania also play an important role in understanding this issue. According to the *World Development Report* published by the World Bank in 2021, there are 4 regions in Romania where more than 30% of the population has never used a computer: South-Muntenia (37 %), North-East (33 %), South-East (33 %) and South-West Oltenia (31 %). At the opposite pole are the Bucharest-Ilfov Region with 10 % and the West Region with 19 % of citizens who have never used digital devices (World Bank, 2021). Thus, the study shows us that children born in poor regions would be less competent than those born and raised in economically developed areas, so I can conclude that the level of education is closely related to the level of development and urbanisation of the country.

According to *Quantitative analysis and labour market in Romania Study*, only 10 % of Romania's population had digital skills above the basic level in 2019, with Romania ranking last in the EU in this respect (KPMG, 2019). Alarming is the fact that only 20 % of the market needs for professionals in technology, engineering and science are currently covered in Romania, and the gap between universities offer and labour market demand is widening, due to under-delivery and under-achievement of skills needed in the jobs of the future, mismatches with the needs of the real economy in full swing, and labour migration. As a result, 1 in 4 employees in Romania will remain low-skilled, according to the DESI 2022 country report (DESI, 2022).

However, it is not enough to be only formally educated. Digitising education, smart automation, digital skills, and creativity in an age of technology is a necessity, not an option. As a result, our most valuable resource, the human resource, needs to benefit from continuous exponential learning and all its implications, so that today's young people become tomorrow's whole and functioning adults.

Education is a condition of existence. Digitised education offers a chance to adapt to changes and develop in a European area and beyond, starting at home, through a series of measures and reforms, aligned with *Romania's National Strategy for Sustainable Development 2030* (Department for Sustainable Development of the Romanian Government, 2017).

Thanks to the EU's resilience and recovery mechanisms under the *NextGenerationEU* instrument, Romania has outlined its €29.2 billion modernisation

plan through reforms. According to the 2022 *Country Report on Romania* (European Commission, 2022), the *National Recovery and Resilience Plan (NRRP)* will support education and skills development, allocating 12.4 % of the total budget to such measures (Minister for European Investment and Projects, 2022). Education will receive €4 billion from the NRRP in this context, of which €3.6 billion will be allocated to "Romania Educated" (Romanian Ministry of Investment and European Projects, 2022). By the end of the implementation of the programme, 6176 schools will receive technology and resources to equip computer labs, 75 000 classrooms will be equipped with modern furniture and 50 schools will be energy neutral, 2 000 green minibuses will be purchased to transport pupils and 130 crèches will be created.

In addition, 1175 SMART Labs will be purchased for secondary and high schools, the use of which will contribute to exponential knowledge accumulation. Thanks to the use of 4.0 technologies, pupils will benefit from augmented virtual reality simulations, which will help them to develop digital and technological literacy skills, stimulate creativity, memory, transdisciplinarity, critical and analytical computational thinking. Thus, the Exponential School aims to increase flexibility and adaptability to a technologically fast-paced world through the intelligent digital educational labs created by INACO in 2019-2021.

Another project to digitise education in Romania is the Strategy for the Digitisation of Education in Romania 2021-2027, which aims to make 90 % of Romania's population digitally literate and to link education with the jobs of the future (Romanian Ministry of Education and Research, 2021). This will give teachers and students free access to computer applications and software to help them in their learning and school projects, stimulating creativity and building digital skills. In this regard, Romania provides an employment subsidy for people aged 16 to 29 registered with the public employment services, according to Principles 1 and 3 of the pillars (on education, training and lifelong learning and equal opportunities).

At the European level, the European Commission is addressing these issues through its flagship policy initiative, the *Digital Education Action Plan (2021-2027)*, with a set of actions, namely:

- *SELFIE* instrument (Self-reflection on Effective Learning by Fostering the Use of Innovative Educational Technologies);
- Working with the European Investment Bank (EIB) through the *InvestEU* programme, to enable Member States to access funding for digital and physical infrastructure and to support the development of innovative skills and pedagogies;
- Digitisation of the *Erasmus+ 2021-2027* and *European Solidarity Fund* programmes;
- The *European Social Fund* to promote the development of digital competences as a means of ensuring better and fairer employment opportunities for European citizens;
- Development of the new *Digital Europe (DIGITAL*) programme with a specific focus on boosting advanced digital skills.

6. Conclusions

In an ever-changing society, digital skills will greatly determine competitiveness and the ability to drive innovation, being a pull factor for investment and a catalyst in the virtuous circle of job creation and growth, enhancing social cohesion. Artificial intelligence and new technologies have the potential to address some of today's biggest challenges in education, innovate teaching and learning practices and ultimately accelerate progress towards SDG 4. However, these rapid technological advances inevitably bring multiple challenges and risks, which have so far outpaced regulatory frameworks and policy debates.

Nevertheless, the quality and relevance of education and training available, including teaching standards, varies widely. Poverty, social exclusion, and lack of access to social and health care lead to increasing educational disparities, so the level of education is closely linked to the level of development and urbanisation of the country. This contributes to widening disparities in countries' economic and social performance, while stronger education and skills policies are key to shaping innovation and facilitating increased convergence with the best performing countries. In this context, skills (STEM, SMAC, cross-disciplinary knowledge) are a pathway to employability and prosperity. Their acquisition and development are essential for integrating the jobs of the future.

However, we are aware that Romania's education system still faces substantial challenges in terms of equity, inclusiveness, and quality of education. Despite recent progress, the school drop-out rate remains very high, highlighting existing socio-economic disparities. In this respect, the digitisation of education should be supported through a series of reform measures and good politics. For example, the Digital Education Action Plan and Smart digital learning LABs come to support inclusive and equitable digital education without discriminating and marginalising.

Taken together, these aspects should enable us to design and create an educational infrastructure that meets the needs of the population in order to provide access to inclusive quality education, accessible lifelong learning, and jobs that meet the challenges of the future in the context of the 2030 horizon. But for this, more transparency in the allocation of funds and greater investment in the education sector are needed. Moreover, policies, should promote equitable and inclusive access to digital education, with focus on empowering girls and women and disadvantaged socio-economic groups.

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Assessment of Global Business Literacy of Slovak Students

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Abstract

University students, especially those studying business and economics, face the challenges of a global business environment. This applies particularly to students in countries intensively involved in international business, where a significant portion of foreign-owned companies operate. This is the case of Slovakia, which is considered one of the most open European economies with added value created by foreign-controlled companies exceeding 40 %. Hence, future graduates who aspire to work in these companies or the field of international business are expected to be globally literate, and we consider it important to prepare them for this future global business career. The present paper, besides a brief introduction of the concept of global business literacy, is aiming to assess it on a sample of Slovak students, which should ultimately lead to an adjustment of their readiness to operate in the field of international business. For this purpose, the data from the 42-item survey completed by 150 Slovak university students studying business and economics are used. The data are processed using principal component analysis as well as correlation analysis. Our results show that students who completed a course focused on international business and those who traveled or lived outside their home country report significantly higher level of global business literacy in some components. At the same time, we also identified certain gender differences in this regard. Some pedagogical implications are further discussed in the paper.

Keywords: global business literacy, international business, Slovakia.

JEL Classification: A29, F69, I23.

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1. Introduction

Globalisation affects many aspects of our lives, including the patterns and dynamics of the labour market. Davidson et al. (2020) pointed out that globalisation influences the mix of jobs available in the economy as well as the speed at which people acquire skills. At the same time, as employment and work, in general, become more geographically complex (Dorow et al., 2017), future employees are expected to cope effectively with the challenges of a global working environment. Even more crucial, it is for future graduates in the field of economics and business, who are often expected to work in the international business environment. This is a case of students in Slovakia because this country reports a high portion of foreign-controlled companies as potential future graduates´ employers.

According to the latest data contained in the Statistical Yearbook of the Slovak Republic (2022), the share of foreign-controlled enterprises reaches almost 12 %; however, there are significant differences in terms of size categories of enterprises. Within the category of large enterprises (i.e. with 250 or more employees), the share of foreign-controlled enterprises in the total number of enterprises in the Slovak Republic is at the level of 69 %. Hence, foreign-controlled enterprises are among the largest employers in Slovakia.

It is in our interest to deal with the issue of preparedness of Slovak students of business and economics for international business careers through the assessment of their global business literacy and identification of factors that can influence this type of literacy. Our research is based on a questionnaire survey completed by 150 Slovak university students. For the processing of the data, principal component analysis and correlation analysis are used.

2. Problem Statement

The importance of assessment of global business literacy and its further development can be underpinned by findings related to the knowledge, competencies, and skills necessary for an international business career. A study by Schworm et al. (2017) showed that the extent of international business education through not only formal but also informal educational processes is a prerequisite for the subjective career success of managers in an international environment. Overall, the authors demonstrate that studying international business not only advances academic knowledge in this discipline, but also has important implications for all stakeholders within international business. Fakhreldin et al. (2021) also confirmed the importance of intercultural management courses and suggested that these courses should be a core for all students to foster their future global employability.

Besides the development of global knowledge through specific courses, the relevant literature also provides other examples of complementary co-curricular activities that can contribute especially to the development of global competencies and skills. Meng et al. (2017) investigated, e.g., the effects of the experience of contact with foreigners through home campuses activities and found it as a significant means for cultivating global competence. The authors recommend the

establishment of, e.g., English Corners and organising various campus activities to connect international students with local students, through which both parties can cultivate their global thinking and acquire communication skills necessary for an intercultural environment. Another example is the experience of working in virtual project teams as a means of internationalisation at home. Rauer et al. (2021) find such an international tele-cooperative project beneficial for the development of international competencies.

The highest level of global business competence can generally be achieved through internationalisation abroad. In this regard, short-term and long-term study abroad programs are often mentioned. Geyer et al. (2017) proved that study abroad programs, especially short-term ones, have a significant impact on both leadership skills and career aspirations. Moreover, Le et al. (2018) concluded that the effects of short-term study abroad programs are similar to the long-term ones, which are more money and time-consuming. Another effective means of increasing students' confidence to enter the global labour market and look for opportunities outside their home country, is considered to be international internship experience. Kattiyapornpong and Almeida (2022) in this regard concluded that international internship experience facilitates students to build their international professional networks, become culturally competent, increase their level of self-perceived competence, and cultivate a globalised perspective of career adaptability. However, Pinto and Pereira (2019) showed that the experience, although from an optional foreign internship, is positively perceived by future employers and it is advisable to have it listed in the CV, but it does not support the prediction that "the more international, the better". This suggests that the employability of graduates depends not only on the academic qualifications and skills they can bring to the labour market, but also on the expectations of their unique contribution.

The above literature review shows that there are various means and factors that contribute to the development of global business literacy and subsequently influence the course of a business career, especially in an international context.

3. Aim of the Research

At the center of our interest are students of economics and business who face the challenges of being ready to work actively in the global business environment. We have taken into consideration the fact that job offers on the current labour market in Slovakia are often submitted by multinational corporations, since 69 % of large enterprises in Slovakia are foreign-controlled (Statistical Yearbook of the Slovak Republic, 2022). According to Drahokoupil and Fabo (2019), these foreign-controlled companies generally advertise occupations with higher qualifications compared to domestic companies. Hence, the aim of our research is to assess the level of global business literacy of Slovak university students and identify its key determining factors, which should ultimately lead to an adjustment in the readiness of the students to operate in the field of international business.

4. Research Methods

For the purpose of our research, a questionnaire survey was conducted using the MS Forms platform during the summer term of the academic year 2021/2022. Students filled out the questionnaire immediately after the particular course under the supervision of the teachers (authors). Therefore, the questionnaire was filled out by all students participating in the particular course, whom the teachers could address. The effective sample consisted of 150 bachelor and master students of the Faculty of Business Economy of the University of Economics in Bratislava, with seat in Košice, Slovakia. The research sample consisted of 115 undergraduate students and 35 master students. In terms of gender, there were 101 women and 49 men.

The questionnaire included 42 items/ statements divided into seven specific dimensions, six of which were adopted from the concept of global business literacy developed and validated by Arevalo et al. (2012), namely: self-efficacy - 8 items (SE), willingness to learn - 8 items (WtL), relationship development - 6 items (RD), technical competence - 9 items (TC), self-awareness - 7 items (SA). Moreover, based on the findings of our previous study (Bobenič Hintošová, Bruothová, 2022) we decided to expand the concept of global business literacy by the dimension of risk-taking tendency (RT) consisting of 4 items, one adopted from Dohmen et al. (2017) and three complementary items adopted from Donthu and Gilliland (1996).

In the case of these statements, students were asked to express the extent to which they agree with each of them on a 7-point Likert-type scale: 1 = strongly disagree, 2 = disagree, 3 = somewhat disagree, 4 = neither agree nor disagree, 5 = somewhat agree, 6 = agree, 7 = strongly agree. Some statements were negatively worded, and the responses were consequently reverse-coded. In general, the higher the score, the higher the achieved global business literacy and risk-taking tendency. Moreover, the questionnaire included also some background information related to age, gender, language competence, travel experiences, and interactions with other cultures.

The 42 items of the questionnaire were subject to principal component analysis (inspired by the study by Arevalo et al., 2012) using SPSS. The suitability of data for this analysis was confirmed by the Kaiser-Meyer-Olkin Measure of Sampling Adequacy and Bartlett's Test of Sphericity. Based on the results of the principal component analysis, the identified components were subjected to a correlation analysis (using the Pearson coefficient) with selected background information data.

5. Findings

The initial principal component analysis showed the existence of six components with eigenvalues greater than 1 explaining 27.1, 10.6, 8.9, 7.2, 5.9, and 5 % of the variance, respectively. The six-component solution explained a total of 64.7 % of the variance. Table 1 reports the rotated six-component solution.

The items in the first component reflect the self-efficacy dimension of global literacy that is associated with a willingness to live and work abroad, as well as

perceived adaptability in this case. The second component consists mainly of items routed around the willingness to learn more about world history, global geography, other countries, and their cultures. Some of the items of the self-awareness dimension, namely the perception of otherness when doing business abroad, are loaded into component three. Items in component four express relationship development with foreigners at personal but also professional level. The fifth component is related to items describing perceived technical competence, i.e. knowledge about international trade, global institutions, and the difference between developed and developing economies. Three of the four risk-taking questions are loaded into component six.

Table 1. Rotated component matrix[a]

	Component					
	1	**2**	**3**	**4**	**5**	**6**
se5	0.825					
se6	0.799					
se1	0.793					
se2	0.768					
se4	0.615			0.321		
se7	0.425					0.369
wtl1		0.784				
wtl3		0.754				
wtl5	0.457	0.708				
wtl2		0.671				
tc7		0.669			0.315	
wtl4	0.461	0.637				
sa7			0.732			
sa6			0.720			
sa4			0.671			
rd6			0.600			
tc1			-0.532		0.447	
rd5				0.825		
rd3	0.310			0.716		
rd4				0.675		
rd1				0.593		
tc6					0.843	
tc4					0.768	
tc2					0.683	
rq4						0.820
rq1			-0,334			0.806
rq2						0.792

Note: Extraction method: principal component analysis.
Rotation method: Varimax with Kaiser normalisation.
[a]Rotation converged in 7 iterations.
Source: Own processing.

Further, we conducted a correlation analysis using the Pearson coefficient, between the identified components and selected background information, namely, living abroad experience, passing a course related to international business (IB course), year of study, and gender. The results are reported in Table 2.

Table 2. Correlation matrix

	living abroad	**IB course**	**year of study**	**gender**
component 1	0.249**	0.188*	-0.019	-0.081
component 2	0.041	0.006	-0.163*	0.013
component 3	-0.150	0.123	-0.094	-0.106
component 4	0.148	0.081	-0.155	0.044
component 5	0.159	0.256**	0.286**	0.179*
component 6	0.102	0.051	-0.002	0.001

*Correlation is significant at the 0.05 level (2-tailed).
**Correlation is significant at the 0.01 level (2-tailed).
Source: Own processing.

The results show that the living abroad experience enhances the self-efficacy dimension of global business literacy. It means that students who travelled or lived outside their home country for a longer time have better abilities to adapt to life abroad. However, the living abroad experience is not significantly associated with any other component. Passing the course related to international business is positively related to both self-efficacy as well as technical competence, i.e., international business competence. This competence is also better developed for students in higher grades. Surprisingly, the year of study is significantly negatively associated with the willingness to learn dimension. Significant gender-related associations have only been found in the case of international business competence. That is, men reported a higher perception of knowledge about international business than women.

6. Conclusions

The aim of the present paper was to provide an assessment of the level of global business literacy of Slovak university students and to identify its key determining factors. We first provided considerations on the context of international business career development including tools that can be utilised in this regard, which are often found to be used for global business literacy development. Then, we presented the results of a questionnaire-based survey. The principal component analysis showed the existence of six components, which were subsequently subject to correlation analysis. The results show that the self-efficacy dimension is positively associated with living abroad experience, as well as passing the international business course. Therefore, this dimension of global business literacy can be developed through formal education on the basis of a classroom-based approach as well as through internationalisation abroad. The willingness to learn dimension is negatively related to the year of study, which may reflect a greater curiosity and desire for learning in the case of younger students. The formal knowledge

base related to international business is significantly better developed after passing the formal education related to international business, as well as in the case of students who study longer.

We have considered also other factors to be included in our analysis (such as foreign language skills and intensity of regular contacts with other cultures); however, our sample is relatively homogenous in terms of foreign language skills and intensity of contacts with other cultures, which are relatively weak. Therefore, we have not detected strong statistically significant relationships in this regard. At the same time, Slovak students have in general relatively few experiences from abroad. Hence, we consider it important to encourage students to involve more actively in internationalisation abroad activities and to spend part of the study abroad as a part of the curriculum. At the same time, we recommend including more internationally oriented components into curricula, such as foreign excursions, the creation of virtual multinational teams to solve tasks/ case studies, etc., which could at least partially compensate the study abroad experience for students, who cannot afford it. Our study can serve as a basis for a broader international comparison of the results in future research.

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A Design Methodology for Lifelong Career Transitions

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Abstract

As technology facilitates job automation, individuals feel more motivated to engage in activities that align with their values and life purpose. This trend accelerates the demand for career education through vocational guidance and mentoring. Well- thought-out work design is highly connected with employee well-being, enhancing a positive work attitude and the organisational performance. Workers will not only perform various job tasks in the future, but the duties will be markedly different from what they have studied. Talent mobility and upskilling is currently one of the main focuses of companies that will lead to a migration of the workforce towards more tailored forms of labour. Despite this accelerated transformation of the world of work, the general concept of work design, including task management, operations, relationships, skills, and evaluation, is resistant to change. Assessing and evaluating one's skills, as well as planning a strategy on how to develop new competences, is an individual process. With this article, I intended to build a methodology for designing a personalised lifelong career transition plan, in the context of work automation and the use of digital technologies, for multi-skilled creatives. The methodology, which was carried out following qualitative and theoretical research, consists of assessing and reporting skills, identification of gaps in knowledge mapping work opportunities, and linking individuals' abilities with the most suitable technology by way of design. It is built on the design thinking process, answering four design questions: what is; what if; what wows; what works. Further research will be performed by testing the methodology and iterating it until I obtain the most suitable solution.

Keywords: job design, skills taxonomy, lifelong learning, upskilling, work automation, design thinking, work design.

JEL Classification: L10, L25, M30, O10, O32.

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1. Introduction

The hypothesis from which this research had started was that organisations do not know how to integrate multi-skilled creative individuals, in the context of a need for this type of candidates for a post-pandemic reset and the transition towards a new era in the field of human resources and talent acquisition, in which the enhanced digitalisation of the businesses and the development of technologies need workforce requiring both human, creative abilities and technological ones. I have attempted to identify the degree of awareness of the organisation regarding the employment needs of multi-skilled creative talent. This niche refers to those individuals that have experience in the domain of creative industries, originating from several fields, from advertising to fashion design, architecture, or film and music. A concrete example is that of an employee hired as creative director, within a translation company using technology and artificial intelligence, that has in their profile competencies associated to the advertising sector, but also marketing and branding. These are candidates who can manage the creative processes of organisations, generate creative solutions, or act as a bridge between the creative team and management or the technical team of the respective company.

2. Problem Statement

2.1 Literature Review

In this section, the main definitions of the concepts that form the background for this paper will be provided, explaining the main factors that form the basis of the research.

Job design, or job crafting, has many definitions. One such definition given by Cárdenas-Muñoz and Campos-Blázquez (2023), based on the compilation of 76 others, is that job design is the proactive behaviour that makes the employee change their role, demands, resources and their work, in order to develop their full potential, to have a positive impact on their environment (individual, team, enterprise, and society), adapting to any context (face-to-face, remote, hybrid, and Metaverse).

Work design is the process of employees proactively creating their own tasks and activities during work, without changing the job itself, to increase their own enjoyment by raising their level of stimulation, avoiding boredom, and optimising their personal experience of work. Work design differs from job design, reflecting both the technical tasks of the individual within the limits of the fixed job and their engagement in flexible roles outside the limits of the defined job, possibly affecting the interface with other work roles (Reiche, 2023). Work design can even be playful, introducing notions of play into designed activities (Bakker et al., 2020).

By skills taxonomy, there is understood a list of capabilities that is structured. This list identifies the resources of an entity in a quantifiable way, classifying skills within the organisation into groups and clusters, thus creating a common language

and understanding (Guy, 2021). Skills can be translated across taxonomies to form a common tongue (Zhi et al., 2021).

Work automation means the substitution of human labour by technology for specific tasks or jobs, such as processing large databases to discover repetitive patterns needed to generate value, increase efficiency, and support decision making, and also eliminate human errors through automation. (Keegan et al., 2022).

Upskilling basically means learning additional skills. In the context of automation, employees could find that some of their skills could easily be replaced by technology. Upskilling could become a necessity for evolution in one's career.

Lifelong learning can be defined as learning activities undertaken in all the moments of life, with the aim of improving knowledge, skills, and competences from a personal perspective: civic, social, or work (Colin, Le Grand, 2008), and in the current environment, could be considered as a way in which to engage in a continuous education, considering the initial training as only a starting point (Dandara, 2014).

3. Research Questions / Aims of the Research

The world of work is going through an accelerated transformation due to rapid automation (Stankevičiūtė, 2023), and the resistance to change displayed by the hiring companies is a factor that risks hindering progress.

For the last 100 years, the workers that were in demand had to develop a linear, scalable economy to answer the needs of globalisation. Today, the new challenge is the dissonance felt at the levels of the emerging businesses and the candidate profiles for leadership positions in these industries. Creative thinking influences the rigid, resistant to change structures.

The initial question that founded my research is: how can I build a methodology for designing a personalised lifelong career transition plan, in the context of work automation and the use of digital technologies, adapting creatives for the future job market?

Talent mobility and upskilling is currently one of the main focuses of organisations, and this will lead to the birth of a multi-skilled creative corporate culture. This collective will need leaders, managers, and business translators with strong creative and soft skills. The aim of this paper is to help bridge the gap between creatives and companies by aligning the capabilities of the multi-skilled individual with a tangible need, through a new job design framework.

4. Research Methods

The research methods used:

- Documentation in the literature, in order to synthesise the context of scientific research, especially in the field of work relationships;
- Comparative analysis between how work has been organised in the past and how it could be designed in the future;

- One-on-one exploratory interviews, held virtually, on the Zoom platform, as well as face-to-face. Using this qualitative research method, I uncovered the ways through which to integrate the creative talent in the organisational environment, by gaining a profound understanding of the role this competence has in business and what the participants want in relation to their future professional development and personal wellbeing.

Design thinking is a creative problem solving methodology that has been used in business since the early 1990s. It is a human-centered approach to innovation which utilises the designer's mindset and tools to integrate the needs of people, the latest technologies and the goals that lead to business success through new products and services. Design thinking has the advantage of being a useful tool in solving wicked problems, meaning problems that seem impossible to solve due to their ever-changing nature.

Exploratory, or in-depth interviews, are one-on-one conversations where the interviewees are treated as the experts. These are one of two design thinking tools that are used especially in the Empathise phase of the process, which sets the foundation for the definition of the problem to be solved, the other one being observation. I have chosen to use the exploratory interview in my research, since this method has the advantage of allowing for a deeper probing into the participants' thinking, avoiding groupthink that could influence candid feedback. I have been teaching design thinking for the past 2 years to students, and due to my experience, I decided to work with design thinking as a starting point for the future jobs design framework, answering 4 questions: what is, what if, what wows, what works. The design thinking process has the advantage to perform in-depth analysis on small groups of people, with the aim to deliver the solution that best fits their specific needs. My research is focused on a small niche that involves multi-skilled creative individuals.

5. Findings

As part of my research, I have interviewed various international experts on the field of work, HR, and organisational design. The interviews were conducted during 2021, over the whole year, and they took place one-line as well as face-to-face. The respondents were selected based on their experience in the field of working with highly creative and multi-skilled individuals.

Mesa is a Portuguese company that creates ad-hoc teams to solve complex problems in a short period of time. They count on the experience and skills of the recruited talent and the working process. The working method of Mesa is based on a simple formula: "a leader at the head of the table to unlock people's full potential, a small team with all the knowledge and skills needed to solve a problem and one mission – a clear reach point with which the whole team compromises with." One process leader at Mesa was interviewed on how creativity can be a key factor when building a solution for a complex challenge. They emphasised that teaming creative people with corporate employees brings more freedom of thinking, adding that "In these hard structures to change, creative people's mindsets will impact."

An expert is the author of a bestselling book and has 20 years of combined executive HR and Talent Acquisition experience, working for Fortune 500 companies, and the president of a leading IT and Engineering Staffing firm. According to them, companies hire young talent for their story, the recruitment process is about building a connection right away. Storytelling and a deep understanding of one's skills and knowledge can help creative professionals land more suitable jobs.

Another expert is the world's leading authority on talent and human resources, ranked as the number one management guru by a leading business magazine, considered as one of the most important business thinkers in the world, and author of over 30 books and 200 specialist articles. They emphasised the importance of the companies' understanding of the current moment we are passing through and the adaptation of strategies that were successful in the past to current global needs: "success is given, in my view, by the current context and how we respond to change. Companies that do not embrace change will disappear. Two aspects are essential in the organisational environment to maintain a permanent state of innovation and hyper creativity: focus from outside to inside and embracing divergent thinking". Regarding innovation at the work relationship level and designing jobs for the future, they point out: "companies that are open to change should ask employees the following question every day: Can you tell me what you did today to help a customer have a better experience? At its core, change is about constantly creating added value for consumers, regardless of the environment or where they choose to work."

The main findings of the research are the urge of businesses to transform the way they attract, hire, and retain talent by ensuring lifelong learning and development for their employees in the context of job automation and a sustainable work-life balance. A sense of purpose and service is mandatory for multi-skilled creative people, to make them enrol in new forms of work. Also, co-creating tailored positions in companies is a competitive advantage and a motivation factor for employees.

Following this research, I have concluded that there truly exists a lack of personnel with multi-skilled creative competencies in the organisations and, at the same time, a lack of understanding of these profiles. Presently, the organisations are facing complex problems that require an approach that is different from the one used in the business environment until recently. With this new paradigm in view, I designed a lifelong learning and upskilling process, based on three pillars: pivot, career narratives, and talent manifestation.

5.1 Overview

The method is a holistic approach delivered through a series of 3 interconnected or independent events and one-on-one sessions and includes working with a set of design tools and exercises: starting with the evaluation and measuring of individual capacity, passing to an evaluation of the professional abilities and knowledge and, finally, sketching a career pivot, using transferable abilities and prognosis. The job design methodology is based on the four key questions that drive the design thinking process: what is; what if; what wows; what works (Liedtka, Ogilvie, 2011).

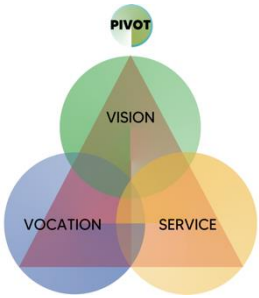
5.1.1 What Is?

In design thinking, this stage represents the exploration of the status-quo. It is an empathic process, built on exploratory interviewing and observation, as research methods.

5.1.1.1 Pivot

Exploring the areas of vocation, service, and vision, the first module, Pivot, aims to provide individuals with the knowledge on how to identify and embody their creative skills, measure their strength, and deploy them to improve performance, and trace the impact of their daily work on their personal well-being and health.

Figure 1. Pivot



Source: Author's personal contribution.

To build an individual answer to the question: - what is the most suitable career path for one's future, creatives are invited to define what their innate abilities are, what is the service they want to provide for the community at large, and what are the skills that enable them to pivot toward a new professional life. This is the pivot step, where they create their own capabilities chart and identify a potential career pivot, which they are asked to write in a „from – to" phrase: from where you want to pivot and where you want to go next.

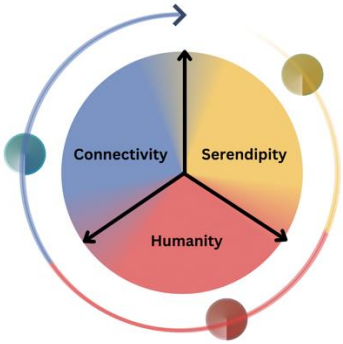
5.1.2 What if?

This stage is ideation and the place where designers start to consider new possibilities to create innovative products and services.

5.1.2.1 Career Narratives

For my methodology, the product is the career pivot, which individuals need to tailor according to their needs, values, and baseline skills. This is the second module of the job design process, which provides people with a roadmap and matches their capabilities with a tangible need. This layer is about exploration, and it uncovers 3 possible futures of work. This research is focused on finding new ways to navigate the future job market and establish a pivot in one of these areas of innovation: Connectivity (Marketing, Communication, Customer), Serendipity (Digital, Tech, and Data Science for Business), and Humanity (People, Behaviour, Transformation).

Figure 2. Career Narratives



Source: Author's personal contribution.

Which of the following fields enables a pivot to manifest at its full potential? In this session, creatives have to evaluate the context in which to position their pivot, using the landmarks offered by the mentor as a guide to help them align their pivot with a tangible market need.

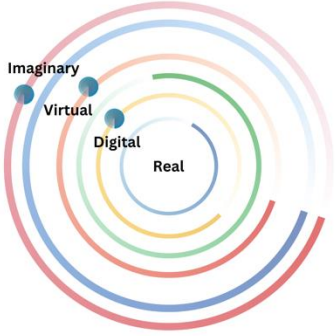
5.1.3 What Wows?

This stage helps teams of designers to focus on a solution that stands out.

5.1.3.1 Talent Manifestation

Technology is a key factor in design and is part of the toolkit of any creative professional. This step is very experiential and connects talent with future mediums of expression, in addition to the known reality. In industry 4.0, businesses will have to come up with new ways to manufacture, create, and sell their products. The digital market will become a place for digital native products, and, in this context, the ideation will be focused on how to future-proof our careers by designing collaborative functions which will link technology (AI) with the human creative potential. The last step of the method is designed to break the norms and come up with innovative solutions to be acquired by companies looking to pioneer the future of work.

Figure 3. Talent Manifestation



Source: Author's personal contribution.

5.1.4 What Works?

This stage is where small-scale prototypes are born and tested.

5.1.4.1 Implementation

Following one method proposed by the experts I interviewed, after the jobs design process, individuals have 90 days to launch the change and start the transformation. After the expiration of the term, they are invited to participate in an on-line or on site reunion in which to share from their personal experience and iterate in order to move forward with their career pivot.

5.1.5 Research Limitation

The current study is in an incipient phase and, therefore, has several limitations. First, the data was gathered from a small sample of experts, therefore its results may not be representative for the entire population. Second, the data that was gathered is qualitative therefore its interpretation might be biased. Third, since as mentioned, the research is rather recent, it does not benefit from the improvements brought by testing and iterations.

6. Conclusions

6.1 Overview

The future of work will look differently in the next five years due to the transformations that are presently felt, regarding the crises generated by unexpected situations. These crises are in their turn generators of opportunities. To educate the future generations to continuously adapt to change, personalisation of the requalification programs will be needed, as well as a different approach to the report to everyday work. This need is also felt in the context of the transition from a scalar economy to a symbolic one, in which the business strategies are built around the real values and need of the consumers and require both human and technological competencies to be successfully implemented in the new virtual worlds. Creativity is an often-used instrument in solving complex problems, and there will be more and more need of employees with creative abilities to generate innovative solutions across all industries.

Presently, the biggest challenge for the creative talent is to find a way through which to become interdependent through the identification of the proper technology that would complete their skillset and will support them in their future professional choices.

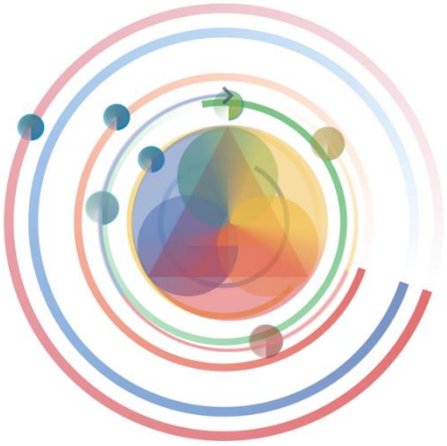
In conclusion, the upskilling of creative talent in the context of the new economy first refers to the alignment of their values with their personal mission and community service, through new forms of work. The tasks are delivered through processes of co-creation and collaboration between creative and technological communities. The process of pivoting in a career also requires a knowledge of the ecosystem of the new technologies, of the VR, AR, and XR type, and of the

instruments with which the new reality will be built: the metaverse. These instruments are momentarily accessible through games, platforms, and apps, and become more and more easy to use, facilitating the evolution of the creative economy.

6.2 Future Steps

To enhance the current methodology, the future steps that would need to be taken are methodological testing with various groups of multi-skilled creative individuals, as well as further iteration based on the new findings and repeated testing.

Figure 4. Future Jobs Design Methodology



Source: Author's personal contribution.

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Comparative Study of Employers' and Students' View of Business Management Skills and Competencies

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Abstract

This article compares employers' and students' views on the skills and competencies that business administration and public administration graduates need to acquire. The opinions of the two categories, mentioned above, regarding the skills and competencies in the business administration and public administration fields are identified based on a questionnaire administered to the students at the University of Bucharest, Faculty of Business and Administration, and based on the opinions expressed by prospective employers. The present study also aims to identify and analyse the main differences between employers' expectations and how students are prepared during their university years. The results of the study can be used to update and improve the curricula of the study programs in the field of business administration, so that they correspond better to the requirements of the labour market.

Keywords: skills, competencies, business administration, questionnaires, labour market.

JEL Classification: I23, I25, J24, O15.

1. Introduction

This study aims to identify, compare, and analyse the opinions of employers and of students with regard to competencies and aptitudes to be gained during business administration and public administration bachelor studies.

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The importance of this study is given by the essential role played by the labour market in a modern economy. For demand of labour to be properly aligned with labour supply, study domains, as well as competencies and aptitudes required by employers, must be constantly updated. (Lieberman, 2021). From this perspective, the educational system has an especially important role in the training of future graduates, in the formation of competencies and aptitudes required by employers (Van Damme, 2022).

Artificial intelligence and growth in digitalisation have led to changes in the nature of work and business models. Therefore, changes need to be made in the education system, which should lead to improvements in productivity (Siepel et al., 2019) and the standard of living.

This paper starts, concerning employers, with the study "Analysis report concerning graduates and employers" done within the context of the Human Capital Operational Plan (POCU, 2014-2020), in which, based on a questionnaire applied to 41 employers, the authors identified and classified the most important competencies desired from potential employees and were listed 6 aptitudes considered important for prospective employment. In the second part of the study, in order to cover the students' opinion on the same topics, we applied three questionnaires to students from the Faculty of Business and Administration, University of Bucharest (FAA). Based on 53 answers to the first questionnaire concerning aptitudes and competencies, 68 answers to the second questionnaire which was done to ascertain the need for the creation of a new master's program, Small and Medium Size Business Administration (AAMMLE), and 50 answers to a questionnaire concerning the need for a new master's program in the area of Energy, Climate Change, Sustainability and Public Policy (ECCSPP), for a total 171 answers, the same competencies were ordered on their importance and a list of the most important aptitudes, as considered by prospective students, as created.

After doing a comparative analysis of the two opinions, those of employers and prospective employees, certain essential differences were observed, especially with respect to competencies. Furthermore, students expressed their options, in another questionnaire, about the order of competencies considered important for the two new programs. The results are in line with those of the European Union with regard to the circular economy, sustainability, and digitalisation.

2. Problem Statement

The significant changes which are taking place, at the moment, in the global economy, require essential changes on the labour market. Gerstenberger and Webern (2023) have recently shown, based on a series of studies done over a period of 20 years on European employees, the fact that there are profound changes concerning aptitudes and necessary competencies corresponding to different existing places of employment. From this we can conclude that there exists, at present, a lack of labour and competencies. Less of the work currently being done requires physical labour or operating machinery; instead much more is focused on aptitudes and competencies oriented towards social work and, as a result of digitalisation, repetition,

standardisation, and routine. These changes require changes in the types of required competencies, a much more important part being digital ones (Waltower, 2023), to which one can add competencies concerned with the transition to the green economy. "It is in the context of these employment, sectoral and occupational shifts that Europe is faced with relatively high labour and skills shortages. Eurostat data show that by the third quarter of 2022, the average EU vacancy rate had reached historic highs of around 3 %." (Gerstenberger, Webern, 2023).

Based on an analysis done by Eurofund and Cedefop (European Centre for the Development of Vocational Training) on the European Company Survey, a positive correlation was found between employee competencies and performance. Adapting competencies and aptitudes of prospective employees is essential for economic development. The share of EU workers with skills not matched to their jobs is 45 %, according to Cedefop.

Regarding factors influencing labour demand "Beyond technology, other key drivers of structural change include the offshoring of certain activities to less developed countries and structural changes in the demand for products and services due to higher income levels and demographic changes (aging) of the population, among other factors. As will be described in the remainder of this report, the extent to which EU countries are affected by these factors differs between countries." (Hoftijzer, Gortazar, 2018). Significant changes in the evolution of competencies and aptitudes in the labour supply because of the expansion of the education system, but also because of international migration. "Labour supply factors influence the level, type, and distribution of skills of the workforce. They have been extremely relevant in the last decades for most, if not all, European countries. The expansion of education systems has been very important in many countries since the 1980s and particularly large in the EU-South and CEE countries, resulting in a rapid rise in the workforce's educational attainment. Simultaneously, the inflow of migrants has also had an impact on labour and skill supply." (Hoftijzer, Gortazar, 2018).

According to the report "Analysis report concerning graduates and employers" (POCU, 2014-2020), the role of a quality education is to determine positive changes for every individual, as well as to change the overall economic development of society.

The added value of this study is that it emphasises the existence of a difference between employer expectation and student preferences, which has future implications concerning the way in which future study programs can be structured and implications for economic policies as to how employers can be persuaded to give a greater importance to certain aspects.

3. Research Questions / Aims of the Research

Is there a match between the competencies desired by employees and the competencies that future graduates want? The research aim of this study is to identify aptitudes and competencies required by employers in SE Romania and to compare them with those that the students at the FAA, hope to obtain. By comparing and contrasting the two opinions, potential employers and employees, the present study

hopes to identify compatibilities in order to better adapt future study programs to the requirements of the labour market in Romania, as a part of the labour market in the EU. The study also contains a classification of the importance allotted by students at FAA to competencies corresponding to relevant areas of study.

4. Research Methods

The data gathering method was a questionnaire. We used two questionnaires which were given to FAA students and potential applicants to bachelor studies at FAA. The two surveys were distributed online using Google Forms, and the answers gathered in Google Drive. In both cases, they contained closed-form questions with a small number of possible answers.

In order to analyse the employers' expectations with regard to students' competencies and aptitudes, a questionnaire was drawn up, based on the aforementioned study, and the students were asked to express their opinions on these competencies and aptitudes, by identifying five competencies they would consider important out of the eight proposed by employers, and by choosing aptitudes, without specifying a limit, out of the six proposed by employers.

In order to measure the importance given by the respondents with regard to the competencies considered important for the new programs envisioned at FAA, AAMMLE and ECCSPP, a questionnaire was distributed and they were asked to specify, by choosing five answers, the importance they give to the various competencies measured.

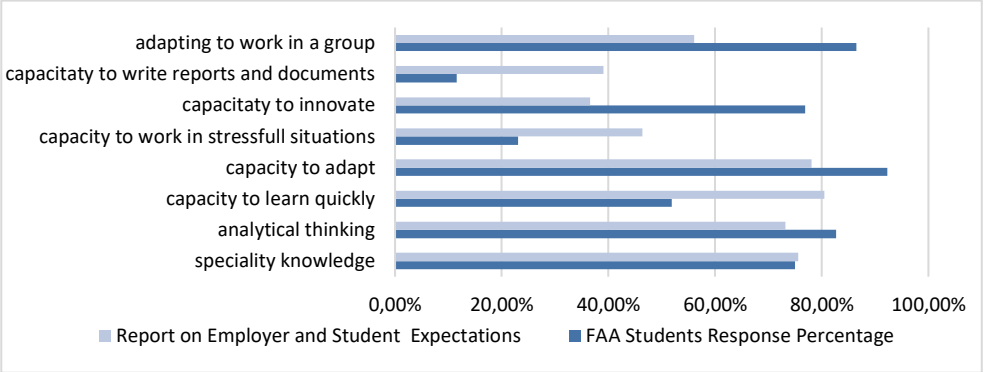
The data was collected, centralised, grouped, and presented in a descriptive and graphical manner. The relative structures measured were also calculated. The research results were analysed and interpreted from a quantitative and qualitative perspective.

5. Findings

In the paper "Analysis report concerning graduates and employers" (POCU, 2014-2020), based on 41 answers from employers, the most important competency is the capacity to learn quickly, with an 80.49 % approval rate, followed by order, the capacity to adapt, specialty knowledge, analytical thinking and adapting to working in a group, all of these having approval rates above 50 % of the responses.

In the same study, employers consider that the most important aptitude of future employees is for them to be open to learning new things, with a response rate of 80.49 %, followed by responsibility and teamwork, both with 65.85 %.

Figure 1. Percentage of respondents who consider that employees have to have the following competencies



Source: Adapted from "Raport analiză așteptări absolvenți și angajatori" (POCU, 2014-2020) with data based on own research.

FAA students who responded to the questionnaire considered that the most important competency is the ability to adapt quickly, 92.31 %, followed by teamwork, analytical thinking, innovation, and specialty knowledge, each with values above 75 %.

By comparing the two answers, employers, and FAA students, we can observe that four of the five competencies match, but in different orders. These are: specialty knowledge, analytical thinking, capacity to adapt quickly, and teamwork. For employers, the most important competency is the ability to learn quickly. From the students' perspective, the most important is the capacity to adapt quickly, which ranks second for employers. The greatest differences, in terms of ranking, refer to the following three competencies.

The ability to learn quickly is very important for employers, but it is only in the sixth place for students. The ability to innovate is important for students, who rank it fourth, but it is last for employers. The ability to work in a team, which is second for students, is not as important for employers, who only rank it in fifth place.

Universities should focus less on the reproduction of knowledge and should focus more on applied practice, which should improve the capacity of students to quickly learn. A greater focus should be on seminar classes than on courses. At the same time, employers should give a greater importance to material motivation, which is one of the most important factors in work productivity. We consider that the small importance given to this competency could be an avenue for future research.

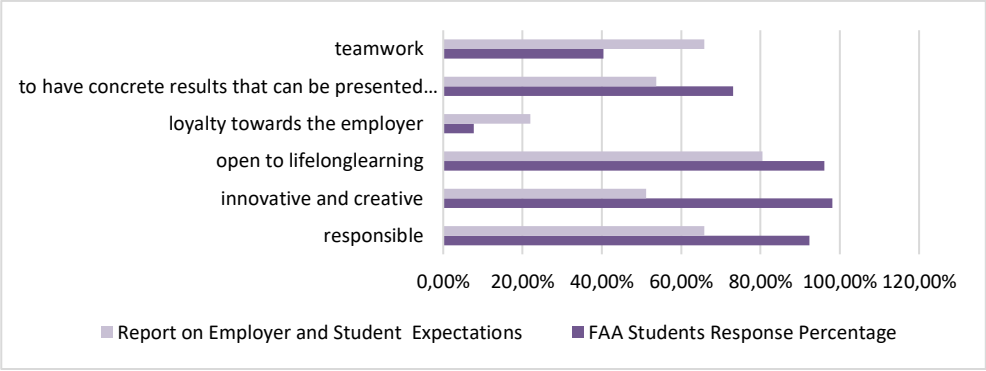
The fact that universities give a greater importance to the ability to innovate, compared to employers, confirms the desire to promote research and innovation at the national, European, and World levels. (Ipanaqué-Zapata et al., 2023). The university aims to involve more and more students in such activities, by encouraging their participation in scientific conferences and other competitions. To this, one must add the large number of traineeships offered by the university, including traineeships financed with outside funding. The fact that employers do not seem to give the same importance to this competency can be explained by the fact

that they're not looking for this in a new employee. By learning quickly, it is possible, in their view, to cultivate this competency in the workplace. It is also probable that employers have a different view, than students, concerning the practical meaning of the term's innovation and creativity. This gap could also be the basis for a future study (OECD, 2011).

Learning to work together is, without a doubt, very important, and it is likely that most of the students rank it very highly because, for now, they might not know how work is done in a collective, in a team at a workplace. (Reynolds, 2017). We consider that, for employers, it is essential for the team leader to encourage adaptability. According to a study done on students from Sparin (De Prada et al., 2022), universities should adapt their programs to changes with regard to the ability of working in a team. "The results suggest significant gender differences, highlighting that female students outdid their male counterparts in most teamwork skills, except leadership. Based on these results, it is suggested to make changes in university education programs to compensate for the influence of socio-academic factors and benefit from the most positive features of each gender in regarding teamwork to achieve an equal and fair higher education." (De Prada et al., 2022).

Regarding the necessary aptitudes, students from FAA consider that the most important one is the ability to be innovative, creative, with a 98.08 %, response rate, followed by openness and desire to learn, with a 96.15 % approval rate, and responsibility, with a 92.31 % positive response rate.

Figure 2. Percentage of respondents who consider that employees have to have the following aptitudes



Source: Adapted from "Raport analiză aşteptări absolvenţi şi angajatori" (POCU, 2014-2020) with data based on own research.

The same tendency can be observed for abilities as was for competencies. Students give a greater importance to the ability to be innovative and creative, compared to employers, who place it second to last. Furthermore, a significant difference can be found when it comes to team work, which ranks second for employers, along with responsibility, while students rank it second to last. One can notice that working in a collective is more important for students than it is for employers, while the reverse is true for teamwork. A possible explanation for this is

that working in a team can be for a shorter duration, depending on the purpose for which it was created, while a collective is more stable in time. Furthermore, the structure of a team can be influenced directly and significantly by its members, their adaptability, while a collective, as a whole, is less impacted by them. Students want to be integrated at the level of the company, while employers are more interested in group-level results.

In the questionnaires that the students filled-in to evaluate the opportunity to create the new programs, AAMMLE and ECCSPP, they evaluated each competency on a scale of 1 to 5.

For the AAMMLE program, a number of 68 responses were recorded. Based on the grades given, the first five out of eight are as follows:

Table 1. Competencies, in order, based on the average score

Competency	Average score	Percentage of maximum answers in total number of answers (%)
Q5. They will provide cost-benefit analysis reports, develop scientific research activities, and provide consultancy in the field of public policy development and management of risks generated by current dynamics in the areas of energy, climate change, and sustainability.	4,22	38.24
Q1. They will know how to generate scientific knowledge in the specific field of activity.	4,19	36,75
Q4. They will know how to professionally interact with professional and scientific environments in the field of activity, specifically in the thematic area of public policies at the EU and CIVIS levels.	4,19	39.70
Q3. They will know how to promote knowledge transfer within the programs and projects of the United Nations and the European Union in the medium and long term.	4,16	33.82
Q7. To maintain/develop relationships with local/government representatives for economic policies in the field.	4,16	32.35

Source: Own calculations based on the data obtained by the authors.

Table 2. Competencies, in order, based on the percentage of maximum answers in total number of answers

Competency	Average score	Percentage of maximum answers in total number of answers (%)
Q4. They will know how to professionally interact with professional and scientific environments in the field of activity, specifically in the thematic area of public policies at the EU and CIVIS levels.	4,19	39.70
Q8. To interact with government agencies.	4,14	39.71
Q5. They will provide cost-benefit analysis reports, develop scientific research activities, and provide consultancy in the field of public policy development and management of risks generated by current dynamics in the areas of energy, climate change, and sustainability.	4,22	38.24
Q1. They will know how to generate scientific knowledge in the specific field of activity.	4,19	36,75
Q2. They will know how to integrate cutting-edge research results in the field into their activities, contributing to the formation of specialists.	4,07	35,29

Source: Own calculations based on the data obtained by the authors.

The competencies Q1, Q4, and Q5 are among the top four, in terms of both the average score and the number of respondents who have given it the maximum grade of five, which bodes well for the purposes of the master's program for which they were created.

For the master's program ECCSPP the questionnaire was answered by 50 respondents. The order for the top three, out of five, of competencies can be found below:

Table 3. Competencies, in order, based on the average score

Competency	Average score	Percentage of maximum answers in total number of answers (%)
Q2. The formation of interdisciplinary specialists in public policies will involve integrating aspects of energy, climate change, sustainability, and resilience into the design and implementation of future public policies.	4,48	58
Q4. It is possible to integrate student training in the thematic area of public policies at the level of the European Union (EU) and CIVIS.	4,46	52
Q3. The training of specialists will be aligned with the requirements of the medium and long-term programs and projects of the United Nations and the European Union.	4,42	50

Source: Own calculations based on the data obtained by the authors.

Table 4. Competencies, in order, based on the percentage of maximum answers in total number of answers

Competency	Average score	Percentage of maximum answers in total number of answers (%)
Q2. The formation of interdisciplinary specialists in public policies will involve integrating aspects of energy, climate change, sustainability, and resilience into the design and implementation of future public policies.	4,48	58
Q5. The training of specialists will focus on developing scientific research activities and consultancy in the field of public policy development and management of risks generated by current dynamics in the areas of energy, climate change, and sustainability.	4,36	54
Q4. It is possible to integrate student training in the thematic area of public policies at the level of the European Union (EU) and CIVIS.	4,46	52

Source: Own calculations based on the data obtained by the authors.

The competencies Q2 and Q4 are among the top three, both in terms of average score and the number of people who gave them the maximum score of five. Which is in accordance with the expected results for this master's program.

For the master's programs AAMMLE and ECCSPP, we can notice that the potential candidates have a clear preference towards internationalisation, adaptation to the economic policy strategies of the European Union, as well as a clear interest in sustainability and the promotion of economic policies in this area.

We can notice a difference in the preferences of students and employers. It is relevant because it makes evident the fact that the orientation towards sustainability and the circular economy represents a fundamental objective of the European Union,

but this objective does not seem to have been undertaken by the companies that should turn them into practice, which would suggest the necessity of adapting these policies to be more attractive towards company stakeholders.

6. Conclusions

By comparing the opinions of employers and students, we found that there are similarities in terms of the classification of competences and aptitudes. With regard to competences, those put forward by both categories are specialty knowledge, critical thinking, the capacity to adapt, and adapting to working in a group. The competency ranked first by employer is the ability to learn quickly, which was not among the first five mentioned by students. From the student's perspective, the most important competency is the capacity to adapt, which is only ranked second by employers.

The biggest differences in terms of competencies are related to the top three ranks. The capacity to learn quickly is considered, by employers, the most important, but is only sixth by students. The capacity to innovate is important for students, ranked fourth, but it is last from the perspective of employers. Adapting to working in a collective is second for students, but it is not as important for employers, who rank it fifth. More research is required in order to properly understand these differences.

Concerning aptitudes, we can see they match with the responses for competencies. For students, it is more important to be innovative and creative than for employers who rank it last. There is also a significant difference when it comes to working in a team, which is ranked second by employers, but it is second to last for students.

From the second questionnaire, which was initially applied to ascertain the opportunity of establishing two new masters programs, we can observe that there is a clear preference among students for adapting to the new objectives in terms of sustainable development, demonstrated by their preference for competencies such as internationalisation, involvement, and collaboration with institutions and other economic agents in order develop and put into practice the economic policies of the European Union. There is a clear preoccupation for the circular economy, sustainability, and promoting economic policies in this domain. We can notice a difference between the preferences of students and employers. It is relevant because it makes evident the orientation towards sustainability and the circular economy, which are fundamental objectives when it comes to formulating economic policies in the European Union, but these are not adopted by the companies that should put them into practice. This suggests the need to adapt these policies to make them more attractive to various stakeholders.

Among the limits of this research, we can count the small sample size, which should be extended to more students from other faculties, other universities and other years of study in order to obtain data which can more easily be generalised.

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An Empirical Research on Students' Perceptions Regarding Marketing Simulations

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Abstract

In higher education institutions, simulation-based learning is an effective tool for strategic marketing courses. Considering the expanding use of digitalization in recent years, marketing simulations based on computers have become an increasingly important tool for students and teachers. This paper aims to identify and analyse the advantages and disadvantages of marketing simulations from the students' perceptions. To achieve these objectives, the author collected the data through a quantitative research method by using a questionnaire. The results of this study show that the main advantages are: active learning, rapid results, learning through play, and making decisions based on results, while the main disadvantages are: difficulties in coordinating with team members, need a high time consumption for understanding the simulator, the complexity of the simulator, and the difficulty in making decisions. The paper also improves the literature on the field of marketing simulations.

Keywords: marketing simulations, students, empirical research.

JEL Classification: M30, M31, M39.

1. Introduction

The topic of marketing simulations in higher education institutions is interesting from three points of view. First, in today's context, teachers must use innovative pedagogical methods to stimulate students to actively participate in the educational process. Thus, the idea of playing a game can be attractive to students and brings the nature of marketing decision making to life (Gundala, Singh, 2016). Second, simulation-based learning is an effective tool for strategic marketing courses (Wolfe, 1997; Vaidyanathan, Rochford, 1998), because it can increase teamwork skills, and promote competitive and analytical thinking (Grădinaru et al., 2021;

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StratX Simulations, 2023). Third, in their role as labour force providers, higher education institutions must take into account that companies want to hire students who have "real-world" skills besides a university degree (Scott, Frontczak, 1996; Mariani, 1997).

Over more than fifty years of research on simulations and their effectiveness in marketing education have originated conflicting findings (Kotler, Schultz, 1970; Faria, Nielsen, 1976; Lambert, 1980; Larreche, 1987; Whiteley, Faria, 1989; Tonks, Wan, 1991; Hinck, 2000; Tonks, 2002; Brooks et al., 2007; Hicnk, Ahmed, 2015). Some authors stated that business simulation games do offer a meaningful educational experience (Faria et al., 2009), while others remark that business simulations are not better than traditional pedagogical methods (Randel et al., 1992).

The paper is made up of six major sections. Following this brief introduction, a problem statement is provided. The third section is dedicated to the research questions, while the fourth presents the research methods. This is followed in the fifth section by the main findings. The article ends with conclusions and suggestions for future research.

2. Problem Statement

The problem of perceived advantages and disadvantages of marketing simulations is a topic of interest in the scientific literature. In a research on 45 students, van Esch et al. (2020) state that online marketing simulations positively influence students' academic outcomes. These results are congruent with those stated by Randel et al. (1992) in their work. Fripp (1997) presented that some of the advantages of business simulations are the following: provide students' motivation, encourage teamwork, and stimulate users to experiment with alternatives without fear of failure, which may pose significant threats if tested during real circumstances. Otherwise, some of the main disadvantages are: student learning is dominated by traditional teaching methods (Storrs, Inderbitzin, 2006), and problems caused by the complexity of real business processes, the informal nature of tasks, and customers' different perceptions of the process (Grikštaitė, 2008).

In Romania, the COVID-19 pandemic has generated radical transformations in the education system, forcing teachers and students to adapt to a new digital environment (Ionescu et al., 2020). Moreover, there are studies that emphasise that higher education institutions should focus mainly on the following dimensions: economic, technological, social, and human (Catană et al., 2021). This context might be an opportunity to use some modern pedagogical tools in marketing courses.

This research will contribute to the deepening knowledge of the student's perceptions regarding the advantages and disadvantages of marketing simulations.

3. Research Questions

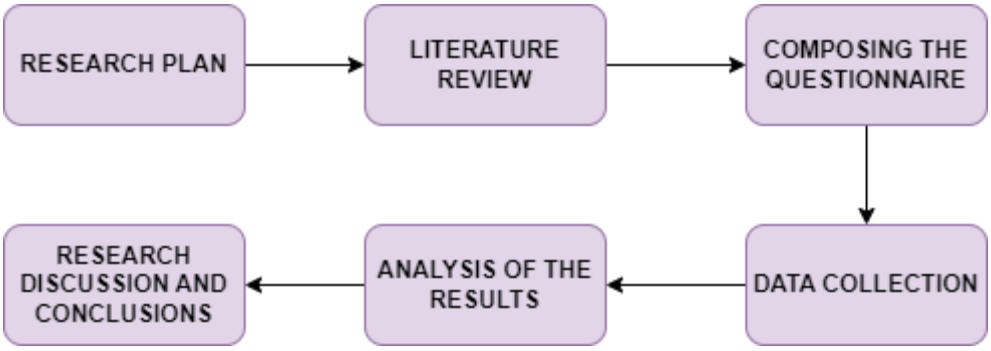
Starting from the previously presented aspects, the author stated the following two research objectives:

- *Objective 1* (O1): To identify and analyse some of the perceived advantages of the marketing simulations.
- *Objective 2* (O2): To identify and analyse some of the perceived disadvantages of the marketing simulations.

4. Research Methods

To achieve the aim of the paper, the author developed a scientific research methodology that includes six stages (Figure 1). First, the author planned the scientific research. Second, he searched for secondary data (e.g., scientific articles, books, reports, etc.) from different fields (e.g., business games, marketing, psychology) through desk research. The author searches for key researchers' work from his perspective, using the following keywords: simulations, marketing simulations, business simulations, students, perceived advantages, and perceived disadvantages. In this paper, the information was selected from the following electronic databases: Web of Science, Springer, Sage, and Google Scholar. Then the outcomes were organised, listed, and analysed.

Figure 1. Research Methodology



Source: Author.

Third, the author composes the questionnaire and chose the university program of business administration specialisation within the Faculty of Business and Administration, University of Bucharest, due to the following reasons:

- In the first semester of the 2022-2023 academic year, the students from the 3rd year of study completed the course entitled "Marketing Simulations". In this course, Markstrat was employed, one of the most used marketing simulators in higher education (Catană et al., 2022).
- The size of the target population, including only students, is a relatively small one (Table 1). So, the author looks at the sample as the whole population.

Table 1. Number of students and gender within the 3rd year of study within the business administration specialisation

Number of students	Gender	
	Female	Male
159	84 (52.83 %)	75 (47.17 %)

Source: Author.

Fourth, in order to check the research hypothesis, the author used a quantitative research method, through an online questionnaire. Before sending the questionnaire in order to collect the data, the author carried on 7 in-depth interviews with students to identify the main advantages and disadvantages. The questionnaire contains 17 questions. A 5-point level Likert scale (where 2 = strongly agree, and -2 = strongly disagree) was used to measure the multi-item factors. No personal data was collected through the questionnaire. The fieldwork research was conducted between 19 and 31 of January 2023 and the author did not send any reminders to students. Then, the online collected data were organised and systematised. A total of 132 questionnaires were validated by students (27 out of 159 sent incomplete responses or did not respond). Thus, the response rate was 83.02 %. Most respondents were female (57.6 %), which is in conformity with the gender structure of the whole population.

Finally, the author analysed the results, and wrote the article, along with the conclusions and future research directions.

5. Findings

The students were invited to respond to the following questions: "What is your opinion about the following advantages" and "What is your opinion about the following disadvantages". These questions are a 5-point Likert scale (where 2 = strongly agree, and -2 = strongly disagree). Then, the points were averaged for each variable and ordered in a descending order.

In the case of perceived advantages of the marketing simulations, the results of the research revealed that the main advantages are (Table 2): active learning (1.24), rapid results (1.22), learning through play (1.17), and making decisions based on results (1.13).

As Gundala said in his work, active learning represents an important perceived advantage for students (Gundala, 2016). Moreover, learning through play is another relevant advantage specific to simulation games. Also, in marketing, making decisions based on results may consist of a better understanding of the product characteristics, customer segments, distribution channels, and marketing mix components (Catană, Toma, 2022).

Table 2. Perceived advantages of the Marketing Simulations

Advantage	Rating
Practical applicability	0.99
Competition with other colleagues	0.73
Rapid results	1.22
Teamwork	0.81

Advantage	Rating
Learning through play	1.17
Active learning	1.24
Overview of economic situations	1.07
Challenge	1.08
Making decisions based on results	1.13
Improve communication with colleagues	0.77
Improve communication with the teacher	1.05
The opportunity to develop myself	0.98
Carrying out various activities	0.93
I can apply acquired knowledge in other areas (at work, in other projects, etc.)	0.92

Source: Author.

The main perceived disadvantages are (Table 3): difficulties in coordinating with team members (0.1), need a high time consumption for understanding the simulator (0.04), the complexity of the simulator (-0.03), and the difficulty in making decisions (-0.07).

Table 3. Perceived disadvantages of the Marketing Simulations

Disadvantage	Rating
Insufficient time to make decisions	-0.31
Simulations have nothing to do with reality	-0.42
Need a high time consumption for understanding the simulator	0.04
Little interaction with the teaching staff	-0.61
The difficulty in making decisions	-0.07
Difficulty working in a team	-0.08
Dramatic changes in results from one round to another in Markstrat	-0.04
Little guidance from the teaching staff	-0.57
Difficulties in coordinating with team members	0.1
Lack of a very clear feedback	-0.48
The complexity of the simulator	-0.03

Source: Author.

Even though other authors identified and presented a relatively small number of disadvantages (Wellington et al., 2016; Skjelbred, Daus, 2022), our research determined new ones and tailored these results to the case of Romanian business administration specialisation' students.

Difficulties in coordinating with team members constitute an important perceived disadvantage for students, similar to the results of other studies (Cosse et al., 1999). However, the disadvantages regarding the need for high time consumption for understanding the simulator and the complexity of the simulator are in contradiction with the facts presented by the owner of the Markstrat simulator (StratX Simulations, 2023).

6. Conclusions

In higher education institutions, simulation-based learning is an effective tool for strategic marketing courses. Considering the expanding use of digitalisation in recent years, marketing simulations based on computers have become an increasingly important tool for students and teachers. This paper identified and analysed some of the advantages and disadvantages of marketing simulations from the students' perceptions. Moreover, the paper also improves the literature on the field of marketing simulations.

From a theoretical perspective, this research brings valuable new input to the expansion of the scientific literature on marketing simulations. In this regard, it presents some of the perceived advantages and disadvantages of the marketing simulations.

From a practical point of view, the marketing simulations field should take into account the perspectives of one of the most important stakeholders, the students. The paper identifies and analyses 14 advantages and 11 disadvantages of the marketing simulations.

Concerning future lines of research, it might be relevant to study some correlations between different variables (e.g., the involvement in the course, the level of knowledge of marketing concepts, the students' personality, etc.) and the perceived advantages and disadvantages of marketing simulations. Since this study has been based on some of the perceived advantages and disadvantages of marketing simulations, future research should be conducted to identify and analyse others. Another limitation of our study is the size and the structure of the population, as there is representative only for Business Administration specialisation within the Faculty of Business and Administration from the University of Bucharest. In future studies, a larger and more representative population should be analysed.

In conclusion, there is a need for other studies in the field of marketing simulations, in general, and in the field of simulation games, particularly. This should be sustained by increasing the interest in stimulating students to actively participate in the educational process.

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Premises of Improving the Quality of the Didactic Process in Pre-university Education in the Context of Education 4.0

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Abstract

Pre-university education is in a dynamic process of continuous transformation, and the impact of the restrictions imposed by the COVID-19 pandemic have generated major transformations. If until then only some teachers were motivated to go through training programs for the development of digital skills, to use applications, platforms, and digital resources in teaching, and students occasionally learned using digital resources, during the pandemic they had to adapt to the new context, to quickly adopt and immediately apply in the classroom, with students, digital solutions for both teaching and assessment. After the removal of the restrictions imposed during the pandemic, both teachers and students benefited from the experience gained during the restrictions and continued to use open educational resources, learning platforms, forms for evaluation and feedback, groups for quick communication. A large volume of open educational resources has been created, with various facilities, useful for supporting the teaching process and facilitating learning, which are expected to lead to improved school performance.

This study presents the results of a research carried out by applying an online questionnaire, distributed by email, to a number of 91 teachers from pre-university education in Romania. Its purpose was to identify the most important aspects that positively influence the school performance of students. The determining factors influencing student results were identified as follows: teaching adapted to students' learning pace supported by applications; the involvement of parents, leading teachers to reduce absenteeism; student participation in remedial activities.

Keywords: adaptive learning, improving student performance, continuous training, online learning.

JEL Classification: C88, I21.

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1. Introduction

Improving student performance and preparing them for the digital society can be achieved through the use of digital technology and new learning methods such as adapted learning. Education 4.0 can be addressed by: integrating technology into the learning process, adapted learning, project-based and collaborative learning, competency-based assessment, developing digital skills.

The integration of digital solutions in the learning process is materialised through the use of mobile devices, tablets, computers, and specialised software dedicated to online learning, to facilitate and improve the educational process.

Adapted learning involves the use of technology, which allows teachers to create personalised learning programs adapted to the needs and learning pace of each individual student. Depending on the students' progress, their learning path is personalised so that each student can learn at a different pace.

"Teachers are no longer transmitters of knowledge, but activators of cognitive activities, managers of teaching activities, and supporters of learning activities" (Xin, et al., 2022). In the Romanian pre-university education system, school performance is based on uniformity and standardisation. All teachers must plan their teaching based on a nationally established curriculum, carry out standardised teaching and assessment, and act to remedy problems identified through assessment. When teachers act to improve school results, they put students at the center of attention, motivate them to learn, effectively lead teaching, use educational technologies and resources for adapted learning and performance, use assessments, and feedback to continuously improve teaching.

"The school must quickly find possibilities to achieve a balance of great accuracy between its traditional role and the new roles that the digitisation of the world in which we live tend to attribute to it" (Pânișoară, 2022).

Learning improvement can be facilitated through continuous monitoring and adaptive learning solutions. Monitoring can be done using data collection systems regarding the evolution of test scores, and adapted learning through the use of solutions based on artificial intelligence and specific algorithms allow predicting the course of the subjects or contents to be studied.

The system of collecting test results can be used with objective results when the assessment is standardised and unitary at the level of a school unit or a group of school units. Both teaching and assessment must be student-centered to increase the quality and outcome of learning, implicitly to increase student achievement.

Standardised assessment must also be carried out on teachers, using a series of items based on which a score is established annually followed by improvement measures to increase the score at the next assessment.

In terms of monitoring student performance, collecting and analysing performance data can help identify learning gaps and identify students who need extra help. This allows for the development of personalised learning strategies and programs tailored to the needs of each student.

Another important dimension is the evaluation of teachers' performances. Following the evaluation, it is possible to identify those teaching staff who need

improvement, in terms of teaching, learning, assessment and the use of technology in the teaching activity. The improvement can be carried out through continuous training programs, which allow the identification of solutions adapted to the needs of teachers, directions that can be obtained after the data analysis stage.

The development of personalised teaching programs can be achieved by processing data related to the progress and performance of students, thus helping to develop personalised teaching programs adapted to the needs of each student. This can improve student performance and increase their satisfaction with the learning process.

The digitisation of continuing education, achieved through technologically enhanced educational environments, leads to the transformation of the optics of teachers, who, when they use online resources, will more easily find the way to motivate students to learn.

2. Challenges of Pre-university Education in Romania and Education 4.0

Pre-university education is impressive by the order of magnitude and by the implications that decisions made at the national level bring. In all school units in Romania, the same curriculum is used, and the teaching, learning, and evaluation process follows the same rules and is measured with the same instruments. We have national evaluation systems for the 2nd, 4th, and 6th grades, evaluation at the end of the 8th grade that ranks the students, and after finishing high school the Baccalaureate exam. Students pass nationally unique subject assessments, the results of which can be compared and ranked. Any action aimed at improving the process and implicitly the results of students, applied at the national level, has profound implications for all generations of students.

Technologies evolve rapidly and people must constantly adapt to these changes. The educational system is conservative and difficult to change. However, both the improvement of learning and the evaluation of teaching activity should be addressed.

Big data and Education 4.0 are two concepts that complement and influence each other. Big data facilitates access to relevant data in adapting and personalising the educational process by collecting, storing, and analysing large volumes of data, while Education 4.0 integrates technologies to improve the learning process.

Education 4.0 promotes project-based and collaborative learning, giving students the opportunity to work together to solve problems and apply the knowledge gained in a practical way.

Competency-based assessment focuses more on what students can do than what they know. This can include project-based assessment, portfolio-based assessment, and self-reflection-based assessment.

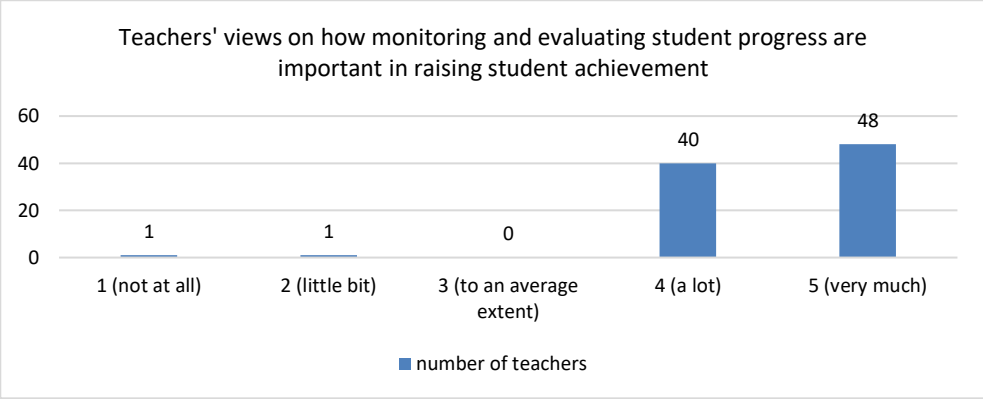
Developing students' digital skills, including skills such as programming, graphic design, data management, and algorithms, are essential elements of Education 4.0.

For the implementation of Education 4.0 in Romania, it is essential that teachers and students have access to modern technology and adequate resources. In addition, it is important that teachers are trained and motivated to use new technologies and be able to create personalised and effective learning programs.

However, the implementation of solutions based on *Big data* in the educational system is a complex process, which is based on the development of a plan built around precise objectives, goals, and expected benefits in the various stages of the educational process. Data sources and tools for data collection and analysis are supporting elements designed to provide valuable information that can help improve the outcomes of pupils, students, teachers, and the education system in general. The data used in this process are students' grades, their results in school and extracurricular competitions, attendance, data retrieved and dynamically updated. Other useful and relevant information is specific to teachers in pre-university education, such as: teaching degree, number of transferable professional credits accumulated in the last closed five-year period, starting from finalisation, interest in professional development manifested through research, publication, participation with students in school competitions.

Yong Cui et al. (2021) argue that by using data on students' academic performance, teachers can better analyse and monitor progress and guide students to success.

Figure 1. The resulting diagram after processing the data collected from teachers about Teachers' views on how monitoring and evaluating student progress is important in raising student achievement



Source: https://forms.gle/vz78nT5cXR1oJrqL9.

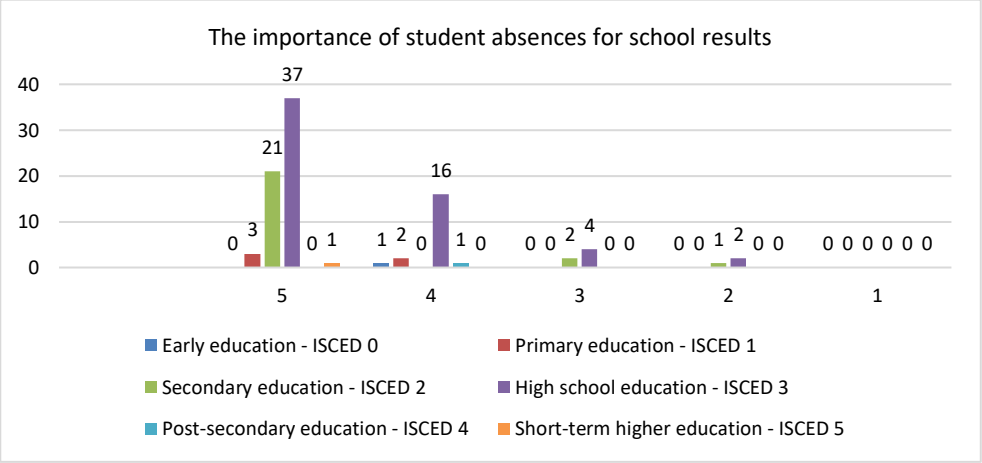
In order to identify ways to improve the results of students in pre-university education, we created a questionnaire that was presented to teachers from Dâmbovița and Teleorman counties. The questionnaire was completed between 19-25 April 2023 by 91 teachers who teach students from ISCED 0 to ISCED 5. In the first part of the questionnaire, questions were formulated regarding the highest level of teachers' studies, the level at which teachers teach, gender, teaching degree. In the second part, questions were asked about the continuous training of teachers. The first question aimed to identify the number of transferable professional credits accumulated by the teachers, in order to detect the interest in their own professional development. Among teachers, 82.4 % have accumulated at least 90 CPT. The next two questions addressed teachers' beliefs about the importance of accredited in-

service training programs and approved in-service training programs in developing skills useful for improving student achievement. Responses were on a scale of 1 to 5, where 5 is assigned the highest appreciation. 39.6 % answered with maximum appreciation (5) for accredited programs and 38.5 % for approved programs, and with appreciation 4 42.9 % answered for accredited programs and 41.8 % for approved programs. The conclusion is that teachers attach great importance to continuous training for the development of useful skills in order to improve student performance and value accredited programs more, after which they receive CPT. In the third part of the questionnaire, there were several questions that aim to identify the aspects that teachers consider important for improving school results, such as: 68.1 % consider the number of absences to influence school results. To improve student performance, teachers value the following aspects differently: 95.6 % adapting learning, 68.1 % setting realistic lesson objectives, 69.2 % classroom management, 50.5 % use of technologies and educational resources in digital format, 52.7 % monitoring and evaluating progress (Figure 1), 73.6 % establishing evaluation criteria, informing students, evaluating, and providing relevant feedback on the results obtained. Zhihui Cai et al. support the positive effect of feedback to improve performance (Cai et.al, 2023). In Figure 2 is an analysis of the responses regarding absenteeism, according to the level at which the teachers teach. Simona Sava in „The school of the future or the future of the school emphasises the post-pandemic effects that lead to absenteeism" (Sava, 2022).

Through questioning and analysis, we can identify and take measures where the effects of the pandemic are felt by increasing inequalities between people, as Adriana Reveiu and Daniela Luminita Constantin (2023) „The impact of the COVID-19 pandemic on regional inequalities in Romania" say (Reveiu, Constantin, 2023).

The teachers subject to the study teach high school students (64 %) and secondary school students (25 %).

Figure 2. The resulting diagram after processing the data collected from teachers about The importance of student absences for school results



Source: https://forms.gle/vz78nT5cXR1oJrqL9.

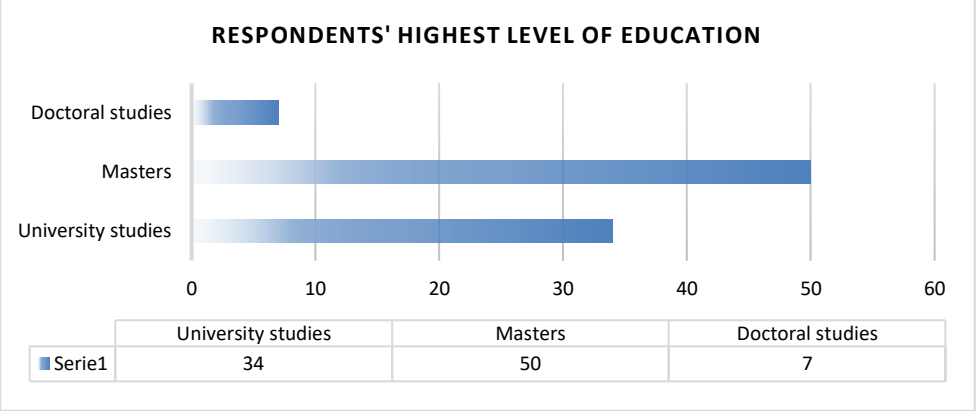
Data collected from students can be used to predict educational performance, but also to provide career choice recommendations, as Xiaomei Bai et al. says in "Educational Big Data: Predictions, Applications and Challenges" (Bai et al., 2021).

Belinda Chiera et al. in "How Much Do We Know About Patterns of Student Engagement?" (Chiera et al., 2021) analyse data collected about learner progress to improve learning and teaching. The move of education to the online environment has created the possibility of analysing the behaviour of learners through the number of clicks made weekly on different courses.

Following the study conducted on teaching staff who have university degrees (37. 36 %), master's degrees (54.94 %), doctoral degrees (7.69 %) (Figure 3) it was found that in order to improve the results students need greater involvement in accredited continuing education programs that help them learn and use modern teaching methods, effectively use digital educational technologies and resources. A great deal of importance (96.70 %) is attributed to monitoring and evaluating student progress. With the help of electronic catalogues, data can be collected to help monitor the number of student absences. The involvement of teaching staff is important for creating a teacher-student relationship that helps improve school results (Almășan et al., 2022).

90.1 % of teachers believe that absenteeism negatively influences student performance, and improved student attendance at school brings improved school results.

Figure 3. Respondents' highest level of education



Source: https://forms.gle/vz78nT5cXR1oJrqL9.

After analysing the answers, the teachers believe that the teaching-learning process must be adapted to the level of the students in order to improve their performance (97.8 %). Considering the fact that a large number of students in the class does not allow the teacher to adapt the teaching for each of them, the use of applications for adapted learning by students allows all students to learn at their own pace. Adaptive learning systems have demonstrated a positive impact on learning, says Shuai Wang et al. (2020).

The electronic educational materials that can be found both online and offline are a real help in the didactic process for the preparation of homework, for providing students with useful materials that will help them achieve the proposed objectives. Danial Hooshyar et al. find from the research that adaptive applications improve the attitude toward learning of students (Hooshyar et al., 2021).

Adapted learning is carried out for each subject of study, for each level of education with the aim of improving student results. Depending on the pace of learning, each student can go through theoretical notions and make practical applications using technology and special applications for learning.

The use of electronic educational materials leads to the efficiency of the educational process by changing the way of learning, by accelerating the pace of innovation and research work, by facilitating the exchange of opinions and knowledge, and the real-time evaluation of the information acquired by students.

3. Research Questions / Aims of the Research

The purpose of this questionnaire is to identify ways to improve student performance in schools in Romania. The teaching staff who answered the questionnaire were informed about ensuring confidentiality and keeping personal data.

4. Research Methods

In order to identify the opinion of teachers in Romania regarding the improvement of student performance and the difficulties they face regarding student absenteeism, adapted learning, continuous training of teaching staff, we conducted a survey -type research, which aimed to apply a questionnaire containing 17 questions to which answered 91 teaching staff from general schools and high schools, from pre-university education in Romania, in April 2023. We considered the application of the questionnaire for teaching staff who obtained the definitive teaching degree (3.2 %), teaching degree II (5, 49 %), didactic degree I (90.1 %). The level at which the teachers teach is: Early childhood education - ISCED 0 (1 %), Primary education - ISCED 1 (5.49 %), Secondary education - ISCED 2 (25.27 %), High school education - ISCED 3 (64, 83 %), Post - secondary education -ISCED 4 (1 %), Short-term higher education - ISCED 5 (1 %).

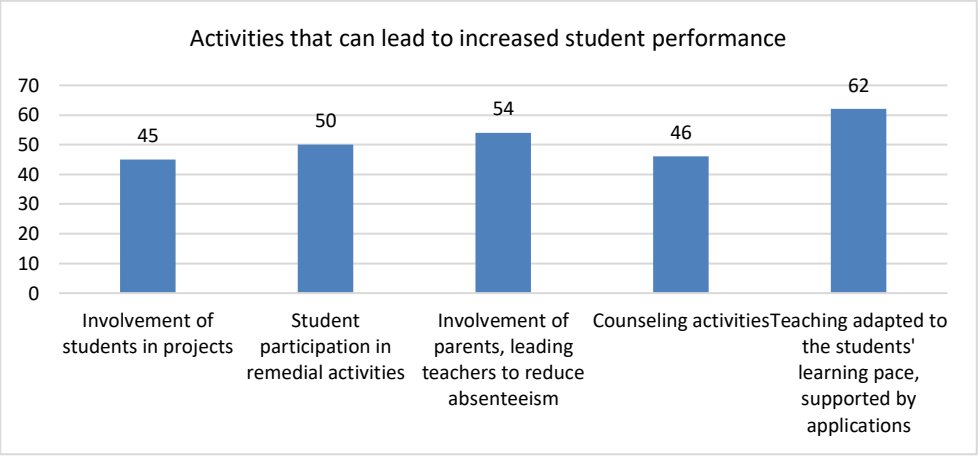
Teaching adapted to the specifics of the student, supported by applications, is a formula that transforms educational resources into pieces, which, distributed specifically to the student's learning pace, lead to an increase in their performance. Prodromou et al. supports adapted learning to improve outcomes (Prodromou, 2021). Among the teachers who participated in the study, 80.21 % believe that continuous training helps them develop skills useful for improving student performance. As Reveiu, A. and Arghir, D.C. say in Mining social media to identify the immediate impact of the COVID-19 pandemic on the Romanian retailers: “early findings, the COVID-19 pandemic has deeply affected people” (Reveiu, Arghir, 2020). The teaching staff who during the pandemic made great efforts for continuous training,

after the pandemic realised that the solution to having better students is for them to be better themselves.

Due to the rapid development of technology, students need competent teachers who know how to use learning applications adapted to their needs. Platforms for adapted teaching, support learning and help the teacher to be able to manage time better and to make teaching more efficient. Shakyani et al. describe the effectiveness of an adapted learning platform (Shakyani, 2023), as well as Kaat Iterbeke et al. (2021). Students can use the adapted platforms both at school and outside of school to be able to go through the curriculum and work tasks at their own pace. People learn using all their senses, and a way to use both hands-on applications and simulators is welcome in the training process. Today's teachers have had no way of benefiting from initial training that uses such tools, therefore offering possibilities to use them in the process of continuous training is more than welcome.

Following the careful analysis of the possible activities that can lead to an increase in student performance, the teaching staff chose: student involvement in projects (49.45 %), student participation in remedial activities (54.94 %), involvement of parents, leading teachers to reduce absenteeism (59.34 %), counseling activities (50.54 %), teaching adapted to the students' learning pace, supported by applications (68.13 %) as shown in Figure 4.

Figure 4. Teachers' responses regarding: Activities that can lead to increased student performance



Source: https://forms.gle/vz78nT5cXR1oJrqL9.

5. Conclusions

The transition from traditional education to modern education, in which we use applications, simulators, modern teaching methods, including teaching systems adapted to the students' learning pace, leads to the production of large amounts of data. The key to improving student performance is in processing this big data. Through the electronic catalogue, data such as absences are collected, which are

transmitted daily to parents with the aim of timely intervention and reducing the number of absences in the future. The school situation of the students is recorded in the electronic catalogues and can be transmitted daily to the parents. With the help of the data collected by the electronic catalogue, students' progress sheets can be made, on the basis of which the leading teachers together with the parents can make decisions regarding remedial plans aimed at improving school results. Creating tailored apps with content from the curriculum helps students learn at their own pace, resume whenever they need to, or go through the concepts provided and specified tasks more quickly.

Therefore, the use of solutions based on Big Data technologies in the educational system in Romania can bring many benefits, such as improving the performance of students and the efficiency of the educational system in general. To use Big Data effectively, it is important to collect relevant data and use the right tools to analyse the data and draw effective conclusions.

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The Use of Logistic Models in Predicting Factors Influencing the Millennials and Generation Z's Buying Decision of Innovative Products: Evidence from Romania

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Abstract

Nowadays, in the context of technical and scientific progress, major changes can be observed in the contemporary society. Therefore, the development and introduction of innovative products in the business market have major influences on the adoption of a lifestyle by consumers. One of the major benefits of innovation is its contribution to economic growth, and thus it is essential to be able to identify what people consider important when looking for novelty in purchased products. This study aims to identify the main factors that influence the decision to buy an innovative product, at the level of generations x and y, and to discover the possible differences and specific features. It emphasises the importance of higher education in the development of sustainable principles and consumer choices and it also attempts to outline the profile of the innovative products consumer and determine the best predictors using logistic models. The difference between those that already bought a product and between those that intend to buy it's also studied. Overall, this article examines the main factors of influencing a consumer's purchase decision and checks which apply and which do not apply in the case of innovative products. The study consisted in a survey based on a questionnaire given to 500 people and captures the differences regarding the decision to buy innovative products between the two generations characterised by the degree of use and increased familiarity with communication, media, and digital technologies. It will be noticed that many of these generations associate innovation with sustainable choices.

Keywords: Generation Y, Generation Z, intergenerational consumer behavior, innovative products, logistic models.

JEL Classification: C01, C10, C12, C40, C50, C83, D10, D91.

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1. Introduction

The investigation of the market and of the consumption needs represents a complex and constantly changing universe, so a special interest belongs to the identification of the specific needs of different categories of the population, but also to their hierarchy, in general, and especially at the individual level.

Psychosociological research on consumers can only bring success to companies in their approach to position themselves in the business market either as leading companies or as companies aspiring first place. By investigating consumer needs and desires – a prerequisite of marketing, from the perspective of the stages, that economic agents have to go through in order to achieve their objectives, specialists in the field conduct market research in order to launch the new product/service to meet the needs and desires of the modern consumer, the central element of the market. In this context, the innovation of products/services in a constantly changing environment is a necessity in obtaining the competitive advantage of the modern enterprise. Thus, innovation requires precision and accuracy, but also intuition and creativity, the ultimate goal being to offer consumers value and benefits, by placing on the market products/services superior to existing ones (Dziallas, Blind, 2019).

Furthermore, an important role in the study of consumer behaviour is occupied by influencing factors, which are widely presented in the literature review, but in general. Thus, this paper has a much more specific objective: identifying the main factors that influence the decision to buy innovative products, that from the authors' point of view, can be a starting point in future research for the studied issue. At the secondary level, the research captures the importance of the level of education, noting that among those interviewed, those with higher education prefer to choose innovative products, considering the introduction of innovation into their lives as a sustainable choice.

2. The Consumer and the Progress of Technology: Offering Value to Customers through Innovative Products

Contemporary society is undergoing major changes, changes that lead to extensive transformations. Thus, one can currently observe the magnitude of the digital world, which certainly has an impact on the behaviour of producers, and especially on consumers. Recent changes have facilitated the evolution of marketing, and even a rethinking of it. Marketing has moved from product-centred marketing (Marketing 1.0) and consumer orientation (Marketing 2.0) towards value-driven marketing (Marketing 3.0).

What awaits us? Is marketing changing forever? Modern marketing will aim to promote other values and aspects of the digital world. Artificial intelligence will significantly change the lifestyle of the modern consumer, who wants nothing more than the integration of technology in everyday life.

In the context of the development of technics and technology, when the digital age is present in the life of the modern consumer, new products/services are essential for both the consumer and the producers (Armstrong, Kotler, 2015). The success of

companies depends on the development of a process through which to launch and develop new products/services to meet the increasingly sophisticated needs of the modern consumer. Generations are changing. In the past, Generation X was in the attention of manufacturing companies, which designed their product/service offer according to the profile of these consumers. Over time, however, the Y, Z and Alpha generations have followed, and these ones do not only use technology, but also make it a way of life (Armstrong, Kotler, 2015; Kotler, Kartajaya, Setiawan, 2021).

Analysing and studying the market, the ideas of new products/services will meet the needs of these consumers, but especially the ones of Gen Z and Y, who practically, from birth, have known the effects of technology in their everyday life. Also, it is noticed that the role of digitisation is increasing in the last decade (Verhoef et al., 2021). In this context, the literature shows that "the wave of digitalisation unleashed in the first two decades of this millennium", is significantly important in the way of how consumers are purchasing online products/services through mobile apps (Scuotto, Kaur, 2021; Talwar et al., 2020).

Hofstede (2011) considers that "as a result, under certain conditions, the behaviour of consumers can be predicted from their attitudes towards products, services, and brands, and a purchase prediction is derived from a positive attitude".

A question arises: What motivates people to make purchasing decisions? Literature review shows that "understanding the variations of what motivates people is important for positioning brands in different markets" (Hofstede, 2011).

3. Factors Influencing the Consumer Behavior

Demographic factors are influenced by the variety of variables that influence the manifestation of consumer behaviour. Thus, age group, level of education, occupation, etc. are demographic factors that can provide pragmatic results in studying consumer behaviour (Herve, Mullet, 2009; Abu et al., 2013, Kumar, 2014; Cruz-Cardenas et al., 2019). Also, when it comes to the study of consumer behaviour, specialists in the field pay special attention to economic factors (personal income, price of products/services, etc.), factors specific to the marketing mix, but also situational factors (time pressure, the presence of other people when the consumer makes the purchase decision, environment, etc.). Also, among the determinants of consumer behaviour, there are both endogenous and exogenous variables.

Exogenous variables such as culture, subculture, social class, and social factors (e.g. reference groups, family, and social roles and statuses) are very important when it is expressed the necessity to study the consumer buying behaviour (Kotler, Keller, 2006; Kanuk, Schiffman, 2007). Family is the most important exogenous variable that influences the consumer behaviour. Each stage of the "family life cycle" provides key answers for marketers who analyse this "composite variable based explicitly on marital and family status but implicitly reflects relative age, income, and employment status" (Kanuk, Schiffman, 2007).

Social class can be "measured by a weighted index of several demographic variables, such as education, occupation, and income" (Kanuk, Schiffman, 2007).

People buy particular products and services according to their education and occupation. Also, income is an important factor that can influence the consumer buying behaviour. The literature review presents membership groups as – primary groups (such as family, friends, etc.) and secondary groups (such as religious and professional groups, etc.) – which can significantly influence consumer buying behaviour. Also, aspirational groups and dissociative groups – groups to which consumers do not belong – can exert a significant influence on consumer behaviour (Kotler, Keller, 2006).

Learning is an endogenous determinant of individual's behaviour that involves changes in his/her behaviour "arising from experience" and it is known that "most human behaviour is learned", "learning being produced by the action of drives, stimuli cues, responses, and reinforcement" (Kotler, Keller, 2006). People also learn from personal experiences.

The literature review shows that "a lifestyle is a person's pattern of living in the world as expressed in activities, interests, and opinions" (Kotler, Keller, 2006). Moreover, in time, marketers discovered new trends in consumer lifestyle. Nowadays, marketers "are facing the challenge of serving five different generations: Baby Boomers, Generation X, Generation Y, Generation Z, and Generation Alpha" (Kotler, Kartajaya, Setiawan, 2021). Sociocultural environment and life experience are very important when it is necessary to characterise new generations. For instance, Generation X, as adults, "experienced the world without and with the Internet" (Kotler, Kartajaya, Setiawan, 2021), while Generation Y has grown with technology. Also, it is important to note that Millennials have been shown to differ from past generations, as they are "digital natives and technology savvy" (Calvo-Porral, Pesqueira-Sanchez, 2019). The common experiences of Millenials when it comes to the discussion of buying products are considered to be mainly related to "the Internet, digital revolution and globalisation" (Andrze, 2020). Millennials not only use technology frequently, but they make it a new lifestyle, and their feedback on online platforms is given according to their engagement through particular brands (Kotler, Armstrong, 2015).

Nowadays Generations Y and Z are often analysed in the literature review. Their characteristics are listed as a response to technological and economic influences in their everyday activities, Generation Z using more likely the Internet than the previous generation (Czerwińska, Czerwiński, 2021). In fact, the members of Generation Z are dependent on technology, multi-task, are more on virtual social networks, and use more kinds of media simultaneously (Desai, Lele, 2017). Generation Z (also called iGen) "has never experienced life before the Internet" (Roblek et al., 2019). Thus, Generation Z's behaviour and lifestyle are expected, to create new opportunities for the investigation and understanding of the most sophisticated needs and motives to buy innovative products.

4. Research Purpose and Objectives. Methodology

The main purpose of this research is to determine key factors in making the decision to buy innovative products. The selected factors to be verified were

collected from the literature review presented above on the part of consumer behaviour, in general, and the identification of the relevant ones on the part of innovative products is desired. It also aims to identify differences in preferences by analysing the two generations that have grown completely in the age of digital technology: Millennials and Generation Z.

Research objectives and hypotheses are related to:

- Identifying which factor regarding aspects like level of education, occupation, income, living conditions, identification with reference groups, opinion of family members identified in the literature review, might be considered a predictor or has a greater weight in making the purchase decision when referring to innovative products, by using rankings and logistic regression. Logistic regression models are often used in studying purchase behaviour, offering important insights (Allenby, Lenk, 1994; Menard, 2009; Wickramarachchi, 2020; Dragos et al., 2020);
- Determining specific features of those who buy innovative products with also the use of logistic models and statistical hypothesis testing and creating profiles by finding common characteristics and socio-demographic data;
- Identifying differences between generations in terms of behaviour using statistical hypothesis testing (Chi-Square test, Likelihood Ratio test, Fisher's exact test, Linear-by-linear Association test). These tests are used according to the type of variables included in the analysis (Jaba, 2002; Lehmann, Romano, 2022).

The models were estimated and the hypotheses were tested using R software version 4.2.3 with the "vcd", the "tidverse", the "caret" and the "leaps" packages. The descriptive analysis part was carried out using SPSS Statistics software.

In order to obtain the information, a questionnaire was made based on main factors extracted from the literature review that are supposed to characterise those who purchase innovative products. It was distributed on online platforms to Romanian citizens belonging to either Gen Z or Gen Y. The general principles of developing a questionnaire were taken into account (Niculescu-Aron, 2005; Pfeffermann, Rao, 2009), and the data were collected between October 2022 and January 2023. The sample consists of 500 persons: 440 from Gen Z and 60 from Gen Y. Those who are from Generation Z have an average age of 19,7 and 88 % are students, while 12 % are employees. 27 % come from rural areas and 73 % come from urban areas. Millennials from the sample have an average age of 33.75 and 12 % are students, 85 % are employees or have a business, while 3 % are unemployed. 72 % completed higher education. 5 % come from rural areas and 95 % come from urban areas.

Thus, when referring to the consumption of innovative products, literature review focuses on factors relating to: education and occupation, income, living conditions, age group, economic factors, identification with specific groups (e.g., family members, friends, role models), price, benefits (Li et al., 2022, Shafi et al., 2021; Abbas et al., 2017; Siegrist, 2008).

5. Research Findings and Discussion

Out of the total, 61.6 % have purchased innovative products (80 % from Gen Z, 55 % from Gen Y) and 38.4% have not. 43.8 % intend to purchase innovative products in the next 6 months (60 % from Gen Z, 23 % from Gen Y) and 56.2 % do not.

When purchasing an innovative product, 60.3 % are influenced by price, 26 % by the degree of novelty, and 13.7 % by the brand name. Proportions for Gen Z are: price – 62 %, degree of novelty – 23.6 % and brand name – 14.3 %. Proportions for Millennials are: price – 61.7 %, degree of novelty – 30 % and brand name – 8.3 %. Although the price matters the most for both generations, for Gen Z the degree of novelty follows as important, while for the Millennials the brand's reputation follows. But when purchasing an innovative product and considering the brand, 19.5 % are influenced to a very large extent, 56.4 % are largely influenced, 12.4 % have no opinion, 10.6 % to a small extent, and 1.2 % to a very small extent. Proportions for Gen Z are: 19.1 % are influenced to a very large extent, 58.2 % are largely influenced, 10.9% have no opinion, 1.1 % to a small extent, and 1.1 % to a very small extent. Proportions for Millennials are: 21.7 %% are influenced to a very large extent, 43.3 % are largely influenced, 23.3 % have no opinion, 10 % to a small extent, and 1.7% to a very small extent. In terms of brand loyalty, 65.8% are loyal, while 34.2 % are not. 69.3 % of Gen Z and 51.7 of Millennials are loyal. 41.1% are used to purchase personalised products or services, and 58.9 % are not (42.7 % from Gen Z and 36.7% from Millennials). 98.6 % are active Internet users, and 1.4 % are not. 99.3 % of Gen Z and 96.7 % of Millennials are active users. In terms of hours spent daily on the Internet, none spend less than 30 minutes, 25% spend between 1-2 hours, 26.4 % spend between 3-4 hours, and 48.6 % spend more than 5 hours. 76.7 % are reading online content when enquiring about purchasing a product or service, and 23.3 % are not. 69.9 % have purchased innovative products recommended through online posts, articles, or videos, and 30.1 % have not.

There are significant statistical differences between Gen Z and Gen Y regarding the purchase and intending to buy innovative products when applying the chi-square tests (p-value < 0.05). There are also differences in brand loyalty, hours spent daily on the Internet and reading online content when inquiring about purchasing innovative products (p-value < 0.05). Gen Z are slightly more inclined to be loyal to a product and to spend more time on the Internet, whilst gen y is slightly more interested in reading online content when buying products.

Regarding the statements below, there were no differences between the answers given, at the level of generations: p-value > 0.05 (Table 1). The following table includes the percentages to what extent the respondents agree, where 1 represents total agreement and 7 – total disagreement.

Table 1. Characteristics of the consumer behaviour of innovative products

Statement	1	2	3	4	5	6	7
1. Products with innovative designs arouse my curiosity.	25%	13.3%	6.7%	6.7%	18.3%	11.7%	18.5%
2. When I purchase innovative products, the decor and ambient sound in the store influence my choice.	13.3%	13.3%	21.7%	15%	11.7%	20%	5%
3. I buy innovative products that suit my personality.	16.7%	10%	16.7%	8.3%	11.7%	23.3%	13.3%
4. The innovative products purchased help me form a new lifestyle.	8.3%	10%	16.7%	15%	21.7%	18.3%	10%
5. The innovative products purchased give me a new status in society.	11.7%	10%	25%	15%	10%	15%	13.3%

Source: Our elaboration using SPSS Statistics based on questionnaire answers.

Respondents tend to disagree with being aroused by curiosity regarding products with innovative designs. They tend to be influenced by the décor and the ambient sound in the store when deciding what to buy, and a factor that contributes to this aspect is whether they are employees/ unemployed/ self-employed/ students/ retired/ housewives/ without occupation (p-value < 0.05). They are not inclined to buy innovative products that suit their personality; neither they consider that those products help them form a new lifestyle. The 4th statement also has as a factor of influence the environment of residence (p-value < 0.05). Generally, they tend to consider that the innovations purchased give them a new status in society.

Initially, by ranking factors according to the importance that the respondents considered having in influencing the purchasing behaviour of innovative products, the preferences were framed as follows:

Table 2. Ranks

	Total	Gen Z	Gen Y
1	Occupation	Occupation	Level of education
2	Level of education	Economic factors	Economic factors
3	Economic factors	Level of education	Living conditions
4	Age group	Age group	Occupation
5	Living conditions	Living conditions	Age group
6	Identification with reference groups		
7	Identification with membership groups		

Source: Our elaboration using R Software based on questionnaire answers.

As can be seen, there are slight differences both in total and in each generation (Table 2). The level of education has a great significance in the orientation towards innovative products, and this will also be observed in the analyses carried out below. Using logistic models, we can check and determine the factors that are statistically significant predictors of the intention of purchasing innovative products. Withal, another model is created based on the behaviour of those that already purchased

innovative products in order to compare and observe if the two models are distinct or not. Also, statistical hypothesis testing was applied to check if there are significant differences between generations regarding their behaviour toward purchasing innovative products. For some variables in the dataset, the p-value was less than 0.05. This means that an association exists and that, indeed, there are differences between generations when referring to the factors listed above.

Table 3. Relevant factors in the purchase of innovative products for Millennials

Variable	AIC	BIC	coefficient	p-value
Level of education	86.55	90.74	0.01918	0.887
Occupation	**83.35**	**87.54**	0.2634	0.0504 *
Income	86.54	90.73	0.02806	0.852
Living conditions	86.52	90.71	0.03297	0.824
Identification with reference groups	83.83	88.02	0.21	0.105
The opinion of family members	85.84	90.03	0.1193	0.398

Source: Our elaboration using R Software based on questionnaire answers.

For the Millennials, when purchasing innovative products, the best predictor is occupation. It has the lowest score for AIC and is BIC and is also the only variable that is statistically significant (Table 3). An increase of one level for this factor multiplies the odds in buying innovative products by 1.3.

Table 4. Relevant factors in the purchase of innovative products for Gen Z

Variable	AIC	BIC	coefficient	p-value
Level of education	448.41	456.58	0.086	0.2307
Occupation	449.74	457.87	0.0268	0.70917
Income	449.67	457.84	0.0308	0.67842
Living conditions	447.28	455.45	0.1135	0.1076
Identification with reference groups	447.45	455.62	0.1122	0.1244
The opinion of family members	**445.91**	**454.08**	0.1399	0.0519 *

Source: Our elaboration using R Software based on questionnaire answers.

For Generation Z, when purchasing innovative products, the best predictor is the opinion of family members. It has the lowest score for AIC and BIC and is also the only variable that is statistically significant (Table 4). An increase of one level for this factor multiplies the odds in buying innovative products by 1.15.

Table 5. Relevant factors in the intention of purchasing innovative products for Millennials

Variable	AIC	BIC	coefficient	p-value
Level of education	76.96	81.15	0.4076	0.01683 *
Occupation	74.25	78.44	0.5130	0.00518 **
Income	**71.47**	**75.66**	0.748	0.00657 **

Variable	AIC	BIC	coefficient	p-value
Living conditions	72.01	76.2	0.639	0.00353 **
Identification with reference groups	78.32	82.51	0.3083	0.02299 *
The opinion of family members	80.54	84.72	0.2595	0.0732 .

Source: Our elaboration using R Software based on questionnaire answers.

For the Millennials, when they intend to buy an innovative product, the best predictor is income. It has the lowest score for AIC and BIC (Table 5). An increase of one level for this factor multiplies the odds in the intention of buying innovative products within 6 months by 2.11. The second-best predictor is related to living conditions: an increase of one level for this factor multiplies the odds in the intention of buying innovative products within 6 months by 1.89. In this case, all the variables taken into consideration are statistically significant.

Table 6. Relevant factors in the intention of purchasing innovative products for Gen Z

Variable	AIC	BIC	coefficient	p-value
Level of education	592.94	60.1.12	0.12186	0.0436 *
Occupation	595.02	603.19	0.084637	0.155
Income	593.84	605.01	0.02818	0.649
Living conditions	596.28	604.45	0.05184	0.381
Identification with reference groups	**591.65**	**599.82**	0.13893	0.0211 *
The opinion of family members	594.83	603.04	0.08498	0.138

Source: Our elaboration using R Software based on questionnaire answers.

When intending to buy an innovative product, for Gen Z, the best predictor is identification with reference groups. It has the lowest score for AIC and BIC (Table 6). An increase of one level for this factor multiplies the odds in the intention of buying innovative products within 6 months by 1.14. In this case, the level of education and the identification with reference groups are statistically significant.

For Millennials, among those who bought innovative products, occupation mattered. Probably, these products have significance in the chosen career. But for those who are thinking of buying in the next six months, all the factors that have been taken into account are important. But the least important factor is related to the opinion of the family members, this underlining their degree of independence. The practical side is highlighted by the choice of the most important factors, such as income and living conditions. For Generation Z, among those who bought innovative products, the opinion of family members mattered. A reason could be the fact that they are still quite young and are still financially supported by their parents, so they are still dependent on their opinions. But for those who are thinking of buying in the next six months, the decisive factor has to do with identification with the reference groups, probably aspiring to be like their models.

6. Conclusions

Through the current study, it was demonstrated that the characteristics presented in the literature review related to the decision to purchase products, in general, can also be applied to the decision to purchase innovative ones. An important aspect of this research relates to the fact that, in the construction of the prediction models, it was shown that the predictors are different or have different weights for those who have already purchased innovative products, compared to those who intend to buy in the next 6 months.

It has also been demonstrated that generations behave differently when they buy innovative products, and the criteria that influence consumer behaviour have different weights or they can be met in generation Z and not in generation Y, and vice versa. For Generation Y, relevant factors are related to the level of education, occupation, income, living conditions, and identification with reference groups. The opinion of family members' matters less. Generation Z has fewer relevant factors that are only related to the level of education, identification with reference groups, and the opinion of family members. Millennials associate the decision of buying innovative products with quality, evolution, effectiveness, performance, utility, necessity, ingenuity, novelty, and appearance, while generation Z associates the concept with design, advantages, actuality, attention, brand, quality, curiosity, sustainability, enthusiasm, efficiency, evolution, impulsiveness, information, simplification, progress. Some associations are quite similar, with price being the most important aspect for both generations. But even more important is the fact that it can be seen that Generation Z is more interested in innovative products, compared to Generation Y, both in the case of already purchasing and in the case of purchasing intention. Overall, education (more specifically, higher education) plays an important role in the profile of an innovative product consumer, and many associate innovation with sustainability.

Thus, the findings of this study have important implications for the intergenerational behaviour of consumers regarding innovative products. One of the limitations of this study being the small sample for both generation z and generation y, further research is recommended and can be generalised by adding other factors and extending the sample not only to those two generations included in this research but also to generation x, boomers, and silent. Finally, the influence of these factors can be fragmented and analysed from the perspective of other characteristics, such as occupation, environment, gender, or education profile.

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Management of Municipal Waste in Romania and Hungary in the EU Context

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Abstract

At the EU level, practices aimed at changing municipal waste management methods toward sustainable management systems are regulated. In the waste hierarchy, the first option is prevention of waste generation, but the emphasis is also on recycling and energy recovery. The present study analyses the dynamics of municipal waste management, in the period 2018-2021, in Romania and Hungary in the European Union context. The general results regarding municipal waste management at the level of the two countries, highlighted increases in the values of some indicators in terms of the quantities generated, but these values are below the average recorded in the EU. With regard to the indicators of efficient management of municipal waste, the two states have made efforts, but they are far below the European average, especially with regard to the quantities recycled, composted and utilised for energy. In this sense, the low recycling rates in Romania of 11.3 %, and in Hungary of 34.9 %, in 2021, compared to the European average, which is around 49 %, are noted, being far below the target proposed for 2020 by 55 %. For this reason, the storage rate is high in both countries, 80% in Romania and 50 % in Hungary. Both states must make efforts to increase municipal waste recycling rates and reduce the amounts stored, especially Romania, so as to better put into practice the principles of integrated waste management and meet the objectives assumed upon accession in this regard.

Keywords: municipal waste, generation, landfill, recycling rate.

JEL Classification: Q50, Q53, Q59.

1. Introduction

In the context of population growth and changes in consumption patterns, waste management is a priority for every country. An effective waste management is

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based on the principles of the "waste hierarchy", to reduce the pressure on the environment and to capitalise on the waste resources. In this sense, the focus is on methods of preventing waste generation and reusing resources. If these methods cannot be applied, it is recommended to recycle the materials, and another possibility would be the energy recovery of municipal waste. The disposal of waste in landfills is the last possible option and the least recommended.

The very different origin of municipal waste, mainly from households, but also from shops, offices, and public institutions, makes them present major differences in terms of their composition and therefore their value as resources. Their inadequate management leads to the endangerment of human health, environmental pollution, and also to the increase of production costs and the depletion of resources. In 1994, the European Union issued a directive on packaging waste, aimed at reducing the quantities that go to landfills or incinerators. The directive encourages the minimisation of the amount of material used in packaging, the reuse of components, and the recycling of packaging materials.

At the EU level, policies and objectives regarding municipal waste management are established. Thus, the objectives for this category of waste refer to reaching the percentage of 60 % recycling and preparation for reuse by 2025 and 65 % by 2035, plus the reduction of municipal waste thrown into landfills below 10 % by 2035, as well as revised objectives for packaging waste (Directive 2018/850).

2. Problem Statement

Waste management has an impact on the environment and on society, but also from an economic point of view.

In recent decades, the problem of rational and efficient use of the total amount of material goods produced in the economy to reduce waste generation has become more and more acute for humanity (Vitenko et al., 2021). Economic growth and technological development have increased the consumption of goods and services, as well as the amount of waste (Petrescu et al., 2022).

Managing the selective collection of waste and its various treatments, especially recycling, contributes to the realisation of a circular economy (López-Portillo et al., 2021). The European Union has outlined its plan for a circular economy with the aim of maintaining growth and competitiveness while halving resource extraction by implementing innovative ways of production and consumption (https://www.sustainability-seeds.org/). Proper management of solid waste is a central pillar of sustainable and long-term environmental policies.

In the EU, waste management (according to the hierarchy of their management methods) is based on the principles of sustainable development. Member States must take measures to treat the waste produced, according to a clear hierarchy: prevention, preparing for re-use, recycling, recovery, e.g. energy recovery and disposal. EU-wide targets include achieving a recycling rate of 65 % by 2030 and capping landfill waste at no more than 10 % (as a percentage by weight) (Cecere, Corrocher, 2016).

In the EU, municipal waste represents 7-10 % of all generated waste (Directive EU/2018/851). Differentiated levels regarding values in the field of waste management in the EU member countries come from the adoption of different development strategies for the transition of economies to the circular economy and also from the differences that appear in social and economic development (Mazur-Wierzbicka, 2021).

The analysis of European waste management demonstrates that member states have faced similar problems in municipal waste treatment, these problems originating in the impact of rapid economic development (Buclet, Godard, 2000).

EU policies and strategic focus are moving away from energy recovery and landfill disposal as ways of dealing with waste (Traven et al., 2018). In recent years, the EU has started a comprehensive regulatory action aimed at moving waste management practices towards sustainable waste management systems, the first premise being the prevention of waste generation and, secondly, the promotion of recycling practices (Chioatto et al., 2022).

The disposal of municipal waste by storing it in landfills is a traditional way of disposal, which has been addressed in the past in many EU countries, but this can have harmful effects on the environment and people, leading to pollution (Khaertdinova et al., 2021). There are countries that almost no longer practice waste storage (Belgium, Holland, Denmark, Sweden, Germany, Austria), where incineration plays an important role alongside recycling. Eastern and Southern European countries still opt for storage, with more than 50 % of municipal waste being stored in landfills (https://www.europarl.europa.eu/).

In recent years, Europe has made substantial progress towards more sustainable management of municipal waste (https://www.interregeurope.eu/). In the short and medium term, the EU will become a leader in the practical implementation of the circular economy concept through reuse and recycling, which will lead to savings on both electricity bills and raw material imports and increase the environmental culture of the population (Vitenko et al., 2021).

3. Aim of the Research and Research Methods

The article addresses waste management issues in the context of promoting a transition to a circular economy. Both countries have a well-developed policy and legal framework for waste management, driven mainly by EU requirements and supported by quantitative targets and economic instruments. The Eastern region of Europe, including Romania and Hungary, is lagging behind in terms of municipal waste management, but the Romanian-Hungarian border area benefits from attracting foreign investments, including in the field of waste management.

The purpose of this research was to perform a comparative analysis of municipal waste management in Romania and Hungary, two neighbouring states, taking into account both the geographical proximity, but also the differences due to the time of the start of negotiations for EU accession, as well as the time of effective accession. The research hypothesis is whether there is a gap regarding the implementation of European norms regarding the management of municipal waste

between the two analysed countries and whether Romania and Hungary have improved their waste management by increasing recycling and recovery rates and decreasing the use of landfills of waste, hypotheses verified by analysing the main waste management indicators.

For this study, specific indicators were selected for municipal waste management in the period 2018-2021. The indicators analysed are: the amount of municipal waste generated, the amount of municipal waste treated, the recycling rate of municipal waste, the amount of municipal waste disposed - landfilled and other, the amount of incinerated waste, the amount of recycled waste, and the amount of waste prepared for reuse. These values were taken both in absolute terms and in terms of the quantity per inhabitant. The study focused on the qualitative analysis of data in Romania and Hungary, compared to the EU average. The data were taken from the Eurostat database.

4. Findings

Municipal solid waste is a mixture of biomass and fossil fuel-based materials. Biomass or the degradable portion includes materials such as food and animal waste, yard waste, paper/cardboard, leather and wood, while non-degradable materials are stable and can take years to decompose in landfill (Ayodele et al., 2018).

Regarding the municipal generated waste, based on the data analysis, it can be appreciated that the general trend is increasing, both at the level of the EU and at the level of the two countries, but the values recorded by Romania and Hungary are lower than the EU average.

In 2018, municipal waste in Romania recorded a value of 272 kg/capita, reaching a total of 302 kg/capita in 2021, representing a percentage increase of 11 %. The values are significantly below the EU average regarding the generation of municipal waste, but the percentage increase is higher in the analysed interval, compared to the European average and the one registered in Hungary (Figure 1).

In Hungary, in 2018, the value of the amount of municipal waste generated was 381 kg/capita and increased to 416 kg/capita in 2021, representing a percentage increase of 9 %. In the EU, the values registered an upward trend, from 500 kg/capita in 2018, to 530 kg/capita in 2021, and the percentage increase in 2021 compared to 2018 was 6 %.

Figure 1. Municipal waste generated (kg per capita)

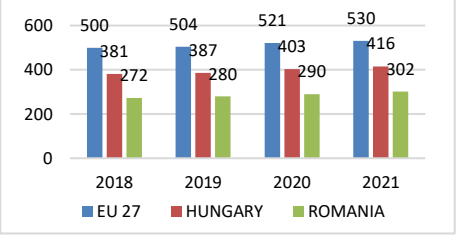
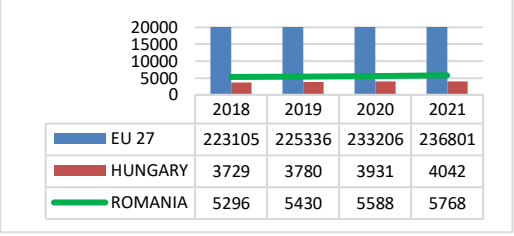


Figure 2. Municipal waste generated (thousand tonnes)



	2018	2019	2020	2021
EU 27	223105	225336	233206	236801
HUNGARY	3729	3780	3931	4042
ROMANIA	5296	5430	5588	5768

Source: https://ec.europa.eu/eurostat.

In absolute terms, EU citizens generated 236,801 thousand tons of municipal waste in 2021, an increase of 6% compared to 2018. In the case of Romania, the trend was also strictly upward, the total amount of municipal waste varied between 5296 thousand tons in 2018 and 5768 thousand tons in 2021, representing an increase of 8%. In Hungary, the trend was also strictly upward during the analysed period, increasing from 3729 thousand tons in 2018 to 4042 thousand tons in 2021, representing an increase of 8% (Figure 2).

An important aspect of municipal waste management is represented by its treatment method, in order to avoid storage in landfills. Regarding the treatment of municipal waste, the situation of the values recorded in the period 2018-2021 is presented in figure 3. In Romania in 2018, the amount treated was 255 kg/capita, reaching up to 280 kg/capita, representing an increase of 9%. In Hungary, the treated quantities started at 383 kg/capita, gradually increasing up to 416 kg/capita, the percentage increase during this period being 8%. Thus, it is found that the values in Romania are much lower than the European average and compared to those in Hungary, which leads to the idea that sustained efforts must be made in this direction.

Figure 3. Municipal waste treatment (kg per capita)

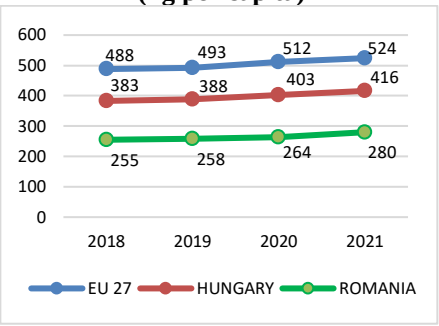
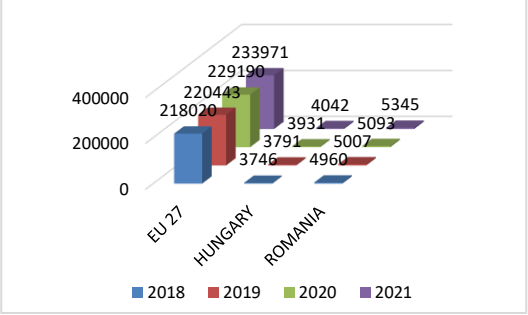


Figure 4. Municipal waste treatment (thousand tonnes)



Source: https://ec.europa.eu/eurostat.

In absolute terms, the amounts of municipal waste treated increased throughout the analysed period. In the EU, the values ranged between 218020 thousand tons in 2018 and 233971 thousand tons in 2021, an increase of 7 % in 2021 compared to 2018. In the case of Hungary, the increase was 7%, a value based on gradual increases from 3746 thousand tons in 2018 to 4042 thousand tons in 2021. In Romania, the increase was also 7 %, from 4960 thousand tons in 2018 to 5345 thousand tons in 2021 (Figure 4).

The recycling rate of municipal waste in the European Union in the period 2018-2021 had an upward growth trend from 46.4 % to 49.6 % (Figure 5). These values are determined based on data from member countries.

Figure 5. Recycling rate of municipal waste (%)

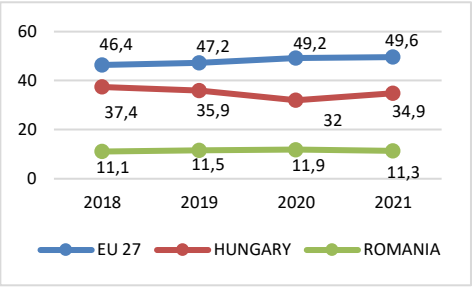
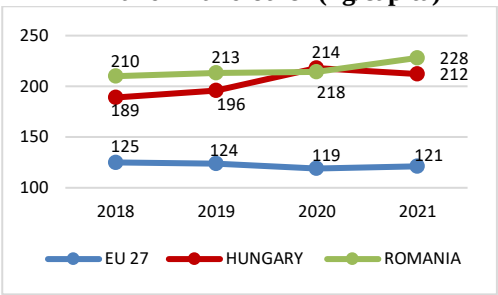


Figura 6. Municipal waste - disposal landfill and other (kg/capita)



Source: https://ec.europa.eu/eurostat.

In Romania, the values of the municipal waste recycling rate during the analysed period were very low, of only 11-12 %, which makes it far below the proposed target for 2020 of 55 %, according to the European directives in force. In Hungary, the recycling rate is higher than the values recorded in Romania, but lower than the European average, with an oscillating tendency, the values in the analysed period being between 37.4 % in 2018 and 32 % in 2020 (Figure 5).

Landfill is the least recommended option, but it is the main means of waste disposal in some Member States, which contradicts the "Resource Efficient Europe" initiative. The EU Circular Economy Action Plan envisages changing the current model of the linear economy and 'closing the loop' on product life cycles through greater reuse and recycling. The plan aims to follow the entire cycle of products, from their production and consumption, to waste management and the market for secondary raw materials (https://ec.europa.eu/).

Thus, in the period 2018-2021, it can be seen that in Romania the quantities sent for storage decreased until 2021 to 121 kg/place, from 125 kg/place in 2018 (Figure 6). In Hungary, there was an increase in the first part of the analysed interval, followed by a slight decrease, reaching 212 kg/place in 2021. Regarding the EU average, the values are much lower than in the case of the two countries, the trend being slightly downward, from 125 kg/capita in 2018 to 121 kg/capita in 2021.

Regarding the nominal values related to the quantities of recycled waste (kg/capita), it is found that in the EU, the trend is strictly upward, increasing from 147 kg/capita in 2018 to 157 kg/capita in 2021, an increase of 6 % (Figure 7). In Hungary, the trend is non-linear, the lowest value being recorded in 2020 of 90 kg/capita, increasing to 106 kg/capita in 2021, the percentage difference being 17 %. In Romania, the recycled quantities are far below the values recorded in the EU and in Hungary, the lowest registered value being 16 kg/capita in 2020, and in 2021 it increased to 20 kg/capita, the trend being oscillating. These values show the lack of concern of the Romanian authorities and citizens regarding the application of European directives.

Figure 7. Municipal waste – recycling material (kg/capita)

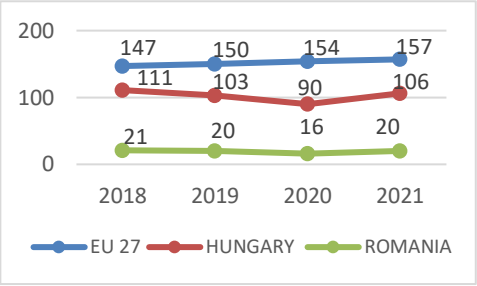
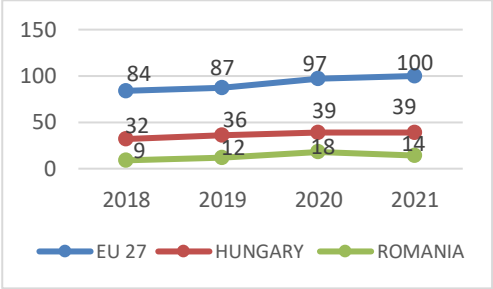


Figure 8. Municipal waste – composting and digestion (kg/capita)



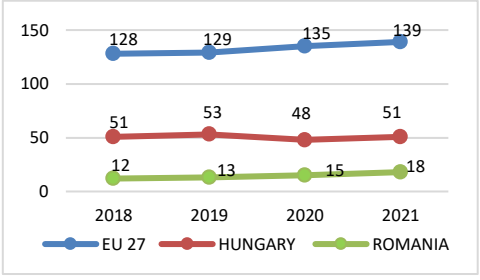
Source: https://ec.europa.eu/Eurostat.

Composting is a method recommended to be used for the valorisation of biodegradable organic waste. The values recorded in the EU are much higher compared to the two analysed countries, due to the fact that in other member states more emphasis is placed on this method, the values being between 84 kg/capita in 2018 and 100 kg/capita in 2021 (Figure 8).

In Hungary, the values gradually increased from 32 kg/capita in 2018, to 39 kg/capita in 2021, and in Romania, the values are lower compared to Hungary, starting from 9 kg/capita in 2018, reaching 14 kg in 2021.

When other waste treatment options, such as reuse or recycling, are not possible, it is recommended to use them through energy recovery. Thus, it is found that this method is practiced at the EU level, the quantities of municipal waste from which energy is recovered, varying between 128 kg/capita in 2018 and 139 kg/capita in 2021 (Figure 9). In Hungary, the values were slightly oscillating during the analysed period; they started from 51 kg/capita and remained at the same value in 2021. In Romania, the values are lower than in Hungary and much lower than those in the EU, but on a slightly upward trend starting from 12 kg/capita in 2018 and reaching 18 kg/capita in 2021.

Figura 9. Municipal waste - energy recovery (kg/capita)



Source: https://ec.europa.eu/eurostat/databrowser/view/env_wasmun/default/table?lang=en.

In Table 1, the municipal waste treated by management operations is analysed. Thus, at the EU level, 54,147 t are disposed of by storage, and in Romania and Hungary are stored 4,357,000 tons and 2,061,000 tons, respectively.

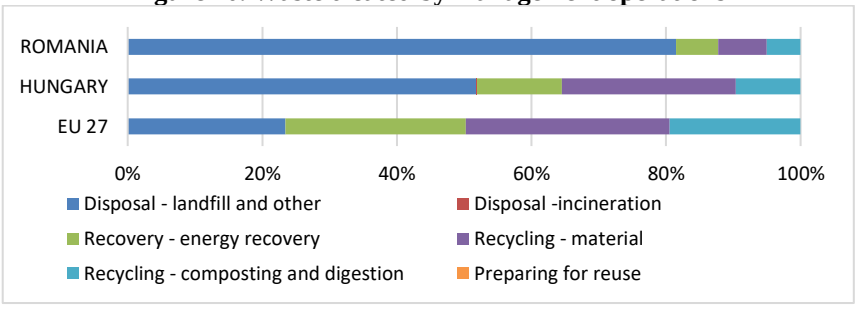
Table 1. Municipal waste treated by management operation (thousand tonnes)

2021	Municipal waste treated (thousand tonnes)					
	Disposal - landfill and other	Disposal - incineration	Recovery - energy recovery	Recycling - material	Recycling - composting and digestion	Preparing for reuse
EU 27	54147	:	61966	69948	44894	:
HUNGARY	2061	3	500	1029	382	0
ROMANIA	4356	0	335	384	270	0

Source: https://ec.europa.eu/eurostat.

Figure 10 shows the treated waste according to their management operations. Thus, it is found that over 80 % of the waste treated in Romania is stored in landfills. It can be appreciated that Romania is one of the countries where most of the collected municipal waste is treated through storage operations at landfills, recycling, and recovery being used to a very low extent. These observations are in accordance with those presented by Ioana et al. (2016). In the case of Hungary, the percentage of waste - landfilled exceeds 50 %. This happens despite the fact that within the waste management hierarchy of the European Union Framework Directive, disposal by storage is the least sustainable option. Both countries must improve their waste management by applying the principles of the waste hierarchy more strictly, especially Romania.

Figure 10. Waste treated by management operations



Source: Own representation based on data available at https://ec.europa.eu/eurostat.

Many EU countries have received loans from the European Investment Bank to finance investments in waste management and treatment. In Poland, the Czech Republic, Hungary and Slovenia, grants from EU funds supported a wide range of waste treatment investments, including integrated waste facilities that combined sorting, recycling and composting for municipal solid waste (https://www.oecd-ilibrary.org/sites/1f4e61ee-en/index.html?itemId=/content/component/1f4e61ee-en).

Efficient waste management involves costs, and these costs are usually too high for local municipalities. Most of the time, the collected sanitation fees do not fully cover the costs necessary to ensure an integrated waste management. The expenses for the protection of the environment represent an economic measure of the response that society gives regarding the state of the environment, and they refer to the expenses incurred for the performance of environmental surveillance and protection activities, those for the prevention of pollution and those incurred for combating effects or damage to the environment (https://www.oecd.org/env/40501169.pdf).

In order to evaluate the situation of the efficient use of environmental and waste management taxes, the identification of a link between the revenues collected from environmental taxes (millions of euros) and the amount of recycled materials (thousands of tons) was also pursued. As other authors have identified, in EU countries, there is a strong correlation between environmental tax revenues and the amount of recycled materials (Năstase et al., 2019).

At the Hungarian level, the value of the correlation coefficient between these indicators (0.200) indicates a weak direct link between the analysed variables (Table 2). The higher the environmental tax, the more materials should be recycled.

Table 2. Correlation

			MATERIAL RECYCLING	
			Hungary	**Romania**
Spearman' rho	ENVIRONMENTAL TAX REVENUES	Correlation Coefficient	,200	-,316
		Sig. (2-tailed)	,800	,684
		N	4	4

Source: Own processing based on data https://ec.europa.eu/eurostat.

In the case of Romania, the value of the correlation coefficient is -0.316, which indicates an indirect connection between the analysed variables. This means that large sums were collected for environmental and waste management fees, but small amounts of materials were recycled. In other words, collected taxes and environmental funds were used ineffectively for the organisation and operation of collection and recycling systems.

6. Conclusions

All stakeholders, including governments, municipalities, businesses, and residents, must be involved in sustainable development in the area of municipal waste management. The two states under study have lower amounts of waste generated/capita and treated than the EU average, which results in a higher rate of landfill disposal than the EU average. This condition results from the employment of alternative waste management techniques on a smaller scale.

The values regarding organic waste composting, energy recovery, and especially recycling are far below those recorded in the EU, especially in Romania, and far below the targets provided in the European Directives.

The degree of waste recycling is influenced by the economic development of each nation, the facilities created for recycling, the income of the population, and the degree of education regarding selective collection. Recycling is an action with a beneficial effect on the environment and represents a major EU objective, so the population should actively contribute to the collection and recycling of the waste they generate, and public authorities must use the funds allocated to waste management more efficiently.

In conclusion, the two EU member countries are below the European average for most indicators on waste management and must make sustained efforts to implement the principles of efficient waste management and to achieve the objectives assumed upon accession.

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The Market of Organic Agri-Food Products in Romania

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Abstract

An important trend influencing consumer behaviour and consumption choices is the trend towards a healthy lifestyle with a balanced diet. Especially among millennials, the demand for organic products obtained from sustainable production processes has increased significantly, due to their increased level of information and purchasing power. The consumption of organic food products is increasing, the main reason being the assimilation of environmental protection principles. The main purpose of this research is to study the demand and supply of organic food products in Romania, based on the analysis of specialised literature, European Commission reports and statistical data. Since 2017, Romania has registered a rapid increase in agricultural areas cultivated in an ecological system (under conversion and maintenance), reaching 469,000 hectares in 2020 (of which 41 % are under conversion). However, the share in 2020 (3.5%) is still below the EU average of 9.1 %. Most of the organically cultivated land (61%) is used for cereals and permanent grassland. The number of organic dairy cows peaked in 2014, falling to almost half of the 2014 level in 2020. In recent years, there has been a rapid increase in the number of organic poultry (especially for egg production) and the number of beehives. From 2015 to 2019, the number of processors in the organic system increased from 106 to 191 and the range of organic products diversified a lot. The demand for organic products by Romanian consumers is still at a very low level. Organic food retail sales amounted to € 41 million in 2020.

Keywords: organic market, organic agri-food products, consumption, price, Romania.

JEL Classification: Q13.

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1. Introduction

"Being an integrative system of organising, leading and managing production, organic agriculture develops and improves the robustness of agroecosystems, and at the same time the diversity from the point of view of biological elements, biological cycles and biological activity of the soil. Through it, managerial strategies against the use of inputs from outside the agricultural holding are highlighted, taking into account the zonal conditions that imply the adaptability of the systems at the local level. By implementing methods specific to the agronomic, biological and mechanical fields, these strategies can be implemented, thus not resorting to synthetic materials to achieve the characteristic functions in the dynamics of the system" (Comisia FAO/OMS Codex Alimentarius, 1999; Stoica et al., 2022).

Organic agriculture represents the integral part of the viability of this field of the economy, having as its interest the satisfaction of the pressing needs of agricultural products, which have met the quality and sanitary standards, respecting the natural environment, the ecological balance over a long period of time (Lupăncescu, Rădoi, 2021).

Organic agriculture contributes fundamentally to the evolution of sustainability, involving the development of economic activities that produce added value at a high rate, as well as the positive dynamic growth of the interest given to rural areas. At the level of the European Union and at the level of our country, laws have been elaborated and implemented that establish objectives, principles, and norms that apply in the framework of organic production. Thus, the rules together with the establishment of the typology, the methodology of the production system related to the plant, animal, and aquaculture productive sector establish legal reports regarding the processing method, the labelling method, the type of trade practiced, verification and authentication, integral processes of the ecological agriculture system (MADR, 2023).

Organic agriculture was born as an improved variant of agriculture accepted by tradition, with industry at its base, and which has limiting tendencies and negative repercussions in terms of the quality of the products and the way they are obtained, on the environment, a fact mainly due to the use in excess of substances of chemical origin, harming the health of people and animals to the same extent, also affecting the quality of the soil. Through the lens of its components, organic farming is ahead of other types of agricultural production by promoting non-conventional and recyclable resources, thus providing the soil with organic nutrients (Lupăncescu, Rădoi, 2021).

The potential that this form of agriculture offers at the level of our country is particularly high, because the natural framework offered by Romanian space offers the right conditions for the expansion of organic agriculture, having fertile land and a low degree of pollution in the rural environment, compared with countries that have experienced economic development, where super-intensive agriculture is the most widespread, based on chemical fertilisers and pesticides (Ilie, 2013; Gonciarov, 2014; Lupăncescu, Rădoi, 2021).

At the level of the European Community, the use of organic agriculture has been developed due to an increasing need of consumers to access agri-food products that ensure their safety and security from a sanitary point of view and at the same time have a certain quality standard, thus improving the consumption of the population by offering genuine foods that, through use, improve the health of citizens (Pîrvu et al., 2009).

At the level of our country, the verification and certification of products obtained through the practice of organic agriculture are carried out by Private Inspection and Certification Bodies (ICB). These bodies can only carry out their activity following the approval received from the Ministry of Agriculture and Rural Development. Obtaining the approvals is preceded by the accreditation of the bodies through another accreditation body: RENAR (SRAC, Ecological Agriculture).

In order to be able to carry out the activity of organic production, precise standards and norms imposed by organic agriculture must be respected. They are carried out in a manner in which they have as a foundation principle of a general nature but also of a specific nature to support environmental protection, maintain ecosystems at the European level, and achieve consumer education regarding the consumption of organic products. The regulations listed above are the basis of all sectors related to organic production and are based on the following principles: the use of genetically modified organisms (GMOs) is not accepted, the use of ionising radiation is not accepted, the limited use of materials used for soil fertilisation; of chemicals used in the eradication of plants and pests that attack crops; does not accept the use of hormones, and the use of antibiotics is limited to the situation of necessity regarding the health of the animals. In other words, organic producers are required to adopt diverse approaches to soil fertility and the health status of both animals and plants (European Commission, 2023).

2. Problem Statement

Following the reform of the Common Agricultural Policy (PAC) that took place in 1992, the promotion of the quantitative increase of ecologically specific agricultural holdings at the level of the European Union was achieved, but the level of market growth is conditioned to a very large extent by the study of consumer needs and their habits procurement, so that an effective marketing mix can be productively applied (Fortea et al., 2022).

The percentage of agricultural land used for organic farming at the level of the European Union experienced an increase of over 50 % in the period 2012-2020, the annual average being 5.7 %, reaching an organic cultivated agricultural area of 9.1 % of the entire cultivated area of the EU in 2020. In a different proportion from one member state to another, the considerably larger size of organic farms compared to classic ones, with young entrepreneurs at the management level, is noted (European Commission, 2023).

The first four positions in the top of the countries achieved according to the area in which organic agriculture is carried out at the level of the European Union are:

France, Spain, Italy, and Germany, so the organically cultivated areas of the 4 countries combined represent 52 % of the entire area in 2012, reaching 59 % in 2020. Permanent pastures held the most important share in the total area used for organic agriculture, representing 42 %, followed by green fodder with a percentage of 17 %, then cereals with 16%, and permanent crops with a percentage of 11 %. Even if the increase was significant, the organic animal production sector constitutes only a small fraction of the total animal production at the level of the European Union, being between 1-7 %, depending on the sector of origin. The PAC offered important amounts, in the form of organic support to meet the development of organic agriculture, for organic cultivated lands, which represented in 2020 approximately 61.6 % of the total cultivated lands, with an average of 144 euros/hectare from the PAC part, and 79 euros/hectare co-financing at the national level (The European Commission, 2023).

Currently, the implementation of the European Green Deal is a vital action for society to ensure food security and transform food chains into a sustainable model. The European Green Pact allows the gradual abandonment of intensive agriculture and, at the same time, supports the responsible consumption of agri-food products by developing the consumption culture toward the appreciation of organic food (Chiripuci et al., 2022).

2.1 The Organic Products Market at the EU Level

The demand and supply of organic products is experiencing accelerated growth both in developed countries and in developing countries, for which the rate is lower. If we analyse the share held by the trade in organic products at the global level, it can be seen that the market is quite large, which leads to a possible development and diversification of these types of products (Dash et al., 2023; Sindhu, 2023).

Being a large and continuously developing market, the market for organic certified agro-food products at the global level had an estimated value of 96.7 billion euros in 2018. There is an assured supply of 2.8 million producers who work in this market, and worldwide the organic cultivated area represents 71.5 million hectares.

Analysing the data for 2015 compared to 2020 for the sales of organic products, it can be seen that they have doubled in value, significant increases have also been registered for imports from countries that are not part of the EU, especially exotic fruits. The same growth was recorded in the market of fresh organic products, in all varieties and in terms of volume and value.

Following a survey of the organic product with the highest organic share but also with the fastest growth on the market of fresh organic products, the egg took first place for countries such as France, Italy, Germany, Spain.

Because local organic producers do not have the capacity to meet such a high demand, increasing amounts of organically certified agro-food products are imported as raw materials for final food products. The level of total imports for the European Union with respect to such products reached the level of 2.7 million tons

in the year 2020 and with an increase of 2.8 %, respectively, 2.87 million tons for the year 2021. If they are not taken calculating imports for the UK at the level of 2021, imports at the EU level decreased by 1% if we compare them with the previous year, up to the share of 2.76 million tons. From this point of view, the European Union represents an importer particularly high on the market for semi-finished products or finished organic products.

Analysed through the prism of the traded volume of organic products, most imports were for cereals, coffee beans, cocoa, fruits, vegetables, and meat. 44% of imports for organic products, were goods and primary products., and for products with a higher value the level was a low one, while juices, olive oil registered increases of 7 %, i.e., up to 212 thousand tons. Imports were twice as high for prepared foods (+120 %) reaching 98,000 tons, but also for beverages (+120 %), 3,700 tons. The Netherlands and Germany are the largest importing countries with a percentage of 50% of total imports, respectively, 945,000 tons (Netherlands) with +10.2 % compared to 2020 and almost 20% Germany (517,000 tons) Germany (+5.2 %). Compared to the first two importers, the following Belgium, France (European Commission, 2022).

2.2 The Organic Products Market in Romania

At the level of our country, MADR regulates the sphere of organic agriculture, while at the European Commission it carries out this regulation for the member countries of the Community. The laws imposed on the organic agricultural sector, as well as on the production of this kind, are carried out in a way that supports sustainable development, while assuring consumers of the quality of the products offered and of this agricultural sector, guaranteeing the functioning of the market mechanisms (Panait, Cucu, 2019).

Romania's organic food production potential is growing. However, this potential is not properly exploited, the demand for this type of product being very low, a fact due to the lack of education and information held by consumers, combined with the very high prices charged compared to the prices of conventional products (Răbonţu, Todoruţ, 2010).

Agri-food products are distributed mainly through retailers, a trade that every year improves the range of organic products, using already existing brands or in the form of its own brand. The sales volume of organic food products represents barely 1% of total food sales. At the level of our country, exports are represented by the vast majority of ecological production, while imports are represented by organic finished products. This happens because there is no specific technical-material basis for the processing and production of ecologically certified products, combined with a small number of authorised producers (Panait, Cucu, 2019).

The distribution of organic certified products is also done through specialised stores, directly from the manufacturer or online. Selling directly from the manufacturer gives a small range of seasonal products, and the volume of sales on this distribution channel is low (Popovici et al., 2018).

2.3 The Price of Ecological Products

Analysing the price dynamics of organic products compared to the prices of conventional products, it can be stated that the prices of certified organic products are at a higher level than the others. However, this does not have major repercussions on the ecological products market because it is already formed, there are categories of consumers who opt for the consumption of these products. If organic products are purchased directly from producers, the price paid by consumers is more advantageous, not only from a financial point of view, but also from a sanitary and environmental protection point of view (Răbonţu, Todoruţ, 2010).

The difference between the prices of organic products and the prices of other products is reflected by the fact that the harvest level is low (20 % - 50 % lower), the labour force used involves a larger number of workers, the distribution is done only in stores or districts specialised requiring compliance with certification standards (Dobrescu, 2004).

Depending on the specifics of organic products, they are sold at different prices, taking into account their physical properties, namely: perishability, degree of demand from consumers, their condition (fresh, frozen, for use as raw materials in obtaining other products), and also by the number of producers for the same type of product.

The main drivers of the market for organic products are demand and competition. The long distance between the organic agricultural farms and the cities where their products are distributed is not a determining factor in setting the price, nor is the competition, which largely depends on the demand expressed for organically certified products, thus determining its lower level. Agricultural farms located at smaller distances from the cities where they sell their organic products set the price according to competitors, which leads to an extremely high level of it, without any concrete justification. Farmers, regardless of their location in relation to the distribution area, do not adopt price policies taking into account market segmentation according to income (Atanasoaie, 2014).

A major consulting company, Everis, conducted a study on the motivation behind the price difference between organic and conventionally farmed products, also finding a notable discrepancy between the two and concluded that among the determining factors that influence these components of the market (product prices), the seasonality of crops is found, but also their rotation, something that visibly affects profit.

2.4 Demand for Organic Products

In the last century, there has been an upward trend in the demand for organic products, increasing 4 times at the global level, and at the EU level by 13 % and by 24.8 % in Spain. The same trend has been registered in the last 10 years, a fact that also involved the increase in the volume of sales and, therefore, also the level of production of ecologically certified products. The increases were confirmed by

FiBL, which presented a series of indicators that attest to these aspects, both at the European Union and worldwide level.

At the European level, the demand for organic products shows an imbalance depending on the area, being higher in Western European countries. However, the trend of increasing demand was also identified in Central-European and Eastern-European countries, especially in Hungary, Poland, and Romania, countries that traditionally developed organic crops that they mostly offered for export. At the global level, the European market is particularly large, and the trend is upward. (Țigan et al., 2021)

Due to the introduction of regulations regarding the certification and verification of organic products, consumers have gained confidence in this type of product, thus increasing the volume of demand (Tarhini, 2022).

Sales of organic products have grown significantly in recent years in the EU, reaching a value of € 34.3 billion in 2017.

Demand for organic products will continue to grow over the next ten years, with the fastest growth through 2025.

2.5 The Offer of Ecological Products

As for the offer at the level of our country for organic products, it contains a wide range of agri-food products: eggs, milk and milk products, meat and meat products, honey, wine, and others. FIBL has carried out research on the place occupied by each assortment of organic goods, resulting in the fact that the greatest success in this market is held by milk and milk products, followed by exotic fruits, with a preponderance of bananas and citrus fruits, counterweighted by apples produced nationally (Panait, Cucu, 2019).

2.6 Consumers of Ecological Products

In Spain, a market study was carried out regarding certain characteristics of consumers of organic certified products, and it was found that 53 % of them are women, with an average age of 43.3 years, being open to online purchases, the producers being thus having to adapt and satisfy these needs, while maintaining the connection with the consumer after completing the purchase.

The consumer chooses to satisfy his needs by purchasing organic products from his geographical area, as close as possible to his residence, supporting local farmers in this sense, helping to maintain a natural environment that is as little polluted as possible, avoiding to obtain imported products that require more distribution channels long and therefore a negative impact on the environment. There is an ever-increasing interest in environmental protection from large companies and not only (Tarhini, 2022).

An accelerated increase in sales indicates a change in demand in the same direction. This was particularly evident during the pandemic period, due to the intense interest in the state of health and the restrictions that accompanied this period of time, but also the lack of basic foods or household production. The current fund emphasises the presence of inflation at the food level, which

influences purchasing power and the decrease in demand for organically certified products (The European Commission, 2023).

At the level of our country, the value of sales of organic products has reached the level of 10 million euros, but due to the lack of processors in this field, the raw material is exported and returns in the form of imports of finished organic products, the cost being obviously much higher, reaching at about 4 times the price.

At the level of 2022, MADR produced reports according to which there is a guarantee of the authenticity of organic products that bear the national and European Community logos and that 95% of the raw materials used to obtain the respective product were certified as the result of organic production activity and that they comply with all the standards imposed in this regard (Dimitriu et al., 2022).

There is a clear citizen interest in the sustainability approach for the agricultural sector. Thus, they certified through a survey initiated by the "Sustainable Romania" project that they want to promote the consumption of the healthiest food while also taking into account the protection of the environment. Consumers want the development of the agricultural sector at the national level by certifying traditional products in a percentage of 79 %, promoting and encouraging farmers 81 %, implementing a functional irrigation system at the country level 78 %, and approximately 90 % want to protect the environment by preventing and combating pollution. Therefore, at the level of the citizens of our country, there is support for sustainable agriculture.

The development involves the consumption of certified organic products, which have higher purchase prices than conventional products; this requires higher incomes, with which the consumer can secure an organic product when faced with the choice of goods on the shelf. We can definitely talk about the increasingly high consumer interest in healthy living, an aspect that can also be supported by adequate ecological and food education.

3. Research Questions / Aims of the Research

This paper aims to analyse the ecological market in Romania. Through the work, it is desired to answer one of the most important questions namely: "What are the trends on the organic market in Romania?"

The research results are intended to help farmers, processors and traders to understand what are the factors that have a direct impact on consumption and production of organic products in Romania.

4. Research Methods

This research is based on statistical data provided by the National Institute of Statistics and the Ministry of Agriculture and Rural Development regarding, from which data were extracted regarding the agricultural area used organically cultivated, the share of organic agricultural production in the total agricultural

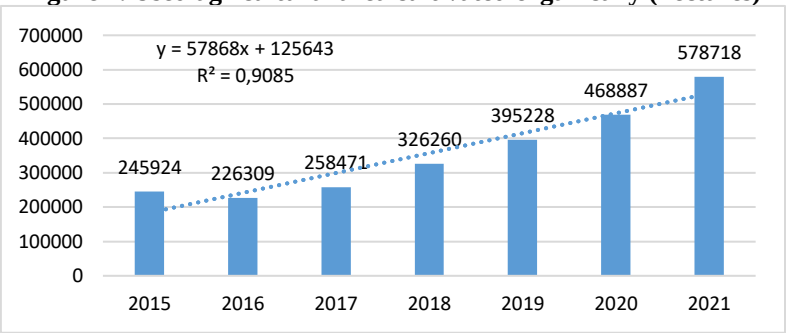
production, the dynamics of operators and areas in organic farming, the evolution of ecologically certified animal herds.

The research method used was quantitative and qualitative data analysis, as well as comparative analysis.

5. Findings

According to the data provided by Eurostat, in the European Union, the organic cultivated area is equivalent to 9.1 % of the total agricultural areas used. The lowest share of cultivated areas in the organic system is recorded in Malta, Ireland, Bulgaria, and Romania. In Romania, the share of cultivated in the system is 3.2 %, almost 3 times lower than the European average.

Figure 1. Used agricultural area cultivated organically (hectares)

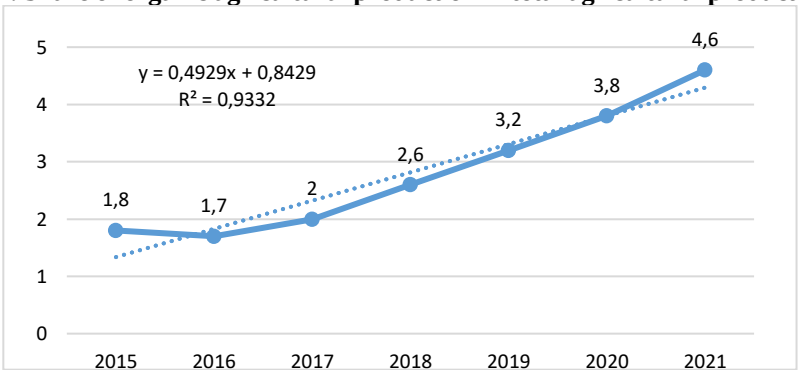


Source: INS – tempo online, TBU0262 - Target 6 - Environment - Used agricultural area cultivated ecologically, accessed on 16.03.2023.

Although the used agricultural area cultivated organically has increased year by year, up to 578,718 hectares in 2021, only 3% of Romania's total agricultural area is cultivated in this way.

The trend line y = 57868x +125643 shows an average increase of 57,868 hectares per year (Figure 1).

Figure 2. Share of organic agricultural production in total agricultural production (%)



Source: INS – tempo online, TBU0262 - Target 6 - Environment - Used agricultural area cultivated ecologically, accessed on 16.03.2023.

The European Commission has developed an action plan to develop organic production, its goal being to reach a rate of 25 % of the total agricultural land by 2030.

Along with the agricultural area cultivated in the organic system, the share of organic agricultural production in the total agricultural production also increased. In the period 2015-2021, there was an increase of approx. 156 percentage points, from 1.8 % to 4.6 % (Figure 2).

Table 1. List of control bodies (CO) in the field of organic agriculture in Romania

No. crt.	Control bodies (CO) in the field of organic agriculture	CODE
1.	SC ECOCERT SRL	EN-ECO-007
2.	SC ECOINSPECT SRL	EN-ECO-008
3.	BIOS SRL ITALY - ROMANIA BRANCH	EN-ECO-009
4.	AGRECO R.F. GÖDERZ GMBH GERMANY - ROMANIA BRANCH	RO-ECO-015
5.	BIOAGRICERT ITALIA SRL – ROMANIA BRANCH	RO-ECO-016
6.	AUSTRIA BIO GARANTIE GMBH ENZERSFELD BUCHAREST BRANCH	RO-ECO-018
7.	CERTROM SRL	RO-ECO-021
8.	SC ECOROISCERT SRL	RO-ECO-022
9.	THE ROMANIAN MOVEMENT FOR QUALITY	RO-ECO-023
10.	CERES ORGANIC CERT SRL	EN-ECO-024
11.	BIO CERT TRADITIONAL SRL	RO-ECO-025
12.	SC SRAC CERT SRL	RO-ECO-026
13.	SC TUV AUSTRIA ROMANIA SRL	RO-ECO-027
14.	RINA SIMTEX - CERTIFICATION ORGANIZATION SRL	RO-ECO-028

Source: MADR, Ecological Agriculture, https://www.madr.ro/agricultura-ecologica/operatorii-certificati-in-agricultura-ecologica-2022.html.

In Romania, the inspection and certification of organic products are carried out by private inspection and certification bodies. They are approved by the Ministry of Agriculture and Rural Development (MADR), based on the criteria of independence, impartiality, and competence provided for in Order no. 895/2016 for the approval of the regulations regarding the organisation of the inspection and certification system, approval of inspection and certification bodies, and supervision of the activity of control bodies. The approval by MADR of the inspection and certification bodies is necessarily preceded by their attestation by an authorised body for this purpose.

Following the checks carried out by the inspection and certification bodies, the operators who comply with the production rules will be able to obtain an organic product certificate and will be able to display the mention of "organic product" on their products. The organic product label must include information about organic production, logos, the name, and the code of the organisation inspection and certification that carried out the control and issued the organic product certificate (MADR, 2023).

Control bodies are responsible for ensuring that the certificate issued to the inspected operator/group of operators complies with the legislation in force.

Currently, Romania registers 14 control bodies in the field of organic agriculture, presented in Table 1.

Table 2. Dynamics of operators and areas in organic agriculture

INDICATOR	2015	2016	2017	2018	2019	2020	2021	2021/2015
Total number of operators certified in organic farming	**12231**	**10562**	**8434**	**9008**	**9821**	**10210**	**12231**	**0%**
Total area in organic farming (ha)	**245924**	**226309**	**258471**	**326260**	**395228**	**468887**	**578718**	**135%**
Total cereals (ha)	81440	75198	84,925.51	114427	126843	134170	139378	71%
Dry and protein legumes for grain production (including seeds and mixtures of cereals and legumes) (ha)	1834	2204	4995	8751	7411	5710	5853	219%
Tubercula ferrous and root crops total (ha)	668	707	666	506	516	387	269	-60%
Tubercula ferous and root crops total (ha)	52583	53397	72,388.33	80193	78350	91639	114408	118%
Green harvested plants (ha)	13636	14281	20351	28254	37661	53718	74703	448%
Other crops on arable land (ha)	356	258	88.25	113	2	0	190	-47%
Fresh vegetables (including melons) and strawberries (ha)	1210	1175	1459	983	804	848	1227	1%
Permanent crops: beef orchards, fruit trees, nuts, etc. (Ha)	11117	12020	13,165.41	18569	22143	22219	21233	91%
Permanent crops pasture and hay (ha)	75854	57612	50686	66890	115420	155038	214657	183%
Uncultivated land (ha)	7226	9457	9748	7573	6077	5157	6799	-6%

Source: MADR, Ecological Agriculture https://www.madr.ro/agricultura-ecologica/dinamica-operatorilor-si-a-suprafetelor-in-agricultura-ecologica.html, accessed on 16.03.2023.

At EU level, approx. 344,000 organic producers and over 78,000 organic processors are active.

In Romania, in 2015, over 12,000 economic operators (producers, traders, processors) were registered in the organic agriculture system, according to data from MADR, but their number decreased in 2017 to 8,434 operators, reaching in 2021 the number the same number as in 2015, namely 12,231 operators. Thus, we observe a paradoxical situation, considering that the organically cultivated area increased by approximately 135 % to 578,718 hectares.

Most of the economic operators in Romania own in the ecological system areas cultivated with cereals (139,378 hectares in 2021) and permanent crops of pastures and hayfields (214,657 hectares in 2021) (Table 2).

Table 3. The evolution of ecologically certified livestock

Road sign	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2021/2015**
Cattle animals (total)	**29313**	**20093**	**19939**	**16890**	**19358**	**19870**	**23339**	**-20%**
Cattle animals for slaughter	491	478	481	701	426	690	922	88%
Dairy cows	21667	15171	12472	10694	13882	12837	14807	-32%
Other cattle animals	7155	4444	6386	5495	5050	6343	7610	6%
Total pigs	**86**	**20**	**20**	**9**	**9**	**14**	**9**	**-90%**
Pigs for fattening	43	13	17	0	0	0	0	-100%
Breeding sows	14	7	3	0	0	0	0	-100%
Other pigs	29	0	0	9	9	14	9	-69%
Total sheep	**85419**	**66401**	**55483**	**32579**	**19367**	**13189**	**13837**	**-84%**
Sheep, breeding females	0	0	0	0	14832	11509	10941	-
Other sheep	0	0	0	0	4535	1680	2896	-
Goats (total)	**5816**	**2618**	**1653**	**1360**	**8161**	**830**	**1080**	**-81%**
Goats, breeding females	0	0	0	0	8112	808	1032	-
Other goats	0	0	0	0	49	22	48	-
Total birds	**107639**	**63254**	**78681**	**83859**	**128596**	**171391**	**214104**	**99%**
Broilers	0	0	285	0	0	27045	27405	-
Laying hens	0	60220	77096	0	127136	143198	186699	-
Breeding birds	0	0	0	0	0	0	0	-
turkeys	0	0	0	0	1460	1148	0	-
Ducks	0	0	0	0	0	0	0	-
Geese	0	0	0	0	0	0	0	-
Equidae	**485**	**0**	**202**	**0**	**297**	**506**	**55**	**-89%**
Bees	**0**	**86195**	**108632**	**138557**	**175959**	**170789**	**171564**	**-**

Source: MADR, Ecological Agriculture https://www.madr.ro/agricultura-ecologica/dinamica-operatorilor-si-a-suprafetelor-in-agricultura-ecologica.html, accessed on 16.03.2023.

The data presented by MADR regarding the herds of organically certified animals show that in 2021, the herds of organically certified animals were 23,339 cattle, 13,837 sheep, 1,080 goats, 214,104 birds, of which 186,699 laying hens, 171,564 beehives, and only 9 pigs and 55 horses.

It is predicted that the herds of animals raised in the ecological system will increase for the pig and poultry categories. For pigs, however, only 2 % of EU livestock will be organically raised in 2030, while poultry (broilers and laying hens) raised in an ecological system could double, up to 5 % of the total.

6. Conclusions

Organic farming in Romania is export-based, farmers want to take advantage of the higher margins in export markets, a trend that is accentuated by the fact that the domestic market lacks processing facilities. Thus we end up exporting raw materials and importing ecological finished products, the main export markets for Romanian ecological products being Austria, USA, Japan, Germany, France, Italy and Denmark. In this context, investments are needed in the processing activity of organic agro-food products.

Manufacturers must constantly invest in research to provide innovative products that meet future consumer needs. However, many producers in Romania are scared by the fact that the conversion period is much too long, up to two years, and the activity requires inspections by control bodies accredited by MADR.

One of the essential conditions for the development of organic agriculture is the promotion of the concept of organic agriculture in order to make consumers aware of the advantages of consuming organic products, so that they offer a higher price for clean products whose quality is guaranteed by an inspection and certification system.

At the level of Romania, the ecological cultivated area is still below the European Union average and is not practiced on a large scale by Romanian farmers. This fact is one of the limitations of our research. Also, another limitation of the research this time is the lack of statistical data on organic agriculture in Romania. Currently, only data on areas, production, and economic operators can be found in the statistical databases. We do not have available data on the consumption of organic products and their prices.

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Bibliometric Analysis and Literature Review on Digitalisation and Geopolitical Impact of the Agri-Food System

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Abstract

The phenomenon of globalisation does not bypass the agri-food industry, in which companies are under pressure to incorporate new knowledge to improve efficiency, food safety, and sustainability. Digitalisation is an essential aspect of this transformation, driving significant progress through the integration of artificial intelligence, robotics, and 5G technology. The aim of this research is to analyse existing studies on the digitalisation of the agri-food sector, identify trends, and create an overview of the interest given to the field. The study also addresses the geopolitical influences that stand in the way of the digitalisation of the industry. Although digitalisation offers many benefits, it also presents several challenges that must be addressed. This study aims to highlight both the advantages and drawbacks of digitalisation in the agri-food industry.

Keywords: digitalisation trends, agro-food industry, geopolitical challenges, precision agriculture.

JEL Classification: Q1, O3.

1. Introduction

Today, agriculture plays an important role in shaping global economy by providing food security. The agriculture system is undergoing a transformative phase that has led to new innovations and modernisation. Digital technology, or what we call digitalisation, is rapidly changing our world, and agriculture is not an exception. The digitalisation of the agriculture industry will help farmers improve productivity

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and increase their yields, as well as create more efficient supply chains for more sustainable food production.

In the first part of the paper, the theories highlighted in the specialised literature regarding the digitalisation of the agri-food industry and the influence of geopolitical factors on industry digitalisation are presented. The second part of the paper comprises a bibliometric analysis of 1.613 studies concerning the digitalisation of the agri-food industry, extracted from the Web of Science database. Within the analysis, the following aspects were examined: the evolution of publications on the digitalisation of the agri-food industry, countries with the highest number of publications, the most popular authors in the field, the evolution of topics addressed over the years, and the most frequently used keywords by authors in their works.

The conclusions reveal that the agricultural industry is progressively adopting sophisticated technologies and computational techniques. Numerous scholars are currently investigating the capabilities of precision agriculture, automation, machine learning, robotics, artificial intelligence, and deep learning as potential solutions to the challenges faced by the agricultural sector. Keywords identified offer significant information on current research trends and priorities.

2. Problem Statement

The agri-food industry serves a crucial function in sustaining the lives of millions of people, ensuring food security, and shaping global economies. As technology advances and the interconnectedness of our world increases, the way we conduct business and produce food will inevitably change. The integration of digital technology into various aspects of the agri-food system will lead to transformational changes and address some serious issues that plague us today. However, as digitalisation grows in importance in the agri-food sector, it is important to understand its geopolitical impact. Understanding the geopolitical impact of the agri-food system refers to the ways in which digitalisation impacts global food security and shapes the relationships between nations by influencing global trade patterns. This raises a significant problem which requires thorough investigation and analysis. The findings of this study will contribute to a better understanding of the complex dynamics between digitisation, geopolitics, and the agri-food system. This knowledge can be used to inform decision-making processes.

2.1 Trends Regarding the Digitalisation of the Agri-Food System

The implementation of digitalisation within the agricultural industry is a crucial and necessary advancement that must be undertaken to effectively address the projected food security challenges communicated by the United Nations and Food and Agriculture Organisation. Farmers and agribusinesses can receive valuable support from the latest technologies such as artificial intelligence (AI) and robotics, the Internet of Things (IoT), and 5G (European Commission, 2022). Smart agriculture encompasses more than just the initial stages of crop cultivation, exerting its influence throughout the entire agricultural value chain, encompassing aspects

such as sustainability and environmental considerations (Șerbănel, 2021). The digitalisation of the agri-food value chain has been impacted by the crisis resulting from the COVID-19 pandemic. This global health emergency has increased the urgency for digital transformation within the sector, primarily due to the increased recognition of the significance of remote work and contactless transactions. Additionally, the crisis has precipitated alterations in consumer behaviour and preferences, subsequently leading to an increased demand for online food delivery services and e-commerce platforms (Ancin et al., 2022).

The transition from conventional agricultural approaches to smart agriculture methods can also be attributed to the expanding global population and the escalating demands of the agri-food sector (Abbasi et al., 2022). Moreover, other authors are of the opinion that the circular economy is based on environmentally friendly technologies and the minimal use of resources. Sustainable agriculture should focus on innovative reduction of greenhouse gases through actions that contribute to the net zero goals. But sustainable agricultural business models do not only involve the use of green technologies that promote the protection of natural capital. There is also a need for multidisciplinary research and intersectoral development, through which dysfunctions can be addressed at the inter and intra system level (Petrariu et al., 2021).

The adoption of digitalisation within the agricultural sector offers multiple advantages to both farmers and the environment. One notable benefit is the enhanced operational flexibility provided by digital technologies, which enable real-time monitoring and predictive systems. This empowers farmers and agricultural experts to respond promptly to potential changes in environmental and water conditions, thereby safeguarding crops (Abbasi et al., 2022). Moreover, smart agricultural practices contribute to the conservation of resources, as they help reduce water consumption, mitigating soil erosion, and minimising greenhouse gas emissions. Furthermore, digitisation plays a crucial role in improving product quality and maximising farm productivity by providing farmers with precise data on crop yields, soil health, and weather patterns (Nezamova, Olentsova, 2022). According to Amentae and Gebresenbet (2021), the main opportunities that emerge in the agri-food sector as a result of digitisation processes include increasing productivity and competitiveness, ensuring a more sustainable use of resources, optimising farm production processes, improving risk management, predicting market trends, and enhancing strategic decision-making capabilities. Additionally, digital technologies can automate certain tasks such as planting and harvesting, reducing labour costs and increasing productivity.

Although digitalisation has great potential for fostering environmentally sustainable agriculture, certain researchers have voiced concerns regarding its potential negative impacts on agro-ecology. These concerns encompassed several aspects, namely: the potential for a continued decline in biodiversity and detrimental effects on environmental assets; possible adverse impacts on soil structures and fertility; the potential for unfavourable alterations to established cultural landscapes; and the risk of negative consequences for resource utilisation and ecological balance

(Zscheischler et al., 2022). Additionally, there are concerns regarding the potential risks associated with data misuse and the emergence of data imbalances. Despite farmers sharing their personal farm management data, they possess limited knowledge regarding the storage and utilisation of this data, as well as their level of control and influence over these processes (Jayashankar et al., 2018). These concerns were substantiated by the observation that the utilisation of digital data and technologies often prioritises productivity gains rather than optimising sustainability outcomes. For instance, the introduction of lightweight and intelligent field robots might result in the cultivation of previously uncultivated land, putting ecological residual niches at risk of disappearance. Additionally, there is a growing trend toward larger and heavier agricultural machinery, leading to soil compaction that negatively impacts soil erosion and the water balance. Worries also arose regarding potential rebound effects and alterations to the cultural landscape (Zscheischler et al., 2022).

Currently, several prevalent digital technologies are being widely employed in the field of agriculture. These technologies include augmented and virtual reality, the Internet of Things (IoT), computer vision, robotics, sensors, and machine learning. Augmented and virtual reality enable farmers to simulate and visualise agricultural scenarios, facilitating decision-making processes. The Internet of Things allows for seamless connectivity among various agricultural devices and systems, enabling efficient data collection and management. Computer vision technology aids in the analysis and interpretation of visual data, helping to perform tasks such as crop monitoring and disease detection. Robotics finds utility in tasks such as automated harvesting and precision spraying. Sensors play a crucial role in collecting real-time data on environmental conditions, soil moisture levels, and other relevant parameters. Finally, machine learning algorithms are employed for data analysis and predictive modelling, enabling personalised insights and optimised decision-making in agriculture (Nezamova, Olentsova, 2022). Abbasi et al. (2022) revealed how digitalisation plays a pivotal role in enhancing sustainability within the agri-food sector through the improved monitoring and management of vital natural resources like water, soil, and energy. It also facilitates the adoption of precision agriculture practices that effectively minimise the use of inputs and mitigate environmental repercussions. The concept of precision agriculture introduces an innovative approach that leverages AI principles to enhance agricultural practices and add value to the industry. By utilising this technology, farmers can gain a deeper understanding of their land and crops through the acquisition of information and data pertaining to crops, weather forecasts, soil conditions, crop quality, and fertiliser management. Furthermore, the implementation of digital tools such as robotics and autonomous machines enables farms to minimise expenses, thereby reducing costs (Mentsiev et al., 2020). Furthermore, digital technologies provide valuable support for implementing circular economy principles, such as reducing food waste and promoting resource recovery. In summary, the integration of digitalisation has the potential to improve the economic, social, and environmental sustainability of agro-food supply chain management.

Nevertheless, transitioning from digitisation to digital transformation in the agricultural sector seems to present challenges as a result of a range of internal and external obstacles. Several reviews have outlined these barriers, which encompass factors such as limited internal resources within firms, complexities associated with data management, concerns regarding data transfer and privacy, inadequate internet connectivity, absence of suitable incentives, and a legislative operating environment that may not fully support digital initiatives in the industry (Ancin et al., 2022).

The widespread lack of digital literacy among the population poses a significant obstacle to the successful implementation of digitalisation in agriculture. Insufficient understanding of the benefits and effective use of digital technologies may hinder adoption. Moreover, concerns about cost and unfamiliarity with the technology may lead some farmers to be hesitant in adopting new digital tools. Another challenge lies in the requirement for reliable Internet connectivity, which may be limited in rural areas, hampering the effective use of digital technologies. Furthermore, there are valid concerns about the potential negative effects of digitalisation on employment and social equity within rural communities. Addressing these challenges requires a collaborative effort involving policymakers, researchers, industry stakeholders, and other relevant parties to ensure the realisation of digitalisation's benefits while minimising potential risks (Ramazanov et al., 2022).

Farmers can improve their understanding of their land and crops by using technology, which provides valuable information and collects data on various aspects such as crop conditions, weather forecasts, soil quality, crop quality, and fertiliser management. For example, a Berlin-based agricultural technology start-up (Plantix) has created an application that revolutionises soil crop monitoring by simply taking photos. Through the utilisation of machine learning and the Internet of Things (IoT) principles, the software analyses the photos, identifies soil defects, detects pests in the land, and reveals patterns related to crop efficiency. This breakthrough application serves as a crucial tool for making informed decisions to enhance agricultural practices (Sridhar et al., 2022).

The use of digital twins has the potential to enable an interoperable and sustainable agricultural transformation. Digital twins can be enhanced with data from sensors and cameras on the ground to optimise water usage, accurately spread seeds and fertilisers, and reduce the need for harmful pesticides by creating virtual representations of physical assets such as fields, animals, or machinery. There are various advantages of adopting digital twins in farming, including increased efficiency and productivity, less waste and environmental impact, and greater decision-making capabilities for farmers. Furthermore, digital twins can be used to evaluate novel farming practices and technologies, decreasing the need for costly and time-consuming trial-and-error operations. (European Commission, 2022). In the actual context, where the whole Planet tries to reduce waste, innovative agriculture systems need to be developed, like, for example, rooftop farming, which is of high interest for urban communities. This innovative farming example aims to contribute to the end-to-end greening of the agri-food value chain. It could have an

important contribution to reaching the Sustainable Development Goals of the United Nation and other similar initiatives (Constantin et al., 2021).

The agricultural sector will gain significant advantages from advancements in digital technologies, particularly in the field of artificial intelligence (AI). With the increasing responsibility of agriculture to ensure food security, food safety, and environmental sustainability, AI has the potential to address these challenges. By harnessing AI, the agricultural sector can meet the demands of a growing global population while contributing to the achievement of the United Nations' Sustainable Development Goals (SDGs). Despite the immense potential, the adoption of AI in agriculture has been relatively slow. We suppose that this sluggish uptake can be attributed to the diverse ways in which AI impacts the agri-food industry, considering the variations in food types, supply chains, climates, and land within the agricultural sector (Ryan et al., 2023).

2.2 Geopolitical Influences on the Digitalisation of the Agri-Food System

The global agricultural and food network operates as a complex and interdependent system, wherein disturbances in one part can reverberate throughout the entire network, often leading to unintended outcomes. According to Archer (2008), the primary influences on agricultural systems are globalisation and narrow profit margins. The author underscores the need to understand the impact of social and political factors on agriculture. There is a sense of complacency with regard to the availability and affordability of commodities, especially within the realm of agriculture. However, there have been instances where food has served as a catalyst for economic and humanitarian crises. We observe a growing recognition that agriculture plays a dual role, both as an instigator and as a victim of geopolitical volatility (Chu, 2022). The global demand for food has escalated due to factors such as population growth, increasing prosperity, and evolving consumption patterns, particularly in emerging economies. However, the supply side has faced challenges such as sluggish productivity growth, crop failures, and extreme weather events, leading to a tightening of the global food market and record-high food prices in recent years. The spike in prices for staple foods has even contributed to social unrest and political instability in various regions worldwide. In North Africa, for instance, high food prices played a role in the 'Arab Spring' uprisings that led to the downfall of autocratic regimes. Moreover, this situation has triggered a surge in land grabbing, where foreign investors acquire large-scale farmland, particularly in Africa, potentially adversely affecting local farmers and global food security. In response to these concerns, countries are increasingly prioritising food security and formulating policies to protect the necessary resources for agriculture and food production. As population growth, increasing prosperity, and changing consumption patterns continue to drive demand, the interdependence of food, agriculture, and raw materials becomes more evident The Hague Centre for Strategic Studies (HCSS), 2013). Digitalisation plays a key role in securing resources, thoughtful analysis, and planning in the field of food, agriculture, and raw materials.

Agrifood supply chains are affected by global economic forces and agricultural bargaining, and risk management mechanisms are needed to reduce uncertainty and risk, according to Shkolnyi (2020).

While some countries have taken steps to ensure their access to natural resources from abroad, others have aimed to decrease their reliance on international markets and enhance domestic self-sufficiency. These actions have been driven by concerns about the potential effects of food prices or food insecurity on domestic political stability and the risk of social unrest. Concurrently, climate change and evolving resource dynamics are influencing the distribution of material power among nations, with traditional export leaders in the Global North facing competition from emerging agricultural forces such as Brazil, China, India, and Russia (Zhoul et al., 2020). Without enough governmental support, digitisation may have a negative impact on the sector, such as diminishing employment, worsening disparities, and further exploiting already scarce resources. Policymakers must act quickly, comprehensively, and thoughtfully to guarantee that the digital transformation of agriculture benefits both stakeholders and societies (Bahn et al., 2021).

3. Aims of the Research

This paper represents a comprehensive bibliometric analysis and literature review aimed to gain insights into the digitalisation of the agri-food industry. In order for this research to succeed, the examination of academic papers and relevant studies was used to understand digitalisation trends and the impact of geopolitical factors. The objectives of this research are: identifying key sources from specialised literature by analysing the relevant academic works on the digitisation of the agri-food industry, analysing the extent of digitisation and its trends in the agri-food industry, and examining the geopolitical factors influencing the agri-food system.

4. Research Methods

To accomplish the research objectives, this study combines the literature review with a bibliometric analysis and articles referring to the digitalisation of the agri-food industry, which were extracted from the Web of Science database, resulting in a number of 1.613 published papers and the usage of the VOSviewer 1.6.19 software in order to analyse the extracted data. To determine the most pertinent articles in the field, a range of keywords were used to emphasise the most significant articles within the domain. The Web of Science database was utilised to conduct a keyword search, which yielded the following results: “precision agri-food” (600 articles), “agricultural robotics and automation” (871 articles), “artificial intelligence in the agro-food industry” (51 articles), “digitalisation of supply chain management in the agro-food industry” (9 articles), “digitalisation of the farmers' management system” (58 articles), and “digitalisation in agro-food industry” (24 articles). To conduct our study, only relevant articles referring to the agri-food domain were taken into account. When selecting articles from the Web of Science, filters were applied to exclude articles from other fields that are not the subject of our study.

5. Findings

The employment of digital technologies and data-driven methodologies in the realm of agriculture and food production has gained significant traction among scholars in recent times. The interest in digitisation within the agri-food sector stems from its potential to yield various benefits, such as heightened efficiency, enhanced productivity, optimised management, and improved food safety. The graphical representation in Figure 1 depicts the trajectory of scholarly works and references pertaining to the digitalisation of the agri-food sector, spanning the years 1987 to 2023. The total number of papers analysed in this study amounts to 1.613. The year 2021 witnessed the greatest number of publications, with a total of 191 papers, whereas the period spanning from 1987 to 1995 saw the lowest level of publications, with an annual range of 0 to 4 articles published. The surge in the quantity of articles published post-1996 indicates the acknowledgement of the digitalisation's potential in tackling significant issues in the agri-food sector such as catering to the needs of an expanding worldwide populace, guaranteeing food security, and curbing agriculture's environmental impact.

Furthermore, a noteworthy yearly increase in the number of citations for publications pertaining to digitalisation within the industry has been observed. The reason for this is that the aforementioned papers lack relevance in the absence of a solid empirical research base. The cumulative number of citations has reached 21,075 between 1991 and the current period.

Figure 1. The evolution of papers and citations regarding the digitisation of the agri-food industry

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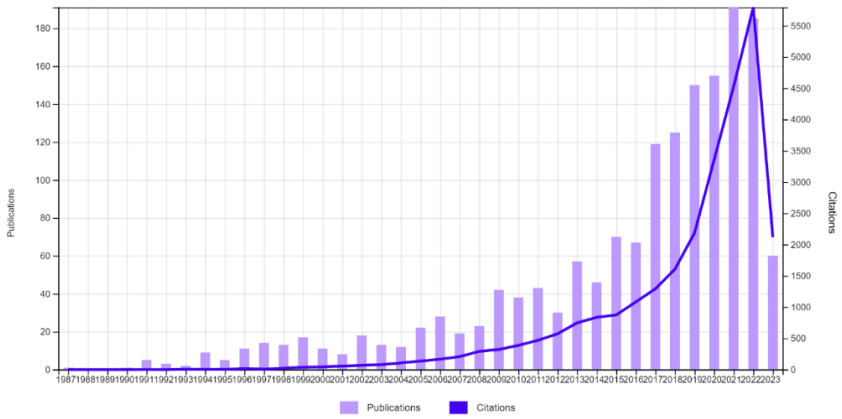
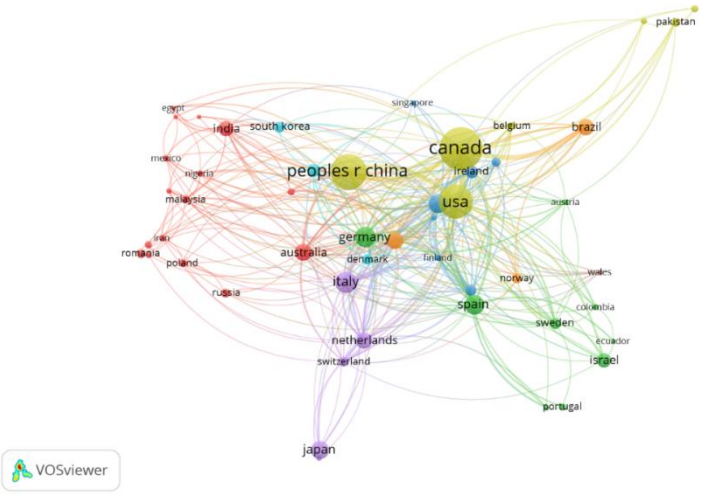


Source: Web of Science.

The evolution of works related to the digitalisation of the agri-food industry has gone through various periods, depending on the subjects of interest for researchers. In the period of 1987-2000, scientific works focused on the application of digital technologies in several areas of the agri-food industry. The topics addressed included the development of computerised tools for data management, inventory, supply

chain optimisation, and the automation of various agri-food production processes, such as automated milking systems, automatic irrigation, and early concepts of precision agriculture. In the early 2000s, a new trend emerged in scientific works – the use of digital technologies to optimise crop management, reduce waste, increase yield, and improve food safety. The research focused on tracking the entire agri-food supply chain from farm to consumer. With the exponential growth in data collection and storage capabilities, scientific works from the period of 2010-2015 increasingly focused on Big Data and Analytics in the agri-food industry. The researchers explored methods of using large datasets for decision-making, predictive modelling, and risk analysis. The topics included data-driven crop management, yield forecasting, prediction of pests and diseases, and supply chain optimisation through data analysis. With the rise of the Internet of Things (IoT) in the period 2015-2020, the emphasis shifted to application development. Topics such as precision agriculture using IoT for real-time monitoring of crops, farm animals and environmental conditions through drones and other Internet-connected devices were explored. In the last three years, scientific work has increasingly focused on the integration of artificial intelligence (AI) and Blockchain technologies in the agri-food industry. Artificial intelligence is being studied to automate tasks traditionally performed by humans, such as crop monitoring, yield estimation, and quality assessment. Blockchain technology has also been explored in the agri-food industry to enhance traceability and transparency of food origins, contributing to the authentication and certification of food products.

Figure 2. Countries with the most publications

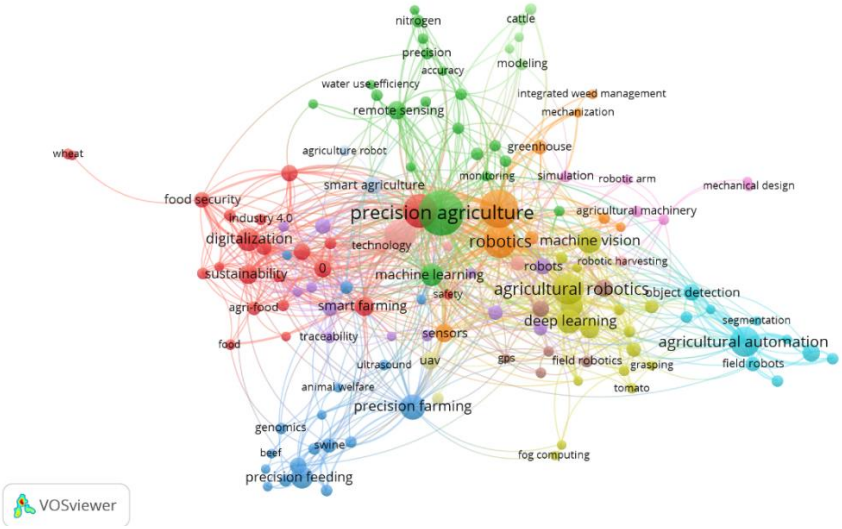


Source: After entering the data in VOSviewer 1.6.19.

Regarding the countries with the most publications in the field, according to the analysis conducted using VOSviewer 1.6.19, Canada emerged as the most productive country in terms of publications, with 396 works in the field and

10.870 citations. This indicates that digitalisation of the agri-food industry is a priority for Canada, with a great deal of attention being given to research in this area. Additionally, the publications from Canada serve as an important source of inspiration for many researchers, given the high number of citations. Other countries that have shown high productivity in writing articles on the digitalisation of the agri-food industry include the USA with 249 articles and 7.828 citations, China with 274 articles and 1.796 citations, the United Kingdom with 74 articles and 2,068 citations, Italy with 96 articles and 2.388 citations, and Germany with 91 works and 1.707 citations. The most popular authors in the field, who have focused their research on the digitalisation of the agri-food industry, have also been identified. The most popular author is Candido Pomar, who has written 26 articles in the field with 279 citations, followed by Luciano Hauschild, with 14 articles and 87 citations, and Aline Remus, who has written 12 articles with 44 citations. By using keywords, we can identify the most popular topics addressed in the work of researchers in the field. Thus, a keyword map was created using VOSviewer 1.6.19, utilising the "Author keywords" function. Through this analysis, frequently occurring keywords or those with high-centrality measures in the authors' works were identified, revealing important subjects that receive significant attention and represent critical aspects of the field.

Figure 3. Map of keywords used most often by authors



Source: After entering the data in VOSviewer 1.6.19.

The findings of Figure 3 reveal that specific terms, including "precision agriculture", "agricultural automation", "machine learning", "agricultural robotics", "artificial intelligence" and "deep learning" are frequently employed by scholars in their scholarly publications. The high frequency of occurrence of these particular keywords suggests their significance and ongoing investigation within the agricultural sector. The study conducted revealed noteworthy attention and interest

toward precision agriculture, agricultural automation, machine learning, agricultural robotics, artificial intelligence, and deep learning. The significant occurrence rate of these specific keywords implies a noteworthy level of focus and fascination towards these particular topics. The prevalent utilisation of the term "precision agriculture" in numerous scholarly publications can be attributed to its robust correlation with technology, data-centric decision-making, efficacy, sustainability, industry acknowledgement, and research imperatives. Precision agriculture has become a thematic field of interest within the academic environment for researchers and practitioners who are exploring the digitalisation of the agri-food industry. The incorporation of specific terms such as "agricultural automation", "machine learning", "agricultural robotics", "artificial intelligence" and "deep learning" suggests that the agricultural sector is embracing sophisticated technologies to enhance their farming methodologies. The implementation of these technologies holds the promise of transforming the agricultural sector through the enhancement of output, effectiveness, and ecological soundness. The employment of these specific terms indicates the multidisciplinary character of investigation and innovation within the field of agriculture. The agricultural sector is confronted with a multitude of challenges that necessitate interdisciplinary cooperation among diverse fields, such as computer science, robotics, data analytics, and agricultural sciences. This implies that interdisciplinary collaboration among experts is essential to effectively tackle challenges and devise innovative solutions for the industry. The agricultural industry is currently experiencing noteworthy trends in the areas of precision agriculture, agricultural automation, machine learning, agricultural robotics, artificial intelligence, and deep learning. The provision of opportunities to optimise resource utilisation, crop management, decision-making, and automation of agricultural operations is observed. These trends are in accordance with the industry's requirement for greater efficiency, sustainability, and productivity.

The utilisation of these specific keywords is expected to persist as endeavours in research and development efforts focus on precision agriculture, which amalgamates the implementation of sophisticated technologies. The forthcoming trajectory entails enhancing agriculture by means of incorporating sophisticated technologies and employing automation, artificial intelligence, and data-centric decision support systems.

6. Conclusions

In conclusion, the significant quantity of scholarly articles pertaining to the digitalisation of the agri-food sector within the WOS database suggests a growing inclination towards the incorporation of digital technologies into agricultural methodologies. The significance of industry digitalisation is substantiated by the authors through scientific papers, wherein they emphasise its various advantages, including heightened efficiency, better sustainability, and improved management of the supply chain. There exists a scarcity of literature that examines the influence of geopolitical variables on the process of digitalisation within the agri-food sector.

Geopolitical factors can exert an influence on the digitalisation of the agri-food industry by affecting technology accessibility, trade patterns, regulatory structures, infrastructure, and data management. Further research is required in the realm of geopolitical influences, as the current body of literature on this topic remains insufficiently explored by scholars. The paper's findings indicate that the agricultural industry is progressively adopting sophisticated technologies and computational techniques. Numerous scholars are currently investigating the capabilities of precision agriculture, automation, machine learning, robotics, artificial intelligence, and deep learning as potential solutions to the challenges faced by the agricultural sector. The keywords that have been identified offer significant insights into the present research trends and priorities. This study provides a comprehensive literature review and bibliometric analysis of published research articles related to the digitalisation of the agri-food industry. Additional research is required to explore the effects of digitisation on systems, particularly with regard to the potential impact on the economic sustenance of individuals residing in rural regions, where agricultural land is situated.

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Ethical Frontiers: Leadership Perspectives in the Contemporary Food Industry

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Abstract

The food industry plays a critical role in society's well-being. However, it is also a challenging industry that faces a variety of issues such as ethical concerns, food safety, environmental impact, and sustainability issues. Leadership in the food industry has become a critical issue, with the need for leaders to embrace ethical and responsible practices to ensure the industry's sustainability and success. The food industry deals with products that are seasonal and perishable, which means that the products must be sold quickly to avoid spoilage.

The literature on ethical leadership in the food industry is constantly growing, with recent research placing emphasis on various aspects within this field, especially considering the social, technological, and economic changes that have occurred in recent years.

The study is based on a review of the specialised literature and is based on the research question „What are the main emerging ethical concerns in the food industry and how can be managed?". It is established on the following objectives: identifying and describing the main emerging ethical concerns in the food industry and determining the roles and responsibilities of leadership in addressing these ethical concerns. The authors reviewed the articles related to leadership in the food industry and found the multidimensional nature of the food industry's ethical concerns, which include the practices of food production, processing, distribution, and consumption.

The results illustrate the importance of ethical leadership in addressing emerging ethical concerns in the food industry. Ethical leaders play a key role in promoting responsible and sustainable practices, ensuring the integrity of food products, and ensuring fair treatment of workers.

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Thus, this study contributes to the development and consolidation of knowledge in this field and can be used as a valuable resource for researchers, practitioners, and decision-makers in addressing specific ethical challenges in this domain.

Keywords: Ethical Leadership, Food Industry, Sustainability, Responsible Practices, Social Challenges.

JEL Classification: Q01, Q18, L66, M14.

1. Introduction

The food industry's centrality to societal well-being, its intricate structure, and the multi-dimensional challenges it presents necessitates an in-depth analysis of ethical leadership within its domain. This leadership model transcends the conventions of transactional business dealings, encompassing broader perspectives on food safety, sustainability, and environmental stewardship.

The complexity of this sector necessitates leaders who can adeptly negotiate an intricate nexus of factors. From the ephemeral shelf-life of food products and the capricious nature of consumer demands to the pressing mandate for transparency, leaders find themselves embedded within a dense regulatory framework. Therefore, this industry mandates a leadership ethos that harmonises economic viability with ethical, environmental, and socio-responsibility considerations.

Drawing from the robust findings of Ana et al. (2019), the indispensable role of leadership within the food service industry, especially from an ethical standpoint, emerges. Their work elucidates leadership attributes such as strategic orientation, efficient task delegation, resilience, and proficient communication. These traits, woven into the fabric of ethical leadership, contribute to an enhanced framework in which leaders in the food service industry display reliability, accountability, visionary thinking, and the ability to foster a culture of trust within their teams.

Simultaneously, the advent of Industry 4.0 underscores the urgency of incorporating ethical principles within leadership roles. Despite the potential transformation promised by digital automation and artificial intelligence, the human-centric dimensions of leadership, specifically within the food service industry, remain irreplaceable (Ana et al., 2019). In this context, ethical leaders are expected to embody high credibility, confidence, and a service-oriented approach, bolstered by empathy and foresight, thus amalgamating the essentials of effective leadership with a steadfast moral compass.

Interpreting the nuanced exploration of ethical leadership by Hai and Van (2021) through the lens of the Fourth Industrial Revolution offers a renewed perspective on this vital leadership style within the food industry. The researchers elucidate the intensification of ethical leadership's importance, not as a series of moral statements or a distinct leadership style, but as an essential performance-enhancing tool in a rapidly digitising environment. This perspective uncovers the significant potential for ethical leadership in the food industry to enhance organisational effectiveness amidst the uncertainties of an evolving technological context.

In the face of the Fourth Industrial Revolution's opportunities and challenges, the food industry requires leaders capable of navigating the evolving landscape with an unwavering ethical compass. By integrating traits such as perseverance, service-orientation, and fair power distribution, leaders in this industry are primed to convert the challenges presented by the technological revolution into opportunities for growth (Hai, Van, 2021). Consequently, as virtue's importance becomes increasingly prevalent in this technological epoch, the successful execution of the Fourth Industrial Revolution in the food industry is intrinsically tied to the development and fostering of robust ethical leadership.

Smykov (2023) elucidates a crucial dimension of ethical leadership within the food industry through an in-depth analysis of public apprehension or 'neophobia' towards innovative food technologies. This resistance to unfamiliarity, which extends to advances such as nanotechnology, genetic modification, and 3D food printing, is fundamentally related to concerns of unnaturalness and potential risk. This circumstance presents a complex challenge for food industry leaders who want to incorporate these technologies while maintaining public trust and product acceptability. Within this intricate landscape, ethical leadership takes on a pivotal role. Ethical leaders are those who ensure that an organisation's technological advancements align with the expectations and apprehensions of its stakeholders. They must deftly navigate the socio-ethical dilemmas inherent in the deployment of novel technologies, showing adeptness not just in managing the technological transformation but in acknowledging and addressing its ethical implications. Ethical leadership, therefore, is about striking a balance between innovation and ethical considerations, between advancing organisational goals and respecting public concerns. It is about creating an environment where technological adoption does not compromise transparency, trust, and respect for societal values.

Given the intersectionality of leadership styles and food safety standards, an analysis of the transformational and transactional leadership within the context of Purwanto's (2020) study on Food Safety Management provides valuable insight. The study accentuates the significance of these leadership styles on the performance of the Food Safety System Certification 22000 (FSSC 22000) in the food industry. Transformational leaders, known for their inspirational methods and vision-sharing, inherently endorse an organisational ethos synonymous with ethical conduct. Their influence facilitates the effective execution of safety management systems such as FSSC 22000. Concurrently, transactional leaders, renowned for their structured supervision and rewards-based approach, foster an environment of accountability, which is integral to ethical leadership. Their contribution also enhances the operation of food safety systems, demonstrating a balanced and proficient food safety management structure.

Emphasising the ethical dimension of leadership in the food sector, these leadership models align with the core tenets of ethical leadership, thereby strengthening its role within the industry. As transformational leaders inspire change and collective ambition towards shared goals, they implicitly nurture an organisational culture imbued with ethical practices. Similarly, transactional leaders,

through their structured approach and emphasis on performance-based rewards, uphold transparency and accountability, which form the bedrock of ethical leadership. As such, both leadership styles, through their profound impact on food safety management, inadvertently fortify ethical leadership practices within the food industry. This intersection provides a rich backdrop for detailed exploration and offers a nuanced understanding of leadership's multifaceted nature within the food industry.

2. Problem Statement

As one of the largest and most complex sectors in the world, the food industry is responsible for producing, processing, distributing, and selling food products to meet the needs of a growing global population. However, the industry faces many challenges related to ethical issues, including sustainability, food safety, animal welfare, and social responsibility. In recent years, ethical leadership has emerged as an important concept in addressing these challenges, and this article will explore the specifics of leadership in the industry.

Technocratic management has dominated the agri-food sector for decades, leading to environmental degradation, social injustice, and ethical issues. Ethical leadership can offer an alternative approach that emphasises responsibility, accountability, and stakeholder engagement (Blok, 2018).

As the current technocratic management approach has failed to address ethical issues in the sector, ethical leadership is necessary to address issues such as environmental sustainability, animal welfare, and food safety. Ethical leadership can promote a more holistic and integrated approach that considers the interests of all stakeholders, including consumers, farmers, workers, and the environment. Ethical leaders in the food industry should also be willing to collaborate with stakeholders, including government agencies, civil society organisations, and consumers. In doing so, ethical leaders can ensure that the food industry is accountable and responsive to the needs of society.

Furthermore, a shift in the professional identity towards responsible professionalism in the agri-food sector is warranted. This shift will require a new understanding of what it means to be a professional in this industry, where the interests of the public and the environment should be prioritised over the interests of corporations. (Blok, 2018)

Different stakeholders in the agri-food sector view ethical issues on a spectrum. Ethical disputes in the food industry arise from different perceptions of what constitutes ethical behaviour. For example, producers may prioritise profits over environmental sustainability, while consumers may prioritise health and safety over cost (Tisenkopfs et al., 2019).

Ethical leadership in the food industry should involve the participation of stakeholders in ethical discussions. This approach can help to address differences in ethical perceptions and develop a shared understanding of what constitutes ethical behaviour. Ethical leaders in the food industry should recognise the power dynamics between stakeholders in the food industry. Producers and corporations often have

more power and resources than consumers, civil society organisations, and government agencies; however, that dynamic is fragile at best. Ethical leadership in the food industry should therefore involve a commitment to balancing power dynamics and ensuring that the interests of all stakeholders are considered (Tisenkopfs et al., 2019).

This is particularly relevant given the highly seasonal nature of the industry, where supply and demand can fluctuate rapidly. Public outcry, whether related to health concerns, sustainability issues, or other factors, can quickly influence inventories and lead to significant waste if not managed effectively. By engaging stakeholders in meaningful dialogue and collaborating with them to address concerns, leaders can build trust and cultivate a sense of shared responsibility. Effective public relations can also help mitigate negative impacts and prevent long-term damage to reputation and the bottom line. By prioritising engagement and communication, leaders can ensure the sustainability and success of their businesses, while also contributing to broader efforts to build a more sustainable, equitable, and resilient food system.

Effective stakeholder engagement is positively associated with sustainable performance in the food industry, including financial and social performance. Engaging with stakeholders can help food firms identify and address sustainability issues, build trust and legitimacy, and promote collaboration and innovation.

Effective communication and public relations are essential components of stakeholder engagement, as they enable food firms to communicate their values, actions, and impacts to a broad range of stakeholders. In doing so, food firms can enhance their reputation, reduce the risk of negative impacts, and improve their overall sustainability performance.

Corporate social irresponsibility has been shown to impact consumer behaviour. Consumers are more likely to punish companies that engage in unethical practices, such as environmental pollution, labour exploitation, and animal cruelty. However, the effect of corporate social irresponsibility on consumer behaviour is moderated by the perceived quality of the food product. (Yu et al., 2022). Ethical leadership can help to prevent corporate social irresponsibility by promoting ethical values and norms within the company culture. By doing so, companies can build trust and credibility with consumers, which can enhance their reputation and market share, while companies that engage in unethical practices, prioritising profit over ethics, are likely to face negative consequences in terms of consumer trust, reputation, and sales.

Additionally, the COVID-19 pandemic has revealed ethical implications associated to the food industry. The pandemic has exposed the fragility and inequality of the food system, as well as the limitations of existing ethical frameworks. Ethical leadership can help to address these challenges by promoting values such as solidarity, reciprocity, and empathy (Anthony, 2021). It has become clear that there is a need for a more inclusive and participatory approach that considers the perspectives of marginalised and vulnerable groups. Ethical leadership

takes on a whole new dimension in responding to global crises and addressing systemic issues in the food system.

As the impact of the pandemic has revealed the need to establish a robust food system, it is critical for knowledge to circulate globally. As an example, in analysing the delivery of agricultural advisory services in Tanzania, research argues that ethical leadership is necessary to ensure that advisory services are delivered in a way that is accountable, transparent, and responsive to the needs of farmers. (Lameck, 2021).

Ethical leaders prioritise the needs of farmers and ensure that advisory services are delivered in a way that is culturally sensitive and appropriate.

In conclusion, ethical leadership is essential for the food industry to operate in a sustainable, responsible, and accountable manner. It is important for the industry to engage in dialogue and negotiation to ensure that the interests of all stakeholders are considered. Companies that prioritise profit over ethics are likely to face negative consequences in terms of consumer trust, reputation, and sales. The COVID-19 pandemic has highlighted the importance of sharing and solidarity within the food system. Ethical leadership is necessary to ensure that the food system is reformed in a way that is sustainable, equitable, and resilient.

While there are significant ethical concerns within the agri-food sector, the issue is multifaceted and encompasses the entire supply chain, from the producers and manufacturers to the consumers. The distance between technocratic management and ethical leadership must be addressed as and so must the lack of clear ethical standards and guidelines within the sector to prevent difficulties in resolving ethical disputes or holding companies accountable for unethical actions.

As consumers are becoming more aware of the ethical implications of their food choices and are willing to pay more for products that align with their values, companies that engage in unethical practices risk losing customers and damaging their reputation. Ethical leadership can have a significant impact on the behaviour and practices of individuals and organisations within the sector

Companies and individuals within the sector must be held accountable for their actions, and there is a need for clear ethical guidelines and standards. Consumers are increasingly aware of the ethical implications of their food choices, and companies that engage in unethical practices risk damaging their reputation and losing market share. The COVID-19 pandemic has highlighted the need for a more equitable and ethical approach to food production and distribution. Ethical leadership can play a key role in promoting more responsible and sustainable practices within the sector (Lameck, 2021).

3. Research Questions

The paper is based on the research question: „What are the main emerging ethical concerns in the food industry and how can be managed?" and is established on the following objectives:

- *Identifying and describing the main emerging ethical concerns in the food industry* and
- *Determining the roles and responsibilities of leadership in addressing these ethical concerns.*

The exploration of these research questions is pivotal in furthering the understanding of the burgeoning ethical landscape in the food industry, which, in turn, has significant implications for a wide array of stakeholders, from policymakers to consumers. The investigation into the principal ethical concerns furnishes an enhanced comprehension of the complex intersectionality of food ethics, technological advancements, and market dynamics. Moreover, delineating the roles and responsibilities of leadership in this context offers valuable insights into how ethical imperatives can be woven into the fabric of strategic decision-making, policy development, and operational execution. Therefore, research questions are of profound relevance, especially in an era where ethical considerations are increasingly becoming integral to business efficacy and sustainability in the food industry.

4. Research Methods

The study is founded on a review of the specialised literature, and it began with the aim of identifying the most important food industry's ethical concerns. It implied selection of documents published in big databases, like Scopus, Science Direct and other, covering the areas of ethical leadership, food industry, and sustainability.

The authors reviewed the articles related to leadership in food industry and found the multidimensional nature of the food industry's ethical concerns, which encompass the practices of food production, processing, distribution, and consumption, selected, and synthetised in a table.

The premise of this paper is the identification of relevant publications that would lead to selecting areas of interest that have an impact on food industry’s ethical concerns. The techniques used during the research are typical for a systematic literature review. It implied selection of documents published in big databases, like Scopus, Science direct and other, covering the areas of ethical leadership, food industry, and sustainability.

After an individual study of the articles and a thorough analysis, the main focal points of interest for the ethical aspects of the leadership in food industry were identified and the research continued with the examination of the impact these have on the sustainability of leadership.

In total, the authors reviewed a number of more than 30 articles related to leadership ethics in the food industry, and the main ethical concerns are identified for a future leader. Out of these, 5 most sources of research were selected and synthetised in a table.

5. Findings

The advent of food ethics in contemporary discourse, as elucidated by Thompson (2016), underscores the multidimensional nature of the food industry's ethical concerns, which encompass the practices of food production, processing, distribution, and consumption.

Ethical considerations inherent in these practices are envisioned within the ambit of humanity's longstanding standards and protocols pertaining to right conduct, social justice, and sustainability, the 'overarching goal set' for food ethics. The underpinning philosophy of food ethics seeks to reform these practices to align better with the overarching goal set, despite potential ambiguities and varying interpretations of its individual components. Within this purview, the critical role of leadership in driving these reforms towards the overarching goal set is pivotal and forms the crux of the present investigation.

The food industry is embedded within a global system, invariably influenced by a conglomerate of corporations that determine everything from farm inputs to the distribution of commodities at the retail level. Governments and international organisations also play an important role in this system, shaping the policies that underpin it. Amid these complex dynamics, leaders in the food industry must straddle the line between the necessity for profit and adherence to the overarching goal set of food ethics, which encompasses right conduct, social justice, and sustainability. It is not merely a question of choosing between the competing demands of ethical considerations and economic viability; instead, it represents a challenge to strike a delicate balance between these facets.

The purpose of this chapter is to provide a deeper understanding of the intricate dynamics and consequences they have for the food industry. Its goal is to draw attention to the ethical concerns that are currently emerging in the food industry and emphasise the pivotal role played by ethical leadership in addressing these concerns. To accomplish this, the authors will highlight these concerns in a comprehensive table, bringing them into sharper focus.

Table 1. Analysis of Emergent Ethical Concerns in the Food Industry and the Corresponding Leadership Roles

No. crt.	Ethical Concern	Source of research	Scholarly Perspective	Implication for Ethical Leadership
1	Sustainable Food Production	Pollan, 2008	Ethical debates surrounding the use of genetically modified organisms (GMOs), pesticides, and other synthetic inputs in food production.	Ethical leaders advocate for and implement strategies to ensure environmentally responsible and safe farming practices, balancing productivity with sustainability.

No. crt.	Ethical Concern	Source of research	Scholarly Perspective	Implication for Ethical Leadership
2	Ethical Food Processing	Pollan, 2008	The ethical dimension of food processing involves considerations about the use of additives, preservatives, and the nutritional impact of processed foods.	Leaders have the responsibility to ensure the integrity of processed foods, striving to minimise harmful additives and maintain nutritional quality.
3	Fair Food Distribution	Godfray et al., 2010	Inequities in global food distribution, excessive food waste, and other related issues present significant ethical challenges.	Ethical leadership involves strategising to minimise waste and ensure fair distribution, while making efforts to increase accessibility to nutritious food.
4	Environmental Sustainability	Foley et al., 2011	The food industry has substantial environmental impacts, including its carbon footprint, water usage, and contribution to deforestation.	Ethical leaders must prioritise and advocate for environmentally-friendly practices, reducing the industry's environmental impact, and promoting sustainable resource usage.
5	Social Justice in the Food Sector	Allen, 2008	Social justice issues within the food industry, such as labour rights, fair wages, and working conditions are major ethical concerns.	Ethical leaders have the responsibility to ensure fair treatment of workers, provide just compensation, improve working conditions, and uphold labour rights.

Source: Constructs and items developed by co-authors.

Pollan's (2008) work offers a close examination of the food system's intricacies, particularly focusing on modern agricultural practices and food processing methods. This perspective, while concentrated on the micro-level, connects seamlessly with the broader systemic concerns addressed by Godfray et al. (2010). They raise pertinent questions about the challenges of equitable food distribution and waste management, effectively expanding the ethical leadership responsibilities from

fostering sustainable production methods to ensuring fairness at a global scale. Subsequently, Foley et al. (2011) offer a comprehensive understanding of the food industry's environmental impact, emphasising the role of leadership in advocating for reduction of this impact and promoting sustainable resource usage. This dovetails with Allen's (2008) focus on the human aspect, highlighting the need for leaders to champion social justice within their organisations and the wider industry.Thus, the selected studies underline the interplay and continuity of ethical concerns within the food industry, extending from production and processing to distribution and waste, and finally to environmental impact and social justice. The studies collectively depict the broad scope of ethical leadership in this complex, interdependent system.

In the complex realm of food ethics, leaders in the industry must demonstrate a nuanced understanding of the multiple layers of concerns, from the modalities of production and processing to the issues of equitable distribution and environmental stewardship.

Leaders are entrusted with the task of judiciously managing the application of technologically advanced yet contentious elements such as GMOs, synthetic inputs, and food additives in the production and processing stages (Pollan, 2008). These leaders are expected to strike an equilibrium between the often-contradictory goals of increased productivity and the preservation of environmental and nutritional integrity.

Fairness in food distribution and sustainability of the environment presents another set of ethical considerations within the industry. The onus lies with industry leaders to formulate and execute strategies aimed at reducing food waste and ensuring an equitable dispersion of food resources (Godfray et al., 2010). This mandate extends to encompassing a proactive stance towards the minimisation of the industry's environmental footprint and encouraging practices that promote the judicious use of resources (Foley et al., 2011).

Furthermore, the concept of social justice is not alien to the food industry; it implores industry leaders to uphold humane practices that guarantee fair remuneration, enhance working conditions, and respect the rights of labour (Allen, 2008).

In our findings, we discussed that Artificial Intelligence and automation has a big impact on food industry.

Technological advancements have revolutionised various industries, including the food industry. Automation and artificial intelligence (AI) have found their way into food production, distribution, and consumption processes, offering numerous benefits such as increased efficiency, reduced costs, and improved quality. However, alongside these advancements come ethical ramifications that must be carefully considered. In this article, we delve into the ethical implications of automation and AI within the realm of the food industry.

In the next part of our study, the authors have delved more into the AI and automation, and we have the following aspects:

5.1 Labour Displacement and Job Loss

One of the primary ethical concerns surrounding automation and AI in the food industry is the potential for significant labour displacement and job loss. As companies embrace technological solutions to streamline processes, there is a risk of replacing human workers with machines and algorithms. This raises questions about the impact on individuals and communities who depend on these jobs for their livelihoods. Ensuring a just transition and providing support to displaced workers becomes crucial to address this ethical challenge. Continuing this trajectory, it is imperative to discuss the socioeconomic implications of labour displacement. The ripple effects of technological unemployment are far-reaching, extending beyond the immediate economic hardship faced by displaced workers. When jobs are lost on a large scale, communities can face a deterioration of social fabric and an increase in mental health issues, in addition to economic decline. Furthermore, the proliferation of automation and AI can exacerbate existing socio-economic inequalities by privileging a small, highly skilled labour force capable of working with advanced technologies, leaving behind those without such specialised skills. As such, leadership within the food industry has an ethical responsibility not just to consider the economic efficiencies of automation and AI, but also the wider socio-cultural implications. In a forward-thinking ethical framework, leaders must actively seek ways to mitigate job loss, through avenues like employee retraining, transitional support, and the exploration of new roles that blend human skills with technological capabilities.

5.2 Socioeconomic Disparities

Automation and AI technologies in the food industry have the potential to exacerbate existing socioeconomic disparities. Smaller food businesses, local farmers, and low-income workers can face challenges in adopting and adapting to these technologies due to their high costs and complex implementation processes. This can create a divide between those who have access to advanced technologies and those who do not, further widening the socioeconomic gap. Contrary to the disparities, there is another side to this narrative, revealing the potential for automation and AI to act as socio-economic equalisers in the food industry. Advanced technologies can lower barriers to entry, streamline operations, and provide previously inaccessible market information. For instance, AI-powered predictive analytics could enable small farmers to optimise yields and reduce waste, thereby leveling the playing field with larger corporations. Similarly, affordable automation solutions could boost local food businesses, enhancing their efficiency and competitiveness. Therefore, while the risk of exacerbating socioeconomic disparities is real, so too is the promise of these technologies as catalysts for social and economic upliftment. This dual potential underscores the need for a thoughtful and inclusive approach to technology adoption in the food industry, one that minimises inequalities and maximises shared benefits.

5.3 Transparency and Consumer Trust

The increased use of automation and AI in the food industry also raises concerns about transparency and consumer trust. As processes become more automated, it becomes essential to ensure transparency in how food is produced, sourced, and handled. Consumers can question the reliability of automated systems and algorithms, leading to a loss of trust in the food industry. Maintaining open lines of communication and providing transparent information about the use of technology becomes crucial for ethical practices.

5.4 Data Privacy and Security

Automation and AI technologies generate large amounts of data, ranging from consumer preferences and purchasing habits to supply chain information. The collection, storage, and use of this data raise ethical concerns about privacy and security. Food companies must handle data responsibly, ensuring robust security measures, and obtaining informed consent from consumers. Additionally, biases within algorithms used in AI systems must be addressed to prevent discriminatory practices and maintain fairness.

5.5 Environmental Impact

While automation and AI can contribute to greater efficiency and reduced waste in the food industry, their overall environmental impact requires careful consideration. For example, the increased reliance on robotics and machinery may lead to a greater consumption of energy and natural resources. Additionally, the potential for overproduction due to optimised processes must be managed to avoid food waste. Ethical decision-making should consider the long-term sustainability and environmental consequences of technological progression.

6. Conclusions

The interplay of ethical concerns and leadership in the food industry beckons the scholarly community for a thorough and continuous exploration. The dialectic between economic imperatives and ethical objectives remains far from settled, representing an arena rife with intellectual challenges and rich with potential to contribute to the broader understanding of ethical leadership.

The intricate balance that leaders in the food industry must strike, and the complexities inherent in their roles, are topics that invite further academic contemplation. It also underscores the need to continue to refine our models of leadership to ensure they are attuned to evolving ethical contexts.

The research may be limited by factors such as the availability and accessibility of resources, the relevance and generalisability of the results, potential subjectivity, methodological constraints, and the continuous evolution of the food industry.

Possible directions for future research in examining emerging ethical concerns in the food industry and the associated leadership roles include conducting in-depth

case studies, utilising both quantitative and qualitative research methodologies, and evaluating the impact of ethical leadership. Exploring these research directions can contribute to a more comprehensive understanding and effective approach to addressing ethical issues in the food industry.

The influence of worldwide regulations on the ethical standards of the food sector is in important factor when the authors drawn their conclusions, as regulations play a crucial role in shaping the ethical practices and behaviours of businesses operating in this industry. These regulations are typically designed to protect public health, ensure food safety, promote fair trade practices, and safeguard consumer rights. By establishing legal frameworks and standards, governments and international bodies aim to maintain ethical standards and hold businesses accountable. Let us explore some keyways in which worldwide regulations influence the ethical standards of the food sector.

6.1 Food Safety and Quality Control

Regulations established by government agencies, such as the Food and Drug Administration (FDA) in the United States or the European Food Safety Authority (EFSA) in the European Union, impose standards for food safety and quality control. These regulations often include guidelines for the handling, processing, labelling, and packaging of food products. By adhering to these regulations, businesses are forced to maintain ethical standards to ensure the safety and integrity of the food they produce and distribute.

6.2 Product Labelling and Transparency

Regulations also require disclosure of information on food labels, such as ingredients, nutritional content, allergens, and origin. These requirements promote transparency and empower consumers to make informed choices. By enforcing accurate labelling, regulations encourage ethical practices by preventing misleading or deceptive claims about food products. They also contribute to the ethical aspect of ensuring consumer trust and allowing individuals to make choices aligned with their dietary preferences and values.

6.3 Animal Welfare and Environmental Sustainability

Regulations and standards that govern animal welfare and environmental sustainability have gained prominence in recent years. Governments and international organisations have introduced guidelines and laws aimed at improving animal welfare practices, reducing the environmental impact of food production, and promoting sustainable farming methods. These regulations encourage businesses to adopt ethical practices that prioritise the humane treatment of animals, minimise environmental harm, and promote sustainable sourcing and production methods.

6.4 Labour Standards and Fair Trade

Regulations also address labour standards and fair-trade practices within the food sector. They establish requirements related to workers' rights, fair wages, and safe working conditions. International organisations, such as the International Labour Organisation (ILO), develop guidelines and conventions to protect the rights of workers throughout the global food supply chains. Compliance with these regulations ensures that businesses uphold ethical standards, treating their employees fairly and responsibly.

6.5 Intellectual Property and Patent Protection

Regulations also play a role in protecting intellectual property rights and fostering innovation within the food industry. Intellectual property laws enable companies to safeguard their inventions, unique recipes, and branding elements. By ensuring proper patent protection and preventing intellectual property infringement, regulations encourage ethical practices by promoting fairness, rewarding innovation, and discouraging unauthorised use or misappropriation of others' creations.

6.6 International Trade and Food Security

Global regulations governing international trade and food security have a profound impact on ethical standards in the food sector. International agreements and organisations, such as the World Trade Organisation (WTO) and the Food and Agriculture Organisation (FAO), aim to establish fair trade practices, reduce trade barriers, and promote access to safe and nutritious food. By facilitating equitable trade relationships and addressing issues of food scarcity and hunger, these regulations contribute to the ethical imperative of ensuring global food security.

In conclusion, this investigation offers not a terminus, but a starting point for further scholarship into the profound and multidimensional nature of ethics in the food industry. It seeks to stimulate thought, inspire further research, and prompt a dialogue that is as complex as the challenges we face, paving the way for a new chapter in the narrative of ethical leadership in the food industry.

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The Impact of the Results Indicators on the Stock Market Performance in the Case of Companies Listed on the Bucharest Stock Exchange

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Abstract

The article aims to develop an empirical study to measure the impact brought by the communication of financial results on the stock market performance of companies listed on the Bucharest Stock Exchange. This study identifies the factors that influence share price and market capitalisation and calculates to what extent the performance indicators manifest this impact. Over time, the researched theme has been the subject of numerous studies developed on various national capital markets. The respective studies allow for an overall knowledge of the factors that can influence stock market performance, but the specifics of each national market do not allow the formulation of general conclusions valid for all cases. The research method used in the elaboration of the study is that of data regression analysis, applied using the SPSS statistical program. The research is developed on the real data reported by 50 companies listed on the Bucharest Stock Exchange, which make up the study sample. The financial data were extracted from the financial reports prepared by the companies, and the stock data from the history of the Bucharest Stock Exchange. The analysis undertaken confirms the link between the independent variables, the results indicators, and the dependent variables, the share price, respectively, the stock market capitalisation. Thus, the stock market performance is influenced by the results recorded by the companies listed on the Bucharest Stock Exchange. The research paper contributes to outline the general assembly regarding the impact of accounting information on stock price volatility. Also, the study increases the body of knowledge in the economic field, by characterising the Romanian capital market.

Keywords: performance, stock market, results, influence, price.

JEL Classification: M41, A10, O16.

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1. Introduction

Financial reporting highlights, in a synthetic way, the entire set of transactions carried out by an economic entity whose purpose is to obtain profit from the performance of its commercial activity. Both the balance sheet and the profit and loss account, as well as the other documents that make up the financial reporting system, provide users with data and information about the financial position of a company.

The most relevant indicator, from a financial point of view, that expresses the performance of a company is the profit, which is the basis of the decisions made by both investors and company managers, who plan their development and growth strategies (Garengo et al., 2005). Profit can take many forms such as gross profit, net profit, operating profit, financial profit, the present study considering only net profit. Along with profit, the category of result indicators also includes gross operating surplus, turnover, or added value.

The stock market represents the place of interaction between the demand and supply of securities, functioning exactly like an organised and regulated area, around which capital holders analyse the opportunities to place it in some companies.

The present paper starts from the premise that financial communication is the one that influences the trading price of the shares of companies listed on the Bucharest Stock Exchange and aims to present the method of determining the impact that the results indicators, calculated on the basis of the financial statements, a have on the evolution of share price and market capitalisation. The research also takes into account other scientific works that address this topic, also conducting a review of specialised literature that deals with subjects assimilated to the object of study. Therefore, the study starts from the hypothesis that the improvement of financial results leads to the increase of stock market performances.

2. Problem Statement

The economic literature, in particular, and that related to the stock market, in particular, include works related to numerous research efforts in the field of influence brought by economic-financial indicators on stock market performance. Investors' reactions to the publication of the indicators characterising the results of the companies they hold portfolios of or in which they intend to invest have been quantified repeatedly, having as reference points either local or global stock markets, or industrial branches or certain objects of activity.

Given the fact that the Romanian economy is going through a period of transition, the capital market of this country is not a very desolate one. That is why the Bucharest Stock Exchange cannot be compared with stock exchanges with global notoriety, but only with the stock exchanges of economies comparable to that of Romania. In the following, the research undertaken by various authors

who have addressed similar themes and methodologies in relation to capital markets similar to Romania's is presented.

Dodonov (2020) addressed the topic of the effect of the publication of financial statements on share prices in 2020, by publishing a study that aimed to analyse the behaviour of the trading prices of the shares of companies in the United States of America at the time of the presentation of financial information regarding the recorded profits. The basic premise from which the author started in the scientific approach is that "good news about a company triggers an increase in the share price". In relation to this fact, Dodonov (2020) is of the opinion that the price of a share appreciates immediately when, with the publication of the financial statements, those interested in the respective company can observe not only an excess of the company's past earnings, but also an excess of financial analysts' expectations of the entity's current performance.

Hossain (2021) investigated the influence of accounting disclosures on stock trading values for pharmaceutical companies listed on the Dhaka Stock Exchange, Bangladesh. The analysis period covered the period between 2017 and 2019, and the regression analysis was applied to variables such as earnings per share, net cash flow per share, net assets, or dividend per share.

The research of H. Tarik (2021) led to the conclusions that cash flow and net asset have a significant positive impact on the market value of a stock. Also, earnings per share influence the trading price of securities significantly but negatively, while dividend per share influences the stock price positively.

The analysis described above had as its starting point a series of other research processes that addressed similar themes. For example, the author Beisland (2010) correlated the influence of the publication of accounting information with the stock market capitalisation, and Oladele et al. (2018) analysed the relevance of the value of accounting information in the perception of actors active in the capital market, based on the data of 121 of companies listed on the Nigerian Stock Exchange.

Farouq and Zaher (2014) studied the impact of indicators derived from the processing of data provided by the accounting of companies in the banking sector on their stock market capitalisation value. By applying the simple regression method and the least squares method, the authors observed, for the period between 2002 and 2011, that the indicators of a financial-accounting nature lead to the direct influence of the trading price of shares and, respectively, the market value of companies included in the sample.

Lambert and Larcker (1987) observed that there is an interdependence between the information contained in accounting data and the evolution of stock returns in 370 companies in the United States of America, from various sectors. Also, Hanlon (1991) concluded, based on the analysis of data of 222 British companies, that there is a strong, significant correlation between financial data and the value of the stock market capitalisation.

Studies like that of Olson and Pagano (2005) or that of Pandey (2005) are also focused on the influence brought by the publication of financial reporting data on the stock market performance of the companies that are the subject of the analysis.

By testing on the basis of statistical methods the data of some companies from the USA, respectively, Malaysia, the authors concluded that the trading price of the shares, which is the basis for determining the stock market capitalisation, is strongly affected by the financial communication undertaken by the business environment, regardless of the company's field of activity.

Arsalan et al. (2016) analysed the impact of communicating different leverage measures on the share price of cement companies listed on the Stock Exchange of Pakistan. They conducted the research by approaching the problem through panel data and considering the share price as a dependent variable. Following the application of the data collection methodology included in the annual reports of the companies in the cement production sector, for the period between 2005 and 2015, as well as after the application of descriptive statistics methods, through multiple regression the empirical relationship between the indebtedness of the enterprises and the trading prices of their shares.

Mohammad et al. (2012) debated the issue of the impact of dividend policy communication on share price volatility on the capital market in Malaysia. In fact, the analysis started from the hypothesis according to which the trading price of the securities is affected by the forwarding, by the management level, of the decisions related to the distribution of the results towards the payment of dividends.

Mohammad et al. (2012), following the analysis undertaken, concluded that there is a negative but significant relationship between the volatility of share prices and the dividend policy practiced by companies listed on the Malaysian stock exchange. The study also reveals that the volume of the dividend, but also its yield, has the most important impact on the change in the trading price of securities.

A study of 41 companies listed on the Bahraini capital market by researchers Sharif et al. (2015) revealed that variables such as return on equity, book value per share, earnings per share, the allocated dividend or its yield, the debt ratio, and the size of the company influence the trading price of the shares in the respective capital market. These variables show a strong significance on the analysed population, suggesting the idea that investors can resort to the decision to participate in the formation of a company's capital, being assured of recording a fair return generated by those variables.

3. Research Questions / Aims of the Research

The purpose for which any company is established is that, based on the activities undertaken, it registers a profit. The economic entity is considered a collection of production factors linked, according to its functions, in order to obtain income at a level higher than the monetary needs allocated in this regard.

Profit is the first benchmark to which each stakeholder will become sensitive, depending on their interest in the enterprise. A company that registers a profit will benefit from increased attention from actors on the economic scene, whether we are talking about investors, credit companies, customers, suppliers, or employees. This fact denotes efficient asset management, prudent capital allocation, and a rigorous and solidly developed policy regarding the sales function.

In this context, to carry out the empirical study, we formulated the following research hypothesis: *the improvement of financial results leads to the increase of stock market performances*.

The decision to place some sums of money in order to participate in the formation of the capital of a company arises from the choice between several investment options, depending on the yield that each one generates, in return for the degree of risk assumed by each investor. Shareholders allocate sums of money in order to establish a portfolio of securities either out of the desire that their investment be remunerated periodically (annually) on the basis of dividends, or out of the desire to increase the market value of the shares held, a fact that generates earnings when the portfolio is sold, based on stock price differences.

When a company listed on a capital market records growing results for several consecutive financial years, the interest of investors in relation to this company will continuously increase. Otherwise, when a company will report, through the financial statements, negative price results for several consecutive periods, it will face the reluctance of existing investors, on the one hand, as well as potential investors, on the other hand. Incumbents will look for alternatives to capital placement, wanting to withdraw their money invested in unprofitable firms, while potential investors will delay coming forward for fear of recording losses on such placements.

The impact generated by the amount of net profit on the investment or disinvestment decision materialises most strongly when the company communicates the financial results. An investor who bases his decisions on the account of these indicators will react as soon as the company makes public the results account of a certain period, comparing it with those of the previous periods.

4. Research Methods and Analysis Results

The empirical study on the volatility of the share price according to the performance indicators of the companies listed on the Bucharest Stock Exchange was developed based on the financial data collected from a number of 50 companies, which operate in most of the economic branches encountered in Romania. The companies were randomly selected, considering that during the entire analysis period their securities were available for sale – purchase in the Romanian stock exchange.

The research contained in the study of the impact of performance indicators on the volatility of share prices was carried out with the help of the "Statistical Package for the Social Sciences" (SPSS) computer program. This is a software program widely used around the world, contributing to social science research by performing statistical analysis of data.

Taking both from the financial reports drawn up by the companies and from the securities trading history, available on bvb.ro, the primary data that allowed the determination of the analysis indicators constitute quantitative variables. For this reason, the correlation analysis that can be used to investigate the phenomenon of

the influence of financial information on the share price is the application of the Pearson correlation coefficient determination methodology.

In addition to the correlation analysis, in order to characterise as accurately as possible, the impact brought by the performance indicators on the price of the shares of the companies listed on the Bucharest Stock Exchange, a multiple regression analysis was also performed. The rigours of selection of the relevant data were kept from the correlation analysis, this fact guaranteeing the unity of the research and the applied methodology.

4.1 Analysis of Variables

The analysis of the impact brought to the share price and stock market capitalisation by the results indicators focused on their grouping according to the reporting period, over the entire time horizon concerned. Thus, data related to net profit (PN), gross operating surplus (EBE), turnover (CA), or value added (VA), were analysed alongside stock market data, i.e., share price (PA) and stock market capitalisation (MK). For an exact comparability of the data series, the logarithmic function, more precisely the natural logarithm, was applied when determining the correlation and regression with respect to the stock price.

Table 1. Data used in the analysis for share price

No.	Variables	Symbol	Unit
	Dependent variables		
1.	Share price	lnPA	%
	Independent variables		
1.	Net income	lnPN	%
2.	Gross operating surplus	lnEBE	%
3.	Turnover	lnCA	%
4.	Added value	lnVA	%

Source: Data processed by the author using Excel.

Analysing the link between performance indicators and share price is a critical component of financial analysis. Investors and analysts use these indicators to gauge a company's financial health and determine its investment potential. The performance indicators commonly used to analyse the link between financial performance and share price include net income, gross operating surplus, turnover, and added value.

Table 2. Data used in the analysis for market capitalisation

No.	Variables	Symbol	Unit
	Dependent variables		
1.	Market capitalisation	MK	mil. lei
	Independent variables		
1.	Net income	PN	mil. lei
2.	Gross operating surplus	EBE	mil. lei
3.	Turnover	CA	mil. lei
4.	Added value	VA	mil. lei

Source: Data processed by the author using Excel.

The analysis of the link between performance indicators and market capitalisation is an important area of research for investors and financial analysts. Market capitalisation is a measure of the total value of a company's outstanding shares and is often used as a proxy for the company's overall value. Performance indicators such as net income, gross operating surplus, turnover, and added value are important measures of a company's financial performance.

4.2 Research Result

The correlation analysis of the share price with the results indicators, in the case of annual reports, can be seen synthetically in the following table:

Table 3. Pearson Correlation for share price

		lnPA	lnPN	lnEBE	lnCA	lnVA
lnPA	Pearson Correlation	1	.368(**)	.361(**)	.256(**)	.417(**)
	Sig. (2-tailed)		0.000	0.000	0.000	0.000
	N	200	168	177	200	197

**. Correlation is significant at the 0.01 level (2-tailed).

Source: Data processed by the author using SPSS.

Thus, it can be observed that the added value registers the most significant correlation with the share price, of 0.417, followed by that of the net profit, of 0.368. Even in the case of gross operating surplus and turnover, the values of the Pearson correlation coefficient are not much reduced, reaching the value of 0.361 and 0.256, respectively, in the case of the two indicators. The Sig = 0.000 value, recorded at each level of the correlation, confirms the accuracy of the results.

All these assessments are validated by applying the regression analysis on the previously correlated data, which, in a synthetic way, is presented as follows:

Table 4. Regression Coefficients for share price

Model		Unstandardised Coefficients		Standardised Coefficients	t	Sig.
		B	Std. Error	Beta	B	Std. Error
1	(Constant)	-8.190	1.976		-4.145	.000
	lnPN	.006	.170	.006	.034	.973
	lnEBE	.003	.368	.002	.007	.994
	lnCA	-.294	.295	-.237	-.998	.320
	lnVA	.759	.528	.603	1.439	.152

a Dependent Variable: lnPA;

Source: Data processed by the author using SPSS.

The correlation analysis of the stock market capitalisation with the results indicators, in the case of annual reports, can be seen synthetically in the following table:

Table 5. Pearson Correlation for market capitalisation

		MK	PN	EBE	CA	VA
MK	Pearson Correlation	1	.898(**)	.934(**)	.813(**)	.948(**)
	Sig. (2-tailed)		0.000	0.000	0.000	0.000
	N	200	200	200	200	200

**. Correlation is significant at the 0.01 level (2-tailed).

Source: Data processed by the author using SPSS.

Similar to the other correlations that confirm the hypothesis that performance indicators have a direct and positive impact on stock price volatility and, implicitly, on the market capitalisation in question, the Pearson correlation coefficient takes its maximum value of 0.948 in relation to value added. The next significant correlation is recorded with gross operating surplus, of 0.934, and net profit and turnover follow the same directions, establishing significant correlations of 0.898 and 0.813, respectively.

Table 6. Regression Coefficients for market capitalisation

Model		Unstandardised Coefficients		Standardised Coefficients	t	Sig.
		B	Std. Error	Beta	B	Std. Error
1	(Constant)	238610290.425	83574214.806		2.855	.005
	PN	3.690	.772	.485	4.778	.000
	EBE	-2.297	.751	-.551	-3.057	.003
	CA	.183	.057	.161	3.197	.002
	VA	1.969	.244	.905	8.066	.000

a Dependent Variable: MK;

Source: Data processed by the author using SPSS.

5. Findings

We observe that the share price of the analysed companies is influenced both positively and negatively by the results indicators considered to be net profit, gross operating surplus, turnover, and added value. In this case, the predictor variables explain 15.50 % of the stock price volatility, this value allowing the validation of the analysis model. The regression analysis shows us that when the net profit increases by one percent, the share price increases by 0.60 %, and when the gross operating surplus increases by one percent, the same price increases by 0.30 %. In relation to the turnover, the regression means that when this indicator decreases by 1 %, the price decreases by 29.40 %, and in relation to the added value, the same analysis shows us that when the indicator increases by 1 %, the stock price increases with 75.9 %, in this way also validating the data correlation analysis.

Thus, we observe that the value of the analysed companies is influenced both positively and negatively by the result indicators considered to be net profit, gross operating surplus, turnover, and added value. In this case, the predictor variables explain 91.00 % of the movement of the stock market capitalisation, this value allowing the validation of the analysis model. The regression analysis shows us that when the net profit increases by 1 million lei, the stock market capitalisation increases by 3.69 million lei, and when the gross operating surplus decreases by 1 million lei, the same stock market capitalisation decreases by 2.297 million lei. In relation to the turnover, the regression means that when this indicator increases by one million lei, the value of the company increases by 0.183 million lei, and in relation to the added value, the same analysis shows us that when the indicator increases by one million lei, the stock market capitalisation increases by 1.969 million lei, thus validating the data correlation analysis.

6. Conclusions

When we refer to a company, the first thing we think about is the one related to the results it recorded. The main goal of any investor is to allocate material funds to a profit-generating enterprise. The impact of accounting information on stock price volatility could not be determined without considering performance indicators such as net profit, gross operating surplus, turnover, or value added.

By applying statistical analysis methods to data from companies listed on the Bucharest Stock Exchange, this paper contributes to the characterisation of Romania's capital market. Thus, as an element of novelty, we can state that the influence of the results indicators on the share price and on the stock market capitalisation is a direct one, which denotes the validation of the previously formulated research hypothesis. So, in the case of companies listed on the Bucharest Stock Exchange, the higher their reported profits, the greater the interest in those companies on the capital market and vice versa. The same can be said about the gross operating surplus, turnover, or added value recorded by companies.

The present research shows us that accounting information influences the stock market performance of companies listed on the Bucharest Stock Exchange.

Comparing these results with those obtained by the authors who have addressed similar topics in the past, we notice that the Romanian capital market also reacts, like other markets, to the financial reports published by companies.

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Sustainable Cities for a Sustainable Future: Integrating Sustainable Development Goals into Urban Planning

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Abstract

This paper presents a detailed bibliometric analysis of the existing literature on the integration of sustainable development objectives in cities. The purpose of this analysis was to identify the trends and evolution of research in this field, as well as to record a significant contribution of researchers and institutions in promoting sustainable development in the urban environment. Also, the situation of Romania regarding the implementation of sustainable urbanism will be seen. Relevant articles published in peer-reviewed journals and academic databases were identified and evaluated. Topics covered in these papers include: policies and strategies for sustainable urban development, technological tools for measuring sustainable city performance, good practices in urban planning and development, and the impact of urban development on the environment and the quality of life of citizens.

Keywords: sustainable development goals, urban planning, bibliometric analysis, Romania.

JEL Classification: Q01, O10, O20.

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1. Introduction

In recent decades, the concept of sustainable development has become a central theme in the global debate on how to build a better and fairer world for all the inhabitants of our planet. Sustainable development is a holistic approach to economic, social and environmental development that takes into account the impact of our actions on the environment and on future generations.

In the urban context, sustainable development becomes a critical issue, as cities are the centres of economic and political power, but also the main sources of greenhouse gas emissions, resource consumption, and pollution (Nagy et al., 2018; Popa, 2015).

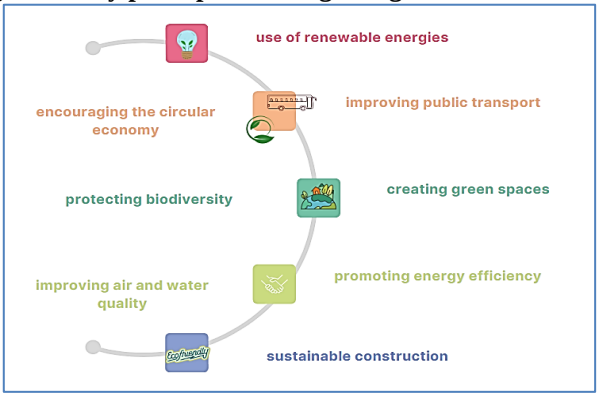
Cities are the main driver of economic development and are responsible for a significant proportion of global resource consumption and greenhouse gas emissions. In addition, rapid urban population growth means that cities are often overcrowded and highly polluted, which can lead to a variety of health and social problems (Sterie et al., 2022).

The Sustainable Development Goals (SDGs) are a set of 17 global goals adopted by the United Nations in 2015 as part of the 2030 Agenda for Sustainable Development. These goals were developed following a broad consultative process and are designed to promote a more sustainable and equitable future for all people on the planet (Ivan et al., 2020). The Sustainable Development Goals cover a wide range of issues, from reducing poverty and inequality to combating climate change and protecting biodiversity (Assembly, 2015; Pătârlăgeanu et al., 2020).

In the current context of climate change and global economic development, the concept of sustainable development is becoming increasingly important for cities and their communities (Dumitru et al., 2022).

Integrating sustainable development goals into cities involves using sustainable development principles to plan, design, and manage urban development to ensure that it is sustainable and equitable. This approach aims to ensure urban development that is less polluting, more resilient to climate change, more inclusive, and more accessible to all citizens (Weymouth et al., 2018; Moallemi et al., 2020).

Figure 1. Key principles of integrating the SDGs into cities



Source: Adaptation after Weymouth et al., 2018.

The implementation of these principles can be achieved through urban development plans, regulations and public policy, infrastructure projects, as well as by involving citizens and the local community in the decision-making process.

Their implementation in cities is also a continuous and complex process that requires a holistic approach and collaboration between the different sectors and actors involved. However, the benefits of this approach can be significant, not only for the environment, but also for the quality of life of citizens and the local economy (Klopp et al., 2017; Serbanica et al., 2017).

Integrating sustainable development goals into cities is essential for a more sustainable and equitable future for all residents (Ban et al., 2022). Cities play a crucial role in achieving sustainable development goals, as they are responsible for a large share of greenhouse gas emissions, resource consumption, and waste production. In addition, cities are also the places where the majority of the population lives and works, which means that the sustainable development of cities can have a significant impact on people's quality of life (Sarkis et al., 2022).

Numerous studies and research have explored how sustainable development goals can be integrated into urban planning and urban development. For example, one study looked at how the circular economy principles can be integrated into urban planning to reduce resource consumption and waste production in cities (Sanchez et al., 2018; Constantin et al., 2021).

In Romania, the Sustainable Development Goals require monitoring at the local and regional level, i.e. an integrated approach that can interconnect the synergies of the different goals (Firoiu et al., 2019). In a paper by Benedek et al., 2021, different indicators were identified from different areas such as health. Education, Energy, Economy in order to make an assessment of the SDGs in different regions of Romania. Therefore, weaknesses and strengths of the goals were identified so that they can be used in policies and actions to achieve a good integration of the SDGs (Benedek et al., 2021).

In the paper "Integrated urban regeneration: solution for revitalising cities" the authors extol the concept of urban regeneration and offer solutions for cities to address certain challenges both economic and environmental. Clear examples, namely urban regeneration projects in Romania, are given to assess their impact. The findings show that urban regeneration can be a solution to urban revitalisation, creating a sustainable urban environment and improving the quality of life (Alpopi, Manole, 2013).

In terms of best practices, as early as 2014, the city of Vienna developed a sustainable urban development plan in 2014, known as "Smart City Wien". This plan focuses on four main areas: energy, mobility, buildings, and technology. The plan aims to reduce greenhouse gas emissions, improve air quality, and use natural resources efficiently (Hesamin et al., 2017; Kramer et al., 2016).

The city of Copenhagen has committed to becoming a zero-emission city by 2025. To achieve this goal, the city is focusing on promoting electric transport, the use of renewable energy and improving the energy efficiency of buildings (Wejs et al., 2018; Olhoff et al., 2014).

The city of Barcelona also adopted a strategic plan for sustainable urban development in 2000, which aims to integrate sustainable development goals into all public policies. This strategy has led to significant improvements in energy efficiency, public transport, waste and water management (Marí-Dell'Olmo et al., 2016).

In a work carried out in 2018 on the topic of the sustainable development of Romanian cities, emphasis was placed on a perspective in which Romanian cities can be managed in a social, ecological, and economic way. Several case studies were taken into account, highlighting the local decision-making factors that can contribute to the development of innovative solutions to current urban problems. The results show that through a good management of resources and renewable energy, Romania can develop sustainable and resilient cities (Tulbure, 2016).

2. Problem Statement

In Romania, sustainable urban planning, sustainable transport transformation and increased energy efficiency should be the main objectives and guidelines so that sustainable development goals are integrated into cities. Cities should also promote recycling and proper waste management by offering separate collection programmes, providing adequate infrastructure, and educating the public on the importance of proper waste management. Involving citizens by getting their feedback and suggestions is also an important point in the integration process, through which their priorities and needs for sustainable development can be identified.

In the framework of the works, the country of Romania was chosen for analysis due to the reasons necessary for urban planning for several reasons, namely, this planning helps to protect the environment and conserve resources, but also to reduce natural risks, namely, climate which includes pollution, floods, and drought.

3. Research Questions and Objectives

Taking into account the above context, this paper seeks to answer the following question: What is the current state of research on the integration of sustainable development objectives in cities and what are the emerging trends and research gaps in this field?

The objectives of the paper are to carry out a systematic bibliometric analysis of the existing literature on sustainable development in urban areas, using tools such as citation analysis, co-citation analysis, and keyword analysis and identifying the most influential publications in the field.

The hypothesis of the paper is represented by the volume of research on the integration of sustainable development objectives in cities that has increased over time, and there are emerging trends and research gaps that can guide future research in this field. The hypothesis suggests that there has been an increase in the volume of research on sustainable development in urban areas over time, which can be examined through bibliometric analysis.

4. Research Methods

Bibliometric analysis is a quantitative analysis of specialised literature through which data mapping is carried out (Donthu et al., 2021).

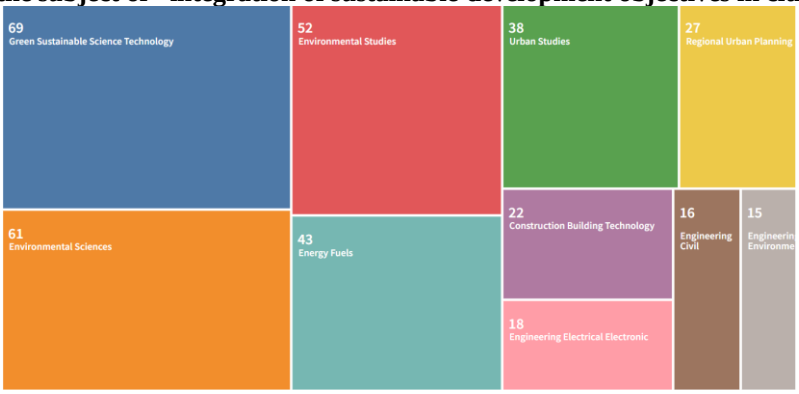
To define the search, the group of words "integration of sustainable development objectives in cities" was selected *topic* and the *plain text* database was exported from the Web of Science where *194 papers* were identified (Moral-Muñoz et al., 2020; Sterie et al., 2023). The database was entered into the VosViewer software, where maps were generated through which we could identify the words interconnected with the subject studied, the countries that address this subject the most, the connection between them, as well as the research directions addressed. In the study, the scientific articles most appreciated by the academic environment were analysed, also taking into account the novelty of the articles.

5. Findings

On the subject of "integration of sustainable development objectives in cities", 271 scientific articles were produced in the period 2004-2022. the main topics in which they were included are green sustainable science technology (69 papers), environmental sciences (61 papers), environmental studies (52 papers), energy fuels (43 papers), urban studies (38 papers), construction buildings technology (22 papers), electronic electrical engineering (18 papers), regional urban panning (27 papers), civil engineering (16 papers), engineering environment (15 papers) (Figure 2).

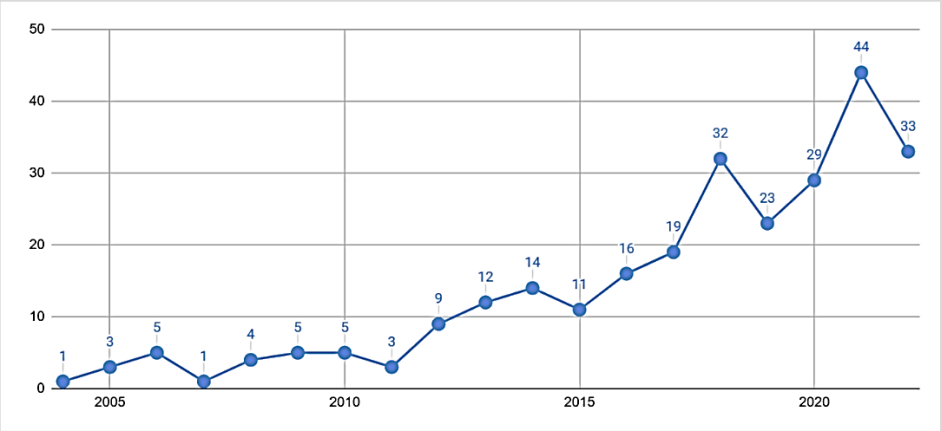
Regarding the evolution of specialised works on the studied subject, according to the Web of Science database, the first work was carried out in 2004, reaching the maximum number of works in 2022, namely 44 works, which will decrease in the following year to 33 works. In the year 2022, the studied topic presented a major interest for researchers, representing an interdisciplinary topic that is of great interest to researchers, academics, and practitioners who try to better understand these global problems and find practical solutions to address them (Figure 3).

Figure 2. Treemap regarding the areas of interest of the works carried out on the subject of "integration of sustainable development objectives in cities"



Source: Edited by authors based on WoS results.

Figure 3. The evolution of the works carried out on the subject of "integration of sustainable development objectives in cities"



Source: Edited by authors based on WoS results.

Next, the content of the first 5 most cited papers found in the Web of Science database was studied.

In the work entitled "Ecosystem services in urban plans: What is there, and what is still needed for better decisions", the authors claim that ecosystem services are key elements for sustainable urban development through the analysis of 22 urban plans from 22 Italian cities. Starting from the hypothesis that urbanisation plans should be based on an internalisation mechanism, the results show that there are a number of instruments that achieve this aspect, and in order to be able to evaluate ecosystem services, it is necessary to reflect on the urban green infrastructure (Cortinovis et al., 2018).

The second most cited paper is entitled "Smart Energy Systems for Sustainable Smart Cities: Current Developments, Trends and Future Directions" presents the evolution of the current smart energy sector, highlighting the key challenges of this sector, but also the guidelines for the future. By integrating ML and CI, future challenges can be addressed and contribute to enriching the theoretical baggage and guiding research communities regarding case studies and challenges encountered (O'Dwyer et al., 2019).

The transition to resilience of cities requires the presentation of some useful descriptors, namely the barriers of planning objectives. In the work "Transitioning to resilience and sustainability in urban communities", the authors raised certain questions regarding the integration of green infrastructure in cities, the operationalisation of urban planning for climate change resistance, policies to limit urban expansion, which should represent main research topics and indicators for integrating resilient systems in cities. The interdependence of quality of life and land use must be a starting point for urban planning if sustainable goals are to be implemented. Integrating resilience can produce conflicts at the socio-economic and market level, but also in terms of European trade policies (Collier et al., 2013).

Table 1. The most cited works on the subject of "integration of sustainable development objectives in cities"

Document title	Year of publication	Citations number
Ecosystem services in urban plans: What is there, and what is still needed for better decisions	2018	154
Smart energy systems for sustainable smart cities: Current developments, trends and future directions	2019	136
Transitioning to resilience and sustainability in urban communities	2013	132
Planning for sustainable accessibility: The implementation challenge	2008	104
Mainstreaming climate adaptation into urban planning: overcoming barriers, seizing opportunities and evaluating the results in two Dutch case studies	2013	99

Source: Edited by authors based on WoS results.

The paper entitled "Planning for sustainable accessibility: The implementation challenge" focuses on a planning strategy called "Network City", which involves a series of changes to existing planning. The aim of the strategy is to create a network to support an efficient public transport system. Starting from the development to the restructuring of the urban area, involving a mixed land use and setting clear objectives related to the population, the employment of the entire region is analysed. Challenges were not slow to emerge; I assume sustainable accessibility, changes to existing practices, strong leadership, and proactive approaches (Curtis, 2008).

Climate change, reducing flood risks, respectively thermal stress, and preserving sustainable objectives are the main topics addressed in the work "Mainstreaming climate adaptation into urban planning: overcoming barriers, seizing opportunities and evaluating the results in two Dutch case studies". The authors integrated a conceptual model into two Dutch urban planning case studies with the aim of demonstrating the dynamism of the process and generating discussions on the value criteria of integration in relation to climate adaptation targets. The results showed that the climate adaptation situation is a difficult one, requiring the stability of synergies and deliberate decisions to be able to take into account current and future impacts (Uittenbroek et al., 2013).

Regarding the keywords used at least 5 times in a scientific paper, they were grouped into clusters, and the most representative keywords are represented by city, environment, circular economy, renewable energy, green infrastructure, and infrastructure, city intelligent. These words suggest that our work focuses on the "city" where the problems related to the environment, circular economy, renewable energy, and green infrastructure must be solved. Information and even communication technologies are also needed to be included in urban planning and to improve the quality of life, so as to lead to the emergence of smart cities.

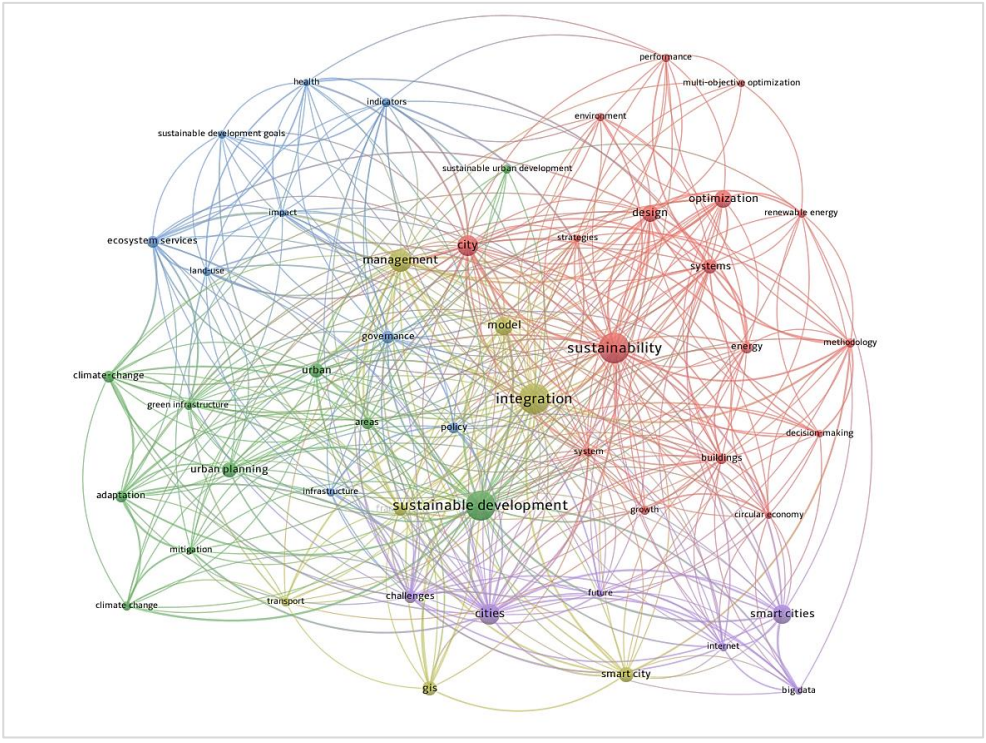
The first red cluster called "sustainability" includes city, strategies, environment, performance, system, multi-objective optimisation, renewable energy, buildings, circular economy, growth, methodology (Figure 4).

The second green cluster, entitled "sustainable development", includes urban planning, zones, urban, mitigation, climate change, adaptation, green infrastructure.

The third blue cluster called "ecosystem services" includes land use, impact, sustainable development goals, health, indicators, governance, policy, infrastructure.

The fourth yellow cluster, called „integration", includes model, management, transport, smart city (Figure 4).

Figure 4. The link between keywords and " integration of sustainable development objectives in cities"



Source: Edited by authors based on WoS results using VOSviewer.

Analysing the keywords according to the years, we notice that in 2016 and 2017, research focused on urban planning, areas, model, environment, system, optimisation, gis, healt.

In 2018 and 2019, the focus was on sustainable development, integration, management, city, sustainability, strategies, design, indicators, impact, land use, climate change, management.

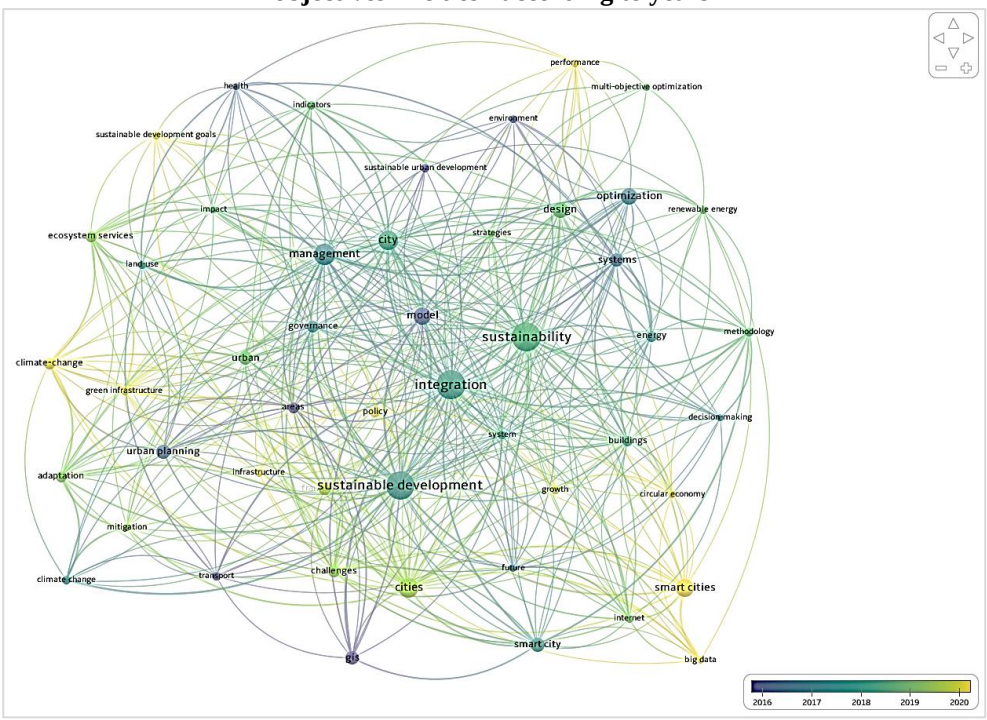
Later, in 2020, the main topics were climate change, green infrastructure, policy, smart-cities, big-data, performance, sustainable development goals.

According to the keywords, there has been an evolution of research themes, for example, since 2016 the focus has been on urbanism, models, and systems, while in the following years the focus has been on sustainable development, climate change.

At the same time, there is a concern among researchers about the integration of sustainable principles, reflected by the terms sustainability, smart cities, and green infrastructure.

By making this map, a multidisciplinary approach to sustainable urban planning is also shown (Figure 5).

Figure 5. The link between keywords and " integration of sustainable development objectives in cities" according to years

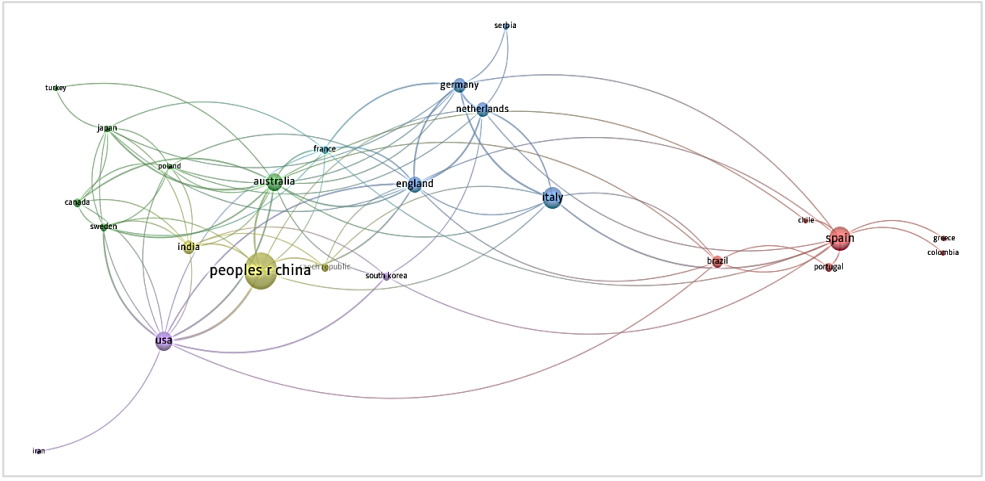


Source: Edited by authors based on WoS results using VOSviewer.

In the figure above, the degree of relationship between countries, the research directions, and the interest addressed to the subject is identified according to the size of the node. We notice that China together with Austria, the United States of America, and Spain pay special interest to the studied subject, presenting different research directions. China presents a large number of works on the subject under study due to the progress made in recent years regarding poverty reduction improving access to education and healthcare, increasing energy efficiency and expanding renewable energies, reducing greenhouse gas emissions and protecting natural resources. Also, closely related European Union countries are identified, such as Germany and the Netherlands, Spain, and Portugal, which present the same research direction. The European Union has addressed a series of measures regarding clean energy, environmental protection, social responsibility, and education and

training in order to achieve the goals of sustainable development and overcome current challenges (Zang et al., 2011; Janik et al., 2020) (Figure 6).

Figure 6. Linkage between co-author countries



Source: Edited by authors based on WoS results using VOSviewer.

6. Conclusions

The increased interest in the Sustainable Development Goals is demonstrated by the large number of articles produced on the subject. Also, important global commitments to sustainable development and to tackling major global problems such as poverty, hunger, inequality, climate change, and biodiversity loss.

Many developing countries have made a strong commitment to achieving the SDGs, as they could contribute to the goal of living standards for their populations and the growth of their economies. At the same time, many developed countries are paying particular attention to SDG research because they are aware of the global impact of environmental and development issues and want to contribute to a more sustainable future.

A sustainable future requires the development of a strategic plan that includes a vision and mission for this planning. Furthermore, partnerships and collaborations between the private and public sector, organisations, and stakeholders can contribute to the implementation of the SDGs. Citizens also play an important role in mainstreaming the goals and developing new solutions for better development.

In Romania, sustainable urban planning, sustainable transport transformation, and increased energy efficiency should be the main objectives and guidelines so that the SDGs are integrated into cities. Cities should also promote recycling and proper waste management by providing separate collection programmes, providing adequate infrastructure, and public education on the importance of proper waste management. Involving citizens by obtaining feedback and suggestions is also an important point in the integration process, through which priorities and needs for sustainable development can be identified (Vranceanu, 2012; Munteanu, 2022).

The novelty factor that the research offers is the multidisciplinary and collective approach and the tackling of contemporary problems. By adopting an approach that values the diversity of disciplines, the research brings together knowledge and expertise from fields as varied as urban planning, architecture, ecology, economics, and sociology. This interdisciplinary collaboration enables a deep and comprehensive analysis of how urban development influences the environment. Integrating these different perspectives contributes to a more complex understanding of the complexity and interdependence of urban processes and their environmental implications.

The limitations of the research are unpublished papers, papers from certain conferences, and various reports not in the Web of Science database. Future research directions are to focus on solutions to adapt to environmental change, promote urban planning practices and research that can explore urban transport.

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Exploring the Interaction between Energy Use in Agriculture and Food Production

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Abstract

This study aimed to explore the academic community's interest in the relationship between energy usage and food production through bibliometric analysis. Using the Web of Science database, 819 research documents published between 1980 and 2023 were analysed. The results of the analysis showed an increase in interest in this topic, with the United States, India, Germany, England, and Italy having the highest number of studies in this field. The research categories most commonly used for such studies were Environmental Sciences (22.431%), Energy Fuels (20.551%), Green Sustainable Science Technology (18.045%), Food Science Technology (12.406%), and Biotechnology Applied Microbiology (10.652%). Although these results suggest that there has been an increased interest in this field, the data also revealed that the participation of countries from the global south is modest. Consequently, this study emphasises the need for further investigation of the development of clean energy technology and legislation that promotes the sustainability of food production.

Keywords: energy consumption, food production, agriculture, renewable energy, sustainable development, climate change, bioenergy.

JEL Classification: Q10, Q16.

1. Introduction

An essential economic sector for mankind, namely the agricultural sector, represents the primordial source of resources: food, labour, and even energy, when the results of agriculture are used as fuel for the energy sector (Clairand et al., 2020). Agriculture can be a significant consumer of energy, which can trigger divergent socio-economic and environmental consequences. There is plenty of energy use in

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the agricultural sector, including activities such as the cultivation of crops, irrigation, product processing and storage, transport, distribution and other logistics-related activities (Naresh Kumar, Chakabarti, 2019). Regarding the energy sources used for carrying out activities in the agricultural sector, they include fossil fuels (referring to diesel, gasoline, and natural gas), electricity, and, in some cases, even environmentally friendly energy sources, referring to the renewable energy sources, such as solar, wind, and biomass (Li, Tao, 2017).

The literature is full of papers dedicated to explaining the use of energy in agriculture and its significant harmful environmental impacts, such as greenhouse gas emissions, pollution (in different forms: air and water), and land degradation. Additionally, the high dependence of implementing large-scale agriculture on the fossil fuel market can cause both sectors to become vulnerable to price volatility and supply disruptions (Chivu et al., 2021). Consequently, promoting energy-efficient practices in agriculture represents an ardent ongoing effort from practitioners and scholars with the aim to find sustainable paths designed to reduce the carbon footprint, and to increase the resilience of these economic sectors to energy-related challenges (Acquier et al., 2019).

2. Problem Statement

Forecast Actuator performed by The Food and Agriculture Organisation of the United Nations (FAO) regarding global population growth until 2050 indicates an increase in energy production by approximately 29-30 % in order to meet consumption needs, and significant growth is also expected in the agri-food sector, with approximately 69-70 % if we refer to food production, to meet demand in the new global reference context (Bundschuh et al., 2014). From these forecasts we can deduce that this demographic growth until the year 2050 will lead to the need to make an extraordinary effort, both in the agri-food sector and in the energy sector, in terms of meeting the demand for food production and energy production (Toró, 2023). A large amount of energy will be required for production in the agri-food system, but if we are aware that traditional energy sources are limited, we can say with confidence that without renewable resources, energy demand will not be able to be met in the long term (Andrei et al., 2021). Therefore, to produce energy in the agri-food system, renewable energy sources will be needed, and in the coming years they will certainly be in the spotlight, and significant investments will be made in this sector, so that we move towards the fulfilment of the Sustainable Development Goal 7 – Clean and affordable energy (Agbedahin, 2019).

In the present moment, several investments are made in the production capacities using the renewable energy resources. But a constant reality is that the increase in demand registered in the agri-food sector together with the demographic growth, will lead to a disproportionate increase compared to the projected increase in energy capacities (Clairand et al., 2020). Therefore, it is extremely important that we also make progress in energy efficiency in agri-food production systems. The goal of energy efficiency in the agri-food sector is to produce the same amount of food or even above the level, but using a smaller amount of energy (Sims, 2014). Thus,

energy efficiency can be expressed by the ratio between the production process and the energy input in that process (Li, Tao, 2017). But where can energy consumption in the agri-food sector come from? First, it is important to understand that this energy consumption can come from direct energy consumption or indirect energy consumption (Istudor et al., 2022). Direct energy consumption comes from the direct use of energy, through all the activities carried out on the farm, from the processing of raw materials to the other activities, in the different stages of production. Indirect energy consumption represents the energy consumed, before the production and supply of inputs (Naresh Kumar, Chakabarti, 2019). We must consider the fact that the efficient use of energy resources is essential, and not only for increasing agricultural production, or the competitiveness of the agri-food sector, but also for environmental sustainability considerations (Khan, Hanjra, 2009). Therefore, energy efficiency in the agri-food sector contributes to the improvement of many fundamental aspects, such as increased food production and environmental sustainability (Andrei et al., 2021). As we stated at the beginning of this article, increasing food production will be essential, considering the forecast of global population growth (Baer-Nawrocka, Sadowski, 2019). We should also not forget that improving energy efficiency in the agri-food sector is one of the main methods of reducing the environmental footprint, without having to reduce food production itself (Constantin et al., 2023).

According to the calculations made by the United Nations, by 2050 the global population will grow by about two billion, and by 2100 it could increase by up to three billion (Eurostat, 2021). Another rather worrying aspect is the fact that increased energy consumption usually decreases the sustainability of the environment (Popescu et al., 2022); therefore, we must have a conscious behaviour so that we do not further degrade the environment. In addition to this aspect, we know very well that in order to meet human nutritional requirements, we must first overcome the existing limitations in the ability to produce enough energy for food production (Bajan, Mrówczyńska-Kamińska, 2020; Bolandnazar et al., 2014).

Consequently, it is now imperative to comprehend the rationale behind employing energy consumption as an indicator of environmental performance (Li et al., 2022).

3. Research Questions / Aims of the Research

The aim of this investigation is to establish a potential correlation between the amount of energy utilised in agricultural production and the resulting level of food activity generated through processing activities. The existence of a correlation between energy production and the amount of food activity generated as a direct consequence of processing will also be ascertained by evaluating the intensity of the said correlation.

4. Research Methods

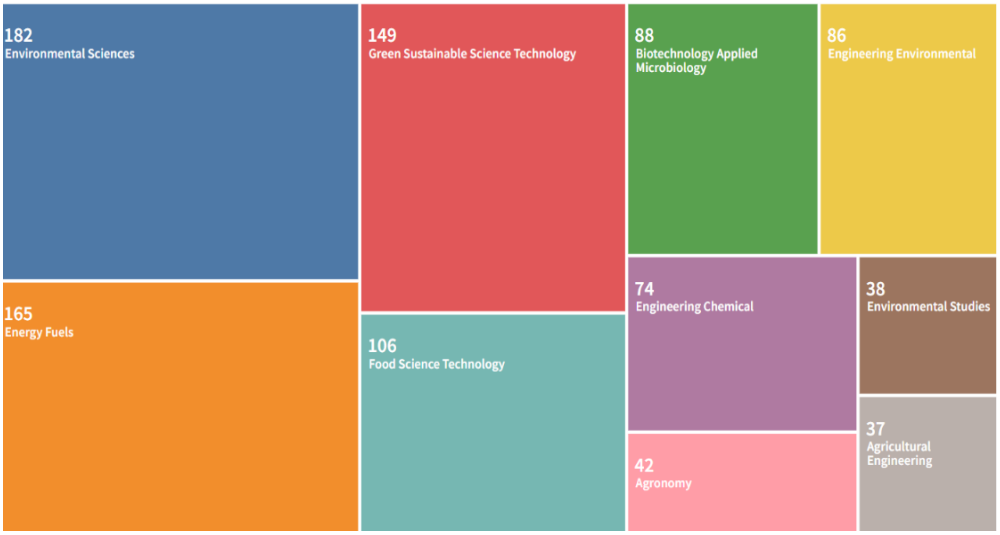
The research utilised a scientific approach called bibliometric analysis, which is a type of scientometric methodology. In recent years, the employment of scientometric and bibliometric methodologies has gained significance in the assessment of scientific publications' productivity, expansion, and interrelationships. This is due to the growing need to monitor the links between keywords used in the study of a subject, which is crucial in accurately evaluating the significance of a theme studied by researchers in a particular field (McKiernan, 2005; Hood, Wilson, 2001). Given the aim of the present investigation, it has been ascertained that the utilisation of a quantitative approach is the most suitable tactic for exploring the scientific inquiry concerning the interconnection between food production and energy consumption in agriculture. In the framework of this research, VOSviewer version 1.16.16 was utilised as a means of generating, examining, and visualising maps that incorporate network metadata. To create bibliometric networks through graphical design and generation, it is essential to have a reliable collection of raw data or metadata. The utilisation of VOSviewer assessment is a necessary condition for carrying out bibliometric analysis. The prioritisation of interconnections among metadata within the analysed database is a key feature of VOSviewer (Sood et al., 2021; van Eck, Waltman, 2017, 2019). In April 2023, a search was performed on the Web of Science database, since the current quantitative research assessment is limited to scientific publications that are presently available and indexed in the specific database. The assessment relies on the unprocessed metadata that has been collected and analysed. This study focuses on the subject of energy usage in relation to the interconnections between food production and agriculture. The search query included the terms "energy usage" and "food production". Based on the findings of the inquiry, a cumulative sum of 819 scholarly articles addressed the subject of agricultural trade vis-à-vis the European Union's sustainable development policies. Web of Science expeditiously executed the search constraint "Timespan: all years". The indices frequently utilised in scholarly investigations comprise SCI-EXPANDED, SSCI, A&HCI, CPCI-S, CPCI-SSH, BKCI-S, BKCI-SSH, ESCI, CCR-EXPANDED, and IC.

5. Findings

The findings of the investigation indicated a surge in the level of attention towards this subject matter, with the United States, India, Germany, England, and Italy exhibiting the most substantial volume of research in this domain. Utilising the Web of Science database, the study query returned 819 documents published from 1991 to 2023. The prevalent research categories employed for such investigations were Environmental Sciences (22.431 %), Energy Fuels (20.551 %), Green Sustainable Science Technology (18.045 %), Food Science Technology (12.406 %), and Biotechnology Applied Microbiology (10.652 %). The findings indicate a rise in the level of attention towards this particular area. The graphical representation depicted in Figure 4 illustrates the progression in studying the energy and food production

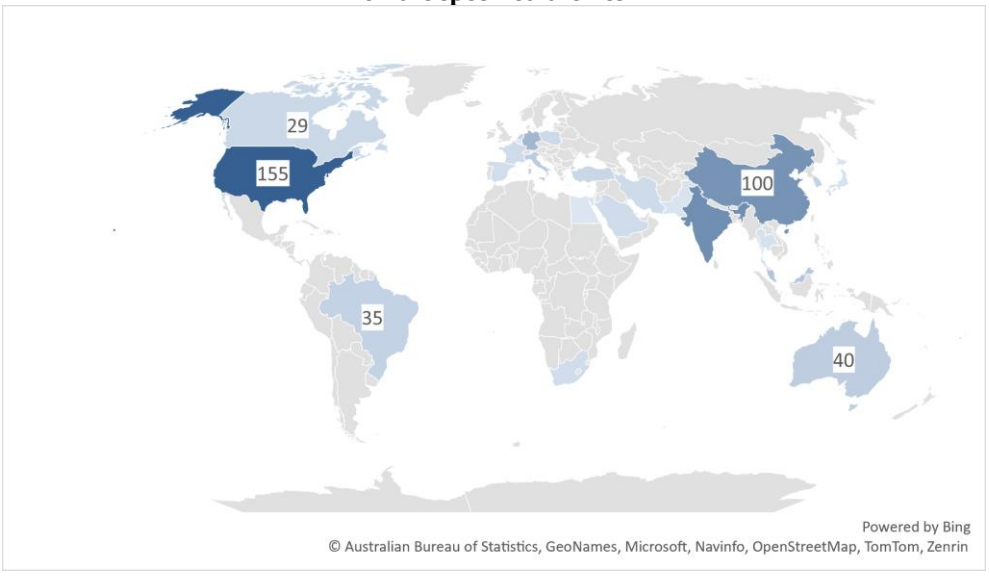
sector of scientific papers that have been both published and indexed, pertaining to the specific topics outlined in the study's query.

Figure 1. Treemap showing the top 10 WoS categories connected with the 819 publications that were detected



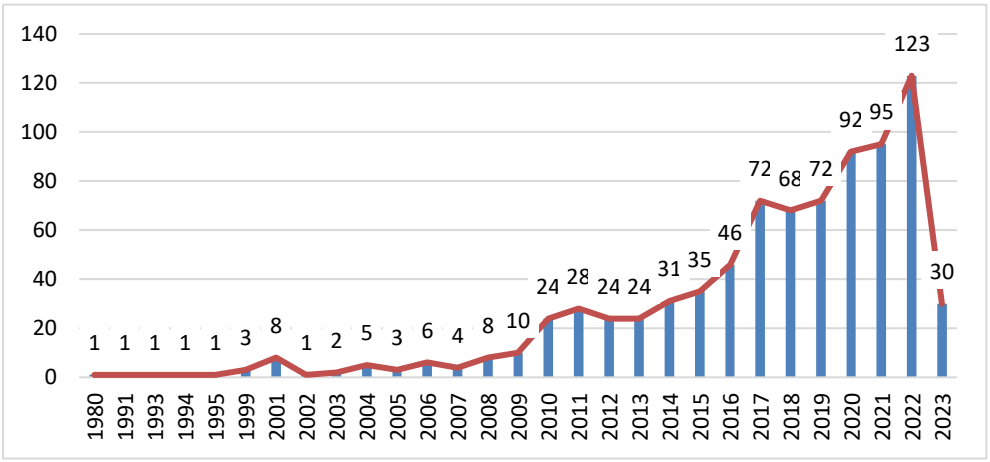
Source: Web of Science.

Figure 2. The origin countries of academics who have disseminated scientific findings on the specified themes



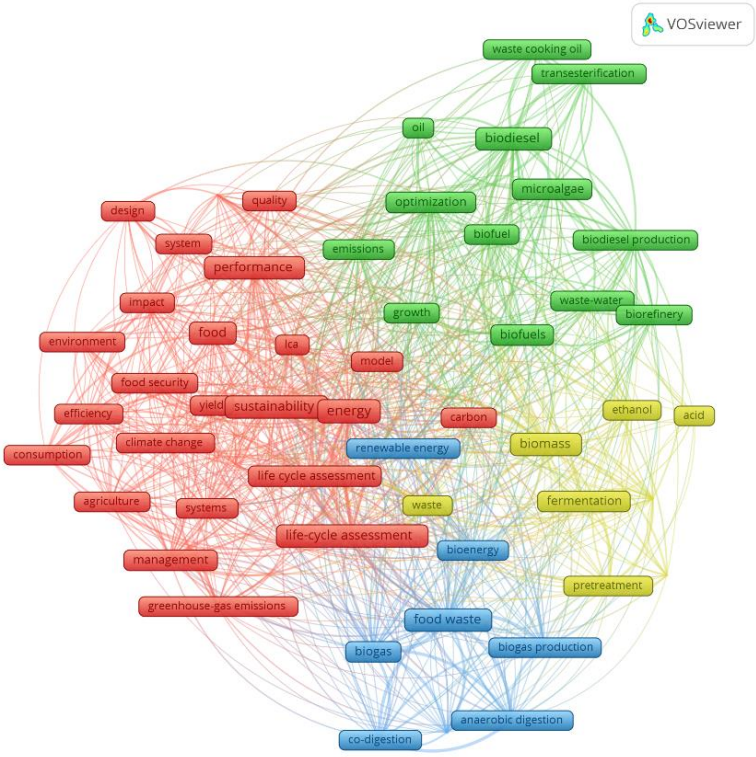
Source: Author's design based on the Web of Science Data.

Figure 3. The evolution of the published and indexed scientific papers approaching the topics specified by the study's query



Source: Author's design based on the Web of Science Data.

Figure 4. Cluster-map analysis of keywords linked to 819 documents identified in Web of Science database



Source: Authors' development in VOSviewer 1.16.16.

The initial cluster of information underscores the formidable obstacles that agriculture encounters as a result of the effects of climate change. Climate change-induced phenomena such as increased temperatures, unpredictable precipitation patterns, and a higher frequency of severe weather events have the potential to impede agricultural productivity in select regions and exacerbate the challenges associated with sustainable farming practices. Paradoxically, the agricultural sector is a significant contributor to climate change due to its involvement in practices such as livestock husbandry, deforestation, and the imprudent application of fertilisers, which can result in the unregulated release of substantial amounts of greenhouse gases. This cluster highlights the necessity of tackling these two-fold challenges in order to attain a food system that is sustainable. Furthermore, the inclusion of the term "consumption" within the aforementioned cluster has prompted the consideration of sustainable consumption models within the realm of research. These models provide a viable approach by advocating for strategies that mitigate the ecological footprints of food systems. Organic farming, regenerative farming, agroecology, and permaculture are agricultural practices that place an emphasis on the preservation of biodiversity, the maintenance of soil health, and the conservation of water resources. Through the promotion of local and seasonal agricultural products and the reduction of chemical inputs, sustainable models effectively mitigate carbon gas emissions linked to agricultural activities, thereby facilitating the transition towards a more sustainable food production system. The notion of energy efficiency, as identified through the cluster analysis, is of significant importance in establishing a sustainable agriculture industry, given the interdependence of food, water, and energy resources. Effective management of energy consumption in agricultural practices, including irrigation, machinery, and processing activities, can substantially alleviate the adverse impacts of greenhouse gas emissions. The incorporation of renewable energy sources, such as solar, water, and wind power, can enhance sustainability in crucial economic sectors by reducing dependence on non-renewable energy sources. This integration also promotes resilience throughout the nexus. As evidenced by the bibliometric analysis cluster, guaranteeing "food security" is a crucial element of this association, given that climate change endangers food production systems by potentially diminishing crop yields and disrupting customary growing seasons. The existing literature indicates that sustainable agricultural practices are crucial to reducing risks and enhancing food security in the context of changing climatic conditions, thereby adding coherence to the preceding arguments. The interconnection among agriculture, climate change, sustainable consumption patterns, energy efficiency, food security, management, and performance, as depicted by the cluster analysis, is a complex network that necessitates collaborative endeavours from both academics and professionals to construct a sustainable future. The establishment of a sustainable food system that is both resilient and environmentally friendly can be achieved through the integration of sustainable practices into daily activities, the enhancement of energy efficiency, the assurance of food security, and the implementation of

efficient food management strategies. This system is designed to withstand the contemporary and challenging impacts of climate change.

6. Conclusions

The findings of this research indicate a significant correlation between energy consumption in the agricultural sector and food production. The interdependence between agricultural energy consumption and food production is evident. Therefore, it is imperative to devise and execute strategies that can proficiently regulate energy consumption in agriculture and its consequential impacts on food production. The research outcomes indicate that the implementation of energy-efficient methodologies and technologies in agricultural production is imperative. In addition, efforts should be made to curtail the intensity of energy of agricultural activities. Furthermore, it is crucial to take into account the complete energy system to discern plausible avenues for mitigating energy consumption and its consequential effects on food production. Furthermore, the present investigation has demonstrated the necessity to improve the surveillance and documentation of energy consumption within the agricultural sector. To expand on this point, additional investigation is required to gain a deeper comprehension of the impacts of energy consumption in the agricultural sector on food output, and to formulate more efficient approaches for regulating energy consumption in agricultural production.

In summary, this research has yielded significant findings regarding the correlation between energy consumption in the agricultural sector and the production of food. The aforementioned data can be used to make informed decisions regarding energy consumption in the agricultural sector and its consequential effects on food production. Moreover, the findings of this investigation furnish a robust foundation for further scholarly inquiry into this significant subject matter.

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The Impact of Organic Products on the Romanian Entities and Consumers Compared to the European Union

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Abstract

Today, people live in an era governed by emergence, sustainability, and continuous changes in every sector of our lives. Nowadays, every individual desires to change their lifestyle to a healthier one. Therefore, organic or bio products have captured everyone's attention, becoming more and more used by every individual determined to lead a healthier life. This trend puts pressure on economic entities, especially on the processes carried out, such as production and sale of these products.

The aim of this paper, first, is to analyse the market for organic products in the European Union in general and in Romania in particular. The purpose of this analysis is to observe whether the same diversity of organic products can be encountered in both the European Union and in Romania, or if it is necessary to import some of them. Second, the most important producers from Romania are analysed to determine the issues that might occur in the production process when dealing with the consumers' needs. To this extent, a questionnaire is put forward for discovering if the consumers from Romania are buying bio products and which products, and, as well as, if they are buying from the local producers or from the imported ones. Thus, descriptive statistics and sentiment analysis are used to observe the problems of local producers compared to the producers from the European Union. The purpose of this analysis is to come up with a solution for the local producers for better meeting the consumers' demand. Moreover, following the application of the questionnaire, as expected, most Romanians are determined to lead a healthier life by consuming more organic products, especially from local producers.

Keywords: sustainability, organic products, sentiment analysis.

JEL Classification: C83, O13, Q00, Q18.

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1. Introduction

In the past few decades, consumers have become especially interested in social and ethical considerations in areas such as eco-friendly, organic, or bio products, or energy consumption. This increased interest and feeling of responsibility has led to an exponential development of the global market for eco-friendly products, while at the heart of this trend being situated the desire of consumers' for living a healthy lifestyle.

This study aims to analyse the consumer's preferences for organic or bio products and to establish that consumers prefer to buy bio products for the health benefits. To determine this, it is necessary to apply a questionnaire specially designed for this study and to discover minimum 50 % of respondents that prefer these products especially for the health benefits. In addition, it is desired to determine whether organic product producers might face issues in satisfying the consumer's preferences expressed in the questionnaire and to discover this problem, we should analyse the responses to the questionnaire as well as the products marketed by local producers.

So, to satisfy the consumers' preferences, producers had started to expand the organic agriculture, this kind of agriculture providing a more sustainable kind of farming. Therefore, to determine the perception of consumers on bio products and their health and environmental impact, this study focuses on a questionnaire applied on 101 Romanian consumers.

In this proposed approach, the paper is structured into three chapters. The first chapter, entitled "Literature review" presents the evolution of the demand for organic or bio products, what is organic agriculture and the biggest countries involved in this kind of agriculture, the evolution of prices and the concept of willingness to pay associated with these expensive goods.

The second chapter of the paper, entitled "Research Methods" presents a literature review of the techniques applied in the third chapter, while the third chapter of this paper, entitled "Results" presents two stages of analysis. The first part is carried out by conducting a statistical survey, while the second part is carried out by applying the technique of sentiment analysis. Both analyses were developed using a questionnaire specially designed for this study. In this sense, the IT solution used is RStudio.

Finally, at the end of the study is added a section of conclusions through which the deductions made following the analysis of the literature and the questionnaire are presented.

2. Literature Review

The demand of organic or bio products in the last year has increased faster due to environmental and health concerns. Customers' feelings and purchasing tend to sustainable and organic products, so producers try to seek know-how into the methods that describe sustainable marketing to access the commercial marketplaces. Being at an all-time best interest, the sustainability awareness caused an entire

new fight, more precisely the fight to market and produce services and products that are eco-friendly (Rambabu, 2022).

This eco-friendly situation occurred especially because of the environmental impact on the planet that cannot be questionable looking at the waste and mass production of useless and non-healthier products. Moreover, this intention satisfies the 12th sustainable development goal of the United Nations that refers to a responsible production, as well as consumption, and conducted to a higher purchase of this type of food (Santos et. al., 2021).

The rapid evolutions in technology provided a great green revolution for organic agriculture, proposing complementary inputs like synthetic pesticides and fertilisers or high-yielding crop varieties, that are mandatory for growing the production of organic goods. The global area specialised in organic agriculture increased from 15 million ha to 51 million ha until 2015 especially in the developed countries, but 88 % of the organic farmers are from India, Ethiopia, and Mexico (Meemken, Qaim, 2018).

Organic agriculture produces organic goods that are defined as more natural because it is free of chemicals and does not irradiate. The consumption of these goods is deemed beneficial for one's health due to the absence of the chemicals in the cultivation and production process (Jyoti, Justin, 2017). Moreover, this kind of farming can improve soil health, water pollution, and increase biodiversity. The consumption of this food is influenced by both external and internal factors like subjective and personal norms (Gomiero, 2018).

Organic food, as already discussed, had formed a global market amounting to more than 92 billion euros. The benefits of this kind of good does not come for free, neither for the producers, nor the consumers. This good tends to be sold at a higher price because of the benefits and because of limited availability. Although consumers are willing to pay this high price (Katt, Meixner, 2020).

The most products that consumers are more inclined to buy are bio fruits or vegetable, the organic meat, eggs, or dairy products that are derived from animals raised without hormones or antibiotics, do not produce interest. (Kamboj et. al., 2023) In Romania, this presumption can be applied as well, products like milk, yoghurt, eggs, meat, cheese, or nuts being at the end of the ranking. Even though products like baby food or kefir are starting to become the most popular, getting a percentage of 72.4 % and 13.1 % and being ranked in the top of the rating for the most profitable imports consumed.

On the other hand, the number of certified domestic producers is increasing exponentially, but organic crop plantations have reached only 2.9 % of the total agriculture area, which is almost insignificant compared to Austria, Czech Republic, or Latvia. Now, 80 % of organic products in supermarkets are imported to create diversity for consumers. So, analysing this situation, we can conclude that the willingness to pay for healthier products is higher and represents a real business opportunity as well (Akcenta Cz, 2023).

3. Research Methods

Survey research is a type of social scientific research that focuses on people's vital facts, beliefs, attitudes, opinions, behaviour, and motivation (Mathiyazhagan, Nadan, 2010). This research is defined as a collection of information from a group of people through responses to questions. It allows several methods to recruit respondents, collect structured or unstructured data, and use various methods of analysis. For the best result, it is mandatory to correctly identify the population of interest and to select the best option of data collection depending on the population that is going to be studied, the most common options being questionnaires or interviews (Ponto, 2015).

The principle mean used to collect data is the structured questionnaire, which has to follow four elements, more precisely: length, complexity, layout, and wording. The length criteria are extremely important, so in order to keep the survey within reasonable boundaries, you have to think of six functions that it has to fulfil: provider of a basis for data processing, the interviewer should see it as an easy task, the interviewer should be helped to give the best answers, the interviewer should be kept intrigued and cooperative, and should feel like it is communicating to the interviewer. On the other hand, the complexity is important as well, so the questionnaire should go from easy to more complex questions to keep the interviewer engaged. Third, layout and wording elements involve using an error-free and simple language and various types of questions, including write-in type or scaling (Baker, 2003).

Another type of analysing the questionnaire is Sentiment Analysis or Opinion Mining. Sentiment can appear in a text as explicit when a person expressed a direct opinion, or implicit when the text implies the opinion. The most usual topic of sentiment analysis are film or books reviews, and political commentaries or news, because of the simplicity of the sentiments expressed, which are more explicit (Mejova, 2009).

This kind of method shows the computational study of opinions, emotions, and attitudes of people towards a specific problem by identifying sentiments that are expressed in a text. Sentiment Analysis can be used on three main levels, such as document, sentence, or aspect. The document-level presents an option to analyse an entire document as a unit to extract positive or negative sentiments and opinions. The sentence-level offer an option that classifies the sentiments in each phrase, firstly by identifying if it is objective or subjective and after this by deciding if it's positive or negative. The third option provides a classification of sentiments respecting both the entities, and the aspects (Medhat et al., 2014). Comparing feelings and applying the sentiment lexicon on every level, this analyse can be achieved through software like RStudio, Python or Microsoft Excel (Feldman, 2013).

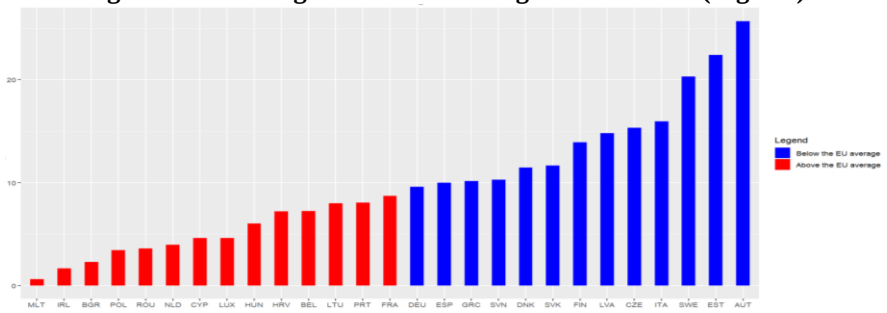
4. Results

In this paper, aspects related to the production of organic products will be discussed, and then, about people's perception of the consumption and usefulness of organic products.

4.1 European Production and Description of the Main Romanian Companies

In this stage, the European context regarding organic agriculture will be described and the main Romanian producers will be presented.

Figure 1. Percentage of total utilised agricultural area (organic)



Source: Own research using data from Eurostat.

Figure 1 shows the percentage of agricultural land on which products that are or are to be certified organic are grown. It is noted that Romania is the fifth country with the lowest percentage, which did not even reach the value of 5 % in 2020.

Table 1. Turnover and Profit of Romanian Producers (2018)

Company	Turnover	Profit	Company	Turnover	Profit
Emiliana West Romania	60	5500	Apiprodex	7.9	0.1
Agricola Alba	23	7600	Premium Fruct	0.8	loss
Orgapic	10.5	642	Agri Mondo	69.8	432
Primagra	2.8	995	Biochem Organics	40	900
Ecofruct	5.9	645			

Source: Financial Intelligence.

Table 1 shows the most relevant producers of organic food in Romania. Orgapic, Agricola Alba, and Emiliana West Romania produce organic grains. Primagra is an exporter and producer of sea buckthorn fruit, Ecofruct collects organic forest fruits, medicinal plants, and mushrooms, Apiprodex produces bio honey, Premium Fruct is a producer of bio fruit juices, Agri Mondo sells organic cereals and seeds, and Biochem Organics sells organic goods like wheat, corn, sunflower, coriander, or barley. As shown, organic agriculture in Romania is not very developed, so most of the products in supermarkets are originated from export.

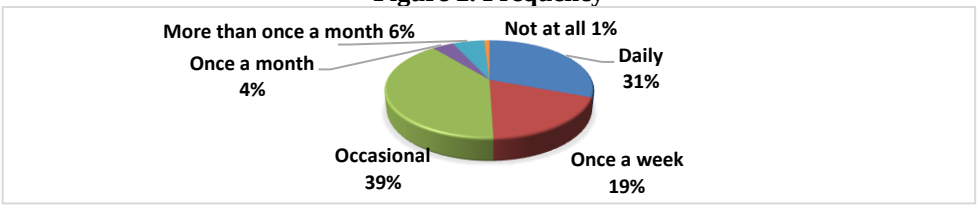
4.2 Consumers' Perception of Organic Products

In this subsection, information related to the description of the respondents, the frequency, and sources of procurement of organic products, the main reasons why they buy or not buy this type of products, and the ability to identify them by recognising the logo will be discussed.

For conducting the analysis, a series of questions have been addressed to Romanian respondents, as discussed in the following. The questionnaire has been applied between March and April 2023 and has been made available through the use of online social networks. A total number of 101 respondents have participated in the survey.

The ratio between the respondents is balanced, with 57 % female and 43 % male. Most of them (about 60 %) are aged between 18 and 24, followed by 35-44 years with 16 % and 25-34 years with 13 %, the rest being over 45 years old. Also, 75 % of the respondents come from urban areas, 23 % of them have an income between 0 and 1000 lei, 33 % have an income of more than 6000 lei, and the rest have amounts between 1000 and 6000 lei. Regarding education, 47 % of them have completed high school as their last form of education, 24 % have completed a master's program, and 17 % have a bachelor's degree. The remaining 12 % either completed post-high-school studies, postgraduate, or Ph.D.

Figure 2. Frequency



Source: Own research.

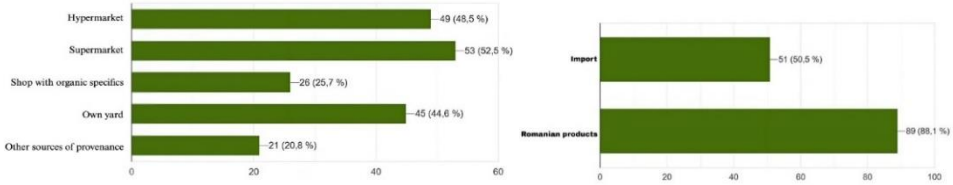
For the frequency of organic products consumption, it can be seen in Figure 2 that 31 % of the respondents stated that they consume daily this type of product, 39 % occasionally, and 19 % once a week.

Figure 3.The most used words and their grouping according to negative or positive feelings (definition)

Source: Own research.

When asked if they could give a definition of organic products, the participants said that they are natural, without pesticides, additives. Those are healthier and do not contain harmful chemicals. In the image on the right of Figure 3, the words are grouped in the form of positive vs negative, organic products being friendly, healthy, being compared to other products that can be toxic, harmful.

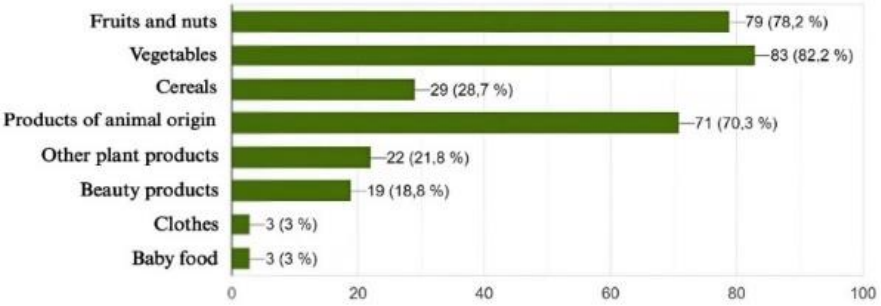
Figure 4. Source of purchase



Source: Own research.

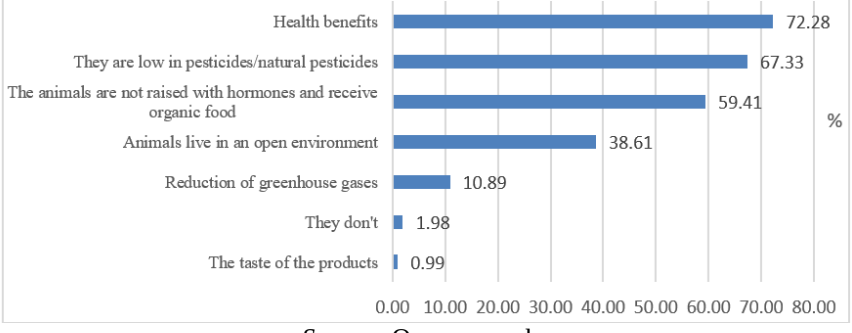
Regarding the place from which they purchase these foods, it is noted that most of the respondents chose Hypermarket or Supermarket (Figure 4), but also their own yard (even if they do not have a certification). Most of the respondents prefer to consume organic products from the country, 50% of them admitting that they also buy imported products.

Figure 5. Products categories



Source: Own research.

Figure 6. Reasons to purchase organic products

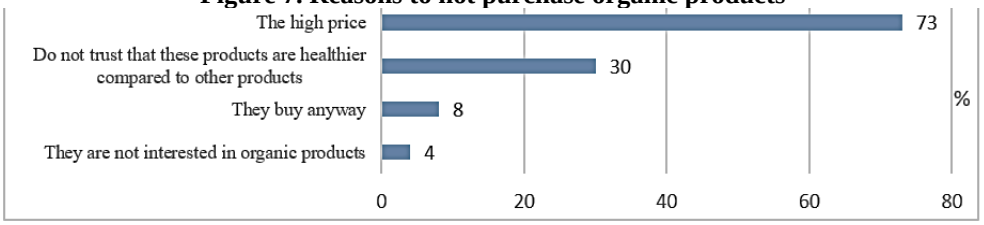


Source: Own research.

It can be seen from Figure 5 that the most used purchased products are fruits and nuts, vegetables, and animal products, followed by cereals and other plant products.

Among the most important reasons why respondents buy organic products are the health benefits, the fact that they do not have pesticides, and also the fact that the animals are raised without hormones and in an open space (Figure 16).

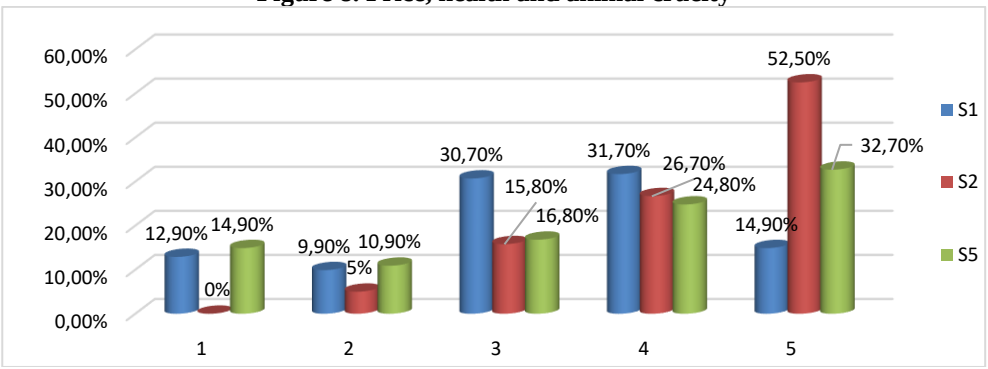
Figure 7. Reasons to not purchase organic products



Source: Own research.

In Figure 7 the main reasons why the study participants said they do not or would not buy organic products are the high price and the lack of confidence that they would be better/healthier compared to other products.

Figure 8. Price, health and animal cruelty



Source: Own research.

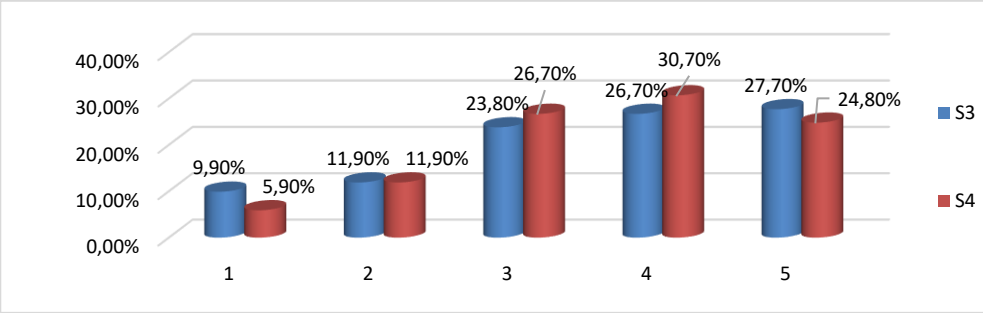
Figure 8 shows the choices made by respondents regarding agreement/ disagreement (ranging between 1-Total Disagreement, and 5-Total Agreement) with certain statements:

- S1: I would give a much larger amount of money to purchase a bio product, although there are cheaper alternatives;
- S2: I am content knowing that what I eat is good for my health;
- S5: I am satisfied with the fact that by purchasing organic products of animal origin I help to reduce animal cruelty.

As can be seen from the received answers, more than 45 % of them would give a higher price, while more than 50 % of them gave a strong agreement that it makes

them happy to know that they eat healthy, and 57.5 % are satisfied that they know that they encourage non-cruelty to animals by purchasing these products.

Figure 9. Comparison with classic products



Source: Own research.

In Figure 9 the following statements are discussed*:*

- S3: Organic products are fresher compared to classic ones;
- S4: The taste of organic products is like the taste of products grown in your own backyard.

It is noted that the answers to these questions are relatively similar, 54.4 % of respondents believe that organic products are fresher compared to classic ones and 55.5 % say they taste similar to those grown in their garden.

Table 2. Covariance and correlation S1-S5

	S1	S2	S3	S4	S5
S1	1.4730693	0.4004950	0.5987129	0.3632673	0.3012871
S2	0.4004950	0.8178218	0.3836634	0.2376238	0.2863366
S3	0.5987129	0.3836634	1.6524752	0.8321782	0.6575248
S4	0.3632673	0.2376238	0.8321782	1.3483168	0.4278218
S5	0.3012871	0.2863366	0.6575248	0.4278218	2.0324752

	S1	S2	S3	S4	S5
S1	1.0000000	0.3648852	0.3837422	0.2577619	0.1741231
S2	0.3648852	1.0000000	0.3300301	0.2262896	0.2220930
S3	0.3837422	0.3300301	1.0000000	0.5575103	0.3587831
S4	0.2577619	0.2262896	0.5575103	1.0000000	0.2584368
S5	0.1741231	0.2220930	0.3587831	0.2584368	1.0000000

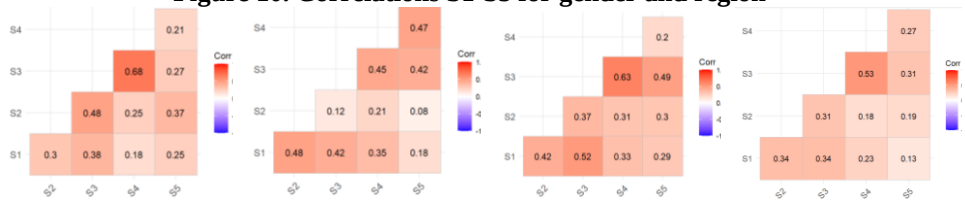
Source: Own research.

From the table on the left, it can be noted the covariance between the agreement with the previously presented statements (S1-S5). The highest values are represented between S3 -S4 and S3-S5. In the right part, the correlations between the variables are represented, it can be noted that they are all positive and that the strongest connection is between S3-S4, of medium intensity; that is, those who agreed with the fact that organic products are fresher than the classic ones, tend to also agree with the fact that their taste is similar to those produced in their own backyard.

Figure 10 shows the correlations between S1-S5 through the prism of gender (g1 - feminine, g2 - masculine) and the environment of origin (r1 rural, r2 - urban). Significant differences in the correlations can be noted depending on the changes made, in the sense that the link between statements S3-S4 defines a strong one (0.68 ~ 0.70) for the female gender and reaching the lower limit of a link of medium

intensity for the male. For the same statements, differences also appear depending on the region of the respondents, those from rural areas having a firmer belief that organic products are fresh and taste like those grown in their own backyard. Also, for the correlation of statements S2 and S3, different opinions are noted according to gender. If for men there does not seem to be a connection between the two statements, for women the opinions regarding the two statements have a connection of medium intensity, a sign that those who believe that organic products bring health benefits will be more inclined to state that the products organic are fresher than classic ones.

Figure 10. Correlations S1-S5 for gender and region



g1 g2 r1 r2

Source: Own research.

Figure 11. The most used words and their grouping according to negative or positive feelings (perspective)

Source: Own research.

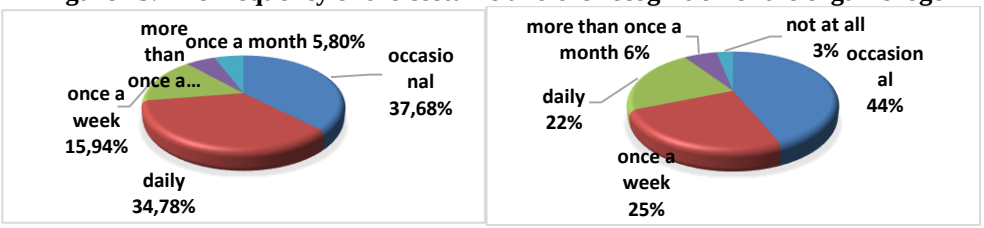
Figure 12. The intensity of feelings generated by organic products

Source: Own research.

Asked what their opinion is about organic products and their usefulness, the respondents answered that they are good, healthy, and taste better. In the image on the right of Figure 11, their price is an impediment, but their health benefits are recognised. These are again compared to other products that are not considered as safe.

Among the feelings identified in the answers given to the previous question, the presence of trust, anticipation, and joy stands out (Figure 12).

Figure 13. The frequency of the costume and the recognition of the organic logo



Source: Own research.

In Figure 13, the respondents are divided into two groups (those who recognised the logo of the organic products from Table 1 and those who did not), for which the frequency with which the respondents state that they consume these products is presented. Among the participants, 68.32 % correctly identified the logo associated with organic products, and of these, 34.78 % consume organic products daily, and 37.68 % occasionally. Of the 31.68% of the respondents who did not correctly identify the logo, 44 % stated that they occasionally consume organic products, 25 % once a week and 22 % daily.

Table 3. Logos and definitions

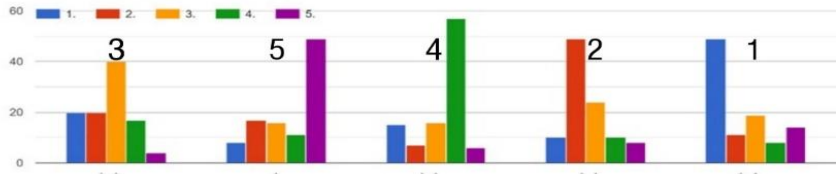
1.	The logo identifies food produced and controlled in accordance with the EU organic farming legislation. Therefore, this organic production and species-appropriate animal husbandry
2.	Represents wood and paper products that are independently certified in accordance with the strict guidelines of the Forest Stewardship Council®. This promotes responsible forest management worldwide.
3.	It is awarded to cocoa, coffee, tea, citrus fruits or bananas grown taking into account ecological, social, and economic requirements.
4.	It represents products that are either vegetarian or vegan. Vegan products do not contain animal ingredients or processing aids such as meat, fish, eggs, and dairy products.
5.	Marks foods that do not contain genetically modified components up to the limit of 0.1 % per ingredient.

Source: https://despre.kaufland.ro/responsabilitate/implicarea-face-diferenta/sigle.html.

For the last question in the questionnaire, respondents were asked to match the logos with the corresponding definitions shown in Table 3.

In Figure 14 it can be noted that the most recognised logo was the one with the number 4 because it is the most intuitive "V" from vegan or vegetarian. The logos for 1 (for organic products), 2 (Forest Stewardship Council), and 5 (Ohne GenTechnik-Siegel) seem to be recognised by an equal number of people, and the hardest logo to guess seems to be 3 (Rainforest Alliance Certified). For this question, only 24 (23.76 %) respondents correctly associated all the logos with their definitions.

Figure 14. Associations between logo and definition



Source: Own research.

5. Conclusions

The evolution of the perception and desire of consumers for bio products has increased exponentially in recent years. More and more people tend to buy these goods to satisfy their utility. The first hypothesis of this study consisted of the argument that Romanians are buying organic or bio goods to live a healthier life. Analysing the organic agricultural land, organic producers, and consumers from Romania, we can only conclude that Romanians are willing to pay a high price for a product that satisfies their desire as well as contribute to their health, as we thought.

The second aim of the study was to determine if the local producers might have a problem because of the high demand and desire of the consumers. After analysing the EU market, the main local producers and the consumers' desires, we have concluded that our producers need to expand their variety of products to decrease the exported products to satisfy the demand.

To sum up, organic or bio products are extremely desired by Romanian consumers as well as the others, but to satisfy their desires, Romania must invest more in the organic agriculture.

The paper has limitations stemming from the nature of the analysis, which relies on questionnaires. Furthermore, since the respondents were exclusively selected from Romania, the study's findings are specifically applicable to individuals residing within the country's borders.

Further research could involve a comparative study that examines the perceptions and preferences of consumers regarding bio products in Romania and similar European Union countries. This would help to better understand local buying behaviour and provide valuable insights for shaping consumer choices in this product category.

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The Effect of Local Government Debt for Infrastructure Development on Economic Development Based on K-means Clustering and Random Forest

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Abstract

Some provinces in China have encountered local government debt issues. The main cause of government debt is the issuance of bonds by the government to raise funds for infrastructure development, aiming to leverage the positive externalities of infrastructure and the increased employment opportunities caused by infrastructure construction to drive local economic growth. However, if the economic benefits of funding infrastructure through government debt are limited, the government should focus on reducing its debt burden. The existing literature has shown divergent views on the relationship between government debt and economic development. Some studies argue that government debt hampers economic growth, while others believe that proactive government debt can stimulate economic development, and some suggest that an increase in government debt can promote local economic growth within certain thresholds, but beyond a certain point, it can impede economic development. This study examines the impact of local government debt on economic growth in different provinces of China using panel data from 2015 to 2021. Through K-means clustering, the 31 provinces of China are divided into three categories based on factors determining promotion and suppression effects. For each province category, this study employs a random forest model to predict the percentage increase in economic growth corresponding to the percentage increase in government debt, while controlling for other variables affecting economic growth. The predicted results from the random forest model demonstrate that the influence of increasing local government debt on economic development varies across different province categories. The main contribution of this study lies in the adoption of clustering of K-means to categorise the provinces, providing a targeted classification for debt-related issues.

Keywords: k-means clustering, random forest, government debt, economic growth, infrastructure construction.

JEL Classification: E61.

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1. Introduction

Government investment exerts a powerful impetus on economic development, especially in China, where government investment in infrastructure has become an important fiscal tool. However, due to the fact that government investment mainly focuses on public goods with longer return cycles and relatively low economic benefits, it is prone to increase government debt. In China, it is obvious that local governments' debt grows rapidly. The debt balance of local governments in China has increased to $36 trillion in 2022. There is no doubt that the space for local government debt issuance continues to be rapidly compressed. Therefore, the following question should be addressed now: for which local governments still need to raise funds through debt to promote economic development by local government investment, and for which local governments should appropriately control the scale of debt.

2. Problem Statement

The theory of positive government debt emerged after the 1930s. For example, the study of Tiebout (1956) gives meaning to the issuance of bonds by local governments: It is more economically efficient to raise capital than taxation. Then Stiglitz (1974) and other scholars on government debt and fiscal risk led to the development of local debt theory. The study conducted by De Mello Jr. (2000) suggests that fiscal decentralisation and taxation systems have driven local governments to accumulate significant debt in order to invest in infrastructure and accelerate GDP growth. Furthermore, research conducted by Panizza and Presbitero (2014) and Owusu-Nantwi and Erickson (2016) indicates that government fiscal deficits and debt levels can promote development, regardless of the maturity of the debt.

At the same time, some studies have found a nonlinear relationship between government debt and private investment. Reinhart (2010) discovers that there is a threshold effect of government debt through empirical tests on developed and emerging market countries. Similar conclusions are obtained from the research of Checherita (2012): When the government debt reaches a certain level, it is expected to decelerate the growth of GDP by hampering the private savings and decreasing the total factor productivity. Law et al. (2021) suggest that the threshold debt value is around 51.65 % in developing countries.

In China, numerous papers on the topic have suggested that the nonlinear relationship between government debt and economic growth takes the shape of an inverted U. However, these studies are empirically derived from a sample of dozens or hundreds of countries, including China, while few studies have been conducted using specific provincial-level data from China.

The main contributions of this paper are as follows: First, this paper departs from most existing researches on local government debt issues in China and other countries by utilising provincial-level data from 2015-2021 instead of national-level data. Provincial-level data allows for more detailed analysis and enables this paper

to differentiate between provinces, with a particular focus on China's local government debt problem. Moreover, while most existing papers in terms of Cluster Analyses of China's local government debt problem categorise provinces mainly based on factors such as the eastern, central, and western regions of China, or different economic regions. There is no doubt that such classifications are only tangentially related to local government debt issues, which can lead to problems such as small category distinctions and unclear category characteristics. This paper employed the K-means Clustering to classify provinces based on factors that directly impact the relationship between government investment and private investment, which results in categories that are more distinct and meaningful.

3. Research Questions / Aims of the Research

The main reason for government debt is to raise funds for infrastructure construction. Government debt itself cannot promote economic development, but government investment that corresponds to government debt can. Therefore, studying the relationship between government debt and economic development actually involves a comprehensive investigation of both the hindering effect of government debt on economic development and the promoting effect of government investment on economic development. When the positive effect of government investment on economic growth is not significant, that is, when the negative impact of government debt on economic growth is dominant, there is a negative relationship between government debt and economic growth. When the positive effect of government investment on economic growth is significant, that is, when the positive effect of government investment on economic growth dominates, there exists a positive relationship between government debt and economic growth.

It should be noted that, for the task of promoting economic development, government investment largely relies on stimulating private investment rather than relying solely on government spending. This is because private investment tends to be more economically efficient than government investment, in that private investment is more willing to invest in industries which generate larger returns, such as high-tech industries and real estate industries, while the main purpose of government investment is not to obtain economic benefits, but to product public goods such as infrastructure, thus exerting its positive externalities.

Therefore, when discussing the relationship between government debt and economic growth, it is necessary to first examine the relationship between government investment and private investment, specifically the crowding-out and crowding-in effects. The relationship between government debt and economic growth varies among provinces, with different levels of crowding-in or crowding-out effects of government investment on private investment.

4. Research Methods

4.1 K-means Clustering

To begin with, this study employs the k-means method to cluster Chinese provinces based on factors affecting the relationship between government investment and private investment, aiming to facilitate the subsequent investigation of the relationships between local government debt and economic growth in different categories of provinces.

4.1.1 Indicator Selection

In this paper, the following six indicators are chosen to classify provinces of China (excluding Hong Kong, Macao, and Taiwan). The data period is 2015-2021.

"Fiscal transparency (fis)". A greater degree of fiscal transparency promotes openness and democracy in government investment decisions, which can increase investors' participation and understanding of policies. It is instrumental in increasing investors' confidence in investment and enhancing the crowding-in effect. On the contrary, provinces with low fiscal transparency tend to suffer from arbitrary decision-making and inadequate information disclosure in the investment process, which may even give rise to behaviours such as power rent-seeking. According to You and Xu (2016), rent-seeking behaviours and government corruption can inhibit private investment, as a deleterious business climate makes sound infrastructure less attractive for private investment. To represent the degree of transparency of the decision-making system, the fiscal transparency scores of the provincial governments are used (Data resource: China Fiscal Transparency Report).

"Population size (pop)". The larger the population size of a province, the more likely it is to produce a network effect. The network effect creates an opportunity for private firms to reduce their marginal costs, making them more inclined to invest. As a result, government investment may exhibit a stronger crowding-in effect (Data resource: CEIC database; unit: million).

"Level of infrastructure construction (inf)". According to Aschauer (1989), government investment can promote private investment by improving local infrastructure construction. However, it is obvious that the increase in private investment resulting from the improvement of infrastructure is subject to diminishing marginal returns. This is because, as the infrastructure in various cities in China gradually improves, the differences between cities become smaller and smaller, and small-scale improvements in infrastructure cannot attract more private investment. According to Jia et al. (2021), due to overcapacity, traditional infrastructure construction in some cities in the central region of China has already hindered private investment. In this paper, the ratio of road miles to the area of a province is used to measure the level of infrastructure construction in that province (Data resource: CEIC database).

"Liquidity (liq)". One of the main reasons for the crowding-out effect of government investment is that it absorbs too much market liquidity, leading to higher market interest rates and increased financial constraints, which suppress private

investment. However, if the local financial development level is good and liquidity is relatively abundant, the crowding-out effect of government investment can be smaller. This is because when liquidity is sufficient, the impact of government borrowing on the local financial market is relatively small. In existing research, there are many variables used to represent liquidity, such as the M2, credit scale, and social financing scale. In this paper, the total loan amount of a province is used to measure local financial development (Data resource: CEIC database; Unit: Trillion RMB yuan).

"Foreign direct investment (fdi)". According to Harrison et al. (2004), foreign direct investment can increase local liquidity, thereby driving domestic investment. In this paper, the ratio of FDI to local GDP is used to measure the level of local FDI inflows (Data resource: CEIC database; Unit: Billion RMB yuan).

"Investment attraction policy (policy)". Osei-Kyei and Albert (2017) points out that one reason why infrastructure projects funded by government investment in most developing countries fail to attract private investment is due to insufficient tax reduction efforts by the government. According to Barbosa (2016), the government can implement subsidy policies or tax exemptions to attract private investment. For this reason, in order to increase the crowding-in impact of government investment, the government might reduce taxes, eliminate fees, and provide subsidies to make the area more appealing to private investors. Given data availability, this indicator is measured by the share of non-tax revenues in each province's general public budget revenues (Data resource: CEIC database; Unit: Trillion RMB yuan).

4.2 Random Forest

Next, this paper utilises the Random Forest to predict the percentage of economic growth that corresponds to the percentage increase in government debt growth for each category, assuming that all other conditions remain constant.

4.2.1 Indicators

To avoid endogeneity issues, this paper chooses the lagged one-year increase in government bond issuance volume (Δbond) as the explanatory variable, while the current year's growth rate of GDP (ΔGDP) is chosen as the dependent variable (Data source: CEIC database).

In addition, previous literature has shown that social capital stock (capital), human capital stock (human), urbanisation rate (urban), and degree of openness (open) all can influence the speed of economic development. These variables are selected as control variables.

Besides, since the amount of local government debt is not publicly available and many governments have a large amount of invisible debt, this paper only studies the impact of the increase in local governments' municipal bonds (bonds issued by local government-controlled enterprises for infrastructure construction).

The total amount of municipal bonds issued by each province in each year from 2015 to 2021 is used to estimate the local government debt of each province (Data source: Wind financial database).

According to Shan (2008), this paper uses a method that uses core factors such as fixed capital formation, depreciation rate, and investment price index to estimate the social capital stock for the current year (Data sources: China Urban Statistical Yearbook, China Industrial Statistical Yearbook).

The average years of education in each province are used to measure the human capital stock of each province (Data source: CEIC database).

The volume of each province's total imports and exports is used to determine its degree of openness (Data source: CEIC database). The urbanisation rate and GDP growth rate of each province are from the National Bureau of Statistics.

5. Results and Discussions

5.1 K-means Clustering Results

31 provinces in China are divided into three categories by K-means analysis. Since the silhouette score of the K-means classification results is 0.53, which is close to 1, the different categories are divided clearly.

Table 1. Results of K-means Clustering

Cluster	Provinces
Cluster 1	Inner Mongolia, Shanxi, Heilongjiang, Guangxi, Hainan, Guizhou, Yunnan, Tibet, Gansu, Qinghai, Ningxia, Xinjiang, Si-chuan, Fujian, Jiangxi, Anhui.
Cluster 2	Jiangsu, Shandong, Guangdong, Zhejiang, Henan.
Cluster 3	Beijing, Tianjin, Hebei, Liaoning, Jilin, Shanghai, Hubei, Hunan, Chongqing, Shaanxi.

Source: China Fiscal Transparency Report, CEIC database.

Table 2. Annual averages by dimension for Cluster 1 provinces

Year	fis	pop	inf	liq	fdi	policy
2015	32	2.4	0.31	1.57	1.53	0.043
2016	35	2.7	0.38	1.78	1.66	0.045
2017	37	2.9	0.41	2	1.42	0.044
2018	41	2.6	0.48	2.22	1.38	0.044
2019	36	2.9	0.51	2.46	1.25	0.048
2020	42	3.1	0.51	2.74	1.31	0.052

Source: China Fiscal Transparency Report, CEIC database.

Table 3. Annual averages by dimension for Cluster 2 provinces

Year	fis	pop	inf	liq	fdi	policy
2015	26	87.5	1.32	6.02	11.23	0.115
2016	33	88.7	1.34	6.82	13.45	0.133
2017	40	89.6	1.35	7.66	13.22	0.142
2018	41	90.8	1.37	8.78	13.38	0.137
2019	39	91.9	1.38	10.11	14.13	0.149
2020	40	92.9	1.4	11.72	13.95	0.163

Source: China Fiscal Transparency Report, CEIC database.

Table 4. Annual averages by dimension for Cluster 3 provinces

Year	fis	pop	inf	liq	fdi	policy
2015	34	24.5	1.51	3.01	6.88	0.071
2016	25	24.9	1.76	3.39	7.21	0.078
2017	38	25.3	1.81	3.8	8.39	0.075
2018	37	25.6	1.85	4.2	8.42	0.069
2019	36	25.6	1.88	4.68	8.48	0.077
2020	38	25.7	1.89	5.19	8.51	0.076

Source: China Fiscal Transparency Report, CEIC database.

5.2 Results of Random Forest

In this study, Random Forest is employed to examine the correlation between government debt and local economic development across three distinct clusters. Specifically, this paper studies the percentage change in GDP for 2023 that corresponds to incremental increases of 5%, 10%, and 30% in municipal bonds issued by provinces in each cluster in 2022. The predictive accuracy of each cluster's random forest model is reported in parentheses:

Table 5. Results of Random Forest

∆ bond	∆GDP		
	Cluster 1	**Cluster 2**	**Cluster 3**
5%	6.1% (62.65%)	2.5% (71.35%)	1.8% (69.26%)
10%	6.8% (58.33%)	2.7% (70.11%)	2.0% (67.74%)
30%	7.1% (60.33%)	2.8% (70.36%)	1.6% (69.52%)

Source: CEIC database, Wind financial database, China Urban Statistical Yearbook, China Industrial Statistical Yearbook.

Derived from outcomes of Random Forest, local governments in provinces belonging to cluster 1 can consider increasing the scale of municipal bond issuance and expediting infrastructure development, as long as the debt crisis does not impede normal economic functioning. According to the average values of each dimension in K-means Clustering, there are several reasons why an increase in the amount of

municipal bonds will have a greater pulling effect on local GDP growth: First of all, considering that most of the provinces in cluster 1 are remote provinces in China and all have large areas. The infrastructure construction in these provinces is relatively poor. As a consequence, the new infrastructure will have a great impact on the local investment. The positive externality brought about by infrastructure is larger, and the crowding-in effect is stronger. Second, the provinces in cluster 1 have less non-tax revenue, which means the investment attraction policy is better and the local government encourages private investment. Considering the two reasons above, when local governments issue municipal bonds for infrastructure construction, it not only generates certain economic benefits through the infrastructure itself, but more importantly, it also creates a more favourable investment environment that attracts a large number of private investments, leading to significant local economic development.

For provinces in cluster 2, they should stop increasing the issuance of municipal bonds and gradually reduce the issuance of municipal bonds. Most of the provinces in cluster 2 are eastern provinces with large population, relatively large jurisdiction, and fast economic development. This paper argues that the economic benefits of municipal bonds in provinces located in cluster 2 are not as good as those in provinces located in cluster 1 considering that infrastructure construction is relatively well developed, and the marginal benefits from infrastructure construction are relatively small. However, government investment in these provinces still plays a certain role in promoting economic development. First, although infrastructure construction in these provinces is relatively high, but because of the large area of these provinces, the infrastructure in some areas is relatively imperfect, and the positive externalities and economic benefits brought by infrastructure construction are still large. Second, these areas have a larger population, which enhances the positive externalities and economic benefits brought about by infrastructure construction. Third, these regions attract a significant amount of FDI, which increases local liquidity and mitigates the crowding-out effect of government investment. Finally, these provinces have ample liquidity themselves, which weakens the crowding-out effect of government investment to a certain extent.

For provinces in cluster 3, they should reduce the issuance of municipal bonds and focus on solving the debt crisis of local governments. The provinces in cluster 3 are divided into two categories. One category is municipalities like Beijing, Shanghai, Tianjin, and Chongqing, which have large populations, well-developed infrastructure, small jurisdictions, high levels of economic development, and high urbanisation rates. For this category of provinces, the infrastructure construction is already well developed, and the increase in positive externalities from continuing infrastructure construction is small. As a result, government investment should be appropriately reduced in favour of strong private investment. Another category is the provinces of Liaoning, Jilin, Hubei, and Hunan. Government investment in infrastructure construction has limited effects on economic growth in these provinces: Firstly, these provinces, particularly Liaoning and Jilin, were among the earliest to develop industry provinces in China and have a relatively comprehensive

infrastructure. Therefore, the marginal benefits of continuing investment in infrastructure construction are low. Moreover, due to their early development, the existing infrastructure is relatively old, which means new infrastructure cannot be well-matched, leading to the need to demolish old structures and build a new one, further increasing the cost of infrastructure construction. Therefore, government investment in infrastructure construction is costly and yields limited returns, hindering local economic development. Furthermore, the weak economic growth in these provinces in recent years, coupled with nearby areas that have greater economic growth potential, has led to a large outflow of population, further reducing the positive externalities and economic benefits of government investment in infrastructure construction.

6. Conclusion

This paper conducts a cluster analysis of the relationship between local government debt and local economic development using the K-means Clustering and Random Forest. The primary findings of this study are outlined as follows: First, K-means Clustering findings show that China's 31 provinces can be roughly split into three groups based on the factors that affect the crowding-out or crowding-in effects. Second, according to the prediction results of random forest, the impact of the in-crease in local government debt on economic development is different for provinces in different categories. Overall, there is a positive correlation between the scale of local government debt and local GDP in China's remote provinces, and the increase in local government debt significantly promotes local economic development. For most of China's eastern provinces, there is also a positive correlation between the scale of local government debt and GDP. However, the rate of decrease in the effect of local government debt on economic development is comparatively steeper than China's remote provinces. Moreover, the influence of local government debt on economic development exhibits substantially lower significance compared to that in China's remote provinces. For China's municipalities, north-eastern provinces, and some central provinces, the increase in the scale of local government debt has a minor promoting effect on local economic growth. After the scale of local government debt increases to a certain extent, it even hinders local economic growth.

However, this paper still exhibits several inadequacies. Primarily, whether it concerns factors that influence the impact of local government investment on private investment or those that affect local economic growth, this paper unavoidably overlooks certain variables. Secondly, the study disregards the influence of policies implemented by the Chinese central government on the scale of local government debt.

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Has Acquiring Property Rights over the Factors of Production Become a Benefit Reserved for a Narrow Number of "Privileged" Individuals and Enterprises? A Study on the Current Situation in the Romanian Economy

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Abstract

The present study starts from the premise that the economic policy of the Romanian state should be adapted in such a way as to favour a wider spread of property ownership over the factors of production among Romanian society in general, and Romanian entrepreneurs in particular. Simply protecting already acquired property rights, while necessary, cannot be considered sufficient for an efficient and ethical functioning of the institution of private property, as the concrete vocation of interested individuals to acquire tangible property rights is highly relevant. This statement will be detailed and properly justified in this study. By presenting statistical and factual data, as well as relevant indicators, it will be demonstrated that there are certain trends of concentration of capital ownership among a rather limited number of economic actors in Romania's current economy, which can produce unfavourable economic, social, and ethical consequences with lasting echoes. Moreover, the economic and legislative policy measures that encourage a wider access to new property rights, as well as the legal mechanisms that penalise capital accumulation not followed by efficient valorisation, will be identified and presented. Last but not least, this study aims to outline proposals for economic and legislative policy measures which could diminish and prevent the identified imbalances for the future.

Keywords: private property, distribution of property rights, concentration of property, capital accumulation, encouragement of property rights acquisition.

JEL Classification: A00-A14, D00-D23, K00-K11, P00-P26.

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1. Introduction: The Matter of the Distribution of Private Property Rights in Romania

The protection of private property is perceived by the Romanian state as a fundamental guarantee for the functioning of the market economy, as it results from the combination of three provisions of the Romanian Constitution (2003): on the one hand, Article 44 of the Constitution, whereby the Romanian state undertakes to guarantee and protect private property, regardless of its holder, and Article 136(5) of the Constitution, which establishes the inviolability of private property, and, on the other hand, Article 135 of the Constitution, which declares that the economy of Romania is a market economy, based on free initiative and competition. Although property, in the meaning of the legal right of property, both over personal use goods and equally over the factors of production, is protected in Romania at a constitutional level, the concrete acquisition of property, *i.e.*, the right to obtain property, is a concept whose practical realisation depends on numerous other factors, other than the constitutional framework in force at a given moment. Such factors are of an economic, social, political, and even historical nature, and they materialise and interact to a generous extent, varying according to the personal circumstances of each person who has the vocation to acquire property rights.

Out of the multitude of these factors, the economic policy of the state plays a special role, being very relevant to the extent to which it is oriented towards encouraging a dispersed character of ownership over the various factors of production or whether, on the contrary, it favours the concentration of ownership in the hands of a relatively small number of economic actors. In other words, the mere fact that a state's legislation allows, as a principle, the acquisition of property rights and that, after acquisition, institutionalised protection is provided for these rights, is not, in and of itself, a guarantee of the realisation of the broad access of interested agents to property over the factors of production. Normative provisions must be accompanied by elements from the spectrum of public policies to ensure the effective fulfilment of this purpose.

Under the conditions in which, after the turning point at the end of the year 1989, the understanding of private property, in the economic sense of the concept (that is ownership over the factors of production), had to adapt to the new capitalist economic order in our country, we consider that the extent to which decision-makers at the top of the state pursued (and, all the more so, the extent to which they succeeded in) a broad materialisation of the vocation for private property cannot be overlooked in any serious analysis of private property in contemporary Romania.

Therefore, starting from the previously stated premise (i.e., that the economic policy of the Romanian state should be adapted in such a way as to favour a wider spread of property ownership over the factors of production among Romanian society in general, and Romanian entrepreneurs in particular), following a synthetic presentation of certain theoretical landmarks, this paper attempts to illustrate the general trends in the Romanian economy that can bring clarifications regarding this issue, emphasising its contemporary reality. Both the most important economic policy factors that have encouraged and continue to encourage the acquisition of

private property and those variables that have even involuntarily hindered the atomisation of this variation of property will be subject to a critical view. Finally, an attempt will be made to formulate recommendations that support the overcoming of the obstacles that arise between interested persons and the acquisition of private property rights.

The relevance of the theme stems from the reality that surrounds us, being obvious that the dynamics of private property rights remains one worthy of remark in Romania, considering the tendency of Romanians to overcome the limitation of their own wealth to goods for personal use or for passive hoarding, and also their significant interest for lucrative activities.

2. Problem Statement: Brief Presentation of Theoretical Benchmarks

The spread of property rights in a given society, as an expression of wealth distribution in society, was the particular concern of the distributist school of economic thought. This economic doctrine, developed in Western Europe at the end of the 19th century and the beginning of the 20th century, emerged from an ecclesiastical vision of Catholic origin on socio-economic phenomena and it considers the right to private property over the means of production a fundamental right which should enjoy widespread distribution among members of society. Thus, distributism differs both from the socialist thesis, which advocates state ownership over the means of production, and from capitalism, which rather promotes the acquisition of property rights by a relatively small number of entrepreneurs.

Among the main supporters of this line of thinking are / were authors such as Race Mathews, Thomas Storck, Gilbert Keith Chesterton, and Hilaire Belloc. The main favourable general arguments in respect of this doctrine are, from an economic point of view, that it would allow a large number of society members to earn a living without having to use someone else's private property, thus alleviating the problem of social inequality and of the large number of people who live in material precariousness, that associations oriented towards the capitalisation of means of production that overlap with the human communities that form the basis of social organisation (family, local community, etc.) could be created, and that distributism would prevent the monopolisation of economic power by a numerically small elite. Similarly, critics of distributism, such as Thomas E. Woods Jr. (2012), have sought to refute the doctrine with criticisms such as the loss of the possibility of immediate gain by those who, working for others, do not need to use their private property (e.g., an employee), the attenuation of the social division of labour, which would ultimately decrease production and cause a decline in the level of wealth (prosperity) in society, increased production costs, or the lack of natural appetite for acquiring factors of production (and, subsequently, for carrying out entrepreneurial activities) in a significant number of people. In addition to economic justifications, both defenders and opponents of the distributist thesis have formulated over the decades reasoning of a social, political, moral, or even religious nature.

Obviously, as with any economic theory and any model of organising human life and activity, the validity of the distributist thesis is relative, and the degree of

feasibility of its specific application varies depending on a multitude of variables characterising a particular society at a particular moment in its evolution. As a result, we do not aim, through this work, to theoretically validate or invalidate this thesis.

We consider a certain degree of atomisation of property rights to be, in principle, well encouraged, but the exact determination of this degree is an extremely complex problem for which we believe a universally valid solution cannot be found, i.e., one that is indifferent to the economic evolution of the analysed society. In fact, by presenting these theoretical frameworks, we have attempted to provide a formal starting point for the current paper, given the absence of Romanian or foreign literature that formally addresses the issue of real access to property rights in contemporary Romania. Therefore, the paper will be constructed based on these abstract general frameworks from the economic theory.

Last but not least, we consider it important to highlight the fact that this paper is, to our best knowledge, the first one to address this topic from the perspective of identifying specific solutions in a Romanian context.

3. Research Questions/Aims of the Research: A Synthetically General Overview of the Main Causes, Effects and Potential Remedies of the Current Situation of Access to Private Property Rights in Romania

This research will attempt to synthetically explain a general overview of the main causes that currently hinder the acquisition of property rights over factors of production in Romania, their specific manifestations and effects, as well as potential measures that could reduce the economic and social impact of these identified causes.

Given the exceptional complexity of the topic, the interdependence, and variety of the relevant data, as well as the space limitations of this work, we emphasise that a comprehensive (or even detailed) analysis would exceed the ambitions of the current research (but without excluding its future developments). Therefore, we will try to give the research a more qualitative rather than quantitative dimension.

4. Research Method: Observing the General Trends through the Interpretation of Studies and Statistical Data

The research method used to develop this paper consists of observing general trends in the studied topic by referring to various recent and relatively recent studies and statistical data. Thus, by interpreting and correlating the obtained data, a succinct and qualitative description of the relevant general trends will be attempted, with special attention given to identifying the main causes of the trends, as well as the main negative effects and their possible remedies.

We would like to clarify that, given the fact that the relevant variables of the analysed situation may not always be mathematically quantifiable, the conclusions of this study may not always take the form of precise formulas. Therefore, in our view, the methodological originality of this work lies in the combination of two

seemingly irreconcilable methods, namely the analysis of precise data and the empirical method.

5. Findings: A Current Complex Situation

5.1 A Specific Historical Background of the Dynamics of Private Property Rights

Referring to the specific situation of our country, it is worth noting that certain trends in line with the distributist theory have attempted to be implemented after the country's return to a free-market economy and to a democratic political organisation following the Romanian Revolution of 1989. It is important to point out that an open support for distributist doctrine has not been prominent in Romania, at least until very recently: even in this very recent period, it could be found with a certain timidity in a rather marginal area of public discourse and it does not occupy a central place even in academic debates.

However, an obvious intention to give private property to Romanians in the last decade of the previous millennium cannot be denied, although it is difficult to argue that this intention was successful. Regarding the privatisations of the 1990s, statistical data was synthesised by two authors in a specialised article (Hăinaru, Gheţiu, 2007), and it is worth noting from the presented data that in 1992, approximately 15 and a half million Romanian citizens received tradable property certificates in former state-owned enterprises that were later transformed into commercial companies after the Revolution. These certificates could be traded without restrictions or exchanged for shares (even in the absence of an organised market, as the authors – Hăinaru, Gheţiu, 2007 – note). Furthermore, the same authors (Hăinaru, Gheţiu, 2007) note that starting in 1994, around 1,500 such companies were sold to employees and management staff, either in exchange for property certificates or even for cash. They also note that in 1995, a substantial privatisation process was initiated that resulted in the issuance of new property certificates, this time nominative and non-tradable, which formally benefited approximately 17 million citizens. At the end of the subscription period in March 1996, 95 % of the certificate holders had used their certificates, resulting in nearly 17 million Romanian shareholders (who certainly represented the vast majority of the country's population at the time). Unfortunately, despite the optimistic appearance of these data, as noted in the same article, the vast majority of the nearly 17 million shareholders were characterised by apathy and lack of financial power, while the operation of the resulting commercial companies was deficient, with significant difficulties in organising and moderating the general meetings of the shareholders. These shareholders, in turn, largely faced conceptual difficulties in understanding the economic and legal significance of shares and of the stock market.

The fact that the privatisation and the ownership plan previously summarised was not a real success was also noted by another author (Copilaș, 2017), who highlighted the cynical reality that many Romanians who were thus given property did not know the rights conferred to them, so they did not understand the usefulness of a property

certificate or of a share. This author categorically expresses the failure of private property in Romania in the last decade of the previous century, accusing the political decision-makers of the time not only of a lack of vision but also of a lack of a real intention to reform the institution of private property and of a real will of concentrating the private property into the power of a few privileged. At the same time, we should note that the particularities of the communist regime in Romania shaped the collective mentality of the Romanian nation in such a way that for the vast majority of the country's citizens, a correct understanding of the institution of private property would probably have been an exercise far too difficult for that era.

Without denying the common conclusions of all the mentioned authors, it is necessary to highlight the fact that, as stated in a report on Romanian privatisation by the Romanian Academy, citing the Statistical Yearbook of the National Institute of Statistics (N.I.S.), collection 1997-2000 (Sava, Ciutacu, 2002), between 1990 and 2001, the share of the private sector in G.D.P. increased by about four times, from 16.4 % in 1990 to 65.9 % in 2001. Therefore, what can be questioned is not the phenomenon of privatisation of the Romanian economy after the Revolution, *per se*, but rather the extent to which most Romanians have truly benefited from the effects of this phenomenon. In other words, the strategic Romanian vision is questionable with regard to its finality, as it did not lead to a broad and equitable distribution of property rights over the means of production in society, but, finally, in fact, rather to the concentration of the majority of these rights in the hands of a narrow elite composed of both domestic and foreign elements.

This phenomenon of concentration of ownership did not remain isolated in the first decade of the transition, but continued into the new millennium and produced new effects until the present period. For understanding the current context, it is relevant to mention that although there was a decrease in the number of Romanian shareholders during the 2000s, it remained high. However, this did not necessarily translate into a notable increase in the interest of Romanian shareholders in effectively exploiting their own property rights held within commercial companies. Therefore, in an article dated August 2015 (Digi24, 2015), the CEO of the Bucharest Stock Exchange stated that over eight million Romanians own shares listed on this exchange, but millions of them are not even aware of their shareholder status (in other words, they simply do not know that they own shares in various commercial companies).

At the same time, from the statements of brokers interviewed in the same article, it appears that many such shareholders are not interested in the situation of the companies in which they hold shares and do not even request the dividends due to them as shareholders, with the professionals interviewed attributing this widespread attitude of passivity to ignorance and to a precarious level of information. We specify that at the date of the writing of this paragraph (14 April, 2023), there were, according to the records of the Central Depository, 8,343,536 holders of shares listed on the Bucharest Stock Exchange (please see: https://www.roclear.ro/Statistici/RepartizareDetinatori, but please note that the database is updated on a daily basis). From the information previously brought to the reader's attention, it may be inferred

that the general level of information regarding the exploitation of property rights related to factors of production has remained relatively low, and the attitude of Romanian owners towards such rights remains largely governed by disinterest, ignorance, and passivity. This, in turn, could indicate that there has not been an organised and sustained effort to inform and educate the general public about the exploitation of the individual's share of what initially constituted collective property rights.

The negative information that we have presented earlier should not, however, lead us to the erroneous conclusion that the acquisition of property rights through the purchase of shares is a negligible aspect in contemporary Romanian economy. Thus, based on the results of a very recent study conducted by Cornerstone Communications (a local consulting firm specialising in investor relations and capital markets advisory and by MIA Marketing (a Romanian market research company) on professional investors who / which trade stocks on the Bucharest Stock Exchange, an author (Constantin, 2023) concluded that, in the year 2022, 74 % of these professionals bought more shares than they sold, with 55 % of them stating that they have prepared an investment plan for 2023 based mainly on buying shares. At the same time, 40 % of the interviewed professionals stated that they want to maintain their *status quo* in 2023, and only 5 % claimed to have built a strategy mainly focused on selling the shares that they own. Despite the fact that these data may seem optimistic, we should consider both the relatively small sample size of the cited study (326 investors), as well as their quality as professional players on the stock exchange. Therefore, we consider that the cited study, although it is essentially optimistic, is less representative for the vast majority of entrepreneurs operating in Romania, and even less so for Romanian entrepreneurs in particular, and for the general population of Romania, in general.

5.2 The Intentions to Acquire Private Property and the Obstacles Caused by the Dysfunctions of the Public Sector

Overcoming the conceptual difficulties faced by millions of Romanian shareholders, it is equally noteworthy that Romanians' appetite for private property in the economic sense takes forms other than exercising their rights within the companies in which they are shareholders. Moreover, the current legislative framework offers numerous other possibilities for acquiring and exploiting private property in the economic sense than involvement in joint-stock companies, as the legislation allows, as it is well known, both the functioning of partnerships (the most well-known being limited liability companies) and of forms of association without legal personality (for example, partnerships which involve the pooling of factors of production without the establishment of a new entity with legal personality). Given that aspect, a local study, cited in the European and governmental funded document entitled ”A study on entrepreneurship in Romania” – a document published in September 2020 (Educativa S.R.L., 2020), shows that as of March 2019, one in two urban Romanians viewed entrepreneurial activity (which, by its nature, involves to a greater or lesser extent the acquisition and exploitation of property rights) as a

career option, meaning that they want to become entrepreneurs (*i.e.*, in the present work's nuance, holders of property rights over the factors of production). In short, these data unquestionably underline the Romanian population's aspiration to acquire and exploit capital, and implicitly, to assume entrepreneurial risks.

Such results do not entirely surprise us, even in the context of the (at least) *debatable* privatisation of the economy that began and evolved in Romania, given the subsequent "Westernisation" of the Romanian economy and society and the liberalisation of the Romanian market in accordance with the requirements imposed by the European Union. Despite this widely prevalent open attitude among the population, the implementation of entrepreneurial intentions (*i.e.*, the assumption of the role of owner and operator of factors of production) is inhibited, as noted in the same study (Educativa S.R.L., 2020), by factors such as bureaucracy (the most powerful discouraging factor), the unclear and unstable legislation, the poor relationship with public authorities, the excessive taxation, or corruption. It should be emphasised that these inhibiting elements are primarily the result of the still-deficient functioning of the Romanian state, specifically of its public sector, which is why we can assert that the recurring problems of its functioning are elements that discourage and impede the acquisition of new property rights, given that they inhibit the very manifestation of the population's spirit of free initiative.

Moreover, recent statistical data provided by Eurostat further supports the strong sense of ownership that characterises the majority of the Romanian nation. According to data published in December 2021, 95.30 % of the population in Romania lived in a household owned by their home, while the remaining 4.70 % lived in rented housing. For clarity, it should be noted that, according to the same data source, only 69.90 % of the population in the European Union was living in self-owned housing, with the lowest percentage of homeowners in the European Union (49.10 %) being recorded in the largest economy in the Union, namely in Germany.

Clearly, the purpose of these statements is not to create confusion between property rights over goods intended for personal use and consumption and goods intended for profit-making within a company. Rather, our purpose is to underline that an intention (a will) to be an owner, namely, a genuine *instinct of ownership*, characterises our collective mentality. Thus, we can affirm that the data indicating the interest of a large portion of the Romanian population in acquiring economically exploitable properties, as well as the data indicating that the overwhelming majority of Romanians possess property over essential goods intended for their own needs (*e.g.*, the need for shelter), lead to the common conclusion of the pronounced and widespread nature of this so-called *instinct of ownership* in Romania. We consider this conclusion to be absolutely essential in order to understand the close relationship between the collective mentality of Romanians (which influences their economic decision-making process) and private property.

5.3 Lack of Funding and of Knowledge

The lack of funding is another obstacle that often prevents Romanians from acquiring factors of production and starting viable businesses. For example, a recent study conducted by B.R.D. Bank and analysed in an article in the business media (Andriescu, 2023) concluded that 63 % of entrepreneurs are at risk of losing business development opportunities due to the overly complex procedures for accessing non-repayable funding. A primary difficulty that emerged from the study is the verification of the business plan's compliance with the criteria required to access a particular funding line, an aspect that revealed that 49 % of respondents feel the need to collaborate with an expert in obtaining financing. The mere existence of non-repayable funding programs supported from the state budget or from the budgets of the European Union (such as *Microgranturi*, *Măsura 1*, *Măsura 2*, *Schema HoReCa*, *Start-up Nation*, *Femeia Antreprenor*, *A.P.I.A.* financing, *I.M.M. Invest PLUS*, *Programul Național de Redresare și Reziliență*), while undoubtedly opportune, is not enough as long as potential beneficiaries do not have the necessary information and knowledge to successfully navigate the financing procedures.

In this regard, public authorities could contribute by carrying out public information campaigns and by establishing procedures that are as clear, transparent, and less open to interpretation as possible, while the private sector specialised in consulting could promote its services through advertising campaigns.

The issue of bearing the costs necessary to acquire the means necessary to carry out productive activities is also highlighted by studies regarding entrepreneurs' use of their own funds in order to support their businesses. Such a study of the Global Entrepreneurship Monitor, cited by C.E.C.C.A.R. towards the end of 2016 (C.E.C.C.A.R., 2016), stated that around 98 % of Romanian entrepreneurs rely on their own funds when starting a business, with their own money covering an average of 66 % of the financing needed for the new business. According to the same study, only 26 % of Romanian entrepreneurs borrow from credit institutions in order to start a business, with only 27 % of entrepreneurs benefiting from government funding. In the context of the well-known difficulty that many compatriots face in procuring their daily necessities, it is reasonable to conclude that for many Romanians, self-financing a business, *i.e.*, purchasing sufficient factors of production, is a problem of an increased difficulty and more of an aspiration than a serious possibility.

5.4 The Tough Competition for Private Property Rights

The difficulties faced by the population of Romania, or more precisely, by the majority of local entrepreneurs in acquiring property rights, are highlighted, as expected, with respect to those factors of production that are susceptible to large-scale exploitation, over an extended period of time, and whose exploitation brings a significant share of the national wealth or, from another perspective, those capital elements whose acquisition involves high patrimonial efforts. With regard to such elements, a significant part of them is actually acquired by a limited number of entrepreneurs, with Romanian or foreign capital, which have considerable financial

power and, equally important, the necessary experience to cope with the disadvantages of the Romanian business environment and of Romanian bureaucracy. For example, an article from the second half of 2021, based on data released by A.P.I.A. (Nițu, 2021), highlighted the ownership of 2.5 % of Romania's arable land (*i.e.*, 250,000 hectares) by a number of only 20 (twenty!) landowners (*i.e.*, professional farmers), foreign landowners from both within and outside the European Union being among them. Therefore, the Romanian entrepreneur finds itself in the situation of competing for the acquisition of factors and resources that could be exploited for obtaining substantial profits both with relatively few Romanian entrepreneurs which already enjoy an extremely advantageous patrimonial situation and also with foreign entrepreneurs – either transnational companies with a long-standing experience and a solid reputation and tradition, or economic agents who / which more or less speculate on the opportunities (or even vulnerabilities) of the Romanian business environment.

It is difficult to accurately quantify the extent of the competition for the ownership over resources between domestic and foreign capital, even though the existence of this competition cannot be denied. From our perspective, there are two main reasons why it is challenging to mathematically represent the magnitude of this kind of competition. First, not all economic resources are recorded in official publicity systems, where the identity of the owner of a particular asset at a certain moment can be publicly known (such as in the case of real estate, with the cadastre and real estate publicity system): in other words, official data are not always available. Second, the competition we are referring to is frequently ”masked” by the presence in the Romanian corporate environment of companies that, although they appear in statistics as Romanian legal entities, actually represent the vectors of foreign economic interests.

To better understand the second reason, it could be relevant to present a conclusion from a reputable press entity in the agricultural sector (AgroStandard, 2021), which is based on data obtained from the National Agency for Cadastre and Real Estate Publicity. According to this source, foreign citizens own only 0.3 % of Romanian arable land (approximately 21,000 hectares of arable land). However, according to the same source, this percentage can be misleading, because most foreign economic interests in Romania acquire properties through companies they establish in Romania with foreign capital, but in accordance with Romanian legislation. Additionally, there is no official data available regarding the extent of arable land owned by those Romanian legal entities / companies with foreign capital.

5.5 A “Reluctance to Associate” In Order to Acquire Co-Ownership

It is important to note the tendency in numerous areas of the Romanian economic life for owners of capital to hesitate in considering the hypothesis of acquiring co-ownership by multiple individuals or at least pooling the individually owned factors. In other words, Romanian owners, whether individuals or companies, prefer to base their activities on the exploitation of their own property rights rather than on the acquisition of co-ownership rights or on the long-term pooling of their own factors

(capital). Another finding in agriculture supports this conclusion: according to a study published very recently, in February 2023 (Mâț, 2023), the average size of a Romanian farm is of only 4.42 hectares, with 54 % of farms having less than one hectare (!) – despite the fact that 92 % of farms own agricultural land – and, on the other hand, 98 % of farms that exploit their own land are organised as individual households. These data not only show a pronounced tendency in Romania towards the exploitation of agricultural land for ”family” (or, in less euphemistic terms, subsistence) agriculture, but also a serious reluctance of Romanian landowners to associate for the purpose of exploiting large areas of arable land more efficiently.

We consider that one main cause of this hesitant trend is represented by the relatively recent historical evolution of Romanian society and economy, characterised both by the notorious collectivisation of the communist period and by the frequent deviations from honest commercial practices that have characterised the last three decades to a not insignificant extent. These historical aspects can be reasonably classified as certain of the causes of Romanian distrust in association in sensitive areas such as agriculture, as exemplified above.

This ”reluctance to associate” has a direct impact on the possibilities of realising the vocation of private property, as well as, in an interesting way, on the establishment by potential owners of their particular limits of this vocation. Thus, in the absence of long-term associations, there is no context for pooling funds for the acquisition of costly means of production, but there is also no hypothesis in which the acquisition of these factors can be justified in terms of the balance between benefit and loss. For example, an individual household that practices subsistence agriculture on a plot of land measuring approximately one hectare not only is very unlikely to have the necessary amount of money to purchase a modern combine, but given the limited cultivated area, this household would not normally need a combine for its own limited agricultural activity. It is difficult to establish how long or even how many generations it will take for Romanians to fully realise the potential of their option to collectively exploit their resources and to associate for the purpose of pooling them in order to acquire new elements of capital that would be impossible or extremely difficult to obtain through individual efforts, or even unnecessary in an individualistic context.

Similar conclusions emerge from a report of the Ministry of Agriculture and Rural Development of the year 2015, which highlights the specific negative connotation of agricultural cooperatives in Romanian rural areas, a connotation attributed to the tragic events during the communist era. The same report presents data that confirms our concerns regarding the “reluctance to associate”: thus, in 2015, less than 1 % of Romanian farmers were part of any form of agricultural association, while the European Union average was of 34 %. The mistrust of Romanian farmers towards associative forms of farming limits their chances of acquiring the technology necessary for a modern agriculture, as duly noted in the same report, which refers to the limited capitalisation opportunities for isolated farmers (in terms of our work: the difficulty of acquiring ownership over systems, facilities, biotechnology and equipment necessary for a high-performance and

modern agriculture). Additionally, the report attributes to the Romanian mistrust in associative forms of work the following paradox: although Romania has approximately 3.9 million agricultural holdings out of the approximately 13.7 million in the entire European Union, the average size of a Romanian farm is of only 3.5 hectares, compared to the European average of 12.6 hectares. Last but not least, we are pleased to note that the Ministry of Agriculture, in the same report, puts forward the thesis that we also support, namely that association can be an efficient solution to the problem of financing of potential new investments (in other words, a solution also adequate for obtaining new property rights). Interestingly, in the Ministry's view, association would also increase farmers' chances of acquiring the necessary technology by successfully navigating the procedures for obtaining European funding.

It is important to emphasise that a widely prevalent attitude of avoiding associative forms of business and co-ownership can be observed in numerous other areas of the economic life, not just in agriculture. From our perspective, in order to overcome the still existing prejudices regarding the associative forms, Romanian entrepreneurs from various domains could be encouraged, in an initial phase, to more frequently resort to associative forms that do not involve transferring ownership rights or acquiring joint property, such as joint venture partnerships. Joint venture partnerships are a form of association allowed by Romanian legislation that do not require the establishment of new legal entities or the relinquishment of the associates' properties, but rather the mere pooling, in factual terms, of the resources already owned by each individual associate. After Romanian entrepreneurs discover the advantages of joint venture partnerships, we do not exclude the possibility that their interest in acquiring new resources as joint property could become a genuine one, with Romanian entrepreneurs turning, thus, to the next level in terms of association.

As a final remark regarding the Ministry of Agriculture's report, which is necessary for a clearer overview, it should be noted that the report highlights the fact that the number of associative forms of agricultural exploitation has increased by 184 % during the period 2010-2012. Furthermore, in the year 2014, 64 % of the surveyed ”young farmers” expressed their favourable opinions on the possibility of being included in an association. Although substantial percentage increases do not indicate a widespread phenomenon when the initial numerical base is low, and unfortunately, although the report does not provide a definition of the term ”young farmers”, these data plausibly indicate that concerns about association, which may be the result of historical collective traumas, naturally tend to diminish over time.

It is also worth mentioning a recent situation in the Romanian economy that has demonstrated a somewhat reduced hesitation toward the idea of association of Romanian economic operators: the association of multiple farmers in Transylvania for the acquisition of the sugar processing unit in Luduș City, Mureș County, from the French corporation Tereos (an acquisition that did not materialise, as Tereos eventually preferred to sell the unit to two other investors).

5.6 Preventing and Combating the Unfair Competition for Private Property Rights

In Romania, as in probably all democratic states in the world, the acquisition of goods can also be done for the purpose of hoarding. The right to private property is, by its very essence, unconditional in terms of the concrete use of the property object by the owner. There are very few legal means by which the underutilisation or inadequate exploitation of the acquired factors of production can be sanctioned. In practice, the role of sanctioning economic agent falls to the market, which rewards those who use their acquired resources in accordance with its demands and deprives of economic success those who do not efficiently exploit their assets. Furthermore, in a market economy, it is not, in principle, the competence of the authorities entrusted with enforcing the law to determine what is and what is not a judicious use of private resources, and they do not have the right to oppose the owner's will not to exploit the property or to exploit it inefficiently. What current Romanian legislation does not allow is not the non-exploitation or inefficient exploitation, but the deterioration of certain capital elements considered to be of particular importance. For example, Romanian legislation imposes fines for the failure of owners to prevent the deterioration of fertile soil or for the accumulation of waste on such soil.

However, what a responsible state, as we presume that ours is, not only could, but must do, is to prevent the acquisition of factors of production through economic and legal operations that involve elements of illicit origin. In a straightforward approach, we assert that money laundering, namely the acquisition of capital elements that, when valued, bring new and, this time, lawful gains, must be prevented and combated in the most efficient manner. Although the crime rate is relatively low in Romania (our country having a criminality score of 4.59 in 2022, according to the Global Organised Crime Index: https://ocindex.net/country/romania), the notorious presence in the social landscape of elements such as significant corruption and organised crime leads to the conclusion of the necessity of an increased vigilance of those Romanian authorities specialised in law enforcement. Thus, what these public authorities can and must prevent is, in fact, the joining of individuals who have pecuniary resources, sometimes significant ones, as a result of law violations through various means, to the competition for production factors already existent between honest Romanian and foreign entrepreneurs. In this regard, an efficient public policy is needed, as the mechanisms of the free market are no longer sufficient to prevent this kind of unfair competition for private property rights. In simple words, what we consider to be important is not only to have the guarantee that Romania does not become an attractive destination for laundering dirty money (the criminal policy dimension of the problem – which falls outside the scope of this paper), but also that the factors of production do not pass into the ownership of those who / which could not acquire them using only resources obtained through honest means (the economic and social dimension of the problem – which is very relevant from the perspective of the scope of the current paper).

We consider it relevant to draw attention at the current stage of the paper to the following aspect, which has a subtle connection to our theme: according to data

published by the National Agency for the Management of Seized Assets, operating under the administrative supervision of the Ministry of Justice, the total value of assets which were confiscated through legal measures is of 16,998,357.87 RON (approximately 3,400,000 euros), based on the most recent data from this public agency (as of 2021 – source: https://anabi.just.ro/bunuri/valorificarea-bunurilor-confiscate-in-2021). However, from our point of view, the volume of assets used in criminal activities or resulting from criminal acts that are confiscated by the Romanian authorities is relatively low, considering that Romania has a medium-level crime index compared to other European countries (according to the Global Organised Crime Index, Romania ranks 22nd out of 44 European states in terms of criminality score). In other words, our opinion is that the Romanian authorities' efforts in confiscating illicit assets should be more substantial, with more significant and measurable results (considering, for example, that, according to the findings of Financial Intelligence in 2022, the total damages from cases pending solely within the National Anticorruption Directorate amount to approximately 648,207,688 euros.). We have brought this aspect to the attention of our readers because, in our view, a state's interest and success in confiscating illicit assets can suggest the extent to which that state opposes the unfair competition for economically relevant resources between the representatives of the *legitimate capital* and the representatives of the *illicit capital* (including here the representatives of "white-collar crime").

In practical terms, as long as we would reasonably presume that the authorities do not demonstrate a high level of efficiency in confiscating illicit assets, we could reasonably assume that there remains an increased risk for these representatives of the *illicit capital* to have, in certain situations, superior material resources compared to representatives of the *legitimate capital*. This could potentially give them an advantage over the latter in this specific competition for new property rights.

Although acquiring property rights with funds of dishonest origin can bring, in abstract terms, economic benefits (the economic outcome not being negated by the financing source of an acquisition), such a possibility must always be invalidated, simply as it contravenes the rule of law and the widely accepted ethical standards.

5.7 The Harmful Effects of the Difficulty of Acquiring Private Property Rights

The difficulty in acquiring property rights in an economic sense leads to harmful effects not only in the economic sphere, but also in the social and even political dimensions, with such effects being visible today in the Romanian economy and society. Among these effects, we consider to be and we can list succinctly: (i) the creation of excessively high barriers to entry in various markets and in the business environment in general, which can discourage entrepreneurial spirit and the association of individuals and capital for the organisation of viable enterprises; (ii) the demotivation of human capital, which can occur when individuals form the belief that it is extremely difficult or even impossible to reach the level of ownership that could offer them a satisfactory level of material security; (iii) the creation of

oligopoly markets in economic activities where the majority of production factors are concentrated in the hands of a small number of owners, with all the harmful consequences that characterise such markets; (iv) the speculation of private property in the context of the risk of the number of owners to be reduced, to the detriment of demand, and in the unjustified and unfair benefit of supply (for example, speculation in the rental market in certain cities, like the notorious case of Cluj-Napoca, or speculation in the leasing and intermediation of transactions with fertile soil); (v) proletarianisation of large masses of people, (vi) creation of social enclaves, (vii) conflicts between social classes and tensions between owners and non-owners; and the (viii) capture of political and decision-making power by the minority that would manage to accumulate the majority of property rights over the relevant capital elements, followed by economic and legislative policy measures aimed at maintaining the *status quo* (a situation that we consider to have already become obvious in Romania for several years).

We consider that special attention should be given to the risk of inequities and disparities in terms of wealth distribution, which we assume to be a real problem of the nowadays Romania:

Regarding the inequalities resulting from wealth redistribution in society, we note that the high level of the Gini index for Romania (34.30 % in December 2021, according to Eurostat data cited by Trading Economics: https://tradingeconomics .com/romania/gini-coefficient-of-equivalised-disposable-income-eurostat-data .html), which is higher than the level of this index in the same reference period in European states such as Spain, Italy, Greece, Germany, the Netherlands, France, Croatia, Hungary, Czechia, Slovenia, Sweden, Denmark, Finland, etc., on the one hand, may lead to the logical conclusion that in an economy such as the Romanian economy, which is characterised by significant inequalities between individuals, competition for property rights acquisition is also characterised by significantly unequal conditions, and on the other hand, it may equally suggest the reverse side of the coin, in the meaning that the acquisition of such rights by the favoured segment of society is likely to further accentuate the already existing serious inequalities, over time (as the increase in individual prosperity is essentially conditioned by the exploitation of factors of production, and the exploitation of factors of production is, in principle, conditioned in its turn by their prior acquisition).

Furthermore, we consider relevant to mention in the same regard one of the conclusions of a report of the National Bank of Romania on financial stability, published in June 2019, which states that the wealthiest 10 % of Romanian households hold approximately 60 % of the national wealth, this fact reflecting a high degree of wealth inequality risk. The same report indicates that 71 % of the value of Romanian bank deposits are held by only 5 % of depositors. In the context of such significant disparities resulting from the distribution of wealth in our country, the competition for new property rights can only be seen to take place from significantly unequal positions. Moreover, within the same page of the report, the National Bank remarks the tendency of accentuating wealth inequality compared to its previous report in 2018 (NBR suggesting the somewhat paradoxical nature of

these findings in the context where Romania is the EU Member State with the highest percentage of population represented by real estate owners).

Moreover, the ”privileged” statistical segment, which holds the majority of national wealth, could be presumed to exhibit a quasi-permanent tendency to expand the percentage of wealth it owns also by acquiring property rights from the other ”less privileged” segments of Romanian society. Notable examples include those well-known situations where small rural households have sold their fertile land to large-scale farmers, sometimes at prices below market value. The reasons for which certain transfers of property rights from ”small-scale owners” to “large-scale owners” were conducted below market prices remain debatable and they need to be assessed on a case-by-case basis. For example, they could be explained due to the lack of knowledge about the market system and conditions, as with respect to the property sellers, or due to their urgent need for money. Additionally, the Romanian State's efforts to properly inform and educate these ”small-scale owners” for a proper understanding of the relevant market (*e.g.*, in our example, the fertile land market) remain questionable at best.

We cannot overlook, in our attempt to bring to the attention of the readers the fact that wealth acquisition (namely, primarily through property rights, either over goods or over claim rights) is becoming increasingly unlikely for many Romanians, the mention that immediately after the Revolution of 1989, Romania was one of the states in the current European Union space that had some of the smallest discrepancies in terms of wealth between its citizens. This conclusion was reached by an author who studied the evolution of economic inequality trends in Romania based on statistical data provided by the National Institute of Statistics (Precupețu, I., 2013), noting that in 1990, immediately after the Revolution, the Gini index had a level of only 22.70 %, gradually evolving to 34.50 % in 2009. Indeed, as we also noticed by correlating the data provided by reliable sources (*i.e.*, Trading Economics), this index reached its peak in 2016 (37.40 %), subsequently stabilising slightly above the 34 % threshold and gradually declining to 32 % in 2022. What we consider essential to be noted is that, for a little over three decades, Romania has become one of the most unequal states in Europe in terms of wealth distribution, although it started, at the time of its transitioning to a capitalist economic system, from being one of the most ”egalitarian” European states in terms of wealth distribution.

The aforementioned author highlights, within the same 2013 work, several macroeconomic issues closely related to the discrepancies she observed, with the article emphasising the problem of a significant portion of the population being exposed to the risk of poverty, one of the concerns expressed by the same author being the existence in Romania of a division between a narrow, isolated, and wealthy elite and, on the other side, a large mass of impoverished individuals. However, from our point of view, the possibilities for a poverty-stricken individual to acquire properties and to exploit them profitably and in fair competition with wealthy individuals are, in reality, illusory, and they could only materialise in isolated cases, *i.e.*, in very rare and highly specific life situations (for example, if the poverty-

stricken individual would receive an unexpected inheritance, or if he / she would earn high income, *i.e.*, a starting capital, from patenting an invention, or due to his / her exceptional sporting or artistic achievements).

Furthermore, please note that as long as the collected data indicates significant difficulties in acquiring new properties, on one hand, and a pronounced trend of accentuating inequalities in terms of wealth, and also the concentration of property rights in the hands of the relatively small segment of the privileged individuals of the recent decades, on the other hand, the probability of the question posed as the title of this article receiving a positive (and well-argued) answer becomes a high one.

6. Conclusions: Acquiring Property Rights over Capital Elements is Still Facing Specific Difficulties that Potential Owners in Romania need to Overcome

The data highlighted succinctly in this paper emphasise the fact that acquiring property rights over capital elements is still facing specific difficulties that potential owners need to overcome. These difficulties have multiple causes, including a specific historical background, financing obstacles, intense and unequal (and sometimes unfair) competition for these rights, a lack of information and knowledge about how financing difficulties could be overcome, and the reluctance of interested parties to associate for the acquisition and common exploitation of such factors. These causes are due to both recent and relatively recent historical and socio-economic developments in the Romanian state, and certain dysfunctions of the Romanian public sector (*i.e.*, public administration) and economy.

From our point of view, formed as a result of analysing these causes, certain economic and legislative policy measures could help overcome the analysed difficulties. As previously mentioned, the Romanian state provides non-refundable funding for business asset growth, but it is essential that the procedures for obtaining funding to be transparent and prevent any abuse and unjustified differences in treatment. Furthermore, more pronounced guidance from public authorities regarding the financing of potential beneficiaries would be desirable. Similarly, to facilitate property acquisition through entrepreneurship association and the pooling of resources, the state's fiscal policy could be adapted to encourage joint capital acquisition. Such support measures for the entrepreneurial environment should be in line with European legislation governing state aid, therefore, it should not be overlooked that the intensity of such measures should still remain limited. Finally, we are convinced that the Romanian state must make much more consolidated efforts to inform and educate the general public to increase the overall level of entrepreneurial culture necessary to understand topics such as the rights that social parties confer on their owners in a society, obtaining financing for business development, or opportunities for association through the pooling and exploitation of factors of production. In summary, by acting in these directions, the Romanian state could reduce the effects of the causes for which we consider that the acquisition of private property rights in economic terms is (relatively) difficult today in our country.

Without detaching ourselves from the above summarised distributist theory, we notice that a certain degree of spread of ownership over the factors of production among the members of a society like ours, which is organised on the principles of a market economy, leads to the emergence or, as the case may be, to the consolidation of a system of small and medium-sized enterprises, and subsequently, from a social point of view, to the shaping or consolidation of a middle class, which contributes significantly to economic prosperity and to social and political stability, but also to ensuring a generally tolerable climate in terms of equity and social justice. The disadvantages of an economy dominated by monopolies and oligopolies, and complementarily, of a system of macro-social organisation in which an ultra-privileged minority coexists with a pauperised and proletarianised majority, are well known and very difficult to subject to serious criticism. Moreover, such a socio-economic organisation of a country would be difficult to reconcile with the notion of a social state, *i.e.*, a state organised according to the principle of social justice, as Article 1(3) of the Romanian Constitution (2003) specifies that Romania is.

It is essential to emphasise that encouraging the acquisition of private property rights over capital elements should not be viewed in isolation from the principle of maximising the efficiency of exploiting each element, nor can it be viewed and conceived in isolation from the general economic and social policies. It should also be noted that this paper represents a brief and indicative exposition that has aimed to highlight certain general trends in a general manner, and this analysis needs to be further developed in order to substantiate specific measures aimed at improving the identified issues from a technical perspective.

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Spatial Econometric Analysis of the Main Indicators of the Romanian Educational System

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Abstract

The Romanian education system is a system characterised by a series of main indicators that quantitatively follow a general situation at the level of each county. Among them is the number of graduates. Analysing the data at the level of each county in Romania, it is possible to create an overview of the educational system, both at the pre-university and university level. However, by analysing these data considering the links that may exist between counties and their correlation with economic indicators, such as average wage, it is possible to observe a direct or indirect influence that a neighbouring county has on another county neighbour. Romania is characterised by several central poles that have a special influence on the neighbouring counties. Thus, this study aims to analyse the number of graduates in relation to the average wage in each county of the country by highlighting the relationships that exist between neighbouring counties. Using spatial econometrics models, it was concluded that the number of graduates of each county affects in the opposite direction the level of the average net salary.

Keywords: education, econometrics, spatial econometrics, statistics, Romania.

JEL Classification: I20, I23, I29.

1. Introduction

A society's development depends on education. Studying education gives one a thorough understanding of human development and offers chances to enhance educational procedures. It could be an opportunity to examine the educational system's operation and the potential for improvement in greater detail. Finding effective teaching, learning strategies, and resolving educational issues can both be aided by this. Education also enables one to comprehend the influences of social, political, and economic factors on educational processes. As a result, it is easier to

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comprehend how various social groups are impacted by the educational system, which can help to develop solutions for building a more equitable system. Studying education can aid in the discovery of novel and creative methods of instruction and learning, as well as reveal information about how educational policies and curricula are created. Understanding the role of technology in education and how it can be applied to enhance educational outcomes is another benefit of studying education.

This study is focused on the Romanian educational system that is strongly characterised by a discrepancy between the rural and the urban environment. The significant differences between urban and rural areas, for instance, necessitate the development of a strong rural economy in Romania. In the first place, a nation's employment rate reveals both its economic development level and the composition of its economic activities. However, it is observed that the economic activities that are carried out in a nation, or, to be more precise, in a state, a province, or a county, have a significant impact on access to education. However, these cause social and economic inequalities and poor economic growth. Romania also faces difficulties due to the poor education of the rural population, which is a result of several factors, including a lack of funding (Burja, Burja, 2014).

2. Problem Statement

The specialised literature is very extensive regarding the educational system. This section of the work aims to provide the reader with a starting point for a better understanding of the analysis conducted by providing a brief review of some studies, some recent, and some less recent but of particular importance.

Faith E. Crampton, in his 2009 study "Spending on School Infrastructure: Does Money Matter", presented a new line of quantitative research that sought to ascertain whether investments in school infrastructure had an impact on student achievement. According to the theoretical framework, financial investments in social, human, and physical capital boosted student achievement. The same result was reached by a 2011 Latin American study as well. In educational institutions, maintaining the infrastructure of the schools can result in better academic performance (Murillo, Roman, 2011). The school needs a factory-model system that receives significant inputs such as infrastructure and students continuously to produce the desired output. Students' or pupils' academic performance cannot be effective in an educational setting where the facilities and furniture are in a dysfunctional state of use. Schools should be most concerned with the accessibility of instructional or didactic resources and the calibre of their physical facilities (Jamil et al., 2018). Few schools, however, are aware of the interdependence and improvements that maintaining the school infrastructure (buildings and furniture) can bring to the enhancement of academic activities there (Taiwo, 2000).

Moreover, it is widely believed that human development and economic growth are closely related, particularly when it comes to education at all levels (Ranis, 2000). This conclusion has been supported by numerous studies that examined a country's economic situation while taking a variety of factors, including education, into consideration.

Using education data from 2005-2018, a study conducted in Croatia validated that a framework that is not sensitive to regional inequalities can only deepen them (Dobrotic, Matkovic, 2022). Moreover, these inequalities already exist and can be intensified without a proper policy (Velkey, 2022). The need for a quality education and professional training is understood beyond the borders of Romania to achieve a competitive economic growth. From the fundamental macroeconomic literature to empirical studies (Topel, 1999; Temple, 2001; Krueger and Lindhal, 2001; and Sianeis and Van Reenen, 2003), schooling was one of the most important factors influencing the growth of GDP per capita. Another study (Hanushek, 2016) that came to the same conclusion as this one supports the notion that primary education lays the groundwork for the skills that students go on to use in higher education and the job market.

A study that brings attention to this point is Stanef (2013), which used regression models to compare education variables in urban and rural areas and concluded that the level of educational inclusion in Romania's counties contributes to the country's economic disparities. Children who have financially challenged parents or parents with low levels of education are more likely to travel the same road. According to a study by Albig et al. (2017), this is an example of a vicious circle. Due to a lack of resources, these families often neglect to invest in their children's education, which results in low incomes.

Due in large part to the process of globalisation, education now plays a crucial role in every economic system. As a result, the relationship between unemployment and education is inverse (Serban, 2012). A person with more education is more likely to land a good job that will help the economy grow. Additionally, to adapt to lifelong changes, education must continue. Education-related expenditures are not independent goals in themselves but rather tools for achieving economic growth. The quantity and quality of domestic and international investments should be considered as well as education alone (Ranis, 2000). Another study carried out in Italy validated the same results. The existing inequalities between the north and the south of the country at the level of the educational system lead to economic inequalities (Guarini et al., 2018). The same results were obtained for Spain using a synthetic index of exclusion in the educational sphere and regional public spending on education (Garcia Luque et al., 2023).

3. Research Questions (Hypotheses)

The research hypotheses of this study concern the link between the factors related to the educational system (the number of high school graduates), and indicators related to the economic situation (average net salary).

H: The number of high school graduates influences the average net salary.

Using the data provided by the National Institute of Statistics in Romania at the level of each county from 2010 to 2020 and using spatial econometrics models, the present study seeks to test the above hypothesis. This time interval was chosen because, at the time of writing the study, it was the only one that contained available data for all the counties of the country.

4. Research Methods

Spatial econometrics models are factual strategies planned to analyse spatial information and measure the effect of geographic area on the results. These models are capable of capturing the connections between economic action and topography, counting diverse sorts of location-based impacts such as spillovers and externalities. They give effective bits of knowledge on the elements of territorial economies and help policymakers get it to the significance of considering components like area when defining economic approaches. At the heart of these models may be a concept known as spatial autocorrelation: the idea that variables that are spatially near (in physical separate) tend to be related. Spatial autocorrelation can be measured utilising diverse measurements, such as Moran's I or Geary's C, and these measurements can give significant data approximately on the quality of spatial connections. Spatial econometrics models integrate the impacts of spatial autocorrelation into their forecasts and allow analysts to account for the effect of spatial proximity on economic results such as poverty, migration, or income imbalance. Spatial econometrics models are a capable tool for economists and policymakers to much better get the complex elements that play inside territorial economies and make better choices. Although there are still numerous challenges related with these models (e.g., information accessibility), their use is developing in significance as increasingly organisations recognise the effect of spatial connections on economic results.

Kapoor et al. (2007), Baltagi et al. (2007), and Lee and Yu (2010) have proposed tests to choose the foremost fitting model for potential expectations (e.g., Hausmann test). A model created by Baltagi and Li (2004) is broadly utilised in experimental considers. This demonstration was made in a consider on cigarette request in 46 American states from 1963 to 1992.

There are three types of spatial interactions to consider. The first model, SAR, looks at how the dependent variable in unit i affects the dependent variable in unit j (j being different from i). This dependence is calculated with the help of a spatial weight matrix WYt that displays the spatial associations between the observations of endogenous variables. The model follows the equation:

$$Y_t = \rho WY_t + Xt\beta + U_t \quad (1)$$

where ρ stands for the spatial autoregressive parameter and Ut represents a vector of errors. The second model, SEM, measures the effect of interactions between the error terms. This is calculated using a spatial weight matrix Wμt which shows that the units could act similarly due to an unobserved trait. This model follows the equation:

$$Yt = Xt\beta + U_t \quad (2)$$

where λ is the spatial autoregressive parameter and Vt is a vector of errors.

A model that encompasses both effects, called SAC, would look like (Elhorst, J.P., 2017):

$$Y_t = \rho WY_t + Xt\beta + u_t,\ u_t = \lambda u_t + \varepsilon_t. \quad (3)$$

The parameters ρ and λ measure the strength of these spatial dependencies. For panel data, the model includes fixed or random effects and takes the following form (Elhorst, J.P., 2017):

$Y_t=\rho WY_t+Xt\beta+\mu+u_t$, $ut = \lambda u_t + \varepsilon_t$. (4)

μ: vector for fixed or random effects. In order to test which of these dependencies should be included in the regression model, the following tests are necessary:

a. LM test for spatial lag

H0: No spatial lag dependency of the dependent variable (The classic regression model is the right one)

H1: There is a spatial lag dependency of the dependent variable (The spatial regression model is the right one)

b. LM test for spatial errors

H0: No spatial error dependency

H1: There is a spatial error dependency

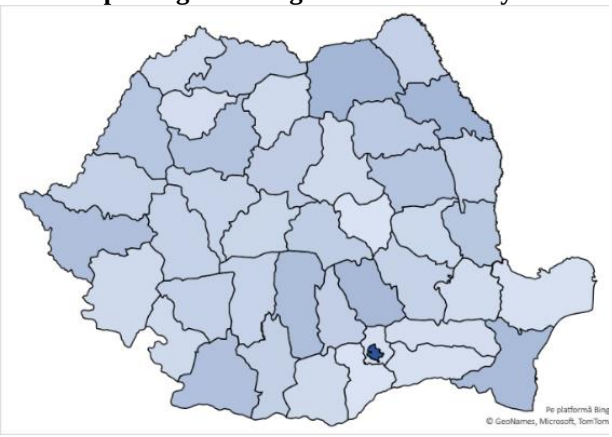
After the results of the tests have been obtained, the most suitable model to explain the relationship between the endogenous and the exogenous variables is chosen, with the interpretation of the coefficients that resulted.

The accessibility to these models has increased as various software have been developed through which the necessary tests can be performed. Thus, in this study, Geoda (software dedicated to spatial econometrics) and the specific packages from STATA are used. This is an ideal environment for analysis due to the already existing tools and infrastructure in panel data analysis. These available packages offer comprehensive and important tools in estimating econometric models by integrating both the spatial components between observations and those arising from errors. In addition, both models with fixed or random effects are implemented. With the help of the Geoda software, the spatial weight matrix is created and then introduced into STATA to create the spatial models.

5. Findings

The situation of high school graduates in 2020 can be seen in the figures below. There are no big differences between the counties, but Bucharest stands out as the first.

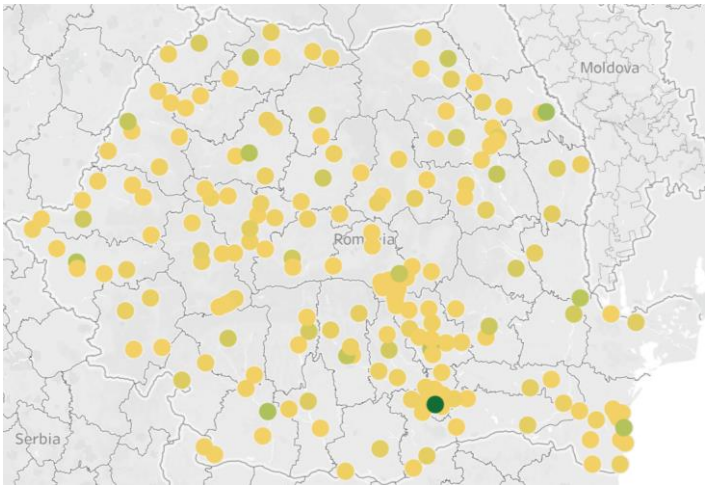
Figure 1. Map of high school graduates at county level – 2020



Source: Created by author based on collected data.

Regarding the data at the locality level for the number of graduates in 2020, Figure 2 suggests in the best possible way the current situation. Again, Bucharest remains the city with the highest number of high school graduates, followed by Iasi, Timisoara, Cluj-Napoca, Constanța, and Ploieşti. Also, in the figure from point 2, it can be observed that there is a cumulation of high schools in the Muntenia area, as well as a deficit in the north of the country.

Figure 2. Map of high school graduates at locality level – 2020



Source: Created by author based on collected data.

In order to see how the number of graduates influences the average net wage, an econometric analysis was conducted. Spatial model specifications with panel data were estimated to account for the presence of spatial dependencies.

In the first stage of the analysis, the stationarity of the data was checked. With a p-value less than 0.05, the null hypothesis was accepted, showing that the panel is stationary, both for the dependent variable and the independent variable. The variables were logarithmised before the testing.

Following spatial dependence tests (Pesaran test), the null hypothesis was rejected. The spatial errors are not independent, which means that a spatial model is required. Regarding the normal distribution of errors, the null hypothesis cannot be rejected for a 90% probability of guaranteeing the results.

In terms of spatial dependence, an attempt was made to estimate the fitted model using Stata's xsmle package. Beginning with the SDM model, it was determined whether it could be reduced to SAR or SEM. Additionally, an inverse squared distance matrix was employed. The tests revealed that the model can transform into either SAR. The following step was to develop a model with autoregressive errors (SAC). Thus, the SAC model is better (based on loglikelihood, AIC and BIC) than SDM or SAR and the results can be seen in Table 1 below:

Table 1. Spatial econometrics model: SAC

Parameters	SAC
Number of high school graduates	-1.643052***
Spatial Parameters	
Lambda	1.90e+07***
Rho	2.78e+07***
Variance	
Sigma2_e	0.0276216***

*** Statistically significant at the 5% level.

Source: Authors' own contribution using STATA.

The results show that there is an inverse relationship between the number of high school graduates and the average net salary. Therefore, an increase in the number of high school graduates leads to a decrease in the average net salary in a county. This may be surprising, but it can be explained by the fact that a greater supply of labour, graduates now available on the labour market, leads to a decrease in wages. Moreover, the model has, as an independent variable, the number of high school graduates. This can mean that a lower qualification leads to a lower net income. Such, education represents an important factor, but secondary education is not enough.

The advantage of this model is given by the spatial coefficients. The spatial coefficient rho, which is associated with the variable's spatial lag, is positive and significant for the model. This positive value is the residual spatial dependence after accounting for the positive spatial dependence reflected in the lambda parameter. As a result, we can say that what happens in one county has a significant impact on activity in neighbouring counties. As a result, an increase in the average net salary in one county can lead to an increase in another. Thus, we can speak of a contagion effect through which the development of a neighbouring county will lead to the development of the adjacent counties. This is also visible at the level of Romania if we consider the fact that the cities located around the country's major economic poles are developed.

Moreover, changes in the values of the independent variables in a county have a direct effect on the average net salary from that county, and an indirect effect on the average net salary from another county. The indirect influence increases the direct influence, increasing the overall effect. The results of the tests confirm the existence of all these effects, with both of them being negative. The overall effect is increased. Results are presented in Table 2.

Table 2. Spatial effects

Efect	Coeficient	P-value
LR_Direct		
Number of high school graduates	-1.663172	0.000
LR_Indirect		
Number of high school graduates	-0.0835917	0.009
LR_Total		
Number of high school graduates	-1.746764	0.000

Source: Authors' own contribution using STATA.

6. Conclusions

According to the findings, a spatial model is the best fit to capture the neighbourhood effect of the selected variable on average net salary. This effect is significant and could not have been observed with a straightforward panel data model. First, by examining the main model's coefficients, the model confirms the findings already reported in the literature by validating the influence of education on economic indicators.

As the results demonstrated, secondary education is important, but not enough. This stage of education is crucial because it could help students develop the skills they will later need, for example, in the tertiary education level. This result is significant both for confirming the research hypothesis and for opening up the possibility of developing local and national policies in this direction. The policies that can be developed considering the results of the present study can address the problem of the quality of education. Considering the fact that a larger number of high school graduates leads to a decrease in the average net salary, the emphasis should be placed on the quality of education with the aim of providing a qualification, but also to offer the opportunity to attend university courses. In any case, education still represents an important factor that contributes to reducing income inequalities (Sylwester, 2002). However, secondary education is not as strong as tertiary education in reducing inequalities (Abdullah et al., 2013).

Additionally, the findings of this study can be used to support earlier research findings. Numerous others show that disparities between counties or regions of a country, whether they be based on gender, number of years of education, or public spending on education and research, frequently have a negative effect on the area's economic development. However, some bonds are stronger than others. According to Loening (2005), the impact of different educational levels on economic growth may be less than that of health sector policies. Because of this, the nation cannot perform as well as other states where these differences have been reduced by various public or private measures implemented. A number of national and international reports from the European Union outline urgent measures, including expanding access to high-quality education for all children through public investment in schools, inspiring students throughout their academic careers, and providing extra support through remedial classes for students who are having trouble, decentralising public administered schools, and enhancing the freedom of decision-making, such as hiring teachers or using funds, creating. All of these actions could result in an improvement in the educational services provided, particularly in rural areas, with the ultimate result being the economic convergence of the counties.

Of course, there are a number of restrictions on this research that should be kept in mind. First and foremost, the perspective on education was only made from a quantitative point of view, excluding qualitative factors like: the level of qualification of teaching staff, the quality of the educational act, the digital proficiency of students and teachers, or the percentage of funding attracted by the school from outside sources. Data scarcity is one of the causes. The analysis contained in the proposed study cannot fully represent the Romanian educational

system without these data. Second, the only dependent variable in this analysis that is being examined is the average net salary. According to the current data, a future analysis might consider conducting separate analyses for pre-university and university education, considering not only the total number of graduates, but also factors like graduation average, professional status following graduation, and national baccalaureate exam pass rate.

However, the current study offers an econometrics and spatial perspective, which adds an important perspective to the specialised literature. As a result, this spatial model, unlike a traditional panel data model, also accounts for the interaction between counties. Thus, the work aids in the growth of this field's research.

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The Impact of Social Status on Financial Education and Saving Behaviour in Young Adult Population (A Case Study for Romania)

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Abstract

Financial education in Romania is at the lowest level among countries in the European Union (Study Standard & Poor's, 2015; OECD, 2018, 2020). In the midst of challenging times, the financial well-being of the population is fundamental for achieving sustainable growth of the economy. This implies knowledge, skills, and competences in the area of personal finances. This exploratory analysis examines the relationship between financial saving behaviour in the young adult population in Romania, their financial education level and their social status, focused on their living situation, whether parents are divorced, and the level of income. Individual psycho-characteristics were explored, such as self-control and future orientation. A sample of more than 2000 Romanian young adults participated in a web-based questionnaire, aged 14 to 30 years.

We explored to find the determinants of financial saving behaviour and investigated the relationship between financial saving behaviour and level of income, self-control, future orientation, financial education, social status, living with family, divorced parents, number of siblings, and other socio demographic characteristics. For exploratory analysis, we proposed the statistical test t-test to test hypotheses of gender differences in the financial savings behaviour and self-control scores and a regression model with financial savings behaviour as a dependent variable.

The results are discussed in terms of recommendation for effective financial education methodology, the role of family through social status, focusing on enriching skills, competences, and behaviour, targeting the financial well-being of the population for sustainable growth of the economy.

Keywords: financial savings behaviour, financial education, social status, sustainable growth, sustainable economy, financial well-being, young population.

JEL Classification: G 53, G 51, G 50, G 41, G 40.

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1. Introduction

Financial well-being is highly dependent on financial behaviour and financial education. However, research indicates that a person's socioeconomic status can have an important impact on their financial education, financial literacy, and saving habits. The purpose of this paper is to investigate how social status affects young adults' financial literacy and saving habits in this exploratory analysis.

Given that Romania has the lowest financial literacy rating in the European Union (Standard & Poor's, 2015; OECD, 2018), the country deserves special consideration in scientific research in this regard. Romanians came close to last in the OECD/INFE 2020 International Survey of Adult Financial Literacy (OECD, 2020). In this context, the case of Romania merits consideration in scientific research because it doubles as one of the poorest nations in the EU, and has a population that is heavily indebted (a debt-to-income ratio of 45-47 % was allowed for loans to population until the end of 2018, a limit of 40 % was enforced by the National Bank of Romania from 2019). Young people are the subject of our research as the road map of adult financial behaviour and well-being established through early-life financial knowledge and abilities, according to Beverly and Burkhalter (2005).

2. Problem Statement

According to research, social status, particularly among young individuals, can have a major impact on someone's financial literacy, financial education, and saving behaviour. The 2015 results for Students' Financial Literacy from the OECD Programme for International Student Assessment (PISA) demonstrate that parental education and income have a favourable impact on young people's financial literacy. Financial literacy was higher among young adults from high-income families with more educated parents than among young adults from low-income families (OECD, 2017). This research implies that a person's family-related background can have an impact on their education and financial literacy.

Financial literacy is positively correlated with saving behaviour, particularly for people with lower income levels, according to another study by Lusardi and Mitchell (2014). According to the study, people who were more financially literate were more likely to have savings and were less likely to incur expensive debt. The authors also recommended that in order to improve young adults' saving habits, financial education programs should focus on fostering financial literacy abilities, such as budgeting, debt management, and saving techniques.

A study by Behrman et al. (2012) also looked at the influence of financial education on young adults from low-income families' savings habits. The authors discovered that receiving financial education earlier in life had a greater impact on improving saving behaviour. The study also revealed that financial education improved both the quantity and quality of saving behaviour. The authors propose that in order to enhance saving behaviour among young adults from underprivileged backgrounds, financial education programs should prioritise the development of enduring financial skills and habits.

Furthermore, individuals with higher levels of social status are more inclined to save money versus those with lower levels and, interestingly, they have different savings objectives. According to a study by Han and Sherraden (2009), youth originating from households with higher incomes and higher educational are more likely to save for retirement and other long-term goals, in contrast to lower-income and lower-education groups, that are more bound to save for short-term goals, such as emergencies.

Nevertheless, there could be serious repercussions due to differences in financial literacy and saving habits among various socioeconomic groups. People with lower socioeconomic status may be more constrained to restricted economic mobility and face financial vulnerability. When comparing groups of different levels of income, people with low financial resources are more likely to suffer from financial stress and low financial well-being (Sano et al., 2021).

According to research, socioeconomic standing, which includes parental education and money, has an important impact on young adults' financial literacy and saving habits. An individual's familial background can have an impact on their financial education, financial socialisation, and financial literacy. Additionally, financial education programs that emphasise the development of lifelong financial habits, financial literacy abilities, and skills can assist young individuals, especially those from underprivileged homes, save more money.

3. Aims of the Research

This research aims to identify the predictors of financial saving behaviour amongst these variables: level of income, self-control, future orientation, financial education, social status, living with family, divorced parents, number of siblings and other socio demographic characteristics.

This analysis, which is exploratory in nature, investigates the young adults in Romania.

We have formulated the following hypotheses:

H1: There is a significant difference between the Financial Saving Behaviour score and gender.

H2: Gender (male) has a positive effect on Financial Saving Behaviour.

Financial behaviour research has repeatedly shown that there is a gender difference in financial behaviour between men and women (Lusardi, 2008; Walczak, Pieńkowska-Kamieniecka, 2018), typically linked to a difference in financial literacy or risk attitude, female shown as a vulnerable group.

H3: There is a significant difference between the Self-Control score and the gender.

Self-control and gender differences is a widely researched hypothesis, mostly finding that women have better self-control, especially at a young age (Trzcińska et al., 2018; Wang et al., 2017; Jo, Bouffard, 2014).

In addition, we expect the following dependences of Financial Saving Behaviour:

H4: Self-control has a positive effect on Financial Saving Behaviour.

H5: Future orientation has a positive effect on Financial Saving Behaviour.

Based on the Behavioural Life-Cycle Hypothesis formulated by Shefrin and Thaler (1988), there is an ongoing conflict within every person between present and future, between the 'planner' and the 'doer', self-control being the paramount characteristic for planning. Financial behaviour in planning, including the saving behaviour, is determined by the ability to control impulses; therefore, individuals with low self-control are not expected to save enough for future retirement (Choi et al., 2011), while future orientation impacts positively on savings, especially on long-term goals (Rey-Ares et al., 2018).

H6: Financial literacy/ financial education has a positive effect on Financial Saving Behaviour.

There are mixed results in the literature; traditional research suggests financial education enhances planning capability, particularly saving for long-term objectives such as retirement (Rey-Ares et al., 2018); nevertheless, the impact seems to be of low significance for the low-income population and the long-term consistency is not proven (Fernandes et al., 2014).

4. Research Methods

For the purpose of this study, data was collected through a web-based questionnaire in the period November-December 2018. The questionnaire was distributed through the national public schools' network via various professors from secondary school, high school, and university level and, in addition, through various social media channels. The respondents were pre-selected in the first section of the questionnaire in a diligent manner, whereas exclusively individuals within the age criteria 14 to 30 years were provided access to the remainder of the questions. To avoid question order bias, a question shuffle tool was automatically enabled for each respondent. To increase the accuracy of raw data collected, control questions were set up in the questionnaire to ensure the understanding of the questionnaire and to avoid random answers, without reading the questions. No monetary compensation was provided to the respondents.

The dataset consisted of 2364 validated responses, and the criteria for inclusion consisted of the Romanian youth population, age 14 to 30 years old. Participants outside this age interval were automatically excluded, as this research studies the determinants of financial saving behaviour in youth. This ability was observed in relation to two variables included in the sociodemographic characteristics with regard to the money the young adults were utilising in their lives. The first variable, *Money Own*, measured the level of income obtained through the youth's own work: employment, entrepreneurial projects, scholarship, etc.). Nearly half of the sample declared that they do not earn their own money (43 %), while the largest group of money-earners is at the lowest level of income below 700 RON (35 %). The second variable, *Money Other*, quantified the "pocket money" or allowances from parents,

family, other persons, etc., including the official state allowance. Only 4.7 % of the youth in our sample declared that they have no "pocket money" or other money allowance, while the majority of the young adults receive quite a small allowance, quite evenly split among the five categories for the level of income: 0-100 RON, 101-200 RON, 201-300 RON, 301-400 RON and over 400 RON.

The structure of this sample was 88 % in the age category 14-20 years and 12 % in the category 21-30 years (mean age 17.43 years, median 17 years), with 61 % female respondents.

The questionnaire was developed using validated scales from the literature to measure the variables of concern for the model.

The dependent variable Financial Savings Behaviour used a validated 3-item scale developed by Xiao and Dew (2011).

In the vast majority of research literature, the concepts of financial literacy and financial education are used synonymously. The 13-item scale for *Financial Literacy* applied in this study, was well-researched to test all areas of personal finance knowledge and was developed by Fernandes et al. (2014) as part of meta-study.

The construct of *self-control* was measured through a 5-item validated scale named "The Brief Self-Control Scale" developed by Tangney et al. (2004), in the dimension of resisting temptation.

Future orientation variable utilised the "Short-Term Future Orientation Scale", a 4-item scale (Antonides et al., 2011).

Data was analysed utilising a series of linear regression to determine the predictors of financial savings behaviour amongst the following variables: self-control, future orientation, financial education and the socio demographic characteristics collected through the questionnaire: gender, age, education and social status encompassed by the level of income (*Money Own and Money Others)*, whether the young adult lives with family and how many siblings, the marital status of the parents, the household income and the number of income earners in the household. The empirical regression model built through analysis included as explanatory variables: self-control, gender, money other, and age, with an R-squared of 16.77 %, which is a good model for behavioural economics.

The gender differences in the financial savings behaviour and self-control scores were tested by applying the statistical T-test. The data provides sufficient evidence to conclude that, on average, there is a gender difference in the Financial Savings Behaviour and Self-Control scores, at a level of significance of 5 %, therefore, being consistent with our formulated hypotheses (Figures 1 and 2).

Figure 1. Testing H gender & FSB score in R

```
> t.test(df$FSB_score~df$GENDER)

        Welch Two Sample t-test

data:  df$FSB_score by df$GENDER
t = -2, df = 2000, p-value = 0.03
alternative hypothesis: true difference in means is not equal to 0
95 percent confidence interval:
 -0.1904 -0.0108
sample estimates:
 mean in group Feminin mean in group Masculin
                  3.23                   3.33
```

Source: Own research.

Figure 2. Testing H gender & SC score in R

```
> t.test(df$SC_score~df$GENDER)

        Welch Two Sample t-test

data:  df$SC_score by df$GENDER
t = -1.9964, df = 1878.5, p-value = 0.04603
alternative hypothesis: true difference in means is not equal to 0
95 percent confidence interval:
 -0.132029069 -0.001173492
sample estimates:
 mean in group Feminin mean in group Masculin
              2.950174               3.016775
```

Source: Own research.

5. Findings. Conclusions

This exploratory research reiterates the gender difference amongst male and female financial savings behaviour and self-control. The implications could be important when developing financial education programs and gender-targeted training might prove more successful, especially when addressing the enhancement of self-control ability. This finding could be paramount in the current context, whereas financial education initiatives to date do not appear to have a significant effect on financial saving behaviour and this weak impact seems to disappear in the long-term (Fernandes et al., 2014).

Figure 3. Regression Model in R

```
Call:
lm(formula = df$FSB_score ~ df$FSI + df$GENDER + df$Money_Other +
    df$Age + df.sc$score_IV1 + df.sc$score_IV2)

Residuals:
     Min       1Q   Median       3Q      Max
-2.69950 -0.56702  0.04865  0.58839  2.73865

Coefficients:
                                          Estimate Std. Error t value Pr(>|t|)
(Intercept)                               3.022878   0.138721  21.791  < 2e-16 ***
df$FSI101 - 250 RON/lună                  0.235618   0.045215   5.211 2.04e-07 ***
df$FSI251 - 500 RON/lună                  0.292261   0.053341   5.479 4.73e-08 ***
df$FSInimic                              -0.793265   0.063735 -12.446  < 2e-16 ***
df$FSIPeste 500 RON/lună                  0.397349   0.059724   6.653 3.56e-11 ***
df$GENDERMasculin                         0.068239   0.036465   1.871  0.06142 .
df$Money_Other201 - 300 RON              -0.069221   0.053154  -1.302  0.19295
df$Money_Other301 - 400 RON              -0.086483   0.060746  -1.424  0.15468
df$Money_Othernu primesc bani de buzunar  0.072867   0.092293   0.790  0.42989
df$Money_Otherpeste 400 RON              -0.143550   0.054624  -2.628  0.00865 **
df$Money_Othersub 100 RON                 0.044803   0.051156   0.876  0.38122
df$Age                                   -0.016982   0.006952  -2.443  0.01465 *
df.sc$score_IV1                           0.268547   0.025054  10.719  < 2e-16 ***
df.sc$score_IV2                          -0.104616   0.024616  -4.250 2.22e-05 ***
---
Signif. codes:  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1

Residual standard error: 0.8485 on 2350 degrees of freedom
Multiple R-squared:  0.1723,    Adjusted R-squared:  0.1677
F-statistic: 37.63 on 13 and 2350 DF,  p-value: < 2.2e-16
```

Source: Own research.

The preliminary results (Figure 3) indicate that age appears to have a small but significant negative effect on the level of financial savings behaviour. This reinforces the importance of developing financial education programs for youth at an earlier age, as part of the National Strategy for Financial Education, currently under development under the coordination of the National Bank of Romania.

The gender variable, male, exerts a very weak positive effect on savings behaviour, which is consistent with our hypothesis and can only accentuate the importance of prioritising vulnerable female groups in designing the National Strategy for Financial Education.

Interestingly, we could have expected that the level of income and the level of financial education to implicate a high prediction of the level of savings. However, our regression model does not include financial education among the explanatory variables, in line with the findings of Fernandes et al.’s meta-study (2014), which concludes that current financial education initiatives are not effective. Amongst the level of income variables (*Money Own, Money Others, Household Income*), uniquely

money received from others has a significant effect on saving behaviour, but the impact is negative and solely when the level of money received from others is at the highest level, above 400 RON. This finding is astonishing from a policy-maker perspective, as it is a classical conception that more disposable income could lead to higher level of savings. However, in the context of the youth population under research, this result could be explained by the lack of awareness of the value of money, *'easy come, easy go*', money not earned through own effort seems to swiftly be converted into expenditure. Alternatively, the negative impact on savings behaviour of the higher level of money received from others could indicate that the young population under analysis does not have any long-term savings goals or the savings' goals they have are small in value and, if they receive an extra amount of money, their tendency would be to spend it. This conclusion is also supported by the fact that money earned through their own work did not entered the regression model to explain the financial saving behaviour.

Self-control appears to have a small negative, but significant effect on financial savings behaviour. This result is not consistent with our hypothesis. More research is needed, as this discrepancy with the literature to date could either suggest a specific characteristic of the Romanian youth population or the youth today require an additional motivation to exert their self-control on financial saving behaviour. Perhaps this additional motivation is linked to future orientation as it appears that this variable does not explain the savings behaviour, as hypnotised.

The empirical regression model constructed in this research does not contain any of the family social status variables, such as whether the young adult lives with family and how many siblings, the marital status of the parents, the household income, and the number of income earners in the household. From a research point of view, this is great news to show that there is a possibility for less long-term financial inequity based on family social status. However, it is recommended to further study this finding. The role of family, if not through social status, could be explored in the area of parental education and parental financial behaviour, as young adults have a natural tendency to replicate the behaviour of parents.

The findings suggest that financial education programmes for youth, in order to be effective, should explore the implication of family, gender-targeted training could prove useful, especially as it is a strong statistical result that there is a gender difference in financial saving behaviour and in self-control. Differences might be analysed to build the trainings on enhancing the positive differences and build capabilities for the negative differences. It is quite clear that the National Strategy for Financial Education in Romania could learn from the research on financial literacy, financial education, financial behaviour, and financial well-being, to present suggestions for an efficient financial education approach, involving, directly or indirectly, the family of the young person and focusing on enhancing skills, competences, and behaviour, targeting as a goal the population's financial well-being for long-term economic progress.

The value of this research is based on the novelty of studying the determinants of financial savings behaviour in a large sample of Romanian young adults. This is the first quantitative study of this type, to the best of our knowledge.

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Using Multivariate Multi-Step Bidirectional Long Short-Term Memory (BiLSTM) Networks Time Series Forecasting of Stock Price for Maritime Shipping Company in COVID-19 Period

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Abstract

The COVID-19 pandemic has had a significant impact on the global economy and the shipping industry. The pandemic has caused a reduction in shipping volumes and rates, resulting in financial challenges for the industry. This research paper investigates the impact of the COVID-19 pandemic on the increase in the prices of maritime shipping transport and the associated effect on the stock prices of shipping companies. The pandemic has caused significant disruptions in global trade, leading to an unprecedented surge in demand for shipping services, which has resulted in a considerable increase in freight rates. In this study, I will propose a forecasting method based on Multivariate Multi-step Bidirectional Long Short-Term Memory (Multivariate Multi-step BiLSTM) networks to predict stock prices for three of the most important companies in the world in maritime transport. BiLSTM is a deep learning algorithm that can capture both past and future temporal dependencies in time-series data, making it suitable for analysing and predicting stock prices. A novel optimisation method is proposed for stock price prediction. It is based on a Multivariate Multi-step Bidirectional Long Short-Term Memory (Multivariate Multi-step BiLSTM) model and utilises the Adam optimiser. Four accuracy measures are introduced into the system: Mean Absolute Error, Root Mean Squared Error, Median Absolute Percentage Error, and Mean Absolute Percentage Error. According to the experimental results, that using Multivariate Multi-step BiLSTM algorithm, 96.60 % prediction accuracy in the training data set and 96.80 % prediction accuracy in the testing data set were both obtained. Running the predictions for five days in the future, it is observed that the model has predicted that the prices would maintain their balance with little downward movement.

Keywords: bidirectional Long short-term memory, multivariate, COVID-19, Maritime transport, Predicting, Stock price.

JEL Classification: C22, C87, E27, F17.

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1. Introduction

The COVID-19 pandemic has brought about unprecedented challenges to the global economy, causing widespread disruptions to businesses and livelihoods. As countries have been struggling for the containment of the virus spread, the economic impact of the pandemic has been felt in many sectors, including, but not limited to, tourism and travel to manufacturing and supply chains.

According to the World Bank Group publications, the pandemic has led to the largest global recession in decades, with a projected decline in global GDP of 4.3 % in 2020 (World Bank Group, 2022). The exacerbated effects of the implementation of lockdowns and social distancing measures have resulted in reduced consumer spending, lower demand for goods and services, and higher unemployment rates.

The pandemic has also highlighted existing inequalities and vulnerabilities within the global economy. Low-income and vulnerable groups have been disproportionately affected, and many struggle to access essential services and support. Meanwhile, the pandemic has accelerated the shift toward digital technologies and e-commerce, leading to new opportunities for businesses and individuals who are able to adapt.

The COVID-19 pandemic has had its critical impact on the world economies, including the shipping industry. The pandemic has disrupted global supply chains, caused delays in shipments, and resulted in changes in consumer behaviour, which has affected the demand for goods transported by the shipping industry.

The shipping industry is a critical component of the global economy, with an estimated 80 % of world trade being carried by ships (UNCTAD, 2021). The pandemic has led to a decrease in the demand for goods, resulting in a drop in shipping volumes and rates. According to the Global Maritime Hub, the pandemic has caused a significant reduction in global trade. The global container trade decline over May 2020 was 11 % compared to the previous year (Global Maritime Hub, 2020). The reduction in shipping volumes and rates has caused financial challenges for the shipping industry, with many companies struggling to remain profitable.

In addition to the drop in shipping volumes and rates, the pandemic has also led to operational challenges for the shipping industry. Restrictions on crew changes and port operations have resulted in delays and increased costs. The industry has had to adapt to new health and safety protocols to prevent the spread of the virus, resulting in additional costs and reduced efficiency.

Despite these challenges, the shipping industry has shown resilience and adaptability during the pandemic. Companies have implemented new technologies and processes to maintain operations and ensure the safety of their crew members. Furthermore, the pandemic has accelerated the trend towards digitalisation in the shipping industry, leading to new opportunities for growth and efficiency.

The pandemic has also highlighted the importance of the shipping industry in facilitating global trade and economic recovery. The industry has played a vital role in ensuring the supply of essential goods such as medical supplies and food during the pandemic. As the world continues to grapple with the pandemic, the

shipping industry will continue to play a critical role in facilitating global trade and economic recovery.

The COVID-19 pandemic has had a significant impact on the global economy and the shipping industry. The pandemic has caused a reduction in shipping volumes and rates, resulting in financial challenges for the industry. The industry has also faced operational challenges due to restrictions on crew changes and port operations. However, the industry has shown resilience and adaptability during the pandemic, with companies implementing new technologies and processes to maintain operations and ensure the safety of their crew members. As the world continues to navigate the pandemic, the shipping industry will continue to play a crucial role in facilitating global trade and economic recovery.

The outbreak of COVID-19 has impacted the world in an unprecedented manner, leading to an urgent need for solutions to address the virus's impact on health, society, and the economy. One of the areas where machine learning models, such as the Long Short-Term Memory (LSTM) model, have shown great promise is in predicting the spread of the virus and assisting with decision-making.

LSTM is a type of recurrent neural network (RNN) that can process data with temporal dependencies. In other words, it can learn patterns from time series data and use those patterns to make predictions. This is particularly useful in predicting the spread of COVID-19, as the virus's progression is time-dependent.

Several studies have been conducted to analyse the effectiveness of LSTM models in predicting the spread of COVID-19. One such study published in the Journal of Procedia Computer Science used LSTM models to predict the number of positive cases of COVID-19 (Sunjaya et al., 2023). The study found that the LSTM models had high accuracy in predicting the number of positive cases of COVID-19, and this could help policymakers make informed decisions about public health interventions.

Another study published in the International Journal of Engineering Applications of Artificial Intelligence used LSTM models for predictability of time series of confirmed cases, deaths, and recoveries in 12 major countries that have been affected by COVID-19 (Zhou et al., 2023). The LSTM models, according to this study, are found to be among the most advanced models for accurately forecasting time series data for the spread of COVID-19 and could be useful in assisting public health officials in decision-making.

Being an extension of the LSTM model as well as a type of recurrent neural network (RNN), BILSTM is a model configuration that can learn patterns from time series data. BILSTM extends the LSTM model by processing data in both directions, forward and backward, allowing it to capture more complex patterns and dependencies in the data.

The effectiveness of BILSTM models in predicting COVID-19 outcomes has been analysed by several conducted studies in this regard. One such study published in the Journal of Chaos, Solitons & Fractals used BILSTM models of predictability of time series in relation to confirmed cases, deaths, and recoveries in the ten major countries hit by COVID-19 (Shahid et al., 2020). The conclusion of study was that

Bi-LSTM model is a predictor of choice for such sequential data, and that can predict with greater accuracy for confirmed cases, deaths, and recoveries of COVID-19.

In another study published in the journal of Results in Physics, Ayoobi et al. (2021) used a BILSTM model to forecast the rates of emerging cases and deaths in Australia and Iran. They concluded that the bidirectional models have lower errors than other models, which may provide useful data for organisations working against COVID-19 and determining their long-term plans.

The following sections of this paper are run as follows: Section 2 illustrates literary studies. Section 3 covers the concept of LSTM, BiLSTM, describing its functions. The proposed structure and methodology are presented in Section 4 to estimate stock prices. And the results come in Section 5. Finally, Section 6 sums up the conclusions and future directions.

2. Literature Review

Chimmula and Zhang (2020) conducted their research in which they presented the Long short-term memory (LSTM) networks as a deep learning approach to forecast the future COVID-19 cases. As per the results, the key conclusion was their ability to predict the potential ending point of this outbreak to take place around June 2020. Moreover, they compared the transmission rates of Canada with those of Italy and the USA. They also presented the 2, 4, 6, 8, 10, 12 and 14th day predictions for 2 successive days; their forecasts in the paper were based on the available data until March 31, 2020.

In another experiment, the proposed forecast models, according to Shahid et al. (2020), are comprised of autoregressive integrated moving average (ARIMA), support vector regression (SVR), long shot term memory (LSTM), bidirectional long short-term memory (Bi-LSTM) which were under assessment from the perspective of time series prediction of confirmed cases, deaths, and recoveries in ten major countries affected by COVID-19. Their conclusion stressed that Bi-LSTM is an appropriate predictor for such sequential data, having the feature of enhanced accuracy of predictability for similar other datasets, and providing a solid foundation for more appropriate planning and better management.

In a similar context, Ayoobi et al. (2021) conducted their study aiming at predicting new cases and deaths rate one, three and seven-day ahead during the next 100 days. Six diverse deep learning methods are examined on the data taken from the website of the World Health Organisation (WHO). The three methods are LSTM, Convolutional LSTM, and GRU. Then, the bidirectional extension is considered for the forecast the rate of new cases and new deaths with regard to each method in Australia and Iran. The key conclusion reached was that most of the time the bidirectional models outperform their non-bidirectional counterparts.

Arbane et al. (2022) however, proposed in their research a natural language processing (NLP) method based on Bidirectional Long Short-Term Memory (Bi-LSTM) technique to perform sentiment classification and uncover various issues related to COVID-19 public opinions; they tested the proposed model using four different scenarios conducted on real datasets extracted from Twitter and Reddit

social media platforms. They concluded that the proposed Bi-LSTM model has superiority over the conventional LSTM model as well as other recent state-of-the-art models.

Sunjaya et al. (2022) conducted research with the objective of predicting the number of positive cases of COVID-19 in Indonesia using the ARIMA and LSTM methods. The two methods were compared to obtain the best method to predict COVID-19 positive cases. The dataset used in this research is the number of positive cases of COVID-19 in Indonesia from 2020 to 2022. The key conclusion, based on the comparison results of the RMSE and MAPE values on the ARIMA and LSTM models, was that the LSTM model is better than ARIMA.

Not far from that perspective, Zhou et al. (2023) proposed forecast models consisting of time series models such as LSTM, Bi-LSTM, GRU, and dense-LSTM that have been evaluated for time series predictability of confirmed cases, deaths, and recoveries in the 12 major countries hit by COVID-19. Their key conclusion was that the LSTM models had the highest prediction error and the highest prediction accuracy for the daily new confirmed case data in the 12 countries.

The proposed method, a demand forecasting method based on multi-layer LSTM networks, by Abbasimehr et al. (2020) was compared with some well-known time series forecasting techniques from both statistical and computational intelligence methods. These methods include autoregressive integrated moving average (ARIMA), exponential smoothing (ETS), artificial neural network (ANN), K-nearest neighbours (KNN), recurrent neural network (RNN), support vector machines (SVM) and single layer LSTM. Their key conclusion reached was that the proposed method multi-layer LSTM provides better results among the tested methods in terms of performance measures.

Miao et al. (2020) proposed a novel LSTM framework for short-term fog forecasting. The proposed network framework consists of an LSTM network with a fully connected layer where the meteorological element observation data returned hourly is transferred into time series data. They compared the LSTM framework with K-Nearest Neighbour (KNN), AdaBoost, and convolutional neural network (CNN) algorithms. The key conclusion was that the proposed LSTM framework achieves the best prediction performance in four evaluation criteria. Especially in TS-Score.

From a different paradigm, stock forecasting was optimised by a new model designed by Gao et al. (2021), where a range of technical indicators were incorporated, including investor sentiment indicators and financial data, and performed dimension reduction on the many influencing factors of the retrieved stock price using depth learning LASSO and PCA approaches. Moreover, they performed a comparison of the performances of LSTM and GRU for stock market forecasting under various parameters. Their key conclusions were: (1) stock prices can be predicted more effectively by using both LSTM and GRU models, and (2) the prediction results of the two neural network models, for different dimension reduction methods, using LASSO dimension reduction, are mostly better than those using PCA dimension reduction data.

Chen et al. (2022) proposed a novel hybrid deep learning approach to improve prediction performance. By modifying the distance measurement algorithm in DTW, an improved K-means clustering algorithm is proposed to cluster banks with similar price trends. Then, those clustered stocks are used to train a long- and short-term memory (LSTM) neural network model for static and dynamic stock price prediction. Besides, the performance of the long-term forecasts is improved by transforming the output of the LSTM network into multi-step output to predict multi-time intervals at one time.

Their key conclusions were as follows: The model based on K-means modifying the distance formula to DTW can effectively cluster the stock price trends. Using clustered data can overcome the inadequacy of using only historical data; LSTM neural networks have higher prediction accuracy, stronger prediction ability, and better generalisation ability for actual financial time series data, compared to machine learning algorithms such as multilayer perceptron and SVM and traditional statistical models such as GARCH. The empirical results show that the performance of the multi-step output static method is significantly better than the dynamic prediction.

Quadir Md et al. (2022) proposed in their research an original approach for the optimisation of stock price prediction, based on an MLS LSTM model which makes use of the Adam optimiser. They concluded that a 95.9 % prediction accuracy is achieved on the training dataset, and a 98.1 % accuracy on the testing dataset with the MLS LSTM algorithm, dramatically exceeding the performance of other machine learning and deep learning algorithms.

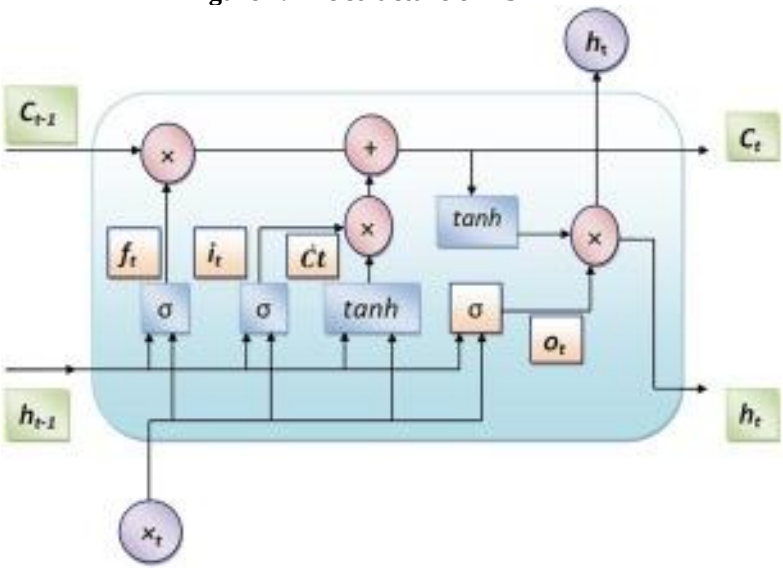
In their paper, Ren et al. (2020), considering the lag of investors' response to the stock price, they chose BIAS as a measure index after news happened for a period to analyse the impact of the news media on stock price trends. They established a model to predict the short-term trend of stock prices using news text data, based on the DBLSTM (Deep Bidirectional Long Short-Term Memory) model. They concluded that their adopted model outperforms other models in terms of prediction accuracy.

Sirisha et al. (2023), put forward a deep-learning (DL) technique proficient to tackle the setback of conventional forecasting techniques and display precise forecasting. The proposed technique is a Stacked Bidirectional long-short term memory architecture, as an improvised version of existing Bidirectional LSTM in which multiple Bidirectional LSTM blocks are stacked, such that each layer contains multiple cells. Based on fair assessment, the functioning of the proposed technique is compared with existing LSTMs. They reached that the key conclusion was that the proposed Deep Bidirectional long short-term memory model exceeds standard approaches.

3. Long Short-Term Memory (LSTM)

This memory is used efficiently in the Deep Learning field and LSTM means long short-term memory networks. It is a type of recurrent neural networks (RNNs) which are able of learning long-term dependencies, especially in the sequence of prediction problems. The LSTM cell is composed of four sections: firstly, the cell states, secondly the input gate, thirdly the forget gate, and finally the output gate. These four parts are used by LSTM to keep the data sequence of long-term and short-term dependencies. LSTM has feedback connections, i.e., it is able to process the entire sequence of data, regardless of single data points such as images. It has the ability to be used in some applications such as speech recognition, machine translation, etc. LSTM is a special type of RNN, which shows outstanding performance on a wide variety of problems. The LSTM has three control units, as shown in Fig. 1: input gate (i_t), output gate (o_t), and forget gate (f_t) (Joshi et al., 2022).

Figure 1. The structure of LSTM



Source: Joshi et al. (2022).

The forget gate f_t uses x_t and h_{t-1} as input to compute the information to be preserved in c_{t-1} using a sigmoid activation.

The input gate i_t takes x_t and h_{t-1} to compute the value of c_t.

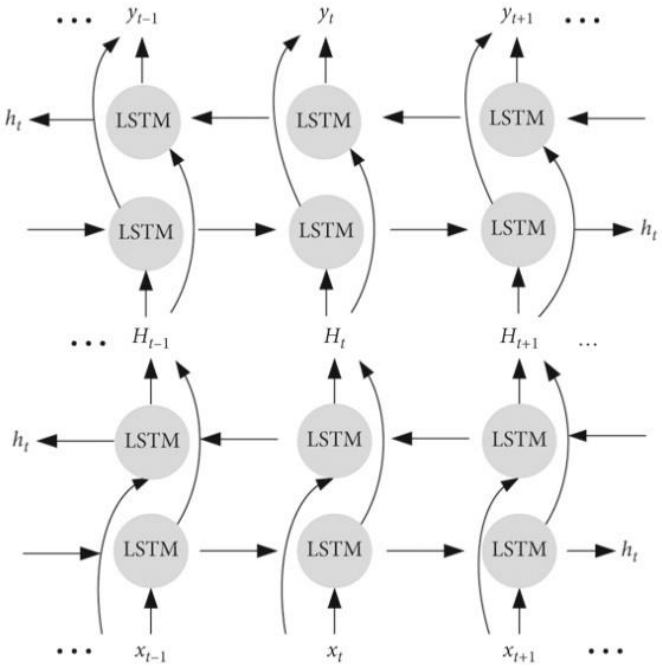
The output gate o_t performs regulation on the output of an LSTM cell by considering c_t and applying both sigmoid and tanh layers.

3.1 Bidirectional LSTM

Traditional LSTM only presents the previous data because it receives inputs, especially in the forward manner through hidden states. To address

this problem, Bidirectional LSTM (BiLSTM) has been adapted. In BiLSTM, inputs could be processed in two directions simultaneously (forward and backward), one direction from before future and the other direction from future to previous. The result is generated by gathering the outputs of two LSTMs. Compared to LSTM, BiLSTM generates superior results for the same input sequence. LSTM maintains long-term dependencies between the temporal phases of sequential data (Joshi et al., 2022).

Figure 2. The network structure of BiLSTM



Source: Peng et al. (2021).

The following equations are used in gates updating:

$$f_t = \sigma_g\left(W_{xf}U_t + V_{hf}h_{t-1} + b_f\right) \quad (1)$$
$$i_t = \sigma_g(W_{xi}U_t + V_{hi}h_{t-1} + b_i) \quad (2)$$
$$o_t = \sigma_g(W_{xo}U_t + V_{ho}h_{t-1} + b_o) \quad (3)$$
$$\dot{C}_t = tanh(W_{xc}U_t + V_{hc}h_{t-1} + b_c) \quad (4)$$
$$C_t = f_t * C_{t-1} + i_t * \dot{C}_t \quad (5)$$
$$h_t = o_t * tanh(C_t) \quad (6)$$

U_t= input at time t, h_{t-1}= previous hidden state, h_t= hidden state at time t.

C_t= memory cell output, $\dot{C}_t$= intermediate cell output.
$b_f, b_i, b_o,$ and b_c= bias vectors.
$V_{hf}, V_{hi}, V_{ho},$ and V_{hc}= three gates and weight matrices that link the output state of the preceding cell to the input cell state.
$W_{xf}, W_{xi}, W_{xo},$ and W_{xc}= weight matrices are used to calculate the hidden layer input to three gates, as well as the state of the input cell.
σ_g= gate activation function, $tanh$= state activation function.

An output vector is generated by the BiLSTM layer - y_t:

$$\overrightarrow{h_t} = \sigma_h\left(W_{x\vec{h}}U_t + W_{\vec{h}\vec{h}}\overrightarrow{h_{t-1}} + b_{\vec{h}}\right) \quad (7)$$

$$\overleftarrow{h_t} = \sigma_h\left(W_{x\overleftarrow{h}}U_t + W_{\overleftarrow{h}\overleftarrow{h}}\overleftarrow{h_{t-1}} + b_{\overleftarrow{h}}\right) \quad (8)$$

$$y_t = W_{\overrightarrow{hy}}\vec{h}_t + W_{\overleftarrow{hy}}\overleftarrow{h}_t + b_y \quad (9)$$

4. Proposed Methodology

The aim of this study is to use deep learning techniques, including Multivariate Multi-step Bi-LSTM, Multi-step LSTM, and Multi-step GRU, to predict the stock prices of three shipping companies: Yang Ming, Evergreen, and COSCO. For evaluation purposes, the study follows a specific procedure, which includes: (1) historical data collection for Yang Ming, Evergreen, and COSCO; (2) exploratory data visualisation; (3) splitting each dataset into test dataset and train dataset; (4) training the three types of models (Multivariate Multi-step Bi-LSTM, Multi-step LSTM, and Multi-step GRU); (5) testing the models; (6) comparing the performance of each model.

Data preparation and sequential Bi-LSTM are the two primary components of Multivariate Multi-step Bi-LSTM. The sequential Bi-LSTM consists of 5 layers out of which 3 layers are vanilla Bi-LSTM and the other layers is Dense. Many layers produce better results but require much more computational power, thus a trade-off between performance and resource usage is reached with five layers. The Open, High, Low, Close, Volume columns are extracted from the main dataset, and used as input for the Multivariate Multi-step Bi-LSTM after being checked for any null values.

Multivariate Multi-step Bi-LSTM much like any other LSTM, it needs to feed its data as time steps. Based on the experimental results, a time step of 50 data points is used, with the last 20 records from the data used for testing and the remainder for training. Mean Absolute Error (MAE), Root Mean Squared Error (RMSE), Median Absolute Percentage Error (MDAPE), and Mean Absolute Percentage Error (MAPE) are used to evaluate the Multivariate Multi-step Bi-LSTM performance.

I used a variety of pre-processing techniques on the stock price data to prepare it for deep learning processing. Handling the missing data is the first step to start with when embarking on cleaning data, by simply scanning each row of the dataset

to check for missing values, and clearly observing the absence of NA values in the columns Open, High, Low, Close, Adj, and Volume.

Then I reshaped the data to be compatible with the application of Bi-LSTM. The data is transformed into time steps to make it fit for the Bi-LSTM model. The step value is taken to be 50. Then, the training data is reshaped to fit the intended Bi-LSTM model to be built. The reshape function combines three parameters: the sample size, the time step, and the number of features. For the proposed Multivariate Multi-step Bi-LSTM algorithm, the sample size is the number of rows in the training set, which is 1211 for Ming, Evergreen, and COSCO datasets. As previously mentioned, the time step is 50. As a result of using the Open, High, Low, Close, and Volume columns, the data feature size will be 5.

Feature scaling is performed on the dataset after its visualisation, which helps to normalise all the data in the dataset using Eq. (10) which may fall between different ranges, converting them into a new range of any given choice, envisaged usually 0 to 1. Non-normalisation of the data may lead to large gradient error values, yielding very large, and thus unstable weight values for the LSTM model. MinMaxScaler, available in the sklearn preprocessing library, is used to normalise the data. It helps to scale all columns of data between values of 0 and 1. Preserving the shape of the dataset, without any distortion, is the reason to choose MinMaxScaler. The following equation yields the transformation:

$$x' = \frac{(X - Xmin)}{(Xmax - Xmin)} \tag{10}$$

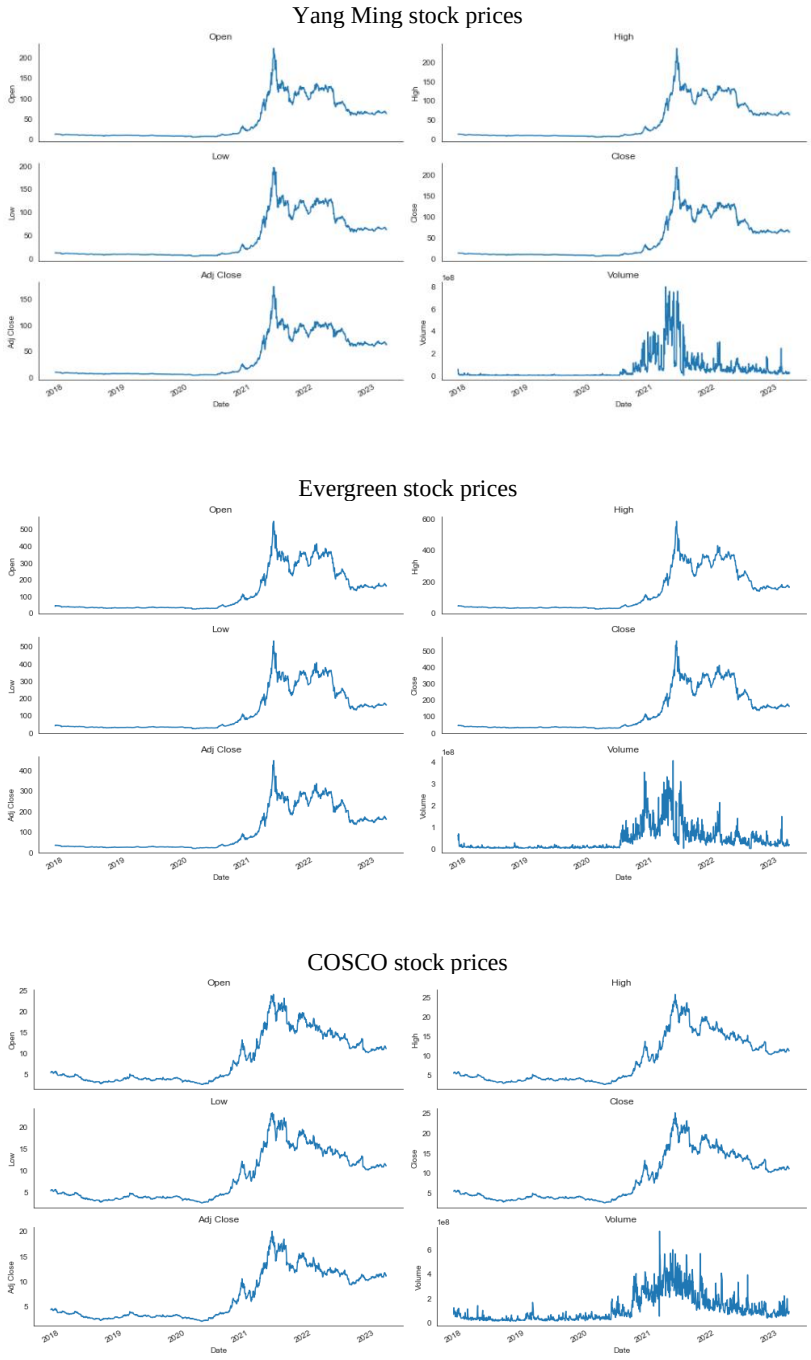
where *x* is an original value, and x' is the normalised value. As a result, in this study, I used the MinMaxScalar to scale the data.

The data is divided into training and testing sets as the process progresses. The data is split into the above-mentioned parts for the last 20 records from the data for testing data and the remainder for training data.

The experiments were conducted using Python 3.9.7 and relevant libraries such as Pandas, NumPy, scikit-learn, Keras, and Matplotlib. The model was trained and run on an i7-6500U Intel Core CPU with a 2.50 GHz machine with 12 GB ram and were implemented in Python 3.9.7 and several core libraries, using Jupyter Notebook server 6.4.5.

Figure 3 shows the line plot demonstrating a fair idea about the progression of the value of the Yang Ming, Evergreen, and COSCO stock price over time starting from January 2018 to May 2023. Following is the extraction of the maximum and minimum closing prices of the stock along with the date of the valuation from the data, and the five last values are shown in Table 1.

Figure 3. Value of the Ming, Evergreen, COSCO stocks price over 5 years



Source: Authors' own research.

Table 1. Last 5 days stocks price for Yang Ming, Evergreen, and COSCO

	Yang Ming	Evergreen	COSCO
2023-04-24	64.699997	165.0	11.35
2023-04-25	63.700001	162.0	11.26
2023-04-26	62.400002	160.0	11.08
2023-04-27	61.700001	159.0	10.96
2023-04-28	63.099998	161.5	11.11

Source: Authors' own research.

It is observed that regarding the stock prices of COSCO, Evergreen, and Yang Ming. On 22-05-2020, the lowest price for COSCO stock was 2.41, while Evergreen recorded 22.75 on 01-04-2020, and Yang Ming reached a low of 4.73 on 19-03-2020. These lows occurred during the same period when COVID-19 started to become a global concern. Conversely, the peak valuation for COSCO stock was observed on 07-07-2021, with a closing price of 25.07. For Evergreen, the highest valuation was 560 on 06-07-2021, and for Yang Ming, it was 216.5 on 08-07-2021. These periods coincided with the time when container transport prices reached their highest levels due to the impact of the pandemic. As of July 30th, the estimated prices for transporting containers from Shanghai to EC America (base port) were $9720 for a 20-foot container, $10067 for a 40-foot container to S America (Santos), and $8,102 for a 20-foot container to W Africa (Lagos), (UNCTAD, Nov. 2021).

The datasets used in the experiment are Yang Ming, COSCO, and Evergreen stock prices recorded between 01 January 2018 and 01 May 2023, extended over the five-year range period. The dataset was extracted from the website of Yahoo Finances. Table 2 shows the specification of the used parameters.

Table 2. Dataset specifications.

Parameter	Description	Data Type
Date	Date of the observation.	Date
Open	Daily opening price of the selected stock.	Number
High	Daily high price of the selected stock.	Number
Low	Daily low price of the selected stock.	Number
Close	Daily close price of the selected stock.	Number
Close Adj Close	Daily Adjusted close price of the selected stock.	Number

Source: Phumudzo Lloyd Seabee y al. (2023).

The prediction of stock prices is accomplished in the following stage, that aims to build the Multivariate Multi-step Bi-LSTM model for this function, setting the type of model to be sequential, which means that data is fed to all the layers of the Bi-LSTM model in a sequential manner. The intended Multivariate Multi-step Bi-LSTM model consists of five layers, which are revealed as the optimal number of layers for accurate predictions while avoiding overfitting. The first layer is Bi-LSTM layer, the input shape of the layer is defined as (50,5) because of the chosen time-step of 50, indicating that each input is of size 50 and there are 5 feature columns set as the input, setting the number of Bi-LSTM cells as (100). The second

is also a Bi-LSTM layer of shape (50); and in the same way, the third is also a Bi-LSTM layer with shape (50), the fourth is a dense layer with shape (5). The final layer is the dense layer of shape (5) which is the number of days to be predicted. This indicates that all the output layers of the previous layer are densely connected (fully connected) to the output layer of the model. The optimiser used is adam, and the loss function is mean squared error.

After the model is built, it is compiled with a batch size of 5 and an epoch size of 100, indicating that the data is combined together in batches of 5 and fed into the Bi-LSTM model. 100 epochs correlate that the data is fed to the model 100 times. After training, the training data is used to make predictions. The predicted data needs to be normalised back to the normal scale, which is done using the inverse transform () function. Once the data has been inverse-scaled, the accuracy measures can be obtained by comparing the inverse-scaled data with the original data, which is, then, used to gauge the performance of the model MAPE.

5. Results

For predicting stock prices and comparing them with the original values, training and test data are used. The proposed algorithm's accuracy is measured by a set of metrics: Mean Absolute Error (MAE), Root Mean Squared Error (RMSE), Median Absolute Percentage Error (MDAPE), and Mean Absolute Percentage Error (MAPE), The first metric used to be known as (MAE), is the average of the absolute value of the deviation of all individual observations, which can prevent the issue of incorrect mutual cancellation and accurately reflect the magnitude of the actual forecast error as shown in Eq. (11).

$$MAE = \frac{1}{n}\sum_{1}^{n}\left|X_t - \acute{X}_t\right| \tag{11}$$

The Root Mean Square Error (RMSE), whose range is 0 to infinity, describes the expected value of the square of the error caused by the predicted value and the true value as shown in Eq. (12):

$$RMSE = \sqrt{\frac{1}{n}\sum_{1}^{n}(X_t - \acute{X}_t)^2} \tag{12}$$

The median of all absolute percentage errors calculated between the predictions and their corresponding actual values is known as the Median Absolute Percentage Error (MDAPE). In contrast to MAPE, this metric uses the median to reduce the potential impact of outliers, as demonstrated in Eq. (13) (Xin Wen et al., 2022):

$$MDAPE = \text{median}\left(\left|\frac{X_t - \acute{X}_t}{X_t}\right|\right) \tag{13}$$

A prediction model's accuracy can be determined using the Mean Absolute Percentage Error (MAPE) metric. It is measured as a percentage, and its value can be determined by calculating the average modulus of the actual value of observation minus forecasted observation divided by the actual value of observation, as shown in Eq. (14).

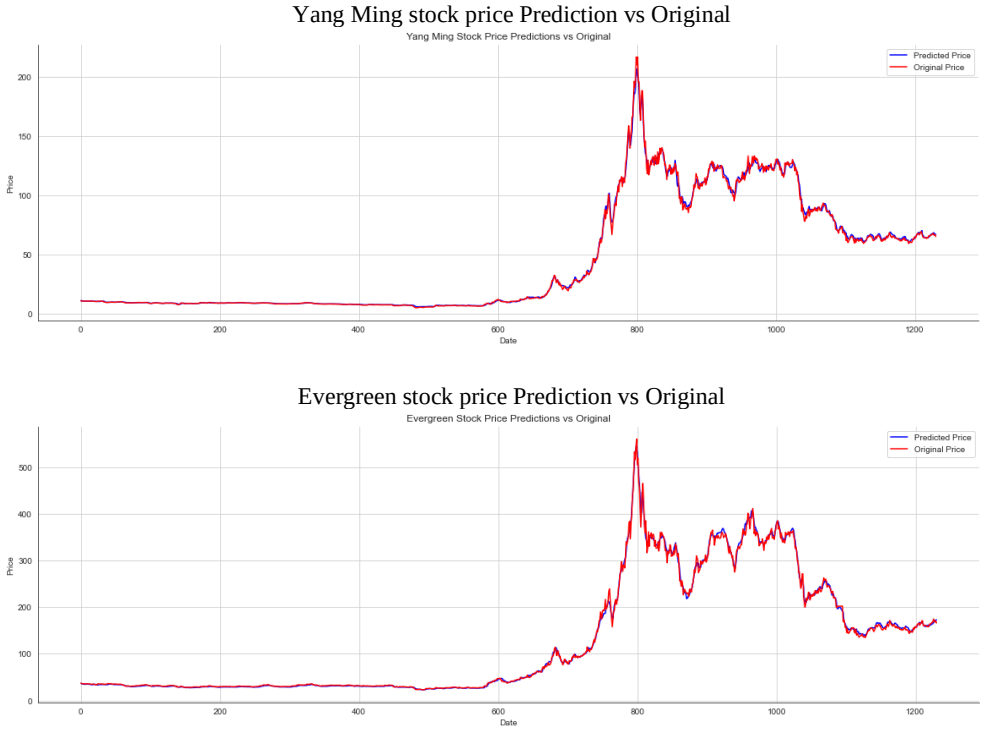
$$MAPE = \frac{1}{n} \sum_{1}^{n} \left| \frac{X_t - \acute{X}_t}{X_t} \right| \tag{14}$$

where X_t is the actual value, $\acute{X}_t$ is the forecast value, and n is sample size.

The average Mean Absolute Percentage Error (MAPE) of the three stocks of shipping companies that got from the model on train data is 3.40 and on test data is 3.20, which means that its performance accuracy is 96.60 % on training data and with an accuracy of 96.80 % on testing data.

For the purpose of illustrating the accuracy of forecasting by Multivariate Multi-step Bi-LSTM, the stock price on a particular date and the forecasted stock price are shown in Fig.4 and tabulated in Table 3. The model's predictions are exceptionally accurate as seen by the extremely high overlap between the actual stock price and the predicted stock prices.

Figure 4. Original and predicted values for Yang Ming, Evergreen, COSCO stocks price



COSCO stock price Prediction vs Original

Source: Authors' own research.

Table 3. Comparison of Original stock price with the predicted stock price for Yang Ming, Evergreen, COSCO

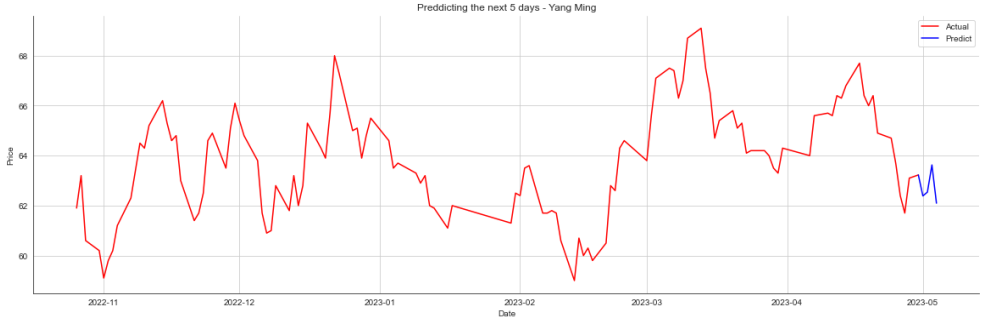
Yang Ming		Evergreen		COSCO	
original	**predicted**	**original**	**predicted**	**original**	**predicted**
65.30000305	66.13468	161.5	162.70284	11.35000038	11.122854
64.09999847	65.82395	159.5	161.2883	11.30000019	11.106308
64.19999695	64.365364	160.5	158.74097	11.25	11.170407
64.19999695	63.811657	161.0	158.46455	11.22000027	11.220832
64.00	63.76806	160.5	158.8813	11.43000031	11.2364855

Source: Authors' own research.

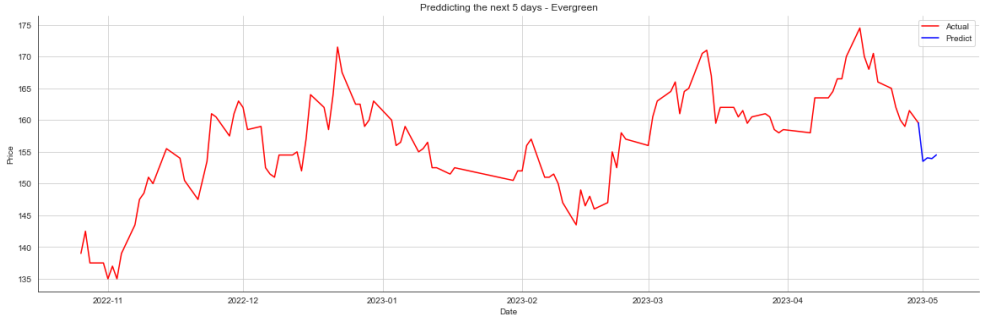
After that, I will run the forecasts for the next five days by feeding the model the stock prices from the previous 50 trading days; It can be seen that the model produced and calculated the prediction shown in Fig. 5 and tabulated in Table 4 for the respective companies (Yang Ming, Evergreen, and COSCO).

Figure 5. Original and predicted values for Yang Ming, Evergreen, COSCO stocks price

Predict the next 5 days – Yang Ming



Predict the next 5 days – Evergreen



Predict the next 5 days – COSCO

Source: Authors' own research.

Table 4. Predicted values for 5 days for COSCO, Evergreen, Yang Ming

Yang Ming	Evergreen	COSCO
63.226921	159.552673	11.280349
62.387566	153.504135	10.981813
62.540276	154.056610	11.015346
63.627842	153.932785	11.209640
62.096630	154.523544	11.005470

Source: Authors' own research.

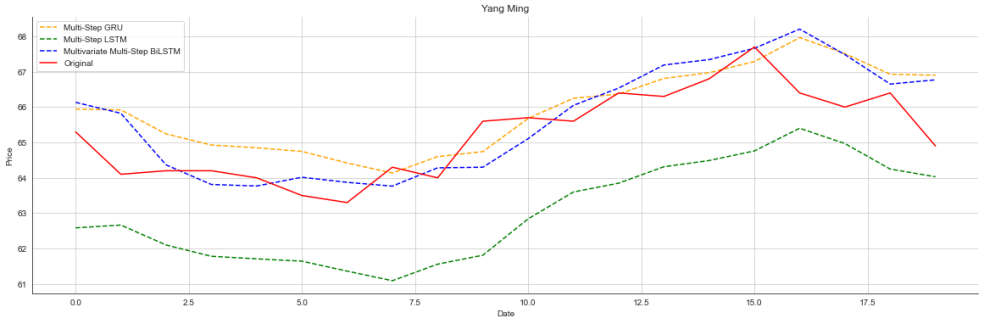
In comparison, the model suggested that sea shipping prices would remain stable with little downward movement, which would have a positive effect on the industry by reducing prices. However, predicting stock prices, particularly for transportation/ shipping companies, is challenging due to the multitude of variables that can influence stock values. These variables include political and logistical issues, internal conflicts within companies, and external factors such as wars and natural disasters such as pandemics. The COVID-19 pandemic clearly demonstrated the substantial volatility in the stock values of transportation/shipping corporations. Therefore, forecasting stock prices over an extended period is challenging given the unpredictable nature of these factors.

To validate the effectiveness of the proposed model, compare it to other models such as Multi-step LSTM, and Multi-step GRU on the three stock datasets (Yang

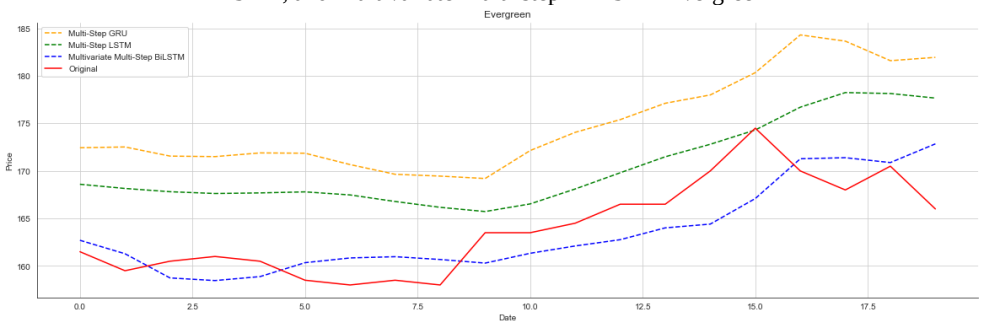
Ming, Evergreen, and COSCO). After training the Multivariate Multi-step Bi-LSTM, Multi-step LSTM, and Multi-step GRU models with the processed training set data, the model is used to predict the test set data. As illustrated in Figure 6, the real value is compared to the predicted value.

Figure 6. Comparison of the predicted value and the real value for Multi-step GRU, Multi-step LSTM, and Multivariate Multi-step Bi-LSTM on Yang Ming, Evergreen, COSCO test data

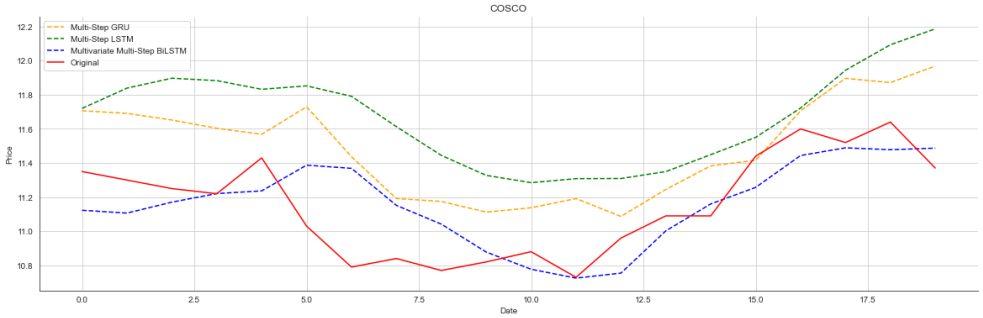
Comparison between predicted value and actual value for Multi-step GRU COSCO, Multi-step LSTM, and Multivariate Multi-step Bi-LSTM Yang Ming



Comparison between predicted value and actual value for Multi-step GRU COSCO, Multi-step LSTM, and Multivariate Multi-step Bi-LSTM Evergreen



Comparison between predicted value and actual value for Multi-step GRU COSCO, Multi-step LSTM, and Multivariate Multi-step Bi-LSTM COSCO



Source: Authors' own research.

Figure 6 shows the broken line fitting degree of real value and predicted value for Multivariate Multi-step Bi-LSTM, Multi-step LSTM, and Multi-step GRU among the three predicting algorithms. There is a significant overlap between the actual value and the predicted value by the Multivariate Multi-step Bi-LSTM model. Regarding the predicted value and real value of each method, the evaluation index of each method can be calculated, and the comparison results of the three methods are tabulated in Table 5.

Table 5. Forecast errors of different network models

Yang Ming				
	MAE	**RMSE**	**MDAPE**	**MAPE**
Multi-Step GRU	2.45	3.05	2.9	3.79
Multi-Step LSTM	1.82	2.21	2.89	2.81
Multivariate Multi-Step Bi-LSTM	1.65	2.17	2.08	2.53
Evergreen				
	MAE	**RMSE**	**MDAPE**	**MAPE**
Multi-Step GRU	6.94	8.07	4.27	4.24
Multi-Step LSTM	6.07	7.22	3.64	3.71
Multivariate Multi-Step Bi-LSTM	6.06	7.54	2.77	3.66
COSCO				
	MAE	**RMSE**	**MDAPE**	**MAPE**
Multi-Step GRU	0.49	0.61	3.45	4.45
Multi-Step LSTM	0.48	0.55	4.09	4.31
Multivariate Multi-Step Bi-LSTM	0.38	0.49	2.53	3.41

Source: Authors' own research.

In Table 5, the MAE, RMSE, MDAPE, and MAPE of Multi-Step GRU are the highest, whereas the MAE, RMSE, MDAPE, and MAPE of Multivariate Multi-step Bi-LSTM are the lowest. The results demonstrate that Multivariate Multi-step Bi-LSTM outperforms the other two methods. In terms of prediction accuracy, MAE, RMSE, MDAPE, and MAPE are the lowest and most accurate of the three prediction models.

6. Conclusions

This research paper proposes a new approach for stock price predictability based on a Multivariate Multi-step Bi-LSTM model that makes use of the Adam optimiser. The Multivariate Multi-step Bi-LSTM method divides normalised time series data into time steps to determine the relationship between past and future values for accurate prediction. A prediction accuracy of 96.60 % and 96.80 % on the testing data set was attained using Multivariate Multi-step Bi-LSTM. The proposed model predicts the values with an average error percentage of 3.20 % on the testing data and 3.40 % on the training data, which is significantly low, resulting in highly accurate forecasts. By running the forecasting for five days in the future, it is observed that the model indicated that prices would remain stable with little downward movement, leading to a positive impact on sea shipping with lower prices

expected. The performance of Multivariate Multi-step Bi-LSTM is the best among the three methods, according to the results of a comparison of the three methods (Multi-step GRU, Multi-step LSTM, and Multivariate Multi-step Bi-LSTM). The results demonstrate that Multivariate Multi-step Bi-LSTM outperforms the other two methods. In terms of prediction accuracy, MAE, RMSE, MDAPE, and MAPE are the lowest and most accurate of the three prediction models. This research has some limitations, including, but not limited to:

- Time limitations: it covers the datasets that are relevant to the duration of COVID-19 period;
- Scope limitations: the various data utilised by the model in relation to the external variables/factors such as political and logistical issues, as well as the opinions and emotions/perceptions held by most investors are not taken into consideration for the prediction period;
- Feasibility: The prediction of the stock closure price is only for the five following days; this has a very limited referential value for investors who prefer to have prediction values for much longer periods to make better investment decisions.

Therefore, future researchers need to focus on increasing prediction accuracy by developing an integrated model of Multivariate Multi-step Bi-LSTM with other deep learning technologies, while using more quantitative and qualitative variables as inputs in the prediction model.

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A Management Accounting Teaching Strategy for Student Engagement

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Abstract

Traditionally, a cohort of students receives the same homework. Therefore, it is easy for them to take the solution from a colleague or website, which will have the consequence that they will not accumulate the knowledge and/or competence for the respective applications. The research question of this paper is: How can a professor determine students to engage in Management accounting and Performance measurement and control homework? The paper presents a teaching strategy that is useful for disciplines related to management accounting. It involves the creation of applications in which the amounts (variables) are missing. The students have to complete the text with some specific data for each of them. Applications for all the chapters included in the syllabus of Management Accounting and Performance Measurement and Control were created. The text and solutions to the example built for "Internal transfer price", and answers to a questionnaire are included in this paper. The study improves the literature on the strategies which can be used in teaching Management accounting, in order to ensure the student engagement with the assignment. Also, the described teaching method is useful both in an online and offline environment, as it is more likely for the students to find the motivation to solve the applications.

Keywords: teaching strategy, management accounting, deep learning, student engagement, homework, transfer pricing.

JEL Classification: A20, A22.

1. Introduction

Management accounting-related content is taught in a smaller number of classes than financial accounting. It involves some previous knowledge of economics, mathematics, and marketing (Kovar, Evans, 2001; Spraakman, Jakcling, 2014; van den Brink et al., 2003), a correlation between chapters, a degree of interpretation of data, and decisions that a student has to make on his or her own. Thus, it is considered

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difficult by many students. A tool available to teachers is homework. Starting from these ideas, the research question is as follows: How can a professor determine students to engage in Management Accounting and Performance Measurement and Control homework?

Constant learning is necessary in Management Accounting (MA) to allow students to make progress. They have to use the concepts from several chapters for a case study, and it is very difficult to do well on exams if they cannot understand the complete picture. Usually, homework is based on textbooks and is the same for the entire cohort. In addition, homework and textbooks are almost the same from one cohort to another. This means that it is easy for students to take the solutions from a peer or to find them on the Internet. The strategy described here is important because it obliges students to solve the applications themselves, as they are specific to each person. In this way, discussing about the solution with colleagues may even be considered a part of the learning process (Nnadi, Rosser, 2014). The first examples were developed during the online teaching caused by the pandemic. So, I consider that the approach is particularly useful in the online environment, when the professor cannot proctor in any way the activity of the students.

To answer the research question, I introduce a teaching strategy based on applications with variables specific to each student. They are created for each chapter taught in MA and Performance Measurement and Control (PMC), disciplines included in the second and, respectively, third year of studies at the undergraduate level in the Faculty of Accounting and Management Information Systems, Bucharest University of Economic Studies. Both disciplines are compulsory. There is no figure included in the examples, but only variables that can be replaced with data characteristic for students (e.g., birth date, number in the group or cohort in alphabetical order, mother's birth date). The examples can be solved during the class or as a homework by the students. The professor collects the data from the beginning of the semester, so that she or he can check the text and the solution of the students. Additionally, I present the results obtained on a questionnaire for one lecture (i.e., in which transfer pricing was discussed). I designed the questionnaire to encourage the students to connect what they learn with their previous knowledge.

The contribution of the study is that it provides an idea for the professors to determine the students' engagement in their learning process. It is an alternative to traditional lectures and traditional applications given to students (Lord, Robertson, 2006). It contributes to the literature in which the professor is presented as more than a person who transmits information.

2. Problem Statement

'The success with which students are able to achieve understanding [in lectures] may depend critically on the capacity of the higher education teacher to recognise and build from students' existing conceptions and to anchor new knowledge in a meaningful framework' (Hounsell, in Mulligan and Kirkpatrick, 2000, p. 312). Examples of the context with which the students are familiar increase the relevance

of the new aspects studied. Lecturers should be able to present the material in an understandable language (Lord, Robertson, 2006).

Nowaday, the lecturer has to have the abilities to help students in ways that are not available to them in other modes. For instance, a lecturer extracts the essential part, thus transmitting more than a student can learn by himself (Lord, Robertson, 2006), presents the most recent developments in the field, beyond the textbooks, "synthesises, analyses, and critiques" other perspectives (Baldwin, 1993; Isaacs, 1989). She or he constructs the lectures as a combination of passive and active learning, engaging the students (Peters, Chiu, 2022).

Recently, accounting education is directed toward problem-based learning, which is defined as "a progressive educational approach that uses complex, real-world problems as the motivation or starting point and focuses on the learning process" (Spraakman, Jakcling, 2014). The level of complexity of the case studies varies between the undergraduate and graduate level. Thus, I consider that for the undergraduate level, particularly at the first contact of the students with a specific aspect, mini-cases may be more suitable (Chu, Libby, 2010) than complex case studies.

The online education which emerged everywhere in the world at the beginning of the pandemic imposed on different types of teaching and learning, education and assessment tools. Online education is efficient in the short term, having advantages such as space savings, reduced infrastructure costs (Mardini, Mah'd, 2022), flexible schedule, and better time management. Disadvantages include poor attendance, engagement, and exam performance (Cheng, Ding, 2021), and additional stress (Mihai et al., 2020). Another issue is that online teaching requires different approaches from the tutor, including varied and meaningful assignments (Țarțavulea et al., 2020). In the long term, online learning may be more effective for theoretical than practical courses (Mardini, Mah'd, 2022) and it may have a negative impact on students' skills and learning outcomes (Sangster et al., 2020). So, research is needed to support students to overcome the difficulties of the online learning, while taking advantage of its benefits.

The MA cases presented in the literature start from familiar contexts (e.g., Kovar, Evans, 2001; Hoozée et al., 2020 – bakeries; Anctil et al., 2020 – recycling industry; Smith, 1998 – conference costs). Some of them are dedicated primarily to specific sections of the syllabus (e.g., Kovar, Evans, 2001; Smith, 1998 – cost-volume-profit analysis and decision making; Anctil et al., 2020 – joint products and decision making; Hoozée et al., 2020 – transfer pricing) or present several linked cases (e.g., Calderon et al., 2019; Peters, Chiu, 2022; van den Brink et al., 2003). The cases are sometimes focused on technologies needed to solve them (e.g., Peters, Chiu, 2022 – interactive spreadsheets). Most of the examples provided in this paragraph are long cases. In this paper we introduce smaller examples designed for all the chapters of MA and PMC. Nnadi and Rosser (2014) introduce the 'individualised accounting questions' technique. Their variables are based on the students' ID numbers, and the outcome is improved understanding and performance of the students. However, the approach described in this paper takes into account a higher number of variables.

Also, a part of the requirement is that it asks the student to create the text by themselves, part that is scored accordingly.

3. Research Questions

The research question of this paper is: How can a professor determine students to engage in Management Accounting and Performance Measurement and control homework?

4. Research Methods

Instead of a case, in this paper, I describe a strategy to create cases which can be personalised for as many students as it is necessary. Thus, the technique is useful for small and large cohorts.

5. The Description of the Applications

5.1 The Context and Development of Applications

At the beginning of the pandemic, the professor who developed the applications has had a teaching experience of 19 years at the Bucharest University of Economic Studies, Faculty of Accounting and Management Information Systems. Most of the teaching activity involved MA-related lectures and tutorials. In 2020, at the beginning of the pandemic, she started teaching in Romanian MA to a cohort of students who had the same professor at PMC, which is a related discipline included in the learning plan in the next semester. This can be an advantage because a professor gets to know the students and can build in the second discipline on the work done during the first semester.

The university applies the Bologna process, which means that the length of the study program is six semesters. The two disciplines are included in the second part of the undergraduate program. A semester lasts 14 weeks. On average, a cohort is split into five groups of approximately 25 students. Each week, the students have a lecture and a tutorial lasting each for one hour and a half. The written materials are available at the beginning of the semester. The students can download and study them anytime.

Traditionally, in the case of university, the teachers give written material on paper (such as a textbook) or online to the students at the beginning of the semester or weekly. The material includes the aspects discussed during the classes, additional examples, and homework that the students must solve. The homework is the same for the entire cohort, and it is usually checked during the class. However, when the pandemic imposed the beginning of online classes, all materials were provided online. In the case described here, lectures and tutorials were conducted in zoom, with video. The materials were posted on an online platform for students without solutions. The professor discussed with the students during the classes and solved the examples in real time, writing everything in word. At the end of the class, the students were asked to upload their notes, and after a few hours, the professor

uploaded the official solutions, too. Additionally, the students could make a print screen, as there was no technical solution for the tutor to stop them. Thus, the materials could be taken from one group to another, and the students had no incentive to pay attention to the class. After the first tutorial, all the other groups could have the examples solved. The first solution was for the tutor to solve different problems during the tutorials with each group. This, however, involves a large amount of work and the examples were created for only one class. The materials were transferred from one generation to another (even though it was specifically stated in the files that they must not be transferred), which meant that each semester everything had to be new or it was already available. As an example, there were students who came after the end of the online period to face-to-face classes, with the solved materials printed from their older peers. The students were enrolled in an undergraduate study program, meaning that the examples solved were mostly designed to help them accumulate the technical skills for the new concepts encountered. So, a solution had to be found in order for the professor to be sure that all students work for the classes.

In MA, many examples are based on linear relationships between variables. Thus, these applications were created so that they could all be solved in excel after just changing a few cells with specific amounts. In this way, the tutor can easily check the solutions sent by the students.

The applications were built in a specific context. For example, for traditional and ABC costing, the example was created for an accounting company; for target costing, the example was built for a small gelateria that introduced a new product, figs ice cream; for standard costing, the example was about manufacturing home-made chocolate based on mother's recipe. They ranged from very simple examples (e.g., from a linear equation with two variables, showing the cost behaviour), to case studies covering several aspects, such as the one dedicated to standard costing and cost variances. This means that solving an example may take between a few minutes and more than an hour. The familiar context was a supplementary incentive for students to solve the application. Also, using their own data urged them to see which is the result for their own case.

Before sending an application to the students, the professor solved it with at least two sets of figures. For instance, for the examples that involved birth dates, two dates were used: January 1, 1999, and October 25, 1978. Thus, a small and a large number were selected. For some of the variables, the minimum and maximum values were set. For instance, if a variable is set for an increase in price, it could be written as max([day of birth]; 100 %). Thus, the professor made sure that the figures for each example are realistic.

5.2 The Learning Objectives of the Applications

The learning objectives of the suggested applications are (adapted from Kovar, Evans, 2001; Peters, Chiu, 2022):

- To facilitate learning in the context of a variety of new concepts in MA and PMC;
- To enable students to learn actively with personalised applications;

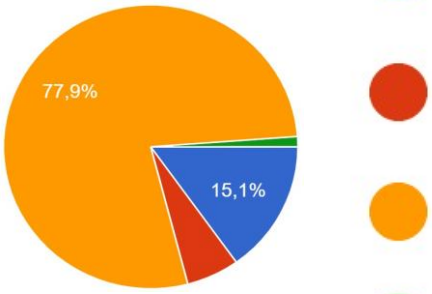
- To offer feedback (through the score and the correct solution) to each student starting from their personalised example;
- To create a tool which facilitates face-to-face and online learning;
- To engage students in learning MA and PMC;
- To offer students a tool to practice the studied concepts;
- To improve the students' critical thinking through the interpretation of the results they reach.

5.3 Description of One Lecture

The lecture chosen as an example for this paper is "Transfer pricing." Transfer pricing is included in the syllabus of the professional organisations (e.g., ACCA) and of most of the European accounting faculties (Pistoni, Zoni, 2000), the topic having an average priority. In the case described here, the lecture was included in the PMC discipline, week 11 (out of 14), when the students were already familiar with all the types of costs which could be computed.

In line with the suggestion of Mulligan & Kirkpatrick (2000, p. 330), the lecture starts with an overview of the aspects to be discussed. The chapter includes an initial questionnaire, which contains very simple questions that are meant to encourage students to think about transfer pricing in simple terms. Of the two most recent cohorts studying PMC, 86 students answered the questionnaire. This was distributed at the beginning of the class, and it was fulfilled on a voluntary basis. The responses were anonymous. As can be seen, most of the students answered correctly to the questions two to six.

1. VSD manufactures bicycles. The company manufactures bicycles in the Assembly Department. For the bicycles, wheels are required, which are produced in the Wheels Department. In this case:

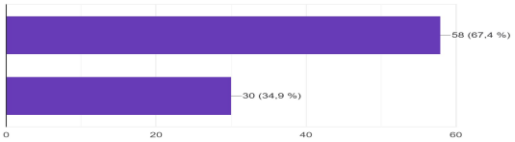


- The Wheels Department is the one that sells the wheels.
- The Wheels Department is the one that purchases the wheels.
- The Wheels Department is the one that manufactures the wheels.
- The Wheels Department is the one that manufactures and sells the wheels.

Correct answer: The Wheels Department is the one that manufactures and sells the wheels.

2. The wheels are:

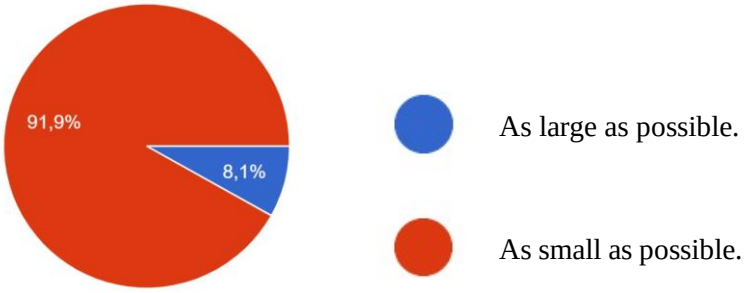
Intermediate products



Finished goods

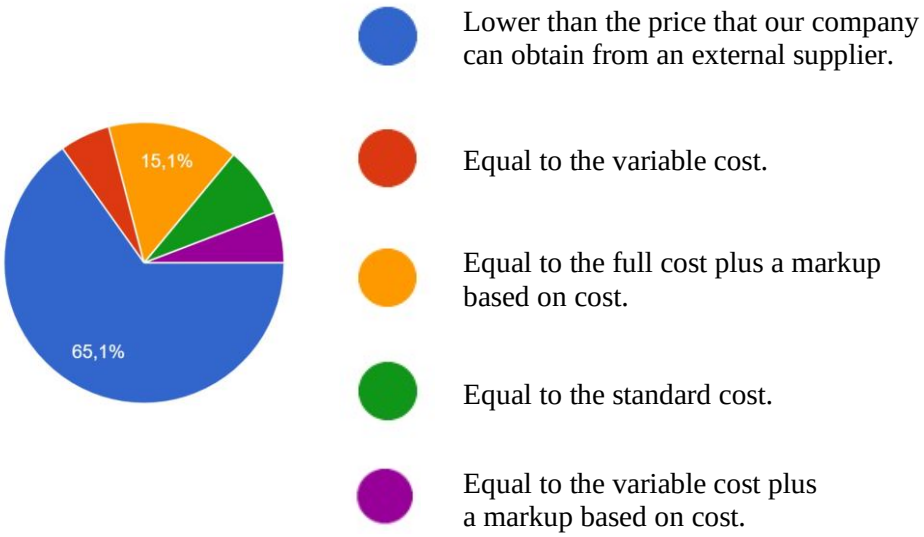
Correct answer: Intermediate products.

3. The Assembly Department will prefer the wheels price to be:



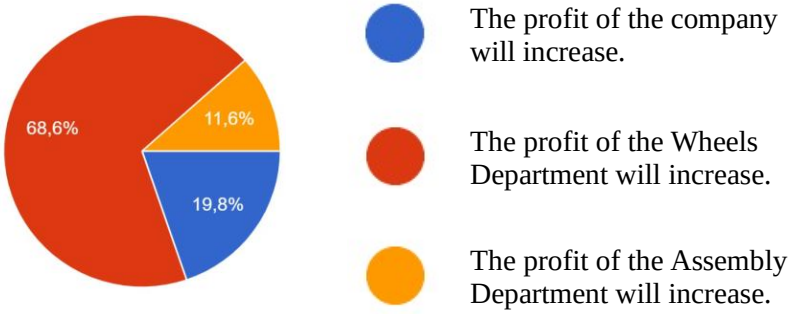
Correct answer: As small as possible.

4. From the point of view of the Assembly Department, it is acceptable for the wheels price to be:



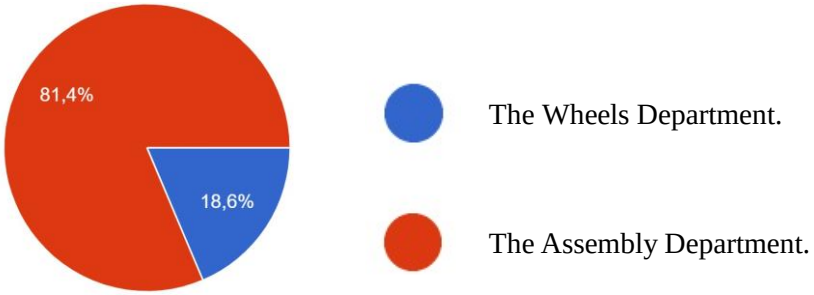
Correct answer: Lower than the price that our company can obtain from an external supplier.

5. Once the internal transfer price for the wheels (from one department to another) increases, one will notice that:



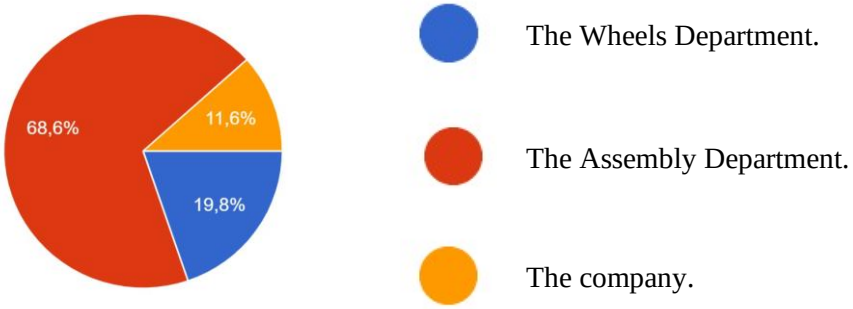
Correct answer: The profit of the Wheels Department will increase.

6. The internal transfer price will represent a cost for:



Correct answer: The Assembly Department.

7. The use of the internal transfer price has as a purpose the maximisation of the profit obtained by:



Correct answer: The company.

Source: Author's compilation.

The lecture was available to the students online from the beginning of the semester. It includes a description of the theoretical concepts and examples of setting the transfer prices starting from the variable cost, and the full cost, the standard cost.

5.4 Application with the Date of Birth for Setting the Internal Transfer Price

The application should be solved individually at home, during the week after the lecture, and uploaded on the platform by the deadline set. The students have previous experience with applications with variables. This example guides them in identifying the correct revenues and costs. Some problematic areas are the treatment of transfer price, the identification of the correct fixed cost, the change in the variable cost.

The statement of the problem is presented as follows:

Example (date of birth .....)

An enterprise producing bikes and scooters is organised in two profit centres (Wheels Department and Assembly Department). It presents the following information:

- The Wheels Department obtains [Date of birth*4] wheels/month, sold outside the enterprise at [Date of birth] monetary units (MU)/piece. The maximum production capacity of the centre is [Date of birth*5] wheels/month. The variable unitary cost is [Date of birth*40 %] MU/piece, and the fixed cost for this capacity is [Date of birth*50] MU;
- The Assembly Department manufactures scooters from the sale of which it obtains a profit of [Date of birth*30] MU, but is considering the introduction into manufacturing of [Date of birth*50 %] bicycles that incorporate wheels (two wheels for a bicycle). The selling price of the new product is estimated at [Date of birth*3] MU/piece. Additional costs for product bicycles are [Date of birth*90 %] MU variable unitary cost and [Date of birth*20] total fixed costs for the additional production capacity required for the new product.

The general manager asks you if, under the conditions of an internal transfer price for wheels equal to the unit sale price, the interests of the three parties (Wheels Department, Assembly Department, and the enterprise) are satisfied. Do the calculations and justify the answers. Will the general manager decide to produce bicycles or not?

Round down the numbers (for example: 101*50 % = 50).

The excel template with the formulas is provided in Table 1.

Table 1. Formulas for the application

	A	B	C	D	E
1	1	Available capacity	2510		
2	2	Necessary capacity	=C1		

	A	B	C	D	E
3		Result for wheels and bicycles	Wheels Department	Assembly Department	Total
4	1	Sales revenue (external)	=C1*C1*4	=C1/2*C1*3	=C4+D4
5	2	Internal transfer price	=C1*C1	=-C1*C1	=C5+D5
6	3	Variable cost	=C1*40%*C1*5	=C1/2*C1*90%	=C6+D6
7	4	Fixed cost	=C1*50	=C1*20	=C7+D7
8	5	Result bicycles	=C4+C5-C6-C7	=D4+D5-D6-D7	=C8+D8
9					
10		Initial result Wheels Department			
11	1	Revenue from external sales	=C4		
12	2	Variable cost	=C1*40%*C1*4		
12	3	Fixed cost	=C7		
14		Initial result	=C11-C12-C13		

Source: Author's compilation.

The text with data for one birth date is the following:

Example (date of birth October 25 - 2510)

An enterprise producing bikes and scooters is organised in two profit centres (Wheels Department and Assembly Department). It presents the following information:

- The Wheels Department obtains 10,040 wheels/month, sold outside the enterprise at 2510 monetary units (MU)/piece. The maximum production capacity of the centre is 12,550 wheels/month. The variable unitary cost is 1004 MU/piece, and the fixed cost for this capacity is 125,500 MU;
- The Assembly Department manufactures scooters from the sale of which it obtains a profit of 75,300 MU, but is considering the introduction into manufacturing of 1255 bicycles that incorporate wheels (two wheels for a bicycle). The selling price of the new product is estimated at 7530 MU/piece. Additional costs for product bicycles are 2259 MU variable unitary cost and 50,200 total fixed costs for the additional production capacity required for the new product.

The general manager asks you if, under the conditions of an internal transfer price for wheels equal to the unit sale price, the interests of the three parties (Wheels Department, Assembly Department, and the enterprise) are satisfied. Do the

calculations and justify the answers. Will the general manager decide to produce bicycles or not?

Round down the numbers (for example: 101 * 50 % = 50).

Solution

The solution is presented in Table 2.

Table 2. Solution for birth date October 25

1	Available capacity	2510		
2	Necessary capacity	2510		
	Result for wheels and bicycles	Wheels Department	Assembly Department	Total
1	Sales revenue (external)	25,200,400	9,450,150	34,650,550
2	Internal transfer price	6,300,100	(6,300,100)	0
3	Variable cost	12,600,200	(2,835,045)	15,435,245
4	Fixed cost	125,500	50,200	175,700
5	Result bicycles	18,774,800	264,805	19,039,605

	Initial result Wheels Department	
1	Revenue from external sales	25,200.400
2	Variable cost	10,080.160
3	Fixed cost	125.500
	Initial result	14,994,740

Source: Author's compilation.

Under these specific circumstances, it can be noticed that the interests of all the interested parties are met. Thus, the Assembly Department obtains a profit from this activity. The profit of the Wheels Department is larger than the initial one. From this, it results that the company obtains a higher profit as well.

5.5 Assessment

- All the solutions were uploaded by the students in word files. The students received written feedback for their solutions and a score. For instance, the points for the mini-case described above were awarded as it follows:
- 10 % for the correct figures included in the text;
- 30 % initial result for the Wheels Department;
- 20 % result when producing the bicycles for the Wheels Department;
- 20 % result when producing the bicycles for the Assembly Department;
- 10 % for the comment;
- 10 % default points;
- Total – 100 %.

46 students out of 102 in the first cohort (academic year 2020 – 2021) solved this mini-case. The lowest percentage obtained was 30 (out of 100 %) and the highest 100, with an average of 77.93 %.

6. Conclusions

The paper describes the design and application of a teaching strategy involving active learning. The purpose of the assignments described here is to support students' engagement with the homework by themselves, in order to acquire the necessary knowledge to graduate and eventually work in a company. The applications were already used with three cohorts of students, studying either online and face-to-face. The performance of the students in both environments was the same.

The strategy included in this paper can be used for the creation of examples in other disciplines, such as financial accounting or taxation.

Future research can be conducted in order to explore the opinion of students regarding this type of assignment.

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I would like to thank my student, Naomi Rebeca Bîțu, who provided comments and solutions for the first versions of the suggested applications.

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Recent Perspectives on Outsourcing of Sustainability Reporting

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Abstract

Today, our society is more interested in those businesses that are committed to sustainability goals. Stakeholders assess the business sustainability based on the impact of performed activity on economic, environmental, and social dimensions. Today enterprises should consider their non-financial performance as important as making profit. Some organisations use impression management to highlight their efforts on sustainability, but the external assurance of sustainability reports determines companies to avoid overstating their actions related to sustainable development. This paper investigates the recent perspectives on outsourcing of sustainability reporting shared by clients and providers considering the motivations and the process. We mobilised resource-based view as theoretical framework, Romanian business environment as context, and semi-structured interviews as method involving 24 participants. Following the resource-based view, the results indicated that companies with limited internal workforce and competences need external support to prepare sustainability reports. We found that providers do more than consulting for their clients; they deliver also training sessions, compile data received from clients, and even construct the narratives. Moreover, several enterprises outsourced some activities related to sustainability reporting for compliance reasons and engaged voluntarily limited assurance services to increase their credibility with stakeholders. We discovered that larger companies using external services for sustainability reporting also aim to obtain a high rank in the Corporate Sustainability and Transparency index and use that achievement to enhance their reputation. Under the new European directive on corporate sustainability reporting with applicability from 2024 there will be more reporting companies, entities will have the obligation to make more disclosures, engage mandatory limited assurance services, and because of that, experts anticipate an increased need of skilled professionals. Our research has implications for reporting companies and professionals, and our main contribution was to show the current state of sustainability reporting and emphasise the near future challenges and opportunities.

Keywords: external services, sustainability reports, non-financial performance, stakeholders, resource-based view.

JEL Classification: M14, M41, M55.

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1. Introduction

Our society is more interested today in those businesses being committed to sustainability goals, and stakeholders have a wide range of information sources to assess the positive and negative outcomes of the activities performed by organizations. A business is sustainable when it creates value for all stakeholders having in view the triple bottom line concept meaning people, planet, and profit (Hussain et al., 2018). Companies through sustainability reports inform the stakeholders about the positive and negative outcomes of their activities on economic, social, and environmental dimensions (Bellucci et al., 2019).

Some organizations use impression management within the sustainability reports and they overstate their efforts on sustainability in order to improve the stakeholders' perceptions (Diouf, Boiral, 2017). Studies conducted by Hassan et al. (2020) and Ruhnke and Gabriel (2013) indicated that external assurance of sustainability reports increased the credibility of stakeholders since companies were more committed to sustainable development goals, showed more transparency in their reports, and avoided greenwashing.

In recent studies on sustainability reporting, the importance of internal employees is either emphasized without any mentions to external consultants (Frostenson, Johnstone, 2023), or there are indications that some companies use external consultants; however, the collaboration ways between internal employees and external consultants were not presented (Mahmood, Uddin, 2021).

After reviewing the existing literature on sustainability reporting, we found that there is a lack of information in prior studies conducted on Romanian business environment as regards the involvement degree of external providers within the sustainability reporting process and the role played by the employees in case of outsourcing. Observing that research gap, we decided to conduct this study with the aim to investigate the recent perspectives on outsourcing of sustainability reporting shared by clients and providers considering the motivations and the process. We adopted a qualitative approach using resource-based view as theoretical framework, Romanian business environment as context and semi-structured interviews as method involving 24 participants.

Taking into account the resource-based view, our results showed that companies partially outsource the sustainability reporting since they face limited internal workforce or competences and due to the need of being supervised by external professionals. We found that external professionals do more than just provide consulting for their clients, they also deliver training sessions for clients' employees involved in data collection, they compile data received from clients and even construct the narratives. Clients emphasized that they outsource only some activities related to sustainability reporting and not the entire process, and the involvement degree of external providers is strongly associated with the outsourcing motivations. The changes brought by the new European directive on corporate sustainability reporting with applicability from 2024 regard more reporting companies, the obligation to engage limited assurance services, and an increased need of skilled professionals.

The remainder of this paper is structured into five parts. The first section introduces the problem statement consisting of the literature review and theoretical framework. The second and third parts indicate the research context, research questions, and research methods. In the fourth section we reported the findings of our study and we discussed the results considering also prior research. In the final part we presented the main conclusions, limitations of the study, contributions, implications, recommendations, and directions for future research.

2. Problem Statement

2.1 Literature Review

Companies run their operations in a business context with many stakeholders having different economic, social and environmental interests, and in order to achieve and maintain the success, they have to consider the stakeholders' demands regarding sustainability (Hiller, 2013).

A business is sustainable when it creates value for all stakeholders having in view the triple bottom line concept (people, planet, and profit) with the focus both on short- and long-term while planning and performing activities (Hussain et al., 2018).

The role of sustainability reporting is to meet the stakeholders' demands by providing them the relevant information necessary to make a comprehensive assessment of the impact of the activities performed by companies on economic, social and environmental dimensions (Bellucci et al., 2019). Within the sustainability reports, enterprises highlight what efforts they employed and the progress they made in order to convince stakeholders about their ongoing pursuits towards the sustainable development goals (Herremans et al., 2016).

Regarding the purpose of sustainability reporting, Hahn and Kühnen (2013) stated that companies making disclosures on sustainability intend to increase transparency, enhance their corporate brand, and signal legitimacy.

According to many studies on sustainability reporting conducted by researchers like Bellucci et al. (2019), Diouf and Boiral (2017), Hassan et al. (2020), Hussain et al. (2018), Parguel et al. (2011), and Ruiz-Blanco et al. (2022), the most widespread sustainability reporting framework used among the reporting companies is represented by Global Reporting Initiative (GRI) standards.

The aim of both financial and non-financial reporting should be to deliver a true and fair view of the business performance to internal and external users, but there are organisations using impression management within the sustainability reports since they only show the positive outcomes and hide the negative aspects related to their activity, and by doing that, they overstate their efforts in sustainability in order to improve the stakeholders' perceptions (Diouf, Boiral, 2017).

There are also companies that are more interested in profitability rather than in sustainability, and for the sake of marketing, they use greenwashing practices to present themselves as sustainable organisations mainly to gain the clients' loyalty toward their products and services and they ignore the risk of damaging their reputation (De Vries et al., 2013).

In both earlier studies researchers like Parguel et al. (2011) and in recent papers authors such as Ruiz-Blanco et al. (2022) claimed that sustainability ratings prepared by independent agencies could discourage on the one hand the companies to use greenwashing practices and encourage them on the other hand to genuinely persevere in their sustainability goals.

Regarding the assurance of sustainability reports, there are studies conducted by Hassan et al. (2020) and Ruhnke and Gabriel (2013), indicating that external assurance determined the reporting companies to be more committed to sustainable development goals than to produce and deliver more accurate and reliable information on sustainability, and finally, it increased the credibility with stakeholders.

In recent studies on sustainability accounting, Frostenson and Johnstone (2023) showed the importance of internal employees being involved in sustainability reporting ignoring the input of external consultants, whereas Mahmood and Uddin (2021) stated that companies can receive some support from consultancy firms yet the collaboration ways between internal employees and external consultants were not reported.

After reviewing the existing literature on sustainability reporting we found that there is a lack of information in prior studies conducted on Romanian business environment as regards the involvement degree of external providers within the sustainability reporting process and the role played by the employees in case of outsourcing.

2.2 Theoretical Framework

Resource-based theory of the firm, also recognised as resource-based view, was proposed by Barney (1991), and in his opinion both tangible and intangible resources are necessary to produce goods or services and run the other activities within the company. According to him, tangible resources regard physical assets and workforce whereas intangible resources are related to knowledge, competences, and skills.

Barney (1991) argued that companies can achieve the efficiency and effectiveness through the appropriate allocation and combination of the available resources. Moreover, he emphasised that for proper functioning of their business, those companies lacking some resources or having limited resources can acquire them from the outside of the organisation.

Resource-based view was used in prior research to explain full or partial outsourcing decisions related to human resources (Woodall et al., 2009), accounting (Kamyabi, Devi, 2011) and legal services (Lacity, Willcocks, 2013) considering the available workforce within the company and the necessary know how to perform some specific tasks.

3. Research Questions

The aim of this paper is to investigate the recent perspectives on outsourcing of sustainability reporting shared by clients and providers with a focus on the Romanian business environment as research context.

Based on statistical information provided by the National Trade Register Office at the end of the year 2021 in Romania, there were active 1.1 million companies out of which 27.1 % were located in Bucharest and Ilfov county.

In Romania the legal obligation to make non-financial disclosures related to business model, environmental, social, employees, human rights, anti-corruption and anti-bribery matters was established by the Ministry of Public Finance Order 1938/2016 for public interest entities with more than 500 employees with applicability from 2017. Later, all companies with more than 500 employees were required by Ministry of Public Finance Order 3456/2018 to prepare non-financial reports starting with 2019.

For the year 2021, in Romania there were more than 750 companies being required by the law to make non-financial disclosures (The Azores, 2022). Since the legal obligation to disclose non-financial information was established only a few years ago, the Romanian companies with more than 500 employees have a limited experience on sustainability reporting and because of that, the reporting companies also seek external support from consultancy firms.

Considering the aim of this paper and our research context, we formulated the following two research questions:

RQ1. What are the motivations of companies to outsource sustainability reporting?

RQ2. What does the sustainability reporting process look like in the case of outsourcing?

4. Research Methods

Since the aim of this paper is to investigate the recent perspectives on outsourcing of sustainability reporting, we conducted semi-structured interviews with providers and clients in order to achieve a comprehensive understanding of the subject. Semi-structured interviews were also used in prior research on outsourcing of accounting services by Aman et al. (2012), who involved 20 participants and Lamminmaki (2008) who conducted 15 semi-structured interviews.

We recruited our interviewees after participating in two sustainability events that took place in Bucharest in June 2022 and July 2022 which were attended by 100 persons (providers and clients). We organised two phases of interviews, the first one with providers and the second one with clients.

The interviews with providers were scheduled and took place in August 2022, involved 6 firms out of which 3 Big 4 companies, the average interview duration was around 43 minutes and all interviewed experts had a work experience greater than 10 years. The interviews with clients were scheduled and occurred between September 2022 and October 2022, involved 18 companies out of which 4 companies making voluntary disclosures on sustainability, and the average

interview duration was around 39 minutes. We presented more details regarding the interviews conducted with providers and clients in Appendix 1 and Appendix 2.

All interviews were held in Romanian, the native language of providers and clients, and since they were reluctant to audio record our conversations, we agreed to take notes during our meetings in order to use their answers and comments in our study. In our discussions with providers and clients regarding the sustainability reporting, we focused mainly on themes such as: (1) outsourcing motivations, (2) the role of employees, (3) the challenges faced, (4) external services supply and demand, (5) stakeholders' identification, (6) material topics selection, (7) data collection tools, (8) data quality verification, (9) data compilation, (10) preparation and publication of reports.

According to Guest et al. (2020), in qualitative research is crucial to achieve data saturation and ensure the reliability of the study, and because of that it is necessary to conduct at least 12 interviews. In their opinion data saturation is achieved when researcher receives again and again the same or similar answers and comments to his questions from the interviewees, and because of that new themes no longer emerge and that is an indication that is time to stop conducting additional interviews.

We read our interview notes many times and we coded them manually having in view the themes based on which we constructed the interview questions, but we also considered new themes that emerged during our discussions. We analysed data saturation and after having conducted most of our interviews, it became more and more obvious that providers do more than just consultancy for their clients and clients use external services to complement their internal limited resources (workforce and expertise) and to increase their credibility with stakeholders.

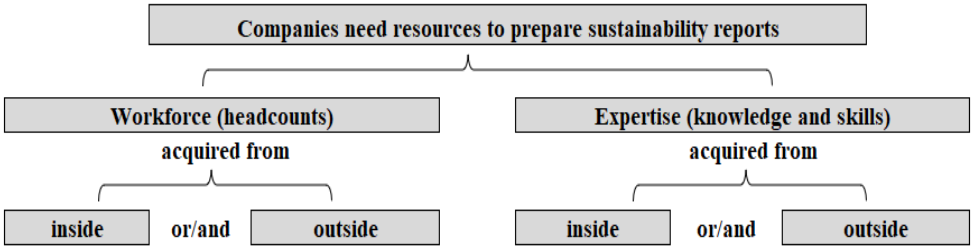
5. Findings

We organised our findings having in view the chosen theoretical framework consisting in resource-based view and we constructed the narratives around the themes of research questions represented by outsourcing of sustainability reporting motivations, sustainability reporting process in case of outsourcing, and other related sub-themes considering the interview questions and answers.

Empirical evidence showed us once more that companies need specialised knowledge and skills to prepare the sustainability reports, and we found that resource-based view has a strong explanatory power on decisions made by managers to engage external consultancy services for sustainability reporting.

Depending on the availability of internal resources, companies can prepare the sustainability reports in-house or they can outsource some activities for which the internal employees do not have the necessary time or they lack the expertise, or the companies want to have an external supervision over the whole reporting process. In Figure 1 we made a graphical representation related to the assessment of resources in the context of sustainability reporting based on the ideas mentioned before.

Figure 1. Assessment of resources in context of sustainability reporting



Source: Own creation based on Resource-based view.

5.1 Motivations for Outsourcing of Sustainability Reporting

According to the answers received from our participants during the interview sessions, the main reasons why companies outsource their sustainability reporting are represented by a lack or limited internal resources in terms of workforce or expertise, then the need of being supervised by external professionals and the desire to achieve higher sustainability and transparency scores.

Regarding the lack or limited internal resources in terms of workforce or expertise, one of the clients stated that *"No matter how much we would have liked to accommodate the whole sustainability reporting process within our internal accounting department we realised that it was not possible with our existing accountants without overtime and in the end after many struggles we chose to partially outsource our sustainability reporting"* [C8, manager of accounting department].

Furthermore, another client argued that *"We outsourced some activities related to our sustainability reporting since our external consultant has more expertise than us, they review our data, statements and help us to comply better with the legal requirements"* [C2, manager of sustainability department].

There are companies that face constraints related to their organisational structure, and they are restricted to hire new employees, but they are allowed to use external services. Regarding this aspect, C5, who is the manager of the accounting department within a construction company, mentioned that *"When we found out about our legal obligation to prepare sustainability reports, we wanted to hire a new accountant with some expertise on that, since we had no prior experience in non-financial reporting, but we did not receive the approval for the management for that, but instead we were allowed to engage external support from consultants".*

With regard to sustainability reporting, in Romania the Corporate Sustainability and Transparency Index (CST index) is prepared by the agency The Azores Sustainability & CSR Services. The The CST index represents an assessment taking into account 10 categories and 70 sustainability indicators related to the sustainability strategy and the participation of companies from an economic, environmental and social point of view, considering also the operating industry of the companies (The Azores, 2022).

Both providers and clients emphasised that involving external consultancy services and mentioning that in the sustainability reports is also meant to help the reporting companies to achieve higher sustainability and transparency scores and it can increase their credibility with stakeholders. In respect to this practice, the interviewee P6, who is a manager of a consultancy firm on sustainability, claimed that *"We have clients that are willing to collaborate with us not only because of our knowledge and experience, but also due to their interest in gaining higher corporate sustainability scores following our collaboration"*.

Clients being multinational companies indicated that their parent companies impose them to collaborate with external consultants while preparing the sustainability reports in order to mitigate as much as possible the manifestation of greenwashing, avoid damaging their reputation, and increase their credibility with stakeholders.

Our findings, the lack or limited internal resources in terms of workforce or expertise with respect to the motivations for outsourcing of sustainability reporting are consistent with prior studies on outsourcing of accounting (Kamyabi, Devi, 2011) and legal services (Lacity, Willcocks, 2013) and we observed that companies embraced a partial outsourcing meaning that they also rely to some extent on their employees.

In addition to previous studies conducted by Hassan et al. (2020) and Ruhnke and Gabriel (2013) arguing that external assurance of sustainability reports determined the companies to provide more accurate and reliable information, our study brings empirical evidence that outsourcing of sustainability reporting can also prevent greenwashing and increases the transparency since external consultants are independent and possess expertise.

5.2 Sustainability Reporting Process in Case of Outsourcing

Considering the information provided by our interviewees, outsourcing of sustainability reporting involves a close and ongoing collaboration between clients and providers, and it is crucial to set clear responsibilities for the parties within the service agreements. Providers argued that is very important for clients to define their internal process consisting in description of material sustainability topics, persons in charge with each material topic, tools used for data collection, and mentions regarding the responsible department for sustainability report.

From our conversations with the clients, we discovered that responsible department for sustainability reporting differs from one company to another. While some companies created a distinct department for sustainability within the organisational structure, other entities established that accounting, controlling, or Corporate Social Responsibility (CSR) are the responsible departments for sustainability reporting.

During our discussions with providers, we found that they do more than just consultancy for their clients, they deliver also training sessions for clients' employees involved in data collection, they compile data received from clients and

even construct the narratives. One of the providers stated that *"For our non-audit clients, our services go beyond consultancy since we provide compilation and reporting services and we offer targeted training for internal staff of our clients"* [P4, manager within Big 4].

The sustainability reporting process involves the assessment of material topics, stakeholders' identification, data collection, data quality verification, data compilation, preparation and publication of reports. The most common challenges faced in the process of data collection by some clients, being in their early stage of sustainability reporting, are related to unavailable or incomplete data.

As regards the role of own employees in the context of outsourcing some activities regarding the sustainability reporting, clients indicated that the internal sustainability team is responsible for presenting the business model in detail to the consultancy firm and then both the client and the provider by mutual agreement identify the sustainability material topics which are specific to the value chain of the company (upstream, own operations, and downstream) and the stakeholders.

Moreover, those employees working within the specialised departments of the company who were designated to be in charge with sustainability themes have tasks to maintain data in the information system, verify the accuracy and completeness of data related to material topics, and make comparisons between actual data and targets for the current year and prior years' data. Then the employees working within the responsible department for sustainability reporting extract data from the information system and submit the files to the consultancy firm, make the plausibility checks for the key performance indicators (KPI) calculated by consultancy firm, verify the text within the draft of sustainability report and provide the feedback to the consultancy firm.

On the same subject of outsourcing the sustainability reporting, one of the providers stated that *"Clients deliver data to us and organise for us the understanding meetings with internal sustainability team, then we compile data, prepare the draft version of the report, make the changes we agreed with clients and in the end, we deliver the final version of the report"* [P5, senior within Big 4].

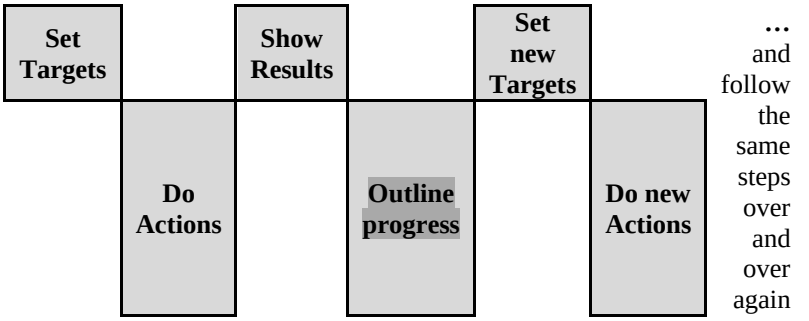
In respect to the involvement degree of external providers within the sustainability reporting, clients emphasised that they outsource only some activities and not the entire process and the involvement degree of external providers is strongly associated with the outsourcing motivations. Within the sustainability reporting, external consultants are mainly involved to provide the reporting companies with the support for identification and confirmation of material topics and stakeholders, perform data compilation and construct the narratives, review the information and statements (disclosures), supervise the reporting process, and transfer some knowledge to clients and reveal the best practices. Regarding the collaboration between internal staff and external consultants on sustainability reporting, one of the clients mentioned that *"In our case, the sustainability report is the product of collaboration between internal departments and our external consultants. We submit them data and further explanations and they put all the pieces together similar to a puzzle following specific rules in order to capture a clear*

and complete picture on our commitment to sustainability development goals" [C15, manager of CSR department].

In addition to prior research on sustainability accounting conducted by Frostenson and Johnstone (2023) showing the importance of internal employees being involved in sustainability reporting and Mahmood and Uddin (2021) mentioning that companies can engage some support from consultancy firms, our study brought into attention the involvement degree of external consultants, the role of employees in case of outsourcing, and the collaboration ways between internal employees and external consultants.

The role of reporting within the sustainability strategy is to show the results, assess the efficiency and effectiveness of the actions compared to the targets, state the progress, set new targets, perform new actions, and the process continues with the same steps over and over again. In Figure 1 we presented an illustration on the role of reporting within the sustainability strategy.

Figure 2. The role of reporting within the sustainability strategy



Source: Own creation based on the information conveyed by interviewees.

Switching the focus on multinational companies, we found that these companies collaborate with external consultants on a regular basis and they have to use the sustainability reporting system established at the group level and prior to any publication all quantitative and qualitative disclosures have to be approved by their parent companies. Few external consultants even complained about some multinational companies that limit the scope of their work, since these clients ask them to prepare the reports so as to include only the minimum information required by the law.

Providers specified that the new European directive on corporate sustainability with applicability from 2024 will determine a significant increase in the number of reporting companies and according to them the number of reporting companies is expected to be at least 5 times higher than it was before, and the entities will have the obligation to make more disclosures. Compared to Non-financial Reporting Directive (NFRD), this new Corporate Sustainability Reporting Directive (CSRD) requires the companies to engage limited assurance services, report their sustainability strategy having in view the targets and the progress, then to publish

information on the role of the board of directors on sustainability, double materiality assessment considering the impacts, risks and opportunities and in the end to present the actions taken to mitigate the negative impacts.

The increase in the number of reporting companies and all the new requirements imposed by CSRD will determine a high demand for skilled professionals. With reference to the increased need for skilled professionals, P1, who is a manager within a Big 4 company, raised a concern and claimed that *"There is a shortage of professionals on the labour market for sustainability reporting. When we hire new graduates, we have to train them on the job, because even though they have some ideas, they lack the solid foundation on sustainability reporting"*.

In the end, providers told us that the European Commission is working on a new directive to prevent greenwashing, and those companies making in the future unsubstantiated claims for the sake of marketing will be liable to significant fines calculated according to their turnover. In this context, external consultants who possess broad competences will play a key role in supporting the reporting companies to make more balanced statements relying just on concrete proofs. Our two last findings have not been reported yet in the literature, since they represent very new requirements.

6. Conclusions

The aim of this study was to investigate the recent perspectives on outsourcing of sustainability reporting shared by clients and providers considering the motivations and the process. We adopted a qualitative approach using core competences theory as theoretical framework, Romanian business environment as context and semi-structured interviews as method involving 24 participants.

Considering the resource-based view, our findings revealed that companies partially outsource the sustainability reporting mainly due to their limited internal workforce or competences and the need to be supervised by external professionals. We discovered that providers do more than just consultancy for their clients, they deliver also training sessions for clients' employees involved in data collection, they compile data received from clients and even construct the narratives. Multinational companies even though collaborate with external consultants on a regular basis they have to use the sustainability reporting system established at the group level, and prior to any publication all quantitative and qualitative disclosures have to be approved by their parent companies. Moreover, several enterprises outsourced some activities related to sustainability reporting for compliance reasons and engaged voluntarily limited assurance services to increase their credibility with stakeholders. The new European directive on sustainability will determine an increase in the number of reporting companies, then the entities will have the obligation to make more disclosures and engage mandatory limited assurance services.

Our study has two limitations. The first limitation regards our research context represented by Romanian business environment, and because of that our findings are specific only to Romanian business environment and they should not be generalised to other countries. The second limitation is related to our restricted number of

participants who were available for the interviews, but we made sure that we collected sufficient and relevant data. We conducted interviews with both clients and providers in order to capture a comprehensive picture of outsourcing of sustainability reporting. Our research enhanced the understanding of outsourcing of sustainability reporting since it brought meaningful insights for reporting companies and professionals regarding that subject, which is still underexplored in the literature.

Our main contribution was to show the current state of sustainability reporting, the reasons why some companies outsource the sustainability reporting, emphasise the near future challenges and opportunities such as more reporting companies, the obligation to engage limited assurance services, the increased need of skilled professionals, and the shortage of professionals on the labour market.

Our research has implications for reporting companies, professionals, professional bodies, and academia. The adoption of a new European directive on sustainability will determine an increased need of skilled professionals. Our recommendation is that academia should respond to that need by adapting the education plan in order to prepare work-ready graduates in sustainability. Furthermore, professional bodies should include more courses on sustainability in the continuing professional development plan in order to broaden the expertise of their members.

In our paper, we focused primarily on outsourcing of sustainability reporting, yet we have identified from our discussions with the interview participants other areas of interest such as the implementation of Romanian Sustainability Code as reporting platform and the challenges brought by EU taxonomy for sustainable activities, but being outside the purpose of this study, we propose them as future directions for research.

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Appendices

Appendix 1. The details of the interviews conducted with providers

Code	Category	Position/ Gender	Work experience	Interview date	Duration (minutes)
P1	Big 4	Manager/F	16	Aug. 11, 2022	35
P2	Consultancy firm	Manager/F	10	Aug. 12, 2022	50
P3	Consultancy firm	Senior/M	11	Aug. 17, 2022	40
P4	Big 4	Manager/M	12	Aug. 22, 2022	45
P5	Big 4	Senior (F)	15	Aug. 26, 2022	50
P6	Consultancy firm	Manager (F)	14	Aug. 29, 2022	40

Source: Own processing based on interviews with providers.

Appendix 2. The details of the interviews conducted with clients

Code	Activity	Reporting type	Department/ Gender	Interview date	Duration (minutes)
C1	Retail	Mandatory	Accounting/F	Sep. 5, 2022	50
C2	Banking	Mandatory	Sustainability/M	Sep. 7, 2022	35
C3	Transportation	Mandatory	Controlling/F	Sep. 9, 2022	40
C4	Farming	Mandatory	Accounting/F	Sep. 13, 2022	35
C5	Construction	Voluntary	Accounting/M	Sep. 15, 2022	30
C6	Food manufacturing	Mandatory	Accounting/F	Sep. 16, 2022	50
C7	Retail	Mandatory	CSR/F	Sep. 19, 2022	35
C8	HoReCa	Voluntary	Accounting/M	Sep. 21, 2022	45
C9	Energy	Mandatory	Controlling/M	Sep. 23, 2022	40
C10	Medicines manufacturing	Mandatory	CSR/F	Sep. 28, 2022	45
C11	Banking	Mandatory	Sustainability/M	Oct. 4, 2022	40
C12	Food manufacturing	Mandatory	CSR/F	Oct. 10, 2022	35
C13	Farming	Voluntary	Controlling/M	Oct. 12, 2022	40
C14	Medical services	Mandatory	Controlling/F	Oct. 14, 2022	45
C15	Transportation	Voluntary	Accounting/M	Oct. 18, 2022	35
C16	Retail	Mandatory	CSR/F	Oct. 24, 2022	30
C17	Food manufacturing	Mandatory	Sustainability/M	Oct. 25, 2022	45
C18	Construction	Mandatory	Controlling/F	Oct. 27, 2022	35

Source: Own processing based on interviews with clients.

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Digitalisation in Sustainability reporting – Electricity Field

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Abstract

Nowaday, digitalisation is mandatory for companies, and the COVID-19 crisis showed us that businesses could adapt better to changes through digitalisation. Sustainability reports offer a larger picture of businesses. The war between Russia and Ukraine, as well as the energy crisis, have attracted our attention to the field of electricity. This paper's objectives are: 1. to show the percentage of companies in the field of electricity that offer digital training to employees from several countries; 2. to see how digitalisation is used based on the sustainability reports, and 3. to see the distribution of gender in Romanian companies in the field of electricity. For the first objective, we used data from Eurostat for 2022. For the second and third objectives, we analysed the sustainability reports for the year 2021 for five big Romanian companies in the field of electricity. Our findings show that for the training offered, Denmark is in the first place with 88.7 % and Croatia is in the last place with 13.9 %. From the sustainability reports, it is clear that all enterprises analysed use digitalisation to simplify different activities and that 75 % of the employees are men and 25 % are women. Moreover, 3 out of 5 companies offer working from home. This paper is special because it analyses the sustainability reports on digitalisation and gender distribution in Romanian electricity.

Keywords: digitalisation, sustainability reporting, electricity, gender equality.

JEL Classification: M41, K38, L86, P18, Q55.

1. Introduction

We live in an era of changes and we need to adapt to day-to-day challenges. Digitalisation is important for all areas, starting with business, education, medicine, state authorities, etc., but it is also a part of our daily life. We cannot imagine living

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for a long time without the Internet or smartphones. The activity of creating the sustainability reports also uses digitalisation.

The first objective of this paper is to reveal the percentage of companies in the field of electricity that provide training to improve their staff's knowledge in ICT (information and communications technologies) skills from several countries. The second objective is to show how digitalisation is used based on sustainability reports, and the third is to disclose the distribution of gender in Romanian companies in the field of electricity. For the first objective, we used data from Eurostat for 2022 for 22 countries, about the percent of companies that provided training to improve their staff's knowledge of information and communications technologies skills, in the field of "Electricity, gas, steam, and air conditioning supply". For the second and third objectives, we analysed the sustainability reports of the year 2021, for five big Romanian enterprises in the field of electricity. The findings reveal that less Romanian companies offer ICT training, all companies use digitalisation, and men are dominant for the electricity field.

2. Literature Review

2.1 Sustainability Reporting

Enterprises provide information to external users in order to motivate them to invest their money and fund their operations (Alshiban, Al-Adeem, 2022). In a world characterised by climate change, resource scarcity, poverty, and inequality, we argue for the potential of integrated reporting that offers stakeholders with economic, social, and environmental stability (Dragu, Tiron-Tudor, 2013). By making NFR (Non-financial reporting) mandatory for enterprises, the EU is seeking to elevate NFR practices in the eyes of corporations and society - something that enterprises should strongly consider and incorporate into their reporting procedures (La Torre et al., 2020). A rough estimate of 1,400 organisations reported non-financial information in 2009; by 2010, this number had increased by 29 % (Dragu, Tiron-Tudor, 2013). Since 2017, more than 6,000 European enterprises have been required by national and supranational law to provide annual non-financial statements (La Torre et al., 2020). The European Financial Reporting Advisory Group (EFRAG) accepted the modified versions of the European Sustainability Reporting Standards (ESRS) on November 16, 2022 (Fenwick, 2022). Roughly 50,000 EU enterprises will be obliged to give sustainability disclosures under the new ESRS rules in the CSRD, which is more than four times the number of firms (approximately 11,700 organisations) currently needed to have non-financial reporting under the NFRD (Fenwick, 2022). The European Parliament and Council approved the Corporate Sustainability Reporting Directive (CSRD) on November 28 in order to hold enterprises more accountable to the public for their social and environmental implications (Kateifides, 2022). Because the COVID-19 pandemic requires the firm to cover its social indicators and make critical managerial decisions regarding the quarantine measures, non-financial reporting is becoming more pertinent (Filyppova

et al., 2021). The level of expertise of those who prepare CSR reporting has a significant impact on its quality and development (Guşe et al., 2016).

2.2 Digitalisation

In the business world, digitalisation frequently informs what and where to purchase and sell, how to promote, how to manufacture and distribute goods efficiently, and how to maintain contact with customers, and in the production mode, digitalisation also means designing products in a digitally, virtually assembling and testing components prior to production, and maintaining the relationship between a sold or rented product, its users, and the producing company (Gray, Rumpe, 2015). Even though complete automation of accounting is unlikely in the upcoming years due to the lack of fully conscious artificial intelligence technologies, accounting professionals will need to conform, perfect the changes and understand how to work with the new technologies that have been implemented in the field of accounting (Codreanu et al., 2021). Respect and care for the environment should be a priority for all businesses as they operate as responsible corporate organisations in accordance with the principles of sustainable development based on environmental protection, mutual respect, and the desire for future generations to be able to benefit equally from the planet's natural reserves that are kept in good condition (Artene et al., 2020). More efficient manufacturing processes and improved environmental management systems can substantially reduce pollution and waste, as well as save water and other resources, which is advantageous to businesses because it can reduce operating costs and reliance on raw materials (Frone, Frone, 2015). The following are some pertinent consequences of digitalisation and sustainability that managers should be aware of: i) digitalisation is a tool for sustainability; ii) digitalisation grows transparency, preventing environmental issues from escalating; iii) green technology plays a role in the optimisation of environmental impacts; and iv) digitalisation improves cost rationalisation and impacts corporate efficiency (Broccardo et al., 2023). New innovative technologies could be viewed as an answer to minimising the negative effects of climate change, and investments in renewable energy sources and their use are also a valid option for dealing with the global energy crisis (Dragomir et al., 2022). The crucial importance accorded to the problem of the security of accounting and financial information in the digital age, where the danger of cybercrime continually weighs on the digital world, requires not only highlighting the significant role performed by the digitalisation of accounting operations but also shedding light on future research around this topic (Feghali et al., 2022). In the near future, cyber accounting will make statistical systems able to adapt and react to the introduction of new and evolving disruptive concepts like Cloud, Edge Computing, and 5G Technology and it will also increase the worldwide compatibility of present performance indicators (Bîlcan et al., 2019).

2.3 Electricity

Population health will benefit significantly from improved electricity accessibility and, where possible, a shift away from fossil fuels and toward renewable sources of power generation (Wilkinson, Markandya, 2007). Despite the fact that investors may play a critical role in mobilising finance to fund renewable energy technologies, data suggests that they are frequently hesitant to do so (Masini, Menichetti, 2013). Reduced carbon emissions contribute to protecting the earth's depleting supplies of natural resources, and, as a consequence, reserves of fossil fuels such as coal, oil, and natural gas will last much longer (Clean energy ideas, 2021). By absorbing heat and trapping it in the atmosphere, greenhouse gases produce warming (Gates, 2021).

2.4 Gender Equity

The UN General Assembly enacted the Universal Declaration of Human Rights on December 10, 1948, incorporating gender equality into international human rights law (Australian Human Rights Commission, 2023). The General Assembly named 1975 as the International Women's Year and planned the first World Conference on Women, which was held in Mexico City during the 1970s when the global feminist movement started to gain ground (United Nations, n.d.). The progressive movement, which calls for gender equality for women and girls and gender norms that support everyone's health and well-being, including gender minorities, is very evident today (Gupta et al., 2019). Three things happen more quickly toward gender equality at work when men genuinely practice equal collaboration at home: 1. Women who live with equal partners succeed at work more than those who do not; 2. Fathers who are equal domestic partners serve as role models for equity, influencing the expectations of the future workforce. 3. Men who share unpaid work at home equally aren't ashamed to ask for and explain why they require scheduling flexibility (Smith, Johnson, 2020).

3. Research Questions / Aims of the Research

The purpose of this paper is to see the percentage of companies that offer training in ICT and how digitalisation is used. Based on the debate about how males dominate the field of "science, technology, engineering, and mathematics" (STEM), we intended to look at the gender distribution in Romanian electrical enterprises.

The main research questions are:

1. What is the percentage of companies in the field of "Electricity, gas, steam, and air conditioning supply" (according to the Statistical Classification of Economic Activities developed in the European Community) that provide training to improve their staff's knowledge of ICT skills?
2. Based on sustainability reports, for what activities is digitalisation used by the Romanian companies in the field of electricity?
3. How is the distribution of gender in Romanian companies in the electricity field in Romania?

4. Research Methods

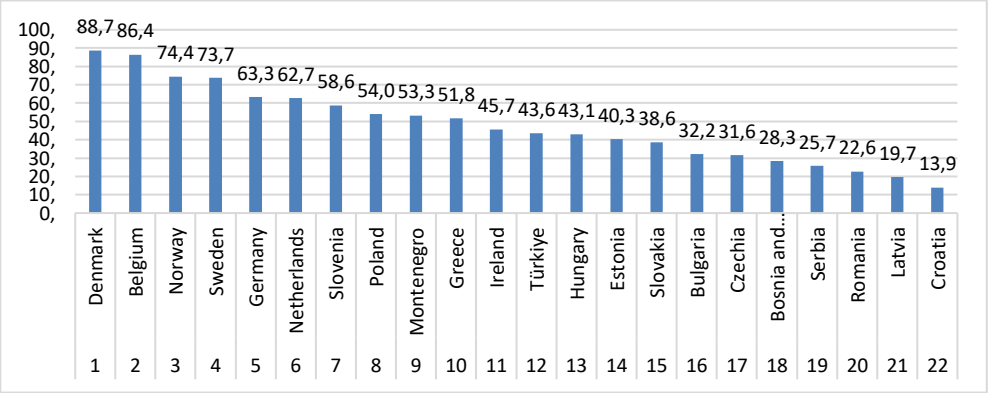
The information came from the Eurostat database and a content analysis of yearly sustainability reports of firms. Secondary Data Analysis was employed. Descriptive research was employed. For the percentage of companies that offer training for ITC, we used data for the year 2022, for 22 countries. For five important Romanian companies in the field of electricity, we analysed the sustainability reports for the year 2021. We used percentages, ratios, averages, median, min, and max, to analyse the research questions. Our research's primary inquiries are: What is the percentage of companies that provide training to improve their staff's knowledge of ICT skills, from the field of "Electricity, gas, steam, and air conditioning supply" (according to the Statistical Classification of Economic Activities developed in the European Community). For what activities is digitalisation used by the Romanian companies in the field of electricity, based on the sustainability reports? We selected significant words to reveal how often they are used. How is the distribution of gender in Romanian companies in the field of electricity in Romania? Here, we extracted the number of employees by gender. The study's findings may be helpful in developing training in companies and increasing the usage of digitalisation for adapting to the market. The study could contribute to improving the sustainability reports and could highlight gender issues, and maybe education issues.

5. Findings

5.1 Training

From data extracted from Eurostat, for the training in ICT for the field of "Electricity, gas, steam, and air conditioning supply" we can see that the companies from Denmark are in first place with 88.7 % of the total companies, in the second place is Belgium with 86.4 %, followed by Norway with 74.4 %, and in the last place is Croatia with 13.9 %. Romania is in the 20th place with 22.6 %.

Figure 1. Percent of companies in the field of 'Electricity, gas, steam, and air conditioning supply' that provided training to develop/upgrade ICT skills – Year 2022



Source: Author's research (EUROSTAT, 2023).

5.2 Digitalisation in Sustainability Reporting

For finding how digitalisation is used, we selected 5 companies from the electricity area: E-Distributie, E.ON Romania, Electrica Furnizare, Engie Romania, and Transelectrica. From their Sustainability reports results, that all use digitalisation in daily activity, starting with communication, online invoicing, client portals where the clients could record the index, could see the balance or could pay the invoices or complaints, etc. The words digitalisation and online are found in all 5 sustainability reports analysed. Tree companies out of 5 offer working from home, more precisely: E-Distributie, E.ON Romania, and Engie Romania. This does not mean that the others do not offer this, but they did not mention it in their sustainability reports for 2021. The word "digitalisation" is the most used, with an average of 32 (Min 6, Max 53), followed by "online" or "Internet", with an average of 10 (Min 4, Max 22). The expressions "software" (Average 1, Min 0, Max 4) and "working from home" or "teleworking" (Average 2, Min 0, Max 5) are less used.

Table 1. Digitalisation – number of words used in Sustainability reports

Company Name	Number of pages of Sustainability Reports	Digitalisation	Online, Internet	software	Working from home, teleworking
E-Distributie	110	46	22	3	1
E.ON Romania	96	53	13	4	5
Electrica	90	6	6	0	0
Engie Romania	78	11	4	0	4
Transelectrica	85	44	6	0	0
Total	**459**	**160**	**51**	**7**	**10**
Average	92	32	10	1	2
Min	78	6	4	0	0
Max	110	53	22	4	5

Source: Author's research (E-Distributie, 2021) (E.ON Romania, 2021) (Electrica Furnizare, 2021) (Engie Romania, 2021) (Transelectrica, 2021).

5.3 Gender Distribution

Table 2. Gender Distribution by number of employees and percent

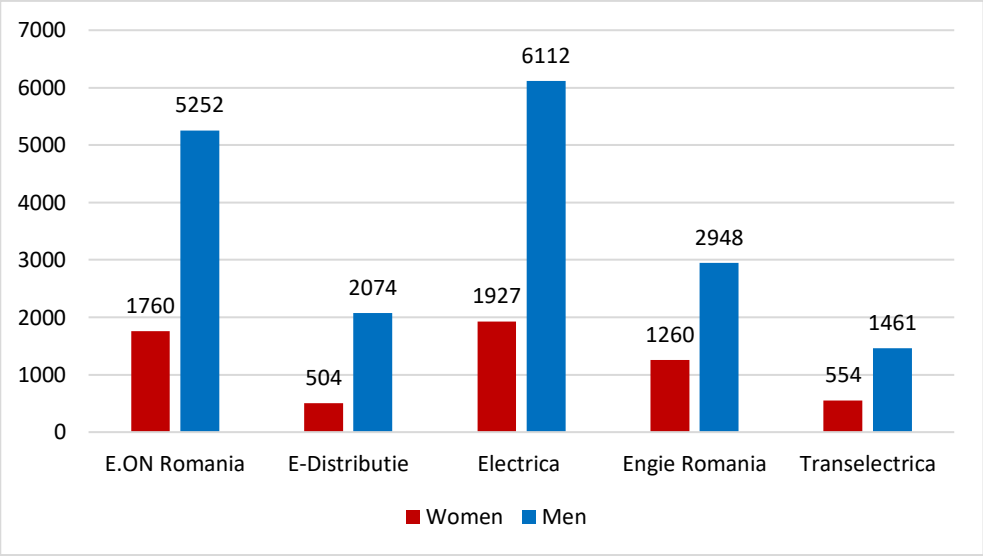
Company Name	Women		Men		Total Number of employees	%
	Number	Percent (%)	Number	Percent (%)		
E-Distributie	504	19.55%	2,074	80.45%	2,578	100%
E.ON Romania	1,760	25.10%	5,252	74.90%	7,012	100%
Electrica	1,927	23.97%	6,112	76.03%	8,039	100%
Engie Romania	1,260	29.94%	2,948	70.06%	4,208	100%
Transelectrica	554	27.49%	1,461	72.51%	2,015	100%
Total	**5,451**	**24.96%**	**16,386**	**75.04%**	**21,837**	**100%**

Company Name	Women		Men		Total Number of employees	%
	Number	Percent (%)	Number	Percent (%)		
Average	-	25.21%	-	74.79%	-	
Min	-	19.55%	-	70.06%	-	
Max	-	29.94%	-	80.45%	-	

Source: Author's research (E-Distributie, 2021) (E.ON Romania, 2021) (Electrica Furnizare, 2021) (Engie Romania, 2021) (Transelectrica, 2021).

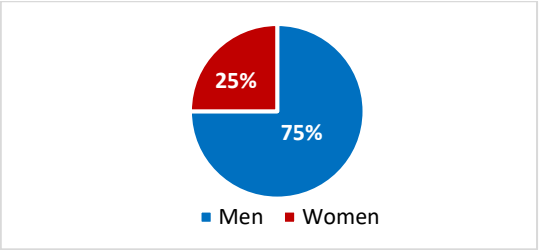
Based on the discussion about the fact that the area of "science, technology, engineering and mathematics" (STEM) is dominated by men, we wanted to see the distribution of gender in Romanian electrical companies. From the sustainability reports of the 5 companies analysed, we found that 75 % (Min 70.06 %, Max 80.45 %) of the employees are men and 25 % (Min 19.55 %, Max 29.94 %) are women. The minimum percentage for women is for the company E-Distributie, with 19.55 %, and the maximum is in Engie Romania with 29.94 %. For all the companies, the average percentage of women is 25 % and of men is 75 %. In Table 1 we can see that for the year 2021, Electrica had 8,039 employees, which is the higher number of employees from the companies from this research. Electrica is followed by E.ON Romania with 7012 employees, and then by Engie Romania with 4208 employees. The smaller number of employees is for Transelectrica, which had 2015 employees in 2021.

Figure 2. Gender Distribution for each company by number of employees – Year 2021



Source: Author's research (E-Distributie, 2021) (E.ON Romania, 2021) (Electrica Furnizare, 2021) (Engie Romania, 2021) (Transelectrica, 2021).

Figure 3. Gender distribution all companies



Source: Author's analysis.

6. Conclusions

According to data taken from Eurostat for the training in ICT for companies from the field of "Electricity, gas, steam, and air conditioning supply" for year 2022, the companies from Denmark are on top with 88.7 %, in the second place is Belgium with 86.4 %, followed by Norway with 74.4 %, and in the last place is Croatia with 13.9 %. At 22.6 %, Romania is in 20th place out of 22, so ICT training is offered in a low percentage by Romanian companies from the fields of Electricity, gas, steam, and air conditioning supply, compared to other countries. The five companies mentioned training offered to their employees for different skills, such as digitalisation, learning new languages, etc. The word "digitalisation" is used, an average of 32 times, and online or Internet an average of 10 times. By calculating the total number of employees by gender for all companies analysed, we found that the average percentage of women is 25 %, while the average percentage of men is 75 %, so the theory that the STEM field is dominated by men is proved. Our recommendation is to increase training in ICT for all companies in the field of electricity, gas, steam, and air conditioning supply, and also to mention in sustainability reports everything that could increase their reputation and the trust of the public. The study's conclusions may be useful in helping businesses create training for their employees and increase their use of digitalisation for market adaptation. The study may help improve sustainability reporting by drawing attention to gender and perhaps educational difficulties. Also, it could help to establish policies regarding increasing the number of employees' training hours and for the state to improve the education in schools. The limitation of the study is that, based on five Romanian companies from the electricity field, we could not generalise and we could not exclude the human mistakes that could have occurred because of manual work. Future research could include a larger number of companies or could include other fields.

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The Financial Performance of the Automotive Industry during the Semiconductor Crisis from CSR, GRI and UNGC Perspectives

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Abstract

The global semiconductor crisis, as a consequence of the SARS-CoV-2 pandemic, highlights a difficult period for the Automotive industry. According to the literature review, CSR promotes social good beyond the law and the interests of a firm and its shareholders, while the GRI and UNGC provide guidance to companies regarding the reporting of sustainability performance. This paper aims to identify the influence of Corporate Social Responsibility, Global Reporting Initiatives, and United Nations Global Compact on financial performance in the Automotive industry for 2021. In order to achieve the research purpose, a quantitative method was performed through statistical and econometric analysis. The econometric analysis is based on two regression equations, for CSR and GRI-UNGC, the data being collected from Thomson Reuters database. In the sample for the CSR model, there are 198 companies, while for the GRI-UNGC model, the total number is 213. This research aims to assess the influence of CSR, GRI and UNGC on the financial performance of companies in the Automotive industry. The results of the CSR model emphasise that there is a positive influence of the CSR Sustainability Committee, the CSR Sustainability External Audit, and the CSR Sustainability Report Global Activities on the financial performance. For the GRI-UNGC model, a positive influence has been found on the GRI Reporting Guidelines. On the other hand, negative influences have been identified on the CSR Sustainability Reporting and the Global Compact Signatory. This study fulfils the gap in research on the semiconductor crisis in relation to sustainability reporting, and it is useful in developing future research perspectives.

Keywords: CSR, GRI-UNGC, semiconductor crisis, sustainability, financial performance.

JEL Classification: L25, M41, Q56.

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1. Introduction

Standardisation of sustainability reporting preoccupied accounting researchers in the last decades (Albu et al., 2016), as well as the economic actors since new crises appeared. Therefore, both parties focused on analysing standards, initiatives, and tools for sustainability reporting. The perspectives of Corporate Social Responsibility (CSR), Global Reporting Initiative (GRI), and the United Nations Global Compact (UNGC) are used for reporting relevant sustainability information (Adams et al., 2022). Nowadays, the Automotive industry is facing a crisis due to the semiconductor shortage caused by the pandemic (Mohammad et al., 2022). This has resulted in significant earnings losses and delayed vehicle deliveries (Marinova, Bitri, 2021).

Despite the numerous articles published on CSR, GRI, and UNGC topics, such as Adams et al. (2022), Bețianu (2010), and Halkos and Nomikos (2021), to our knowledge, there is a gap in the investigation of influence on the above-mentioned topics on companies' financial performance in the context of semiconductor crisis. This study aims to identify the influence of CSR, GRI, and UNGC on financial performance in the Automotive industry for 2021, in the context of the global semiconductor crisis triggered by the SARS-CoV-2 pandemic. In order to achieve the research purpose, a quantitative method was performed through statistical and econometric analysis. The econometric analysis is based on two regression equations, for CSR and GRI-UNGC, the data being collected from Thomson Reuters database.

The findings of the CSR model highlight that the financial performance is positively impacted by the CSR Sustainability Committee, the CSR Sustainability External Audit, and the CSR Sustainability Report Global Activities. However, CSR Sustainability Reporting has negative effects. Furthermore, the GRI-UNGC model highlights a positive influence of the GRI Reporting Guidelines, while the negative influence of the Global Compact Signatory is found.

This paper is organised as follows: Section 2 includes an overview of the CSR, GRI, and UNGC within the area of sustainability. In Section 3 the aims of the research are presented. Section 4 presents the applied methodology, while the research findings of this paper are covered in Section 5 and the conclusions in Section 6.

2. Problem Statement

CSR emerged in 1970 with an initial focus on social issues, while in 1980 it extended its focus to environmental problems (Sun et al., 2022). Since 1990, it has been used to assess, manage, and govern a company's responsibilities to society and the environment (Christensen et al., 2021).

GRI is an NGO composed of businesses' investors, environmental researchers, and accounting representatives established in 1997. It became an independent organisation in 2002 and its aim is to ensure the quality of sustainability performance reports (Bețianu, 2010; Halkos, Nomikos, 2021). It developed a set of continuously

updated different standards, such as economic disclosures, market presence, labour, or materiality disclosures.

There are many sustainability reporting frameworks used such as the International Integrated Reporting Council, Sustainability Standards Board and World Business Council for Sustainable Development, but most notably ones are GRI and UNGC (Subramaniam, 2023). GRI is the best known and most dominant sustainability report framework used by businesses worldwide (Giannarakis et al., 2022).

The GRI standards are classified into three pillars: universal standards, sector standards, and topic-related standards. Adams et al. (2022) suggest that these standards are essential for reporting relevant information on materiality disclosures. GRI has established a strategic partnership with UNCG since 2010. This partnership developed a guide called "Making The Connection" that contains universal principles based on the GRI guidelines. Both initiatives are different reporting tools for Sustainable Development Goals (SDGs) (UNGC, 2010).

The UNGC is presented as a voluntary initiative, a self-regulatory agreement that empowers organisations to supervise their social activity (Orzes et al., 2020). UNGC is a policy tool, while GRI is a reporting framework. In 2010, UNGC announced and signed an agreement to align its work to GRI in advancing corporate responsibility and transparency (Rasche, 2009). This agreement allows companies to use the GRI guidelines to meet the mandatory annual disclosure requirement. This partnership set 17 Sustainable Development Goals (SDG), aimed at providing a clear roadmap to corporate sustainability (UNGC, 2010).

A new crisis generated by the SARS-CoV-2 pandemic has been observed in the Automotive industry. The semiconductor crisis had a big impact on companies that are closely connected to the semiconductor industry (Mohammad et al., 2022). Between 2020 and 2023, earnings lost by billions of dollars were a blow to automakers, while lack of supply prevented the Automotive industry from delivering its vehicles on time (Marinova, Bitri, 2021). Therefore, the originality of this study is reflected in the analysis of companies' financial performance in the Automotive industry during the semiconductor crisis.

3. Aims of the Research

This paper analyses the financial performance of the Automotive industry during the semiconductor crisis from CSR, GRI, and UNGC perspectives. The lack of clear methodologies for reporting non-financial information, and the pressure to report was observed in the Automotive industry in a study conducted by Perello-Marin (2022). The purpose of this research is to determine how the financial performance of the Automotive industry in 2021 is affected by CSR, GRI, and UNGC, considering the global semiconductor crisis caused by the SARS-CoV-2 pandemic.

Based on the literature review, two research hypotheses were formulated: (H1) The financial performance of the Automotive industry companies is influenced by CSR reporting in a crisis context, respectively, (H2) The financial performance of

the Automotive industry companies is influenced by GRI and commission to the UNGC principles in a crisis context.

4. Research Methods

From a methodological point of view, the financial performance of the Automotive industry during the semiconductor crisis is based on quantitative research performed through descriptive statistics and two econometric models. The scope of this research is to identify the influence of CSR, GRI, and UNGC on financial performance in the Automotive industry for 2021.

In this section, the following elements are presented: the sample data, the variables included in the analysis, followed by the econometric models.

4.1 Sample Data

The database size for the analysis of the influence of CSR, GRI, and UNGC on the financial performance in the Automotive industry initially totaled 198 (CSR model) and 213 (GRI-UNGC model) of observations. Considering the missing data, the following number of companies was removed: 5 from the CSR model and 17 from the GRI-UNGC model. To avoid distortion of the regression results, the outliers of the variables, 21 (CSR model) and 21 (GRI-UNGC model), were data trimmed from the database using the Interquartile Range method (Dash et al., 2023). The final statistical sample consists of 172 companies for the CSR model, and 175 companies for the GRI-UNGC model, which is detailed in Table 1.

Table 1. Final Sample Data

	CSR model		**GRI-UNGC model**	
Number of Companies	172		175	
Number of Countries	29		29	
Number of Observations by Region				
Africa	2	1.16%	2	1.14%
Asia	41	23.84%	41	23.43%
Americas	92	53.49%	92	52.57%
Europe	34	19.77%	37	21.14%
Oceania	3	1.74%	3	1.72%

Source: Refinitiv Eikon, 2023.

The secondary data source for this quantitative study was the Refinitiv Eikon (Thomson Reuters) database, which has also been used in other papers on sustainability field (Koseoglu et al., 2021; Nicolo et al., 2023). The analysis was carried out in the year 2021, taking into account the availability of the most recent data, considering the peak of the pandemic period (Ramani et al., 2022) and the increased demand for semiconductor manufacturing (White, 2021).

4.2 Variables

The models are based on a dependent variable that quantifies the financial performance of the companies analysed. Given that traditional rates of return are calculated based on net profit, in order to avoid differences in the tax systems of the countries, this study uses the Returns on Gross Profits-to-Assets as a dependent variable. This variable was used in studies performed by Kenchington et al. (2019) and Novy-Marx (2013).

Regarding the independent variables, the CSR model used four (CSR_SC, CSR_SEA, CSR_SRGA, and CSR_SR), while the GRI-UNGC model had two independent variables (GRI_RG, GCS) specific to sustainable development.

Furthermore, the size and operational efficiency of companies are used as control variables for the linear regressions. Detailed information on the description, sources, and references of the variables chosen for sustainability research during the global semiconductor crisis is found in Table 2.

Table 2. Variable definitions, sources, and references

	Definition	Source	Reference
Dependent variables			
RGPA: Returns on Gross Profits-to-Assets	Gross profit for the year divided by total assets value.	Refinitiv Eikon	(Kenchington et al., 2019; Novy-Marx, 2013)
Independent variables			
CSR_SC: CSR Sustainability Committee (0/1)	The company has a CSR committee or team (=1) or not (= 0).	Refinitiv Eikon	(Nicolo et al., 2023)
CSR_SEA: CSR Sustainability External Audit (0/1)	The company has an external auditor of its CSR/H&S/Sustainability report (=1) or not (= 0).		(Koseoglu et al., 2021)
CSR_SRGA: CSR Sustainability Report Global Activities (0/1)	The company's extra-financial report takes into account the global activities of the company (=1) or not (= 0).		(Koseoglu et al., 2021)
CSR_SR: CSR Sustainability Reporting (0/1)	The company publishes a separate CSR/H&S/Sustainability report or publishes a section in its annual report on CSR/H&S/Sustainability (=1) or not (= 0).		(Koseoglu et al., 2021)
GRI_RG: GRI Report Guidelines (0/1)	The company's CSR report is published in accordance with the GRI guidelines (=1) or not (= 0).		(Koseoglu et al., 2021; Mihai, Aleca, 2023)
GCS: Global Compact Signatory (0/1)	The company has signed the *United Nations Global Compact* which is a non-binding United Nations Pact to encourage businesses worldwide to adopt sustainable and socially responsible policies, and to report on their implementation (=1) or not (= 0).		(Anita et al., 2023; Ortas et al., 2015)
Control variables			
Ln(TA): Size	Logarithm of Total Assets	Refinitiv Eikon	(Koseoglu et al., 2021; Nicolo et al., 2023)
OE: Operational efficiency	Operating costs divided by total operating income		(Caby et al., 2022)

Source: Authors' own research.

In order to establish the influence exerted by the independent variables, the following two models were run to estimate the outcomes for the Automotive industry:

CSR model: $RGPAi = \beta0 + \beta1\ CSR_SCi + \beta2\ CSR_SEAi + \beta3\ CSR_SRGAi + \beta4\ CSR_SRi + \beta5\ Ln(TA)i + \beta6\ OEi + \varepsilon i$ (1)

GRI-UNGC model: $RGPAi = \beta0 + \beta1\ GRI_RGi + \beta2\ GCSi + \beta3\ Ln(TA)i + \beta4\ OEi + \varepsilon i$ (2),

where RGPAi is the dependent variable on the financial performance of the companies included in the econometric analysis. CSR_SCi, CSR_SEAi, CSR_SRGAi, CSR_SRi, GRI_RGi and GCSi are independent variables specific to sustainable development, while Ln(TA)i and OEi represent control variables on companies' size and operational efficiency, and Ɛi is the error. To validate econometric models, multifactorial linear regressions was performed using the SPSS Statistics software.

5. Findings

The main statistical indicators are calculated for all the variables included in the analysis, using descriptive statistics, before performing the regression analysis. In Table 3 the descriptive statistics of the dependent variable, as well as those of the independent and control variables, considering the total number of valid observations after removing outliers, are presented.

Table 3. Descriptive statistics

Variables	N	Mean	St. Dev	Min	Q1	Q2	Q3	Max
Dependent variables								
RGPA_CSR model	172	0.163	0.087	-0.0001	0.099	0.138	0.217	0.422
RGPA_GRI-UNGC model	175	0.164	0.088	-0.0001	0.100	0.139	0.219	0.422
Independent variables								
CSR_SC	172	0.80	0.404	0	1	1	1	1
CSR_SEA	172	0.38	0.488	0	0	0	1	1
CSR_SRGA	172	0.72	0.450	0	0	1	1	1
CSR_SR	172	0.87	0.335	0	1	1	1	1
GRI_RG	175	0.56	0.498	0	0	1	1	1
GCS	175	0.15	0.362	0	0	0	0	1
Control variables								
Ln(TA)_CSR model	172	22.233	1.817	17.900	20.912	22.190	23.465	26.990
Ln(TA)_GRI-UNGC model	175	22.253	1.817	17.902	20.990	22.190	23.490	26.994
OE_CSR model	172	0.805	0.094	0.490	0.763	0.825	0.873	1.000
OE_GRI-UNGC model	175	0.803	0.097	0.487	0.750	0.820	0.870	1.000

The N is total number of valid observations after data trimming outliers. The Q1, Q2, and Q3 are 25%, 50% (median), and 75% percentiles.

Source: Authors' own research, using SPSS Statistics.

A RGPA of 16.3% (CSR model) and 16.4% (GRI-UNGC model) is observed for companies in the Automotive industry. Also, the operational efficiency (operating

costs divided by total operating income) of the companies included in the sample is 80.5 % (CSR model), respectively, 80.3 % (GRI-UNGC model). All the operational efficiency indicators reported by companies in the Automotive industry are positive, which suggests revenues are higher than the operational costs for the entire sample.

It is noticed that over 70 % of companies in the Automotive industry have taken steps to address CSR concerns. These include forming a dedicated CSR committee or team, creating an extra-financial report that covers their global operations, publishing a distinct CSR/H&S/Sustainability report, or incorporating a section on CSR/H&S/Sustainability in their annual reports. On the other hand, a finding is related to the existence of an external auditor on the company's CSR / H&S / Sustainability report, where only 38 % of the sample applied this measure. CSR was also measured using dummy variables by Koseoglu et al. (2021) and Nicolo et al. (2023). For example, Koseoglu et al. (2021) stated that 49.42 % of selected companies prepared CSR reports, and 30.97 % implemented external audits of their reports. Nicolo et al. (2023) presented that 69.20 % of the analysed companies organised a CSR committee or team.

Based on the findings, the mean results for GRI_RG and GCS could be compared, and the Automotive industry tendency to report according to GRI Guidelines (56 %) is highlighted, while a small number of companies (15 %) commit to the United Nations Global Compact. Moreover, Koseoglu et al. (2021) found that only 48.46% of the companies which carry out activities in the Hospitality and Tourism industry, analysed for the period between 2012-2018, prepare the CSR report as a result of adopting the GRI framework.

The results of the linear parametric regressions used to define the valid and statistically significant econometric models are presented in Table 4. The validity of the regression models is supported by the F-Test, which registers a significant threshold lower than 0.01, in the case of both models. Therefore, there is sufficient evidence to state with a probability of 99 % that the econometric models are statistically valid.

The intensity of the link between the variables is assessed based on the correlation ratio (R), highlighting there is a strong association between the variables (R > 0.6). Moreover, the R Square indicator emphasises that the variability of the dependent variable (RGPA) is explained by the independent variables as follows: 52.9 % for the CSR model and 52.3 % for the GRI-UNGC model.

Table 4. Regressions Results

Variables	CSR model	GRI-UNGC model	Statistics VIF	
			CSR model	GRI-UNGC model
CSR_SC	0.029**		1.494	
CSR_SEA	0.022**		1.358	
CSR_SRGA	0.015		1.795	
CSR_SR	-0.030		2.479	
GRI_RG		0.010		1.201
GCS		-0.001		1.102
Ln(TA)	-0.013***	-0.010***	1.484	1.274
OE	-0.575***	-0.616***	1.112	1.015

Variables	CSR model	GRI-UNGC model	Statistics VIF	
			CSR model	GRI-UNGC model
R	0.739	0.730		
R Square	0.546	0.534		
Adjusted R Square	0.529	0.523		
F test	33.055***	48.626***		
Observations	172	175		

Note. Dependent variables: RGPA_CSR model, RGPA_UNGC model
****, **, * indicate statistical significance at levels of 1, 5, and 10%, respectively.*
Source: Authors' own research, using SPSS Statistics.

The collinearity statistics analysis was interpreted based on the Variance Inflation Factor (VIF) values, similarly to Baker et al. (2022) coefficient interpretation. The results of this study show that the independent variables are not correlated. The VIF measures the multicollinearity that could exist between the variables included in the regression model. If a correlation is identified between more independent variables, the results may be skewed. Based on the regression analysis performed in this research, the value of the VIF is around 1 for all variables. This suggests that independent variables are not correlated, which ensures the validity of the analysis.

Considering the results of the developed econometric models, it is concluded that the financial performance of companies in the Automotive industry is positively and statistically significantly influenced by CSR (H1 is accepted). However, GRI and the UNGC principles do not have a statistically significant influence on the RGPA recorded by the companies (H2 is rejected). The findings for the CSR model and the GRI-UNGC model are based on previous research (Fuente et al., 2017; Koseoglu et al., 2021; Mihai, Aleca, 2023; Nicolo et al., 2023).

5.1 Financial Performance and CSR Reporting

The results of the CSR model emphasise that the existence of a CSR committee or team, as well as external auditing of the CSR / H&S / Sustainability report positively and statistically significantly influence the financial performance of companies in the Automotive industry. Furthermore, the CSR model is complemented by the negative and statistically significant influence of the size and operational efficiency of the companies included in the sample on RGPA. It is worth noting that the preparation of the extra-financial report taking into account the company's global activities, as well as the publication of a separate CSR / H&S/ Sustainability report or publishing a section in its annual report on CSR / H&S / Sustainability do not significantly influence the financial performance of companies in Automotive industry.

The negative influence exerted by publishing the CSR/H&S/Sustainability report on the financial performance of companies in the Automotive industry suggests that the related costs to the preparation of the report are higher than the post-publication benefits. Similarly, Ruan and Liu (2021) concluded that reporting ESG factors imposes costs that negatively affect companies' financial performance.

5.2 Financial Performance, GRI Standards and UNGC Principles

The evolution of RGPA is directly proportional to the evolution of GRI_RG, which highlights that financial performance of companies in the Automotive industry is positively influenced by CSR reporting in accordance with GRI guidelines. The other three variables (GCS, size, and operational efficiency) are negatively correlated with RGPA, as they are considered to evolve inversely proportionally. Specifically, these results suggest that the variable size and operational efficiency are the only statistically significant.

6. Conclusions

This research analysed the influence of CSR, GRI-UNGC on financial performance in the Automotive industry using a quantitative approach through statistical analysis and econometric models in the context of the semiconductor crisis. The econometric models used in the study provide valuable information on CSR, GRI-UNGC, and the financial performance in the Automotive industry. The literature review and the aims of the research have exposed the global semiconductor crisis, which has created a difficult period for the Automotive industry.

The first hypothesis (H1: The financial performance of the Automotive industry companies is influenced by CSR reporting in a crisis context) is validated through the first econometric model. The companies in the Automotive industry that focus on sustainability reporting, through the organisation of a CSR committee or team, and external auditing of the CSR / H&S / Sustainability report, lead to financial performance.

To test the second hypothesis (H2: The financial performance of the Automotive industry companies is influenced by GRI and commission to the UNGC principles in a crisis context), the analysis is performed based on GRI and UNGC variables. Although the findings of the GRI-UNGC model conclude there is no influence exerted by independent variables on the financial performance, the relationship between CSR, GRI and UNGC emphasises the idea that the preparation and publication of a CSR report, in accordance with GRI standards, determines the financial performance of companies in the Automotive industry. These arguments are justified by the first model results given the fact that the report is published in accordance with the GRI framework, and it is prepared by a CSR committee or team, also being externally audited.

This research is relevant because it provides opportunities for progress in the Automotive industry, which faces a challenging era. A business recommendation for the companies in this industry may be to start creating sustainability reports. The scarcity of the data represented a limitation of this paper. Further studies might include an analysis of other industries affected by the semiconductor crisis and an investigation of sustainable practices or strategies.

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Growing Double Materiality into Corporate Sustainability Reporting in Order to Meet Green Deal Targets

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Abstract

The transition to a clean, just, and sustainable European economy, in line with the objectives of the Green Deal, is an ongoing activity. Global warming, post-pandemic recovery, the challenges and difficulties arising from the conflict situation in Ukraine, have all intensified the efforts of the Member States in order to reduce the dependency on natural resources and to achieve sustainable growth. European companies are also facing these challenges, as the net-zero emissions targets are expected from the business environment. From these considerations, in 2022, the European Commissions adopted the Corporate Sustainability Directive and presented the first draft of European Sustainability Reporting Standards, as essential tools, aimed to increase transparency and quality of non-financial data. Both documents incorporate the principle of double materiality as a reporting criterion. This paper investigates the frequency with which the two materiality perspectives were reported by 128 European companies operating in five industries. The research is based on a content analysis of 512 Sustainability Reports published for the period 2019-2021. The general findings of the analysis highlight a current low stage of integrating the principle of DM in sustainability reporting, but with obvious perspectives of awareness of its content, usefulness, and purpose. Cross-sector oscillations were observed, with a clear detachment of energy companies, which is considered a positive aspect, given that the greening of the energy sector is one of the European Green Deal's targets.

Keywords: double materiality, CSRD, Green Deal, sustainability, content analysis.

JEL Classification: M14, G30.

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1. Introduction

Economic sustainable development has always been at the heart of European policies and projects, but in the face of intensifying the negative effects of climate changes, the financial and social difficulties caused by the COVID-19, and the challenges arising from the conflict situation in Ukraine, the European Commission (EC) decided to accelerate the actions taken in order to meet a fair and efficient ecosystem. Adopted in December 2019, the European Green Deal (EGD) represents the main instrument that will transform the EU into a competitive and modern economy with sustainable growth that is decoupled from the resource use (EU Commission, 2019a). The green transition needs to be embraced by the entire society, policy makers and, most importantly, business environment. From these considerations, the successful implementation of the EGD requires "better data from companies about the sustainability risks they are exposed to, and their own impact on people and the environment" (EU Commission 2021, 189 final, p. 2).

Introduced as a criterion for assessing sustainability data, the concept of double materiality (DM) has steadily increased in importance, applicability, and impact on achieving the goal of decarbonising European industries. Evidence of the increasing applicability of materiality is also provided by the academic area (Machado et al., 2021; De Cristofaro, Gulluscio, 2023). However, most of the studies undertaken converge toward the conclusion of an emerging and complex character of the concept, as well as major disparities in practical implementation and a lack of uniformity in the concept definition (Cerioni et al., 2021; Fiandrino, Tonelli, 2021).

The gap between the significant evolution of DM within European regulations, compared to the divergences from scientifical framework and practical use of the concept, is the main motivation for our research. Based on this, we formulated our scientific objective to quantify the practical applicability of DM in the European sustainability reporting. The assignment is far from being easy or devoid of subjectivity. As De Cristofaro and Gulluscio (2023) point out in their paper "there is a fragmented landscape of materiality disclosure" and taking into account the ambitious Green Deal's objectives this aspect needs to be improved. For these reasons, the present research goes beyond previous investigations (De Cristofaro, Gulluscio, 2023; Machado et al., 2021; Jorgensen et al., 2021) by providing additional clarifications and contributing to the literature in three main aspects. First, our research focuses only on European companies targeted by non-financial reporting. The homogeneity of the analysed population, in terms of consistency of the DM criteria, allows for comparability of the results and adds scientific value to the conclusions drawn. Secondly, the content analysis, carried out based on the key terms regarding the European view on DM, reveal the real state of understanding and application of the concept, as well as its evolution. Third, but not least, by corroborating the analysis in structure (cross-industry) and in dynamics (2019-2021), important conclusions are drawn, both from a theoretical and practical point of view, considering the on-going process of standardisation of sustainability reporting.

2. Double Materiality Regulation and Practical Implications

The principle of double materiality (DM) emerged and developed in close accordance with European regulations on non-financial reporting. Although it does not clearly mention the need for a double approach in assessing the materiality, Directive 95/EU recommends that companies include in their reporting "key non-financial performance indicators relevant to the specific business of the company" (Directive 2014/95/EU, Art. 19(e)). In June 2019, the EU formally introduced a new element to be taken into account in non-financial reporting, namely, the concept of DM. This principle was stipulated in the content of the communication aimed at providing assistance and guidance in non-financial reporting, complementing the Guide adopted in 2017. These new guidelines underline the importance of the materiality of non-financial indicators, "both from a business perspective and from a societal impact perspective" (EU Commission, 2019b/C 209/01, point.2.2).

With the release, in April 2021, of the Proposal for a Corporate Sustainability Reporting Directive (EU Commission, 2021, 189 final), the principle of DM has been increased to the degree of non-financial reporting criterion and further clarified. The European companies are mandated to communicate information about "the sustainability risks they are exposed to, and their own impact on people and the environment" (EU Commission, 2021, 189 final, p. 3).

The Corporate Sustainability Reporting Directive (CSRD) adopted in December 2022, consolidates the rules for disclosure of environmental, social, and governance data, contributing to a maturing of the corporate sustainability reporting process and bringing it closer to financial reporting (CSRD/2022/464, art. 29). The CSRD mandates the European Financial Reporting Advisory Group (EFRAG) to develop a set of European Sustainability Reporting Standards (ESRS). The principle of DM lies also at the heart of the ESRS delivered on December 2022 (Draft ESRS 1 General requirements).

3. Review of the scientific literature. Research Questions

Even though DM is promoted as an essential requirement for non-financial reporting, both researchers and practitioners have repeatedly pointed out that the diversity of definitions and approaches affects the comparability, usefulness, and transparency of data published in companies' sustainability reports (Cerioni at al., 2021; Fiandrino, Tonelli, 2021). Based on a quantitative content survey of 140 sustainability reports, grounded on the GRI recommendations, Machado et al. observed that companies do not disclose complete and detailed information about all issues identified as relevant (Machado et al., 2021). A rather small percentage, around 22% of the material indicators tracked in the study, was found in the company reports with broad content. Arvidsson and Dumay (2021) observed, in extensive research on non-financial reporting, an increase in the volume of published data, but without an improvement in their quality. The study was carried out on 30 Swedish companies listed on the Stockholm Stock Exchange and involved a content analysis of their published sustainability reports from 2008-2018 (Arvidsson, Dumay, 2021).

Improving the quality of published non-financial data requires, according to Rodríguez-Gutiérrez, creating an inclusive relationship between the company and key stakeholders in order to identify the sustainability issues with the highest degree of materiality. To demonstrate the importance of having a dialogue between the company and its stakeholders, on the materiality's topic, the author approached integrated reporting (IR) as an innovative non-financial communication tool in Spanish companies (Rodríguez-Gutiérrez, 2021).

In a more recent approach, De Cristofaro and Gulluscio (2023) investigated, through an exploratory analysis (based on text analysis), the applicability of DM in reporting sustainability at the level of a sample of 58 companies, from 21 European and non-European countries. The research allowed them a mapping of the latest corporate initiatives to apply DM in non-financial reporting. Such initiatives have unfortunately been identified only in the case of European companies and at a low level. The scholars also pointed out that there are very large discrepancies between approaches to the concept of DM "and a few empirical scientific contributions dedicated to DM disclosure" (De Cristofaro, Gulluscio, 2023, p. 24). Along with this remark, we enumerate the other conclusions drawn from the conducted review: (i) diversity of definitions and applicability of DM (Jorgensen et al., 2021); (ii) a lack of transparency, inaccuracy, and incomplete disclosure of sustainability issues (Machado et al., 2021); (iii) distortion and manipulation of the content of sustainability information in the interest of the company (Arvidsson, Dumay, 2021); (iv) different intensity in the application of DM at the global level, high subjectivism in the identification of sustainable issues, and very little evidence of a formal and consistent adoption of DM (De Cristofaro, Gulluscio, 2023).

In the current stage of knowledge, the present paper aims to make both theoretical contributions, to fill the gap in the literature, as well as practical contributions that focus on the principles laid down by the EU in the field of DM.

Subsidiary to this scientific objective, the following research questions (RQ) have been formulated:

RQ1: What is the general stage for the implementation of DM in European companies reporting? How has it evolved?

RQ2: Are the two perspectives of materiality reported accordingly to dominant principles and concepts at the level of European Union?

RQ3: The current stage of awareness and integration of DM can support the fulfilment of European Green Deal objectives?

4. Research Methods

The study is based on a quantitative content analysis of Sustainability Reports published by European companies for the financial years 2019-2021. The research included exclusively European companies targeted by mandatory non-financial reporting for which have been accessed Sustainability Reports on corporateregister.com platform. As one of the largest Corporate Social Responsibility reporting platforms in the world (Arvidsson, Dumay, 2021), which offers free institutional access to researchers, it allowed us to extract a total

of 512 sustainability reports from a sample of 128 European companies operating in five activity areas (Table 1).

Table 1. Structure of companies' sample

Field of activity	Companies
Basic materials	32
Energy	31
Technology	26
Utilities	21
Industrial products	18
Total	**128**

Source: Authors processing.

This paper examines the degree to which European companies have exclusively implemented the EU view of DM. To this end, we have considered the dynamics of the concept within the European regulations and have particularised this evolution between two main points in time: (a) the period 2019-2020, when non-financial reporting was carried out under the Directive 95/EU assisted, in terms of DM, by the guidance 2019b/C209 on non-financial reporting; (b) the year 2021, when the public debate on revision of the CSRD had already been held and the Proposal for a Corporate Sustainability Reporting Directive was released.

At the level of these regulations, text mining was carried out and a range of visualisations of the main contents of the DM guidance was generated (figures 1, 2).

Figure 1. Visual representations of the key concepts identified within the guid of EU Commission, 2019/C 209/01

Source: Authors processing.

Figure 2. Visual representations of the key concepts identified within the Proposal for CSRD

Source: Fiandrino, Tonelli, 2021, p. 9.

The 512 sustainability reports published by the companies from the scientific population have been the subject of a quantitative content analysis, by using the

linguistic soft Linguistic Inquiry Word Count (LIWC). Quantitative text analysis is an efficient technique to transform textual content into statistically relevant data. This is increasingly used in management research (Pröllochs, Feuerriegel, 2020) and non-financial reporting (Fiandrino, Tonelli, 2021; Arvidsson, Dumay, 2021). Linguistic Inquiry and Word Count (LIWC), in particular, is a software for academic research, which quantifies the frequency with which a word or association of words is used in a given volume of text. Within this process, the software is based on a closed dictionary of terms. The dictionary may be defined by each researcher in relation to its scientific objectives.

In order to elaborate an appropriate dictionary of terms, we started from the list of key terms, identified by Fiandrino and Tonelli, after a text-mining content analysis of all attached documents, as debates and contributions, to the revision of non-financial Directive (Fiandrino and Tonelli, 2021). Gathering opinions and contributions from 588 companies, NGOs, academic environments, and public institutions, these materials present an informational utility extremely valuable. This criterion made the key terms resulting from the analysis of the EU Commission guide, 2019b/C 209/01, to be considered secondary information.

The key terms list used in the research is presented in Table 2. There are terms relevant to the financial perspective of materiality (first category), to the ecological-societal perspective of materiality (second category) and to a unitary-cumulative approach to the concept of DM (third category), in accordance with EU regulators at the time of reporting for 2019-2021.

Table 2. Dictionary of relevant terms to the research context

Item no.	Financial materiality perspective	Environmental and social materiality perspective	Singular approach of DM
1.	Financial	ESG (Environment, Social, Governance)	European Reporting standards (NFRD)
2.	Global (performance)	Climate changes	Transparency
3.	Business (growth)	Non-financial disclosure	Sustainability
4.	Risks (Investors)	Human rights	Carbon footprint
5.	Company value	Greenhouse gas emissions	Responsible business
6.	Impact (Stakeholders)	People, society	Internal and external
7.	Innovation	Social issue	Key process
8.	Green investments	Recycling	Renewable resources
9.	Efficiency	Community needs	Sustainable product
10.	Research and development	Relevant social issues	Company impact

Source: Authors processing.

To document the research questions (RQ1-RQ3) using the quantitative content analysis technique, the following were considered:

1. Index of DM reporting stage (ISr) at the level of European companies:

$$I_{sr} = \sum Weight\ term_{\ i} \quad (1)$$

where: I = 1 … 30 terms

In order to determine the weight of each $term_i$ of research dictionary, the option „Word Frequencies Analysis" of LIWC-22 software is used.

2. Frequency of use of each of the three categories in the research dictionary in total Sustainability Reports. In calculating this reporting frequency, only the terms with relevant internal consistency from category to which they belong are included. The analysis of internal consistency is measured based on correlation degree and mutual prediction of terms from a certain category (appreciated by values between 0-1). This analysis is performed by using the option „Evaluate Internal Consistency" of software LIWC-22.

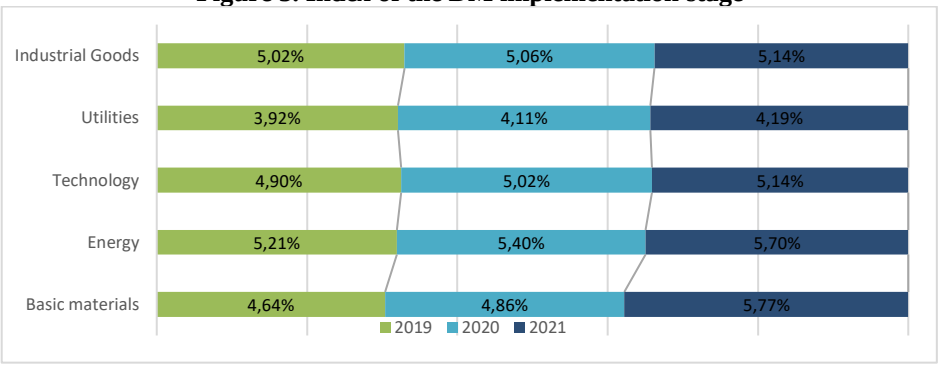
5. Results and Discussions

The results obtained from the quantitative content analysis and the main observations arising from them are presented according to the research questions.

Q1: What is the general stage for the implementation of DM in European companies reporting? How has it evolved?

In order to document RQ1, in the first part of the scientific investigation, the size of the *Index of DM reporting stage* (ISr) was calculated. By aggregating the total frequency of key terms (from the research dictionary) in the content of sustainability reports of European companies, ISr allows us to make a comprehensive assessment of the degree to which the principle of materiality has been integrated into non-financial reporting (figure no.3).

Figure 3. Index of the DM implementation stage



Source: Authors processing.

Based on the results obtained, it can be seen that the ISr values range from 3.9% to approximately 6%, which indicates a relatively low degree of integration of the DM, delimited according to the European vision, in the reporting of analysed companies. The constant upward trend was notated as a a favourable and encouraging premise at the level of European practice. The structure of the companies' sample, in the five activity fields, strengthens and expands the perimeter of scientific observations. As can be seen in Figure 3, energy companies have the highest ISr values. With annual sizes consistently above the 5% threshold, this category of companies demonstrates a higher awareness of the concept of DM. They

are followed by companies in industrial goods, technology, basic materials, and utilities. The slight inter-industrial fluctuations of the ISr level contribute to a better shaping of the position taken by these companies towards the non-financial reporting requirements. The observation is also consolidated by the analysis of the distribution in dynamics of terms with dominant individual frequencies (weight above 0,50% in total of words from Sustainability Reports, as can be seen in Table 3).

Table 3. Terms with dominant individual frequencies (weight above 0,50%)

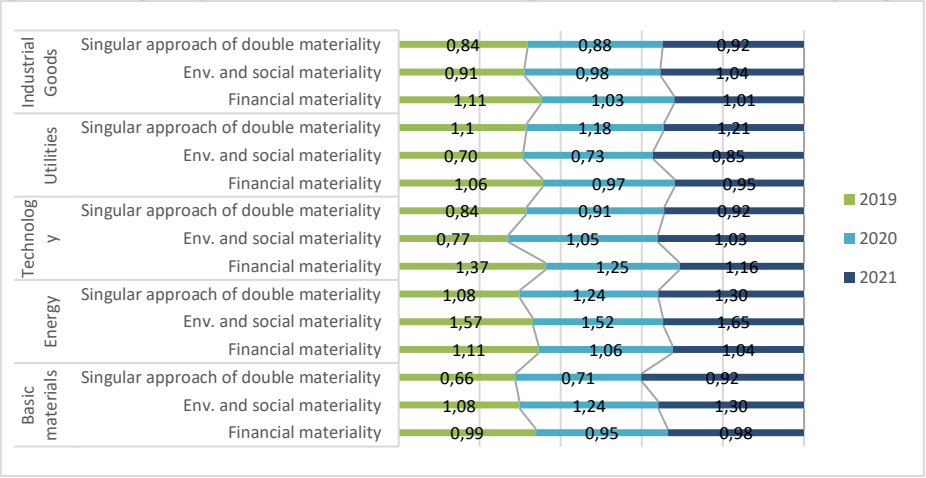
	Basic materials	Energy	Technology	Utilities	Industrial Goods
2019	Financial; Shareholders; Non-financial; Environment.	Innovation; Non-financial; Environment; Climate changes.	Performance; Recycling; Sustainability.	Financial; Company growth; Sustainability.	Performance; Greenhouse gas emissions; Social.
2020	Performance; Non-financial; Environment; Social.	Research and development; Environment; Climate changes.	Social; Greenhouse gas emissions	Environment; Social; Human rights.	Environment; Social; Sustainability.
2021	Environment; Social; Community; Standards.	Greenhouse gas emissions; Renewable resources; Materiality.	Environment; Social; Investors; Non-financial.	Social; Climate changes; Sustainability.	Greenhouse gas emissions; Climate changes.

Source: Authors processing.

Further, we have investigated and tested the internal consistency of the terms, and we documented the second question of our study (Figure 4):

RQ2: Are the two perspectives of materiality reported accordingly to dominant principles and concepts at the level of European Union?

Figure 4. Frequency of use of the three DM categories in total Sustainability Reports



Source: Authors processing.

The *Financial materiality* category has recorded, across all five industries, close weights and even above 1% from total of Sustainability Reports content. This value is attributed to the fact that reporting on financial aspects is a much easier and even more familiar aspect for companies. *Env and social materiality* category, has recorded values above the average of reporting frequency and with a visible upward trend over the time period analysed. These facts constitute favourable premises regarding the integration of DM in line with the EU vision. *Singular approach of the DM* Category, has registered the lowest frequencies of use in Sustainability Reports content. The tendency of oscillation in dynamics is also lower compared to the other two categories of terms, with a normal accentuation towards the end of the analysis interval. The low values of the weight of terms in this category are attributed to positive signals on non-financial reporting.

By corroborating the scientific observations drawn from the analysis of the first two research questions, judgements can be made on the extent to which the current state of assimilation of materiality into the information system can support the achievement of sustainable development goals.

RQ3: The current stage of awareness and integration of DM can support the fulfilment of European Green Deal objectives?

The current low degree to which the principle of DM is reported by European companies, but combined with an adequate manner of approach, the perspectives content of this principle constitutes supportive premises to set a unitary and robust direction towards sustainable development.

6. Conclusions

The present research makes original contributions regarding the European regulations in the area of DM and the way in which the companies have assumed them. The obtained results lead to a rather low stage of implementation of the principle of DM, but with real prospects of growth in the context of a much more rigorous standardisation. The calculated *Index of the DM reporting stage* (ISr) suggests difficulties in achieving sustainable development goals in the short term. Further, the analysis results showed low frequencies of use of the two perspectives of materiality, but with significant evidence of correct understanding and application of their content. Across the analysis, cross-industry oscillations were observed, with a clear detachment of energy companies in terms of implementation of the dual materiality.

Analysed in the context of the European Green Deal, both the overall degree and the individual frequencies of using DM indicate an insufficient level and incompatible with the European objectives, but with real growth potential. Partly, these low values can be justified by the fact that they were recorded in a transitional period between voluntary and mandatory reporting. In order to make a real contribution to climate neutrality, the future ESRD must provide a comprehensive, concrete, and consistent rules for corporate non-financial reporting.

The main limitation of the research arises from the fact that the analysis focused only on the period 2019-2021. This is because, although this is an eloquent

timeframe for the topic of DM, reporting at the level of 2022 (a representative year through the adoption of the CSDR and ESRS) was not included (due to lack of data) in the research. Nevertheless, the present research highlights the importance of knowing how the initial European regulations were understood and applied in practice and can also provide a basis for further research.

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Leadership Skills Perceptions in the Alternative Educational Systems

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Abstract

The perceptions of leadership skills in alternative educational systems have gained significant attention in recent years. This paper provides a concise overview of the perceptions surrounding leadership skills in alternative educational systems, highlighting key findings from existing research and literature. There were four significant leadership skills analysis in the article: self-management, entrepreneurial spirit, focus on results, and power to delegate. Our results show high correlations between these skills. These perceptions highlight the effectiveness of the Montessori approach in preparing students for future success and leadership roles.

Keywords: alternative educational system, leadership, skills, Montessori.

JEL Classification: I21, I26, P46.

1. Introduction

In the ever-evolving world of the 21st century, the demand for effective leaders is higher than ever before. The Montessori educational approach, renowned for its emphasis on independence, self-directed learning, and holistic development, is uniquely positioned to nurture future leaders. This paper explores the essential leadership skills that Montessori students acquire through their educational journey, preparing them to thrive in a dynamic and interconnected world.

The perceptions of leadership skills in alternative educational systems have gained increasing attention as educators and researchers recognise the importance of preparing students for leadership roles in diverse and evolving contexts. Alternative educational systems, such as Montessori, Waldorf, democratic schools, and others,

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offer distinct approaches to education that prioritise holistic development, experiential learning, and student-centred practices. Understanding how these alternative systems are perceived in terms of fostering leadership skills is crucial to shaping educational practices and preparing students for future leadership roles.

Alternative educational systems challenge traditional models of education by emphasising self-directed learning, collaboration, creativity, and critical thinking. These systems often prioritise the development of not only academic knowledge, but also the essential skills and qualities needed for effective leadership in various domains of life. This includes skills such as self-management, entrepreneurial spirit, focus on results, and the power to delegate.

Exploring the perceptions of leadership skills in alternative educational systems provides valuable insights into the effectiveness of these approaches and their impact on students' leadership development. By examining existing research and the scholarly literature, we can gain a comprehensive understanding of how these alternative systems are perceived and how they contribute to the cultivation of leadership skills.

In this paper we will analyse one on the most important future leadership skills: self-management, entrepreneurial spirit, focus on results, and power to delegate.

I. Self-Management: Alternative educational systems are often perceived as nurturing self-management skills in students. These systems provide students with autonomy and responsibility for their own learning, encouraging them to set goals, manage their time effectively, and take ownership of their actions. The emphasis on self-directed learning in alternative systems fosters self-discipline, self-motivation, and a strong sense of personal accountability, which are vital aspects of effective leadership.

Perceptions of leadership skills in alternative educational systems highlight the development of self-management skills. These systems are often seen to empower students to take responsibility for their own learning and personal growth. The emphasis on self-directed learning and individual autonomy fosters skills such as time management, goal setting, self-discipline, and self-motivation. Students in alternative systems are perceived as capable of managing their tasks, resources, and responsibilities, which are essential for effective leadership.

II. Entrepreneurial Spirit: Perceptions of alternative educational systems often highlight the development of an entrepreneurial spirit in students. These systems encourage creativity, innovation, and independent thinking, nurturing an entrepreneurial mindset that values initiative, risk-taking, and problem-solving. Students are encouraged to explore their passions, identify opportunities, and develop a sense of agency, which are key attributes for entrepreneurial leaders who can navigate ambiguity, seize opportunities, and drive meaningful change.

Alternative educational systems are recognised for nurturing an entrepreneurial spirit in students. These systems foster creativity, independent thinking, and problem-solving skills. Students are encouraged to think outside the box, take

initiative, and explore their passions. The emphasis on innovation, risk-taking, and adaptability prepares students to become entrepreneurial leaders who can identify opportunities, embrace challenges, and drive meaningful change. Perceptions often associate alternative educational systems with cultivating an enterprising mindset that aligns with the demands of the modern world.

III. Focus on Results: Alternative educational systems are recognised as instilling a focus on results in students. These systems emphasise the importance of setting goals, measuring progress, and achieving tangible results. Students are encouraged to take responsibility for their own learning and demonstrate a commitment to excellence. The focus on results cultivates a strong work ethic, perseverance, and a drive for continuous improvement, all of which are integral to effective leadership.

Perceptions regarding the focus on results in alternative educational systems vary. While some alternative systems prioritise holistic development and process-oriented learning, others are seen as outcomes-oriented. Students in alternative systems may be perceived as driven by a sense of achievement, setting goals, and striving for excellence. The emphasis on tangible outcomes in some alternative systems prepares students to be results-oriented leaders who can set targets, measure progress, and deliver impactful results.

IV. Power to Delegate: Perceptions regarding the power to delegate in alternative educational systems vary. Although some alternative systems emphasise self-directed learning and individual autonomy, others also recognise the importance of collaborative work and shared decision-making. Students in alternative systems may have opportunities to practice delegation within group projects, cooperative learning activities, or student-led initiatives. The ability to delegate tasks, trust others, and effectively distribute responsibilities is a valuable leadership skill, enabling leaders to leverage the strengths of team members and maximise productivity.

The perceptions of the power to delegate in alternative educational systems are influenced by the collaborative nature of these approaches. Alternative systems often emphasise teamwork, cooperation, and shared decision-making. Students are provided with opportunities to work in groups, engage in project-based learning, and practice delegation of tasks and responsibilities. Perceptions suggest that alternative educational systems cultivate the ability to trust others, effectively distribute work, and leverage the strengths of team members. Such skills are crucial for future leaders who must delegate effectively to optimise team performance.

2. Literature Review

The perception of leadership skills has been analysed by many scientists in the past decades. By examining various studies, we aim to gain a comprehensive understanding of the unique qualities and abilities that Montessori education cultivates in students, preparing them for leadership roles in the future.

Research indicates that alternative educational systems promote self-management skills in students. A study by Şimşek and Tuğluk (2021) examined the perceptions of self-management skills in Montessori education and found that students developed a sense of responsibility, self-discipline, and time management abilities. The self-directed nature of alternative educational systems empowers students to take ownership of their learning, fostering self-management skills crucial for effective leadership.

Alternative educational systems are recognised for nurturing an entrepreneurial spirit in students. A study by Khan (2017) explored perceptions of entrepreneurial skills in Montessori education and found that students developed creativity, independent thinking, and problem-solving abilities. The emphasis on innovation, initiative, and risk-taking within alternative systems encourages students to think entrepreneurially, preparing them to lead with creativity and adaptability.

Perceptions regarding the focus on results in alternative educational systems vary. Some studies highlight the outcomes-oriented nature of alternative systems. For example, a study by Graham et al. (2018) investigated the perceptions of results-oriented skills in democratic schools and found that students demonstrated a strong work ethic, goal-setting abilities, and a commitment to achieving results. However, other studies argue that alternative systems prioritise holistic development and process-oriented learning rather than a narrow focus on measurable outcomes (Cadis, Busu, 2022).

Perceptions of the power to delegate in alternative educational systems are limited in the existing literature. However, some studies suggest that collaborative practices within alternative systems provide students with opportunities to practice delegation. For instance, a study by Casquejo Johnston (2019) examined perceptions of delegation skills in project-based learning in alternative schools and found that students developed the ability to trust others, distribute tasks, and effectively work in teams (Cadis, Busu, 2022).

The reviewed literature indicates that alternative educational systems are generally perceived to promote leadership skills such as self-management and entrepreneurial spirit. The self-directed nature of alternative systems empowers students to take responsibility for their learning, while the emphasis on innovation and independent thinking nurtures an entrepreneurial mindset. The perceptions of a results-oriented focus in alternative systems vary, with some highlighting an outcomes-oriented approach, while others prioritising holistic development. Although limited, the literature suggests that alternative systems provide opportunities for students to practice delegation through collaborative activities. Further research is needed to explore and deepen our understanding of leadership skills perceptions in alternative educational systems, specifically in relation to self-management, entrepreneurial spirit, focus on results, and the power to delegate.

3. Research Methods

The analysis of the leadership skills was performed with a quantitative analysis based on the questionnaires. The population is represented by all parents of the students enrolled in the Montessori educational system, and the sample size was calculated with the formula:

$$n = \frac{Z_{\alpha}^{2} \cdot \mathrm{p} \cdot (1-\mathrm{p})}{E^{2}} \quad (1)$$

where,
n = sample size
E = margin of error
Z_{α}^{2} = standard Z-score
p(1-p) = population variance

The sample size was calculated for a confidence level of 90 % and a margin of error of 5 %, and we get a sample size of 273 respondents. Thus, we have sent the questionnaire to 300 respondents, and we got 280 valid answers, having a rate of responses of 93.3 %. The questionnaires have open and closed responses. For the perception questions, a Likert sale in 7 points was used (1= less important; 7 = very important).

The focus of the questions was on the perceptions of the respondents on the future leadership skills: self-management, entrepreneurial spirit, focus on results, and power to delegate and empowerment for the team.

We have also calculated the correlations between these four factors. For this, we have used the Pearson's correlation coefficient using the following formula:

$$R = \frac{\mathrm{E}[\mathrm{X}-\mathrm{E}(\mathrm{X})(\mathrm{Y}-\mathrm{E}(\mathrm{Y})]}{\sigma(\mathrm{X})\sigma(\mathrm{Y})} \quad (2)$$

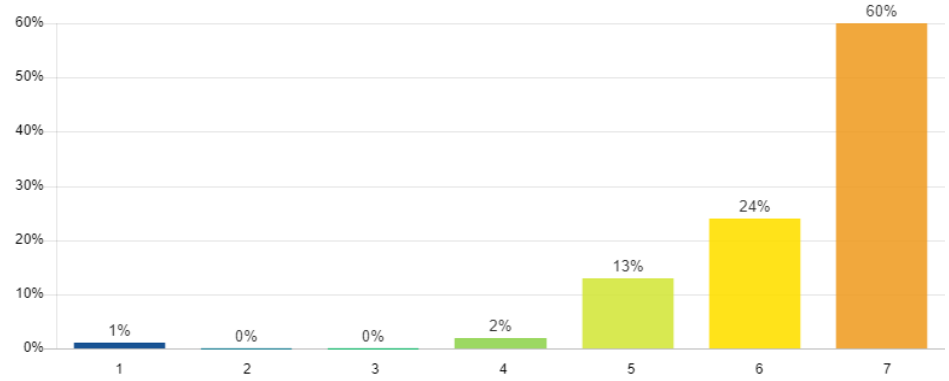
where,
E(X) = expected value of X
E(Y) = expected value of Y
σ(X) = standard devation of X
σ(X) = standard deviation of Y

4. Findings

The results of the perceptions regarding future leadership skills can be seen in Figures 1-4.

In Figure 1 are presented the results regarding the perception of the future leadership self-management skill (intrinsic motivation, self-control, understanding one's own qualities and flaws, etc.).

Figure 1. Leadership skills – Self-management
(intrinsic motivation, self-control, understanding one's own qualities and flaws, etc.)

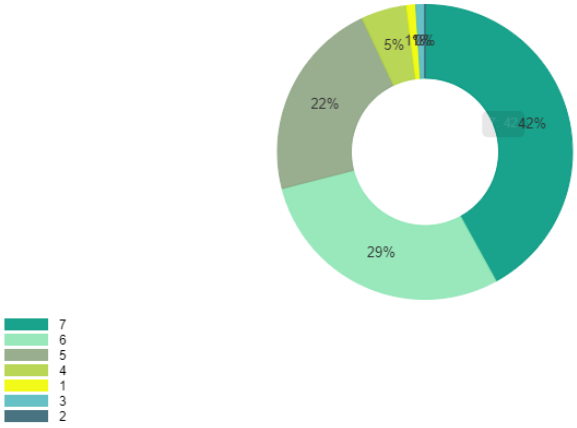


Source: Own calculation.

From the above figure, we could see that most of the respondents (60 %) consider that self-management will be a very important skill in the future. At the same time, 24 % of the respondents consider this skill to be important, and 13 % of them consider that this skill is somehow important.

In Figure 2 we can see the results of the perception regarding the entrepreneurial spirit, explained by courage, risk-taking, energy, passion, optimism, etc.

Figure 2. Leadership skills – Entrepreneurial spirit
(courage, risk-taking, energy, passion, optimism, etc.)



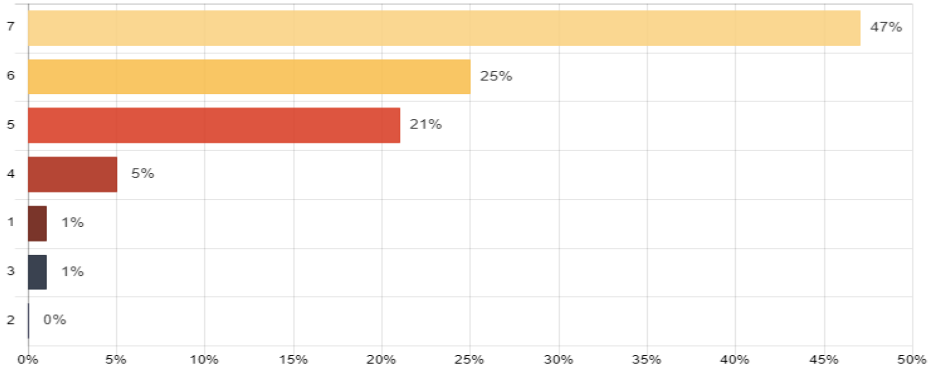
Source: Own calculation.

From this figure, we can see that many of the respondents (42 %) consider that entrepreneurial spirit will be very important in the future. Also, 24 % of the respondents consider that this skill is important, while 22 % consider that this skill

is somehow important. At the same time, only 7 % of the respondents consider that this skill would be less important in the future.

In Figure 3, the perceptions regarding the focus on results as a leadership skill, which is a direct result of responsibility, commitment, assumption, decision-making power, etc. are presented.

Figure 3. Leadership skills - Focus on results (responsibility, commitment, assumption, decision-making power, etc.)

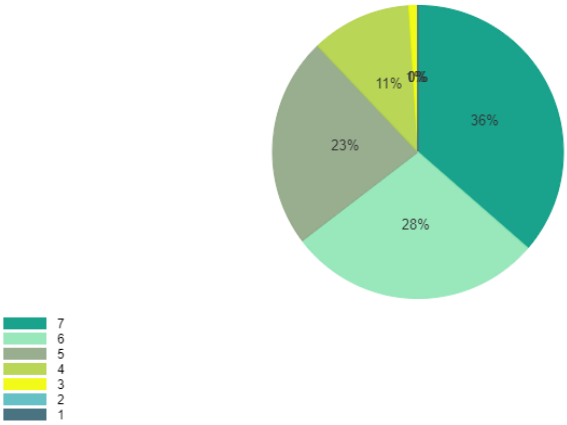


Source: Own calculation.

From Figure 3, we could conclude that most respondents consider that focus on results will be an important skill in the future. Thus, about 47 % of the respondents consider that this skill is of a high importance, while 25 % consider it important, and 21 % somehow important. We could also observe that only 2 % of the respondents consider that this skill is not important.

In Figure 4 we could see the answers regarding the power to delegate and empowerment of the team as a future leadership skill.

Figure 4. Leadership skills - Power to delegate and empowerment for the team



Source: Own calculation.

From the figure above, we could see that the answer was more balanced here. Thus, about 36 % of the respondents consider the power to delegate and the empowerment of the team to be a very important future leadership skill, while 28 % consider that it to be an important future skill, and 23 % consider this skill as a somehow important skill. At the same time, only 11 % of the respondents consider this skill of a low importance.

The correlation matrix was calculated with the Pearson correlation formula, which was described in the Methodology section. The results can be seen in Table 1.

Table 1. The matrix of correlation

	Self-management	**Entrepreneurial spirit**	**Focus on results**	**Power to delegate**
Self-management	1			
Entrepreneurial spirit	0.845109	1		
Focus on results	0.683015	0.729566	1	
Power to delegate	0.368521	0.815913	0.762925	1

Source: Own calculation.

From the table above, we see that there is a high correlation between these four leadership skills, especially between self-management and entrepreneurial spirit (84.5 %). Also, there is a high correlation between the focus on results and the power to delegate (76.3 %), the focus on results and the entrepreneurial spirit (72.9 %), the entrepreneurial spirit and the power to delegate (81.5 %), the self-management and the focus on results (68.3 %), and the focus on results and the self-management (68.3 %).

5. Conclusions

The Montessori educational approach equips students with a comprehensive set of leadership skills essential for the challenges of the future. Through the cultivation of adaptability, collaboration, empathy, critical thinking, and global awareness, Montessori students are prepared to become leaders who can navigate complexity, inspire others, and drive positive change. The future leaders emerging from Montessori classrooms will possess the qualities necessary to have a significant impact on their communities and contribute to a more inclusive, sustainable, and interconnected world.

The perception of future skills developed in Montessori students is generally positive. Montessori education is widely regarded as effective in nurturing the necessary skills and qualities for future success and leadership. Montessori students are often seen as possessing strong adaptability and resilience. Their exposure to self-directed learning and independent decision-making enables them to embrace change and navigate challenges effectively.

The perception of Montessori students' collaboration and teamwork skills is highly favourable. The emphasis on cooperative learning and the inclusive environment of Montessori classrooms foster the development of effective team players and leaders. Montessori education is associated with the development of empathy and emotional intelligence in students. The focus on social and emotional learning cultivates a sense of compassion, understanding, and ethical decision-making, which are crucial for future leaders.

The perception of Montessori students' critical thinking and problem-solving skills is generally positive. The hands-on, experiential learning approach and the freedom to explore various subjects enable Montessori students to develop strong analytical thinking and innovative problem-solving skills. Montessori students are often recognised for their global awareness and social responsibility. The integration of cultural studies, environmental education, and community engagement nurtures a sense of social consciousness and a commitment to making a positive impact on society.

In conclusion, the perceptions of the future skills developed in Montessori students are largely positive, with recognition of their adaptability, collaboration, empathy, critical thinking, and global awareness. Montessori education is valued for its ability to equip students with the essential qualities and abilities needed to thrive as leaders in a rapidly evolving world. These perceptions highlight the effectiveness of the Montessori approach in preparing students for future success and leadership roles.

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Sports, Popular Geopolitics and Technology: The Case of Simona Halep

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Abstract

This paper explores the intersection of sports, popular geopolitics, and technology using the case of Simona Halep as a sporting hero annexed to geopolitical discourse. Drawing on the scientific literature context of popular geopolitics and the logic of Murphy, we argue that nation-states try to impose a dominant geopolitical stance through sports imagery. We also examine how Simona Halep's successes on the tennis court have been used to promote a positive Romanian self-imagery, and how Romanian foreign policy has utilised the image of Simona Halep to achieve improved country branding internationally. The "3mm" documentary on Halep is discussed as a technological challenge presented to this national imagery. We argue that the documentary, which was meant to create engagement between the sporting hero and the wider public, was also used to create an emotional grip with the national symbol Simona Halep and, thus, to create an affective bond with the viewers. The decision to air the documentary on December 1st, the national day of Romania, was crucial in creating a sense of national pride, but failed to enhance the visibility of Romanian (sports) cultural products in an international setting. We demonstrate that sports have immense geopolitical power, and that mediatic technologies such as documentaries can be used to create engagement and to enhance national identity. The study's findings hold implications for future understandings of popular geopolitics and technology, and for policy makers seeking to leverage sports and other cultural products for nation branding and soft power.

Keywords: sports geopolitics, sports diplomacy, tennis, country branding, popular geopolitics.

JEL Classification: F50, M31, Z20, Z28.

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1. Conceptual Clarifications

Popular geopolitics provide cultural representations of states, nations, territories, or spaces through the use of pop culture or everyday meanings (Yatsyk, 2018). To create such representations, popular geopolitics pay close attention to entertainment television, internet, radio and other mass-communication channels in order to facilitate engagement between the mediatic subjects, objects, or practices and the public (Woodyer, Carter, 2020). By using such mediatic tools, popular geopolitics expands beyond statist geography, ideologically enlarging the imagined borders of the state through imagined social spaces and belongings (Rajkovic, 2022): while the physical borders remain unchanged, the imagined frontiers gain positive imagery from geopolitical contributions.

Using the logic of Murphy (1998), we argue that nation states use sports to remap the globe in their own right (Brazilian football, British lawn tennis, Hungarian waterpolo, Chinese table tennis, etc.), while trying to impose a dominant geopolitical stance through such sports imagery. In doing so, sports have the power to exceed physical boundaries and to create what Rajkovic (2022) calls "performative geography": a shift from understanding geographical borders from a mere territorial and cartographical approach to a dynamic and imaginative approach based on sports achievements at the international level. As Guo (2022) argues, popular geopolitics inspire geopolitical imaginations that reach beyond usual geographical boundaries, or, as Sage (2008) points out, there are representations which are manifested through culture (or, in our case, sports) and not through topology. Sports have always been a powerful tool for states to remap the world in a performative manner and to promote their geopolitical interests in the globalised world through soft power features (Cho, 2015; Deos, 2014; Jiang, 2013). Nations can use such performative reshaping to expand their (soft) power and to create new geopolitical imaginations, which reach beyond physical borders and which can establish better diplomatic relationships internationally (Grix et al., 2015). Through sports, countries can showcase their core national identity and expand their influence globally (Chiang, Chen, 2021; Houlihan, 1997; Lemus-Delgado, 2021). Additionally, sporting investments can promote a country's image abroad and serve broader strategic interests. Political leaders and visionaries use sports to build influence and soft power. Sports businesses and leagues seek to expand into new markets. Individuals, from athletes to team owners, pursue personal gains from the prestige, fame, and wealth associated with international sports (Koch, 2020).

Tennis, as any other global sport that reunites shared interests across borders (Roşca, 2010), has a geopolitical power through which it can facilitate diplomatic relationships between states. It intersects the realms of culture, social status, politics, and international relations. Players, officials, and fans from all over the world are brought together to share a common passion for the 'white sport'. This serves as a common ground to promote the international development of mutual respect and understanding, and also to bridge cultural and political differences. As such, it is an effective instrument of global diplomacy. Building on Granchev's (2022) idea, we consider that tennis (and tennis players) can be put in the service of the state through

geopolitical use. By employing popular, tennis-based geopolitics, states have the opportunity to extract positive results from image transfer, define a core identity, enhance rapport to citizens, and claim sovereignty in an international context in which other affirmation endeavors or tools failed to provide expected benefits. Tennis stars, given their international recognition and fame, often serve as a source of positive publicity and can be used to strengthen diplomatic ties (Bardocz-Bencsik et al., 2021; Vanc, 2014).

Inshakova (2022) revealed that popular geopolitics is a key in defining modern geopolitical economies and the prosperity of societies, next to traditional building blocks such as the political system. The serial narrative of the identitarian and sovereign state, traditionally created through political actions or dedicated country-branding campaigns, is taken over in popular geopolitics by fan-based constructions (representations). The framework used by a country to tell its unique story is constructed by sporting heroes and fans' representations of them.

2. Popular Geopolitics – Simona Halep

Sporting heroes such as Simona Halep can be exceptionally productive for projecting nationalistic imagery and for the geopolitical discourse with which Romania addresses the world, especially since Halep's major successes occurred during a decade in which Romania's traditional sporting performers (gymnastics, handball, football, etc.) failed to convince internationally. Romanian athletes have continued to perform well in some sports, such as table tennis, rowing, and fencing. However, these sports have not achieved the same level of notoriety as more popular sports such as tennis, especially after 2010. First, the media coverage (and mediatic appeal) of such sports was minimal, often being overshadowed by more popular sports like football, handball, tennis, or basketball. Odd enough, despite athletes achieving remarkable success at international competitions, the low media attention in their home country meant that their successes were not as widely recognised and appreciated by the domestic public. As a result, their achievements were probably not celebrated as much as they should have been on a national level, or at least, not as much as Halep's successes in tennis. Without extensive media attention, remarkable performances in table tennis or rowing often went unrecognised due to the lack of publicity and missed the chance to gain widespread recognition and inspire individuals to participate. Second, Romania's prominence in the international sports scene has waned in recent years, as other countries have taken the spotlight in sports in which Romania historically achieved notable performances, such as gymnastics, athletics, or handball.

Halep thus emerged as an opportunity to construct an identity for her native country. Romania already issued the message that it can produce international champions in the aforementioned other sports, but because of the lack of mediatic appeal, such sports could not create the platform for diplomatic communications that Halep was able to produce for her country. Through this platform, Halep became a source of official pride and national hope (Burnar, 2023), outlining Romania's place

on the world map, in terms of Murphy's (1998) and Rajkovic's (2022) remapping of the globe in one's own right through performative geography.

Simona Halep is probably Romania's main success story in sports of the 2010s. Like other athletes who reached heroic status, her narrative structure as informal geopolitical ambassador for Romania is associated with collective prestige (see Swierczewski, 1978) and is constructed of a mix of plot and success stories: between 2013 and 2020, she won 22 WTA tournaments and two Grand Slams (Roland Garros, 2018 and Wimbledon, 2019). Apart from being an athlete, Simona Halep became a medium through which a national rhetoric of success could be narrated globally: a scenario that Romania did not enjoy very much lately (in sports, in particular, but also at the overall level). The success of sports heroes is generally being used to create positive associations with their home countries. Through their on-court achievements, tennis stars also become symbols of international diplomacy, being able to send messages of goodwill around the world. Not only this, but Simona Halep is part of the WTA circuit, meaning she has a permanent international exposure, which enables her native country to showcase national identity on a global stage. Her national hero reputation and informal geopolitical ambassador status became apparent not only during her years of sporting success, but even in the aftermath of her doping suspension and during her long-protracted judgment, when the PM of Romania took the exceptional step of defending her as innocent (GSP, 2023).

However, as it usually happens in popular geopolitics, athletes do not typically engage in diplomatic efforts intentionally. While Halep is most certainly aware of her geopolitical role and that her actions can have a profound impact on popular geopolitics, she (and most other athletes) focuses on her sport and simply competes as part of her athletic journey. But, because international sporting events such as WTA tournaments provide a platform for diplomatic exchange and dialogue beyond the actual sporting competition, public diplomacy joins the game. These events serve as an opportunity (in most of the cases friendly and respectful) for diplomacy and exchange that can help foster better international relations, and states are ready to use them. Halep's athletic efforts and successes unintentionally promoted popular diplomacy through international competition. Her athletic prowess helped elevate Romania's public profile on the world stage, creating a better understanding of her native country internationally.

Simona Halep's storyline was well suited for a popular geopolitical annexation not only due to her performances on the court at that moment, but also because she epitomises an imagery that most Romanians can culturally relate to (or, by any means, aspire to): a young, well-mannered family-oriented girl who focuses on her tennis rather than on other social or commercial concerns that might be met with other high-performing athletes. Halep, thus, encapsulates a positive Romanian self-imagery which the public discourse could then use to achieve improved country branding at international scale. Moreover, this strong focus on the tennis game meant that Halep did not engage with major geopolitical themes (i.e. migration, political crises, inflation, etc.), so she would be easy to be instrumentalised for a given national rhetoric. Also, Halep enjoys a positive audience reception. That Halep is the

Romanian tennis player with the most WTA trophies and the most grand slams is a fact.

We can argue that a popular geopolitic constructed around the (fair) image of Simona Halep as a new Romanian sporting hero and role model (with an emphasis on "new", yet somehow universal Romanian archetype) has been exported by Romania in its foreign policy demeanours (Burnar, 2020, 2021). Using the imagery of Simona Halep was yet another attempt that Romania made to improve the country's foreign policy after the fall of the Communist Regime in December 1989, all the more so as Romania's sporting performances at the international level tended to decrease over time since the December Revolution. This can be explained by the fact that socialist planning was also reflected in a typical socialist sports training, the effects of which were still witnessed in the years after the revolution (the performances of the national football team and Olympic sports until the mid-2000s, when youth trained before 1990 reached the peaks of their careers), but as time passed, the effects vanished. Against such a backdrop of declining sports performances, Simona Halep has emerged as a ray of hope for Romanian sports. Haut et al. (2019) point out that successful athletes who are treated as heroes and receive accolades in their home country may not be recognised on an international level. Simona Halep is an exception to this rule. She has earned a great level of respect both in her homeland and across the world, although her stardom is clearly more powerful in Romania (Burnar, 2022). Her achievements on the court, including the two Grand Slam titles, have made her an inspiring and admired figure, beloved and respected across the world. She has become a role model for many aspiring athletes, and internationally represents Romania with distinction. Since the WTA circuit has a global following, using Simona Halep as a representation of a constructed identity about Romanian success transcended the geographical borders of her native country.

3. The "3mm" TV Documentary – A Technological Challenge to the Discourse of Romanian National Pride

Earlier, it was emphasised that private actors, as well as national states, engage in sporting investments, often doubling it with nationalist imagery amid geopolitical affairs in pursuit of diverse interests. This tendency was also observed on December 1st, 2020, when the private television channel, ProTV, one of Romania's top commercial broadcasters, aired the documentary film "3mm" about WTA tennis player Simona Halep. There was an additional layer, seeing that the documentary was funded by one of Halep's main commercial sponsors, Banca Transilvania / BT, which branded it as "motivational documentary for all Romanians". The bank had previously engaged with both Halep and nationalistic discourse, through an advertising campaign in 2018-2019 that portrayed Halep in glowing terms, as a national symbol (Burnar, 2023). As the respective campaign also ran in countries such as Spain or Italy, home to a prominent Romanian diaspora, it meant that BT had made a conscious choice to use the glories of Halep as a

springboard for its commercial interests, while trying, at least at face value, to improve the image of Romania abroad.

In Romania, Simona Halep is one of the most successful examples of popular geopolitics in recent years. Through her successes on the court, Halep transferred international prestige to the country, in a context in which Romania does not necessarily enjoy a positive image on the international stage. As observed by Kobierecki and Strożek (2017), good performances on the court shape the brand of a nation. This in turn piqued the major interest of shareholders from both the public and private sectors, who wished to capitalise on Halep's image as a national treasure.

As a mediatic event, "3mm" carried significant cultural value as it was the first documentary on Halep, who was 29 years old, and ranked second on the WTA circuit during its premiere (Roșca, Burnar, 2023). It aimed, according to the producers, to emphasise that Halep's achievements were not a coincidence but a product of her determination and hard work.

In addition to the significance of the documentary's main figure Halep, the socio-cultural context appeared (via multiple factors) to enhance the media impact of "3mm." December 1st is celebrated as Romania's National Day. In the context of airing a show about a national hero on a National Day, it could foster patriotic sentiments. Additionally, this was also the 25th anniversary of ProTV, further increasing the cultural significance surrounding the documentary's arrival.

It is noteworthy that, in spite of the patriotic promotional value and nationalistic imagery of the "3mm" documentary, the television ratings for the program were rather poor considering the numerous factors involved, including features such as national day, the holiday of audiences, COVID-19 movement restrictions, and a sports documentary showcasing a well-established popular hero.

From the perspective of 'popular geopolitics', it can be said that the '3mm' documentary was intended to create an engagement with the everyday between the sports hero and the general public. Meanwhile, the TV station also wanted to create an emotional connection between viewers and the national symbol Simona Halep by broadcasting the documentary film. Tapping on the potential of this affective bond, the decision to air the documentary on December 1st, the national day of Romania, was a powerful way to promote national pride and recognition of a successful athlete, hoping to achieve an effective image transfer from the athlete to the nation, demonstrating the positive impact that one person can have on millions.

4. Conclusions

Traditional geopolitics have been widely studied, with their vast implications for modern economies, societies, and political systems being largely acknowledged. This is not the case for popular geopolitics, a less discussed approach to geopolitics based on the contributions of popular culture to the serial narratives of states. In this paper, we used tennis as a case study to highlight that popular geopolitics can be a key for the better understanding of our globalised world.

Our analysis of the "3mm" documentary about Romanian tennis player Simona Halep highlights the significant role of popular geopolitics in creating cultural representations of states, nations, territories, or spaces.

The TV documentary aimed to create a strong emotional connection between the national symbol Simona Halep and the Romanian public by airing it on Romania's National Day. While it can be assumed that it elicited a sense of national pride, notwithstanding the bad TV ratings, the documentary failed to enhance the visibility of Romanian cultural products at the international level, indicating that such mediatic technologies face challenges in reaching global audiences.

Our findings underscore the immense geopolitical power of sports and how they can be leveraged to promote nation branding and soft power through the use of popular cultural representations. We argue that this documentary presented a technological challenge to national imagery, as it aimed to create engagement and enhance national identity by tapping into mass-communication channels (TV and the Internet) and everyday meanings.

This analysis can influence future understandings of popular geopolitics and technology, and of policymakers seeking to harness the power of sports and other cultural products for geopolitical ends.

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Exploring Entrepreneurs' Interest in Adopting New Digital Technologies

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Abstract

The adoption of new digital technologies is essential for companies to maintain competitiveness and remain relevant in the current business environment. However, the cost of such technologies often serves as a significant impediment, particularly for small businesses or start-ups with limited resources. This study aims to investigate the degree of interest among entrepreneurs in adopting new digital technologies in the absence of financial barriers. To achieve this objective, the study involved direct interactions with a limited database of companies of varying sizes and industries.

The study presented a hypothesis to entrepreneurs, allowing them to obtain a digital solution without incurring financial costs. The hypothesis aimed to eliminate the financial barrier that is typically viewed as the primary obstacle to the adoption of digital technologies. However, additional factors, such as lack of awareness, perceived complexity, or resistance to change, may hinder technology adoption. Therefore, this study will explore the decision-making processes and underlying motivations of entrepreneurs in relation to the adoption of new digital technologies. The study aims to provide a unique perspective on the motivations of entrepreneurs in adopting new technologies in such a context, and offer valuable insights into the factors that influence such decisions, as well as the perceived benefits and drawbacks of digital solutions. The research seeks to analyse entrepreneurial intentions and draw conclusions related to industry, company size, and revenue. Specifically, the study aims to identify whether there are differences in perceptions of digital technology adoption based on these variables. The investigation aspires to reveal how industry, company size, and revenue impact entrepreneurial intentions toward digital technology adoption, providing a nuanced

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understanding of these variables' influence on decision-making. The research team seeks to gain insight into these factors to contribute to the development of tailored digitalisation strategies for businesses of varying sizes and industries.

Keywords: digital technology adoption, digital transformation, entrepreneurial mindset, financial costs, strategic digitalisation.

JEL Classification: L26, O33, M15, L21, L11.

1. Introduction

The growing importance of digital technology adoption in today's competitive business landscape has been widely acknowledged. The successful implementation of digital technologies can significantly enhance the efficiency, competitiveness, and innovation capabilities of organisations, including small and medium-sized enterprises (SMEs). However, despite the numerous benefits associated with digital technology adoption, many SMEs, particularly in emerging economies such as Romania, have been slow to embrace these technologies. In this context, it becomes essential to understand the factors that influence the adoption of digital technology among Romanian SMEs and the barriers they face during this process.

This article presents a qualitative study that investigates the experiences, opinions, and perspectives of entrepreneurs and decision-makers within Romanian SMEs concerning digital technology adoption. By focusing on the specific context of Romania, the study aims to provide valuable information on the factors shaping digital technology adoption among SMEs and the challenges and barriers that they encounter in their digital transformation journey.

One of the key findings of this study is that, contrary to the general perception that digitalisation and technological advancement are inevitable steps in organisational development, many entrepreneurs in Romania prioritise other aspects of their business operations over digital transformation. This highlights the need for a more nuanced understanding of the factors influencing digital technology adoption among SMEs and the role of contextual factors, such as industry, company size, and revenue, in shaping the adoption process.

2. Literature Review

2.1 The Concept of Digital Technologies

Today, digital technology significantly influences how new company initiatives are conceived of and developed. The increased investment in computer processing and data preparation equipment in the manufacturing and service sectors, as well as in the telecommunications infrastructure, is indicative of this new technological era.

Three separate but connected components, digital artefacts, digital infrastructures, and digital platforms, were said to make up the concept of Digital Technologies (Nambisan, 2017). According to Bharadwaj et al. (2013), such rapid

progress has significantly altered the corporate landscape and the competitive environment.

Digital technologies have rendered it possible to launch new businesses and digital start-ups whose business models and operations are heavily dependent on novel technology. Digital technologies, which take on numerous forms such as digital goods or services (Lyytinen et al., 2016), are, in this sense, enablers of entrepreneurial activity.

As a result, there are many different ways that IT and digital technologies have an impact on corporate innovation and entrepreneurship (Steininger, 2019). For example, they may serve as facilitators, mediators, or results of entrepreneurial operations.

A new breed of entrepreneurs is emerging as a result of the constant fusion of business and technology (Giones and Brem, 2017). These entrepreneurs primarily use digital technologies to carry out the majority of the steps necessary to start a new firm.

2.2 Factors Influencing the Process of Digital Technologies Adoption in SMEs

By interviewing 2222 micro and small businesses in Indonesia, Trinugroho et al. (2022) develop an empirical framework on the determinants of the use of technologically based innovation. We discover that certain business parameters, together with company and owner characteristics, significantly contribute to the explanation of the adoption barriers for digital innovation. According to their findings, businesses with less direct selling, marketplaces that are competitive, and customers who prefer cash payments are more likely to use digital technologies. Younger businesses and younger owners that have access to the internet are also linked to a greater likelihood of adopting digital technology. They also discover that businesses with higher sales and profitability during the COVID-19 epidemic are more likely to use digital technologies in their operations.

Regarding the adopters-accepters, access restrictions and privacy concerns may prevent DT from being fully adopted. All five of the examined hurdles were thought to be important by the adopters-resisters, but only the impersonalisation barrier appeared to have significance when the barriers were connected to their desire to fully embrace DT. Additionally, the findings imply that restrictions have a more adverse impact on people with substantial DT experience's intention to completely adopt (Dimitrova et al., 2022).

The distinctive qualities of these companies can be emphasised when investigating the causes of such variations in IT adoption in SMEs. According to Madrid-Guijarro et al. (2009), SMEs typically have restricted access to market information. As a result, especially in light of SMEs' weaknesses at various organisational and managerial, technological, personal, and environmental levels, the adoption and use of IT in SMEs is in a disadvantageous position in this regard (Al-Qirim, 2007).

The literature suggests that a number of variables, such as management's attitude and perception of IT, support and commitment, IT knowledge and experience, innovativeness, perceived behavioural control over IT, desire for growth, and familiarity with administration, have a direct impact on the process of IT adoption in SMEs (Qureshi, York, 2008).

Prior research on IT adoption in SMEs reveals that the majority of failures and unhappiness were caused by one or more of the causes listed below: lack of necessary resources (knowledge, skills, financial, managerial); improper education and preparing of end users; improper linkage of adopted IT to corporate strategies; insufficient realisation of organisational challenges; inadequate realisation of end users' needs; constraints on the ability of a business to hire IT personnel; unqualified management in CEO structures with significant levels of centralisation (Ghobakhloo et al., 2011).

The next stage after having the intention to use is actually acting in the desired way. The acceptance of new technology results if the intention and desire are favourably shaped by the effects of earlier variables. On the other hand, if a person's desire and intent toward technology are negative because of organisational, technological, and environmental problems, then it is apparent that they do not have a strong desire in this area. Accordingly, an individual's intention affects whether or not they actually use new technology systems (Esmaeilpour et al., 2016).

The majority of SMEs surveyed by Fanelli (2021) expressed their dissatisfaction with the lack of funding for technical advancements and the significant challenges in obtaining public and private funding (28%). The findings support North et al.'s (2001) claim that one of the main obstacles preventing SMEs from adopting innovation was finance.

SMEs need particular policy measures to make sure that necessary infrastructures can be provided and that technology services can be offered to enable them to fully develop and harness their potential. Additionally, it is important to support publicly funded research and development organisations in focusing on the technological requirements of SMEs. The availability of commercial space, the infrastructure for transportation, the size of local marketplaces, the characteristics of rural labour markets, and the availability of information and funding are some of the typical aspects of the rural environment that exist concurrently (Smallbone, Welter, 2006).

Some needs of the SME sector can be met by specialised AI solutions. A variety of SMEs' operations, including decision-making, human resources, customer interaction, inventory management, and cyber security, can be improved with the use of customised AI solutions. SMEs must comprehend the value of AI, get through the obstacles, and use it to their benefit (Bhalerao et al., 2022).Indeed, while AI serves as a powerful tool for SMEs, it is just one facet of a broader spectrum of digital technologies that can help drive business growth and efficiency. This suite of technologies extends beyond AI to include the Internet of Things (IoT), Robotic Process Automation (RPA), cloud computing, Metaverse technologies, and mobile applications, among others.

The Internet of Things, for example, enables seamless interconnectivity between devices, offering SMEs the opportunity to optimise operational processes, enhance customer service, and improve decision-making. Similarly, Robotic Process Automation allows for the automation of repetitive tasks, leading to increased efficiency and accuracy. Cloud computing provides SMEs with scalable and cost-effective computing resources, enabling them to compete in the digital marketplace. Metaverse technologies offer innovative ways for SMEs to interact with customers and stakeholders in virtual environments, while mobile applications provide opportunities for customer engagement and business process management on the go.

As entrepreneurs navigate the rapidly changing digital landscape, the metaverse emerges as a unique area of potential interest. The concept of the metaverse, while met with scepticism by some, has gained significant attention, particularly following Facebook's transition to "Meta" (Chinie, Oancea, 2022). This immersive platform, underpinned by technologies such as Augmented Reality (AR) and Virtual Reality (VR), presents a new frontier in digital opportunities. As these technologies evolve, they could potentially pave the way for SMEs to explore innovative digital solutions. Hence, it is critical for SMEs to stay abreast of these emerging trends that could redefine digital commerce and interactions in the virtual realm.

Furthermore, demographic trends appear to play a crucial role in the adoption of digital technologies, including the metaverse. Notably, Generation Z, a demographic group heavily engaged with the digital world, appears to show a propensity for adopting metaverse applications (Chinie, Oancea, 2022). This indicates that the younger generation, already adept at digital innovations, could potentially act as early adopters of such technologies in the entrepreneurial context. Additionally, there seems to be a correlation between involvement in immersive gaming environments and willingness to engage with metaverse applications. These insights underscore the importance of understanding user behaviours and preferences in the adoption of digital technology, an aspect of critical importance for SMEs aiming to maximise the benefits of digital technologies.

Therefore, it is crucial for SMEs to comprehend the broader value of digital technologies, navigate through the obstacles, and use these varied tools to their advantage. Just as with AI, successful implementation of these technologies requires understanding their capabilities, aligning them with business needs, and investing in the necessary skills and infrastructure.

3. Research Methodology

3.1 Research Design

This qualitative study employed a phenomenological approach to explore the factors influencing the adoption of digital technologies among small and medium-sized enterprises (SMEs) in Romania. The phenomenological approach allows for an in-depth understanding of the experiences, opinions, and perspectives of the entrepreneurs and decision-makers within these companies. By using this approach, we aimed to capture the essence of the phenomenon, identify the

underlying motivations, and reveal the factors influencing their decisions to adopt digital technology.

3.2 Sample and Sampling Procedure

The study involved a purposeful sampling of 10 companies from various industries and sizes within Romania. This sampling method was chosen to ensure the inclusion of companies with diverse characteristics, which could provide rich and varied insights into the phenomenon under investigation. The companies were selected based on the following criteria:

- Industry: The sample included companies in various industries, such as manufacturing, construction, retail, and services.
- Company size: The number of employees in the companies ranged from 1 to 30.
- Annual revenue: The companies' annual revenues ranged from approximately 1 million RON to 13 million RON.

3.3 Data Collection

We conducted semi-structured interviews with entrepreneurs and decision-makers within the selected companies. These interviews allowed us to gather in-depth information on the companies' experiences and perspectives on digital technology adoption. The interviews were guided by a set of open-ended questions, which explored the participants' interest in adopting digital technologies, their previous experiences with digital technology, the perceived benefits and drawbacks, and the barriers they faced in the adoption process.

In extending our semi-structured interviews, we intentionally centered our inquiry within the broader thematic framework of digital transformation, specifically the adoption and utilisation of digital tools that facilitate business management. We defined 'digital tools' expansively to encompass any online platform that aids in the operation and oversight of business activities.

Three digital tool types were particularly highlighted in our discussions: Customer Relationship Management (CRM) systems, Enterprise Resource Planning (ERP) software, and Project Management tools. CRM systems are strategic assets for businesses, providing capabilities for managing and scrutinising customer interactions and data, thus bolstering customer relationships and stimulating sales growth. ERP software amalgamates multiple business processes into a single integrated system, enabling SMEs to streamline operations, augment productivity, and enhance decision-making capabilities. Project management tools are instrumental in the planning, execution, and monitoring of projects, ensuring projects remain on schedule and within budget constraints.

Such digital tools provide an expansive infrastructure that empowers businesses to operate with heightened efficiency and competitiveness in the digital age. They confer numerous advantages, including improved data analysis, enhanced internal and external communication, increased operational efficiency, and superior customer service.

The overarching aim of these interviews was not solely to gain insight into SMEs' experiences and perspectives concerning AI, but to traverse the broader landscape of digital tools. We sought to understand the impact these tools, beyond just AI, have had on their operations. This comprehensive approach gave us the opportunity to examine more thoroughly the multifaceted ways in which digital technologies are being adopted and integrated within SMEs and to discern the principal benefits and challenges these entities encounter throughout this transformative process.

3.4 Data Analysis

We analysed the collected data using a thematic analysis approach, which involved identifying, analysing, and reporting patterns within the data. During the interactions with the participating companies, detailed notes were taken to accurately capture their experiences, opinions, and perspectives on digital technology adoption. These notes were later transcribed, allowing us to thoroughly examine the data.

We began by reading the transcripts of the interactions to familiarise ourselves with the data, and then generated initial codes that described various aspects of the companies' experiences and perspectives on digital technology adoption. Next, the data was coded using a series of codes that corresponded to these categories. For example, interest in digital technology was coded as I1 (Accepted), I2 (Refused), or I3 (No response), while barriers to adoption were coded as B1 (Lack of time), B2 (Lack of resources), B3 (Lack of dedicated personnel), or B4 (Different priorities). Previous experience with digital technology was coded as E1 (Positive experience).

Table 1: Coding scheme used for categorising companies' experiences and perspectives on digital technology adoption.

Category	Code	Description
Interest in Digital Technology	I1	Accepted
	I2	Refused
	I3	No response
Barriers to Adoption	B1	Lack of time
	B2	Lack of resources
	B3	Lack of dedicated personnel
	B4	Different priorities
Previous Experience with Technology	E1	Positive experience

Source: Constructs and items developed by co-authors.

Once the initial codes were generated, we grouped these codes into broader themes that captured the main patterns and trends observed in the data. The themes were then refined and organised to form a coherent picture of the factors influencing the adoption of digital technologies among the companies in our sample.

Based on the data, responses from the companies can be classified into the following categories:

1. Accepted (4 companies): These organisations demonstrated a clear interest in adopting digital technology.
2. Refused (1 company): This organisation exhibited resistance towards digitalisation and declined further discussion on the topic.
3. No response (3 companies): These organisations did not provide a definite response regarding their interest in digital technology adoption.
4. Time-limited – Negative (2 companies): These organisations recognised the potential advantages of digital technology, but cited time constraints or other challenges as barriers to adoption.

3.5 Barriers to Adoption

The study identified several impediments that hindered the adoption of digital technology among the companies:

1. Lack of time (2 companies): Organisations that reported being too busy to allocate time and resources to implement digital solutions.
2. Lack of resources (1 company): The organisation cited a shortage of personnel to facilitate the digital transformation process.
3. Lack of dedicated personnel (1 company): The organisation was not prepared for digital technology adoption due to the absence of staff responsible for the digital transformation process.
4. Different priorities (1 company): The organisation stated that they were against digitalisation and did not want to address the topic in the future.

3.6 Previous Experience with Digital Technology

Out of the 10 companies, only one reported a positive previous experience with digital technology (E1). The employee of this company acknowledged the benefits of digital solutions, but faced time and resource constraints, which made it difficult to implement the technology in the current context.

3.7 Differences in Perception by Industry, Company Size, and Revenue

The results of the study indicate that companies from various industries, sizes, and revenue levels show different levels of interest in digital technology adoption. The four companies that accepted the proposal of digital technology adoption belonged to different industries, suggesting that the sector does not necessarily determine the willingness to adopt digital solutions. However, the study sample is limited, and more research with a larger sample size may provide a more comprehensive understanding of the relationship between industry and technology adoption.

Concerning company size and revenue, it is worth noting that the companies that accepted the proposal came from a range of sizes and revenues. However, the data also suggests that smaller companies with fewer resources may face more substantial barriers to adoption, such as a lack of time, resources, or dedicated personnel. Larger companies may have more capacity to allocate time and resources

to digital transformation, although this was not universally true among the companies in the study.

In conclusion, the findings of this study reveal varying levels of interest in digital technology adoption among the companies, with several barriers influencing their decisions. The results also underscore the importance of understanding the specific context of each company to develop tailored digitalisation strategies that address their unique needs and challenges. Further research with a larger and more diverse sample may provide additional insights into the factors that influence digital technology adoption across industries, company sizes, and revenue levels.

4. Discussion and Implications

This chapter discusses the findings of the qualitative analysis and outlines their implications in the context of digital technology adoption among Romanian entrepreneurs. The findings contribute to a better understanding of the factors that influence entrepreneurs' decisions to adopt digital technologies and the possible barriers they face in this process.

4.1 Influence of Company Size, Industry, and Revenue

The analysis revealed that company size, industry, and revenue play a role in shaping the entrepreneurial intentions towards digital technology adoption. Smaller companies with limited resources and a higher workload per employee appeared to be more hesitant to adopt digital solutions. On the other hand, larger companies were more likely to recognise the benefits of digital technologies and express interest in implementing them. This could be attributed to their greater financial capacity and ability to allocate resources for digital transformation. In addition, businesses operating in the manufacturing and construction industries appeared to be more inclined to adopt digital solutions compared to those in other sectors. It is essential that future research explores these patterns further and identifies the underlying reasons for such differences.

4.2 Barriers to Digital Technology Adoption

The study identified several barriers to digital technology adoption among the participating companies, including lack of time, lack of resources, lack of dedicated personnel, and different priorities. These barriers highlight the need for tailored strategies to support companies in overcoming these challenges. For instance, providing targeted training and resources to smaller companies or those with limited resources can help them overcome the initial barriers and facilitate the digital transformation process.

A significant hurdle is the lack of resources. According to an analysis by Mithas et al. (2013), companies with limited financial resources struggle to invest in new technologies, as these may require substantial initial and maintenance costs. Possible solutions to overcome this obstacle may involve securing funds or grants dedicated to digitisation.

The absence of dedicated staff is another barrier to the adoption of digital technology. Research conducted by Parviainen et al. (2017) demonstrated that many organisations face a shortage of personnel with digital competencies. This hurdle can be surpassed by investing in the training of existing employees or by hiring new talents with digital skills.

Regarding differences in priorities, a study by Bharadwaj et al. (2013) indicated that some managers may view the adoption of digital technology as less important than other issues, such as increasing sales or maintaining profitability. To overcome this obstacle, it is crucial to better understand how digital technology can contribute to achieving business goals.

4.3 Limitations and Future Research Directions

This study has some limitations, mainly related to the limited sample size and the focus on Romanian companies. Future research could expand the scope by including a larger and more diverse sample of companies from different countries and industries. Furthermore, further studies could explore the role of other factors, such as organisational culture, management styles, and external pressures, in shaping entrepreneurs' intentions to adopt digital technologies.

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Synergy in Innovation, at the Government Level

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Abstract

In an information society in which the quality of life, as well as the prospects for social change and economic development, depend to a greater extent on information and its exploitation, the institutional field of management of IT applications for European funds becomes a matter of national importance, with critical values for national security. Reinventing government can be achieved through digitalisation and government computerisation, which involves modernising the current IT infrastructure through specific external funding sources such as European funds, doubled and secured by advanced cyber protection and defense capabilities against possible vulnerabilities or cyber-attacks.

Knowledge and scientific information are of enormous importance in the global information society, by: supporting innovation, promoting economic development, making decisions in an efficient and transparent way, at the governmental level, and especially for the implementation and use of intelligent technologies in the development of the degree of digitisation of public services through financing provided by European funds and the National Recovery and Resilience Plan.

In order to move on to building the knowledge society, it is necessary to reduce the digital gap, which accentuates disparities in development, excluding groups and even countries, from the benefit of information and knowledge. The limiting factor in development will be related to the human capacity to assimilate and develop these technologies, to use them in new fields of activity, for new products and services.

Keywords: synergy in innovations; intelligent technologies; e-business; digital transformation; awareness; e-learning; automation of repetitive processes.

JEL Classification: O3, Q5, D83, O10, O11, K24.

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1. Introduction

This will produce a re-classification of knowledge, so that the model of access to knowledge undergoes changes, the primary interest is no longer directed towards the universal aspect, the concern becomes centered on the local space, introducing migration from the word. to image, from speech to personality.

Postmodernist discourses thus speak of a multitude of local realities or of a global reality, or even of the lack of a reality, in conditions where an ideology can no longer convince large masses of individuals, as a fragmentation takes place at the level of the subdivided currents that are found in many local realities, in one it was marked by conflicts but not by struggle, by problems but not by contradictions, by unions but not by classes, and most importantly (by the fact that) no concrete utopia animates social movements wide

Thus, through social changes, and the end of the modern world, certain major changes occur in the social life of the individual, postmodernity leading either to the emergence of a new type of society or to a new phase of capitalism, both based on two phenomena: the development of new technologies and the emergence of consumerism, crystallised as economic-social behavior. Postmodernity, this condition of the contemporary world, is defined as a term used by philosophers, social scientists, art critics, to refer to aspects of art, culture, economy or current social conditions, which are the result of features unique aspects of life in the late 20th and early 21st centuries.

Globalisation, consumerism, the fragmentation of authority and the transformation of knowledge into an object of use, being included in the defining features of the postmodern condition. This is how the phrase information society appears in the specialised literature of post-industrialism, a notion that in sociology refers to a type of postmodern society, in which old norms and ways of thinking are replaced by new technologies and new lifestyles. A transformation of civilisation is thus produced, leading to the information society through three scientific and technical revolutions: the traditional craft, the scientific organisation of production and automation.

2. Emerging Technologies in a Secure Cyber Environment

Starting from the growing role of science in production processes, combined with the emergence of information technologies and the need to automate repetitive processes, the economy and society become centered on the new central principle, called theoretical knowledge.

Within this computerised society, the new social context is based on telecommunications and computers, which become decisive for the way in which economic and social changes are produced, the way in which knowledge is created or recovered, and the nature of work and the organisations in which people are employed. Another relevant characteristic of the informational society is the way in which knowledge and information will replace work and capital, as central factors in the economy and IT, by shortening the actual work, diminishes the role of the

individual in the production process, thus replacing work as the source of added value, within the national product.

In the information age, the information society is a society in which the quality of life, as well as the perspectives of social change and economic development depend, to a large extent, on information and its exploitation. In such a modern society, living standards, work and leisure patterns, the educational system, and the labor market are all significantly influenced by advances in information and knowledge (EIS, 20005).

In the evolution towards an informational society, where the role of informational technologies is decisive, the following major and determining criteria are followed: economic (services and informational goods); technological (telecommunications, computer, and new technologies); social (information gets value); political (the flow of information and communication methods can create global realities in which individuals can be involved); cultural (the tendency to replace local culture with the so-called global economic culture).

The ambivalence of the information society, seen on the one hand as a global entity, and on the other hand as a mosaic made up of sub-societies spread around the world, is caused by electronic means of communication, which create a virtual global space, within which the notion of a foreigner loses its semantic consistency, creating a direct relationship between individuals, which will produce deterritorialization, through the creation of world markets, through the existence of a stock exchange accessible from anywhere and permanently, thus providing information about the circulation of capital in the world the whole. In this way, a global environment is born, a global space structured on individual models of life.

Technologies produce a breakdown in local plans, by focusing attention on certain local sectors in the sphere of marketing, advertising, and mass media, by resuming certain symbols and elements of culture and reaffirming local identities.

The fragmentation generated by telecommunications is seen as a hyperreal world, in which codes and digital systems are, in fact, simulations that dissolve the individual's life. Thus, we are dealing with the adaptation of the individual to information technologies or are they designed and realised in such a way as to serve the individual, the interdependence between the two actions being inherent in the process of using the technology, as well as the mastery of certain levels of knowledge, the changes continuous advances in technology, challenging and subjecting individuals to a perpetual specialisation and discovery of ways of change and innovation.

The new environment of humanity is not so much hardware or physical; its essential poses are information and coded data configurations, which more quickly gives a software image to the environment, identifiable at all levels of the individual's life.

The use of intelligent technologies will result in the development of the degree of digital culture and cyber security, among civil servants, in the economic-social-political-post-pandemic context for e-business, as a result of changing the

traditional work style by adopting the new methods developed through new emerging technologies.

The Ministry of Investments and European Projects, in cooperation with institutional partners, is the main developer of the national IT exchange program between Romania, as an EU member state, beneficiary of non-reimbursable European funds, and the European Commission, according to the provisions of Regulation (EU) No. 1303/2013 of the European Parliament and of the Council of 2013.

The implementation of ensuring the security of the cyber infrastructure intended for the management of European funds, was and will be conditioned by a cooperation with the institutions that have the necessary expertise in the field, thus realising the premises of some strategies, in accordance with the European legislation in force and transposed into projects financed from European funds , aimed at ensuring cyber security, as well as increasing the level of awareness of the importance of the state of security at the governmental level:

- project code- SMIS 48723 – Titeica 1 – The national system for the protection of IT&C infrastructures of national interest against cyberspace threats, financed by the Sectoral Operational Program for Increasing Economic Competitiveness 2007-2013;
- project code - MySMIS 127221 – Titeica 2 – Updating and developing the national system for the protection of IT&C infrastructures with critical valences for national security against threats from cyberspace", financed by the Competitiveness Operational Program 2014-2020 (DOG, 2020). (ICIN\IVC 54 MIPE – project with national coverage, and the implementation period according to the financing contract - 23.08.2019 - 23.08.2022, with related maintenance services and support for applications and equipment until 23.08.2027);
- the Titeica 3 project – will be implemented through PNRR by the National Cyberint Center, intended for the development of the national cyber protection system, included in Component C7, Digital Transformation, through the National Recovery and Resilience Plan – resulting in the expansion of the protection area. of the Information Technology and Operational Technology infrastructures, as a beneficiary entity of cyber security and protection, as well as participation in training programs organised in the field of cyber security.

The objectives of the MIPE cyber security projects, being the updating and development of existing IT systems by including them in the national system, of new IT&C infrastructures with critical values for national security, in order to increase the capacities to identify possible cyber -attacks, as well as to increase the national level of ensuring cyber security, subject to a common approach of national and EU policies in the field of cyber security and interoperability, regarding the transition to a Government cloud as desirable.

Through the results obtained, the projects aim at increasing the cyber security of IT and communications services at the national level, increasing the availability and level of security offered to institutions and entities of public interest by modernising the security systems related to the existing IT systems. Within the organisations,

emphasis will be placed on achieving the interoperability of the security systems to be implemented and integrated, in terms of corroborating information, collaboration, analysis, and reaction through the IT mechanism for rapid alerting and disseminating information in real time, thus obtaining effective results in a timely manner.

The outline of a national system of prevention and protection against cyber-attacks, through cyber defense activities, will create the premises for the development of innovation and the use of intelligent technologies, at the government level, with the aim of eliminating repetitive processes through automation and artificial intelligence. The operation in parameters that do not correspond to the performance, of the applications intended for the management of European funds, will generate a vulnerability, manifested in the decrease in the level of absorption of European funds, with implications in the national economy, constituting a real threat to the national security of Romania, due to the economic-financial repercussions , as well as social-political regarding the obligations assumed by Romania, from the perspective of the membership status of the European Union.

The national system of prevention and protection against cyber-attacks, through cyber defense activities, having a beneficial role in the implementation of the new National Cyber Security Strategy and in ensuring Romania's compliance with the commitments assumed at the international level, including those related to the implementation of the Cyber Security Strategy EU Cybersecurity, the NIS Directive, and NIS 2.0, as well as in the activity of the European Center for Industrial, Technological and Research Competence in Cyber Security (ECCC) established in Bucharest (EC, 2022).

In the undesirable situation of the blockage in this critical area of the national economy, constituted by the field of attracting European non-reimbursable funds, the balance specific to the state of national security will be restored by informing the competent minister as quickly as possible, as well as by adopting the appropriate measures to remedy the identified deficiencies.

Thus, eliminating the risk of disengagement, through an automated and efficient management of European funds, fulfilling a better management of an objective of national strategic interest. The realisation of national interests, as well as the acts of economic destruction, degradation or decommissioning of the structures necessary for the proper development of life and its quality, can constitute threats – even through the existence of a state of blocking the absorption of European funds, framed from the point of view of information for national security, in the provisions of Chapter 3 related to the National Defense Strategy 2015-2019/National Defense Strategy of the country for the period 2020-2024, and art 3, letter f, Law 51/91.

In this newly developed branch of the national economy, represented by the field of European funds, the countering of these possible risks will be realised gradually, due to a high degree of persistence manifested, including through the lack of the necessary resources, as well as the necessary specialisation in the efficient management of IT systems, located in continuous development, the focus being oriented towards the results obtained and efficiency in the creation of public values, including at the level of the national cyber critical infrastructure.

Impediments encountered in the functioning of the gear that is the basis of attracting funds, will bring damage both to the national budget and to the image at the community level, interoperability being a basic principle of the member states, necessary in the expected evolution process through transformation, reinvention, and digitisation.

Non-compliance with the obligations assumed as a member state can cause economic failures, manifested in the development of society and the increase of the quality of life depending on the evolution in the management of current financial resources and for the future, through the membership of the European Union and its specific financial exercises (EC, 2010).

The analysis carried out on these aspects of national interest has an incidence in the current year – 2023, a favorable moment for cyber-attacks that are characterised by frequency and persistence, making it vital that both state and private organisations are armed with the most effective tools and knowledge of cyber security, to prevent, detect, and respond to threats encountered. Permanent vulnerabilities will always escalate into possible threats that materialise in future risks to national security. Thus, awareness through prevention is the most effective strategic approach of a governmental organisation such as the Ministry of European Investments and Projects.

In the international geopolitical context, of the situation between Russia and Ukraine, a considerable increase in the number of attacks, registered in the virtual environment, on public institutions considered to be targets, by cyber attackers, was observed, thus making it imperative to ensure the cyber protection of workstations and mobile devices within MIPE - through the centralised administration of an anti-virus type solution, completing the purchases related to the project carried out in the Cooperation Agreement with Cyberint: Titeica 2 – Updating and developing the national system for the protection of IT&C infrastructures with critical valences for national security against cyber threats.

Ensuring the state of balance and security is increasingly important among organisational concerns, in the context of the exponential increase in the number and complexity of cyber threats (malware/ransomware/social engineering in particular). Deficiencies found in the development solutions, hardware and software used, as well as the lack of an appropriate modernised infrastructure, dedicated to the national IT system, can cause malfunctions in the electronic services offered to beneficiaries and the business environment in the process of developing future electronic business solutions.

As an area of application, the IT system acquires importance at the national level, but it can also slow down certain processes in the economy, such as the annual preparation of the national budget.

The inclusion of interoperability requirements in the relationship with the European Commission requires a clear focus on functional and secure reporting processes, automation of repetitive processes, increased processing of documents in electronic format, and signing with digital certificates. The concentration of

resources can only provide solutions under safe operating conditions, ensured by a balance specific to the state of cyber security.

In the national strategy for alignment with European standards, including harmonisation with European provisions, this may constitute a vulnerability in the proper functioning of the activity, in the context of increasing rigors/requirements regarding interoperability in the EU.

It is necessary to ensure compliance with the requirements of the NIS2 European Directive and Law 362/2018 – regarding the wave of digital information that must be managed and controlled by technical security measures, as well as Law no. 3652/2018, which transposes the European NIS Directive, and regulates the necessary framework for developing the level of preparation of EU states to deal with possible incidents that may affect IT security.

The EU NIS (Network and Information Systems) Directive 2016/1148 is an essential legal piece launched at the EU level to increase the level of cyber security for critical infrastructure units, including critical infrastructure entities in the fields of utilities, transport, healthcare, and digital services, as well as European funds. Establishing a set of principles and rules to define, measure, and improve cyber security (ED, 2016).

Given the expansion of cyber-attacks, compliance with the requirements of the NIS Directive is imperative. A cyber security strategy based exclusively on prevention is not enough, finding a need for maximum involvement, through rapid detection and use of effective emerging solutions.

An unforeseen attack on a critical cyber infrastructure of national interest, such as that intended for European funds, can occur as a result of security risks not properly treated, with possible results, data leaks, through exfiltration, or by causing syncope in operation, even leading to interruptions in the operation of essential and critical services for the national infrastructure.

According to current and long-term trends, the main frequent threats that should be monitored in an organisation are malware and phishing attacks, especially in a government institution such as the Ministry of Investments and European Projects, representing a real area of interest for groups of cyber-crime, for the purpose of espionage activities or theft of strategic information, such as government information.

The measures implemented regarding the awareness of the importance of the activity of ensuring cyber security, especially among specialised personnel and intended for ICT activities as well as public officials, require preparation for combating the risks that the public institution will face, starting from the up-to-date software components according to security standards, and up to e-learning sessions on defense tactics in the cyber environment at the user level (NCD, 2021).

Adapting to periods with frequent technological changes, or decision-making in moments of calm observed in the governance process, can constitute vulnerabilities in terms of ensuring the necessary balance in the organisation.

The behavior manifested in situations such as the loss or lack of administration credentials, access to work environments created through electronic tools, can create certain impediments in the process of administering the cyber security component.

Most of the time, political management changes within the institutional framework are also reflected in the specific activities of technical departments such as ITC, by slowing down the decision-making and construction process, not representing a good institutional practice, especially in the case of ensuring cyber security.

The progress registered in the development of new technologies will establish the desire to align with the new standards of the future, through the use of new solutions such as the private or hybrid cloud, which will be adopted at the governmental level, from the point of view of budget efficiency, but especially for specific considerations of the cyber security component.

Through the analysis of the vulnerabilities described, we find the need to establish within the organisation a specific post of cyber security administrator. He will have to possess the necessary specialisation in the field, through certified resources in the field of Cyber Security with an emphasis on specific activities such as National Security Information Management.

At the level of the Ministry of Investments and European Projects, this measure is being implemented, a first step, by signing the Cooperation Agreement, between MIPE and Cyberint, through a national level project of critical cyber infrastructure - ICIN\IVC 54 MIPE, linked to the structures of the European funds and the national critical infrastructure, succeeding in the unification through cyber security solutions of the majority of state institutions of national strategic importance.

The response to Cyber Security incidents, as an activity, requires the existence of its own specialised staff, through a Security-Operation-Center type team, specific to such situations, by nomination and inclusion in the Security Structure of MIPE, being extremely useful public institution, including in situations of cooperation with authorised authorities in the field of cyber defense. Awareness and training in cyber security is very useful within the organisation, especially among users, public officials, promoting the use of solutions to protect them from incidents, respecting the regulations related to their own password, which should comply with certain current security standards.

Raising awareness of the importance of ensuring cyber security measures will be achieved by informing users, being the first measure of protection against increasingly frequent cyber-attacks in the post-pandemic context of the current information war, as a result of the events in the geostrategic area of Ukraine.

Error is human, but can be avoided through awareness. Hacker attacks will be countered, through periodic information, through constant emails, courses, training, eliminating the possibility of more serious future problems, especially with regard to sensitive government information and data.

In the near future, public administration will evolve towards a new approach to the use of emerging technologies, being transposed into future strategies regarding innovation in development and ensuring cyber security, using solutions in cloud, on-

premise, or hybrid cloud environments, depending on the available budgets and of advantages or disadvantages offered. For the efficiency of the activity or in the situation of permanent blocking of employment procedures in the public administration, the subcontracting of services by allowing access to these technologies, represents an effective way of managing platforms and IT systems, with a cost-benefit ratio in favor of the public institution, making the use of internal resources more efficient.

Security solutions used in the organisation generate real benefits for the institution when they are configured correctly in accordance with current security standards, ensuring continuous protection of equipment, applications, and users.

Intelligent and intuitive, easy-to-use management tools can optimise the time needed to implement new security policies, through appropriate monitoring and alerting. Also, the collaboration with the National Cyberint Center – the Romanian Information Service – ensures stability and access to the necessary knowledge in the activity of implementing these cyber security assurance systems at the organisational level.

The unified and integrated technologies offer a measurable advantage in efficient results, the organisation benefiting from such consoles and tools adapted to the level of expertise, in accordance with the strategies built by the Security IT department. Cooperation with other institutions such as the National Cyberint Center – the Romanian Information Service, by participating in seminars and conferences in the field of cyber security, is an excellent tool for improvement and awareness, building at the local level the principles of an applied guide of good practices, assimilated in order to adopting the best decisions for the public institution.

The budget allocated to innovation in public administration will create and maintain the much-desired stability, especially in critical national areas, such as ensuring the absorption of European funds. In industry and economy, the role of robotics and process automation will grow considerably, with technology-related changes bringing both benefits and vulnerabilities, particularly in cyber terms. A virtual parallel world will be created, in which the existence of the state, with all that it represents, must be protected, so that the environment is safe and secure, including for the individual. The consequences of competition in innovation produce major transformations, including in society, simplifying the complex life of modern man, in the information society.

They will crystallise into a national interest for the Government Strategy, areas such as attracting European funds and ensuring cyber security, with the aim of modernising, computerising, and digitising the public administration in Romania.

The inclusion of interoperability requirements in relation to the European Commission requires a clear focus on functional and reliable reporting processes, with results such as increased processing of documents in electronic format, signed with digital certificates. The concentration of resources can only provide solutions under safe operating conditions, ensured only by a state of cyber security.

3. Literature Review

The new innovation trends in the use of intelligent technologies are reflected in the Cybersecurity Policies, applied at the level of the administration console of the anti-virus type solution, belonging to the Ministry of Investments and European Projects – The software product used is an integrated platform for the security management of the equipment (stations and physical / virtual servers) used and managed within MIPE – Bitdefender GravityZONE Single Central Administration Console.

The integrated device security management platform is based on a simple and integrated architecture with centralised management for both workstations and data centers. Thus, it allows for efficient and quick installation of the protection solution and requires less administrative effort after implementation, in order to obtain the highest possible degree of accuracy regarding the assurance of cyber security at the MIPE level.

Using machine learning capabilities and automatic incident investigation, certain activities that should have been performed by a security incident response team will be performed automatically in conditions where MIPE does not currently benefit from an internal SOC (Security Operation Center) structure. Integrated and automated response flows will enable designated personnel to respond effectively by limiting lateral spread and stopping potential attacks. Threat visualisation features enable focus on specific aspects of investigations, helping to understand complex detections, and identify the root cause of attacks, thus maximising immediate response capability.

The result is threat prevention, deep visibility, accurate incident detection, and intelligent response to minimise exposure to infection and stop unauthorised access. As an integrated workstation protection package, the integrated equipment security management platform ensures a uniform level of security for the entire IT environment, so that attackers cannot find a weakly protected workstation to use as an entry point. departure for dangerous actions against the organisation.

As a result of cyber events, such as attacks such as those associated with the EMOTET and Andromeda Malware Campaigns, it was found the need to implement a centralised component to ensure cyber security at the MIPE level, by configuring the Central Antivirus Solution Administration Console, in order to come in the face of cyber-attacks and to have the possibility of automatic detection and analysis of cyber threats and related possible incidents. In the current geopolitical conditions and considering the possible cyber effects generated by the informational component of the current global state of war, it is necessary to ensure the cyber security component by using emerging machine learning technologies, cloud scanning features, and sandbox analyser to detect malicious activity that evades traditional endpoint attack prevention mechanisms.

Threat visualisation features enable focus on specific aspects of investigations, helping to understand complex detections, and identify the root cause of attacks, thus maximising immediate response capability.

The integrated central console provides automated alert prioritisation with one-click remediation functions. Therefore, it will achieve continuous analysis within the organisation, using unique capabilities to identify risk based on hundreds of factors. Providing clear guidance for mitigating potential risks at the user, network, and operating system levels.

For the administration of the 3400 licenses of the workstations, centrally from the console, it is necessary to consume a low effort for the maintenance activity of the automatic processes, being easy to implement and integrate into the existing security architecture.

The agent is resource-efficient, with low administrative costs in terms of disk space, memory, bandwidth, and CPU resources.

The flexibility, scalability, and upgradeability of the complete endpoint protection platform and managed detection and response services are required in the process of ensuring the cybersecurity standard built at the MIPE level.

By using cutting-edge threat detection technology, including fileless attacks, ransomware, and other zero-day threats.

In threat analysis, the event logging feature continuously filters events produced on the endpoint, compiling a prioritised list of incidents for further investigation and response.

In the event recording process, continuous monitoring allows data to be passed to the threat analysis module to visualise the results generated by the events involved in an attack.

The single management console automatically executes suspicious payloads in a controlled virtual environment. The threat analysis module then uses this analysis to make appropriate decisions about suspicious files, according to the automation achieved through the security policy implemented at the level of the single management console.

Cyber Security incident investigation and response processes will be automated through the IoC search capability, querying the event database to discover possible threats through ATT&CK techniques and indicators of compromise, as well as updated information on discovered threats or other possible malware.

4. Methodology

The research was carried out at the level of the Ministry of Investments and European Projects, with the main aim of creating scientific and technological excellence by analysing the results obtained through the use of intelligent technologies at the central administration level, as well as obtaining advantages in the field of cyber security and resilience of systems, services and critical infrastructure of national importance, as well as increasing the degree of cyber security culture in the central public administration and among contractual users or civil servants, with the possibility of establishing within the organisation at least three positions with specific tasks in the cyber field, in direct collaboration with the Ministry's Security Structure and in a cooperation agreement with the National Cyber Intelligence Center of the Romanian Intelligence Service.

The period included in the analysis activity is between the years 2013-2023, including two programming periods of non-refundable financing from European funds, facilitated by the European Commission, as well as the National Recovery and Resilience Plan.

The three projects carried out by the Cyber-int National Center, to ensure cyber security at the national level, constituting a security umbrella, over the critical infrastructure of national interest, which will be reinvented through the digital transformation generated with the help of emerging technologies, which have produced an evolution considerable in government digital transformation.

Emerging technologies and the integration of machine learning functionalities through artificial intelligence, at the level of the Ministry of Investments and European Projects, as a development measure through innovation, will produce positive effects, including on the development of the national economy by increasing the absorption of European funds in a secure cyber environment.

5. Results and Discussion

The cyber security policies, applied at the level of the administration console of the anti-virus type solution, belonging to the Ministry of Investments and European Projects, ensure a high degree of defense against current cyber threats.

The software product used is an integrated platform for the security management of equipment (stations and physical / virtual servers) used and managed within MIPE. A complete workstation security solution, designed from the ground up as an integrated EPP and easy-to-use EDR, offering prevention, threat detection, automated response, pre- and post-compromise visibility, alert triage, investigation, advanced search, and one-click fix.

Relying on highly effective prevention, automatic threat detection, and response technologies, the antivirus software product (the IT solution) greatly limits the number of incidents that require manual analysis, reducing the operational effort required to use an EDR solution.

For the centralised solution, delivered on premise and designed with a single agent and a single console, it is also necessary to ensure the premises to ensure compatibility and an easy way to install and integrate into the existing security architecture, by personnel authorised by the manufacturer.

The integrated device security management platform enables precise protection of digital assets against even the most difficult-to-detect threats by effectively responding to all phases of an attack (Regulation, 2016).

The decisive step in the use of emerging technologies through the integration of Machine Learning and Artificial Intelligence functionalities, at the level of the Ministry of Investments and European Projects, was made within the projects financed from non-reimbursable funds, as a measure of the development through innovation, of a critical infrastructure of national interest, through – a cooperation agreement with the National Authority in the field of Cyber-Intelligence - the National Cyberint Center – within the Romanian Information Service.

The result is potential threat prevention, deep visibility, accurate incident detection, and intelligent response to minimise infection exposure and stop unauthorised attacker access (OR, 2022).

As an integrated workstation protection package, the integrated device security management platform ensures a uniform level of security across MIPE's IT environment, so that attackers cannot find a weakly protected workstation to use as an entry point for dangerous actions against the organisation.

The security equipment used within the organisation offers advanced management capabilities to prevent, detect, and investigate cyber security incidents, by analysing the risks generated by possible attacks, as well as timely automatic remediation of threats (CC, 2021).

Increasing awareness of the importance of ensuring cyber security will be achieved by informing users, making the first measure of protection against cyber-attacks within the organisation. Human error can be avoided through e-learning and the implementation of the security assurance component starting from the individual level.

These aspects implemented in the organisation will counter the attacks of hackers, by ensuring regular information activities regarding good practices through constantly sent emails, organisation of courses and training, eliminating the possibility of subsequent, much more serious problems, especially regarding the information and data belonging to the central administration (PA, 2020).

The public administration will evolve towards a different approach to the use of emerging technologies, translating into future strategies, the need to use solutions in cloud, on-premises or hybrid cloud environments, depending on budgets and available advantages or disadvantages, fulfilling a strategy of innovation and development of digitisation processes by using the funds related to the National Recovery and Resilience Plan. In order to make the activity more efficient or to avoid situations of temporary blocking of the procedures applied in the public administration, a solution can be the subcontracting of the necessary services, which allow access to such intelligent technologies, constituting an efficient way of managing the platforms, with a cost-benefit ratio built in favor of the public institution, with the aim of reducing the use of internal resources and decongesting the high degree of burden manifested in the activity of public officials from the central administration.

Public administration services can be optimised with the help of the use of advanced information technologies. The European Commission tries to set its own example in this sense, through the procedures and tools it uses in its day-to-day activity, in its links with the administrations of the member states and with its own decentralised agencies, marked by constant progress in innovation and computerisation. The goal being to facilitate citizens' access to public information through new technologies and computer applications, as well as to achieve better communication between all levels of public administration in the Union, thanks to the high-speed connection.

The development of the European information society requires a considerable financial effort, which is constantly growing, which cannot be fully assumed by the European Union and the governments of the member states. Practical experience has shown that the private sector is the most capable of taking the necessary risks in operating and developing new adaptable markets, having the necessary capital to make such investments necessary for the digital transformation strategy. The integration of machine learning and artificial intelligence functionalities, at the level of the Ministry of Investments and European Projects, can be seen in Tables 1 and 2 below, while the use of intelligent technologies such as Sandbox Analyzer and EDR - Endpoint Threat Detection and Response (ETDR) can be seen in Figures 1 and 3 below, and Computers – Endpoint policy compliance in Figure 2.

Table 1. Integrating Machine Learning and Artificial Intelligence functionalities, at the level of the Ministry of European Investments and Projects

Implementation period	Protected workstations	Increasing the degree of cyber protection	Automate responses to detected and remedied cyber attacks	Fixed vulnerabilities	Possible security risks
2014-2017	250 to 450	200 Endpoints	About 50 %	75 %	25 %
2020-2023	450 to 1700	1250 Endpoints	About 75 %	90 %	10 %
2023-2027	1700 to 3400	3400 Endpoints	About 95 %	95 %	5 %

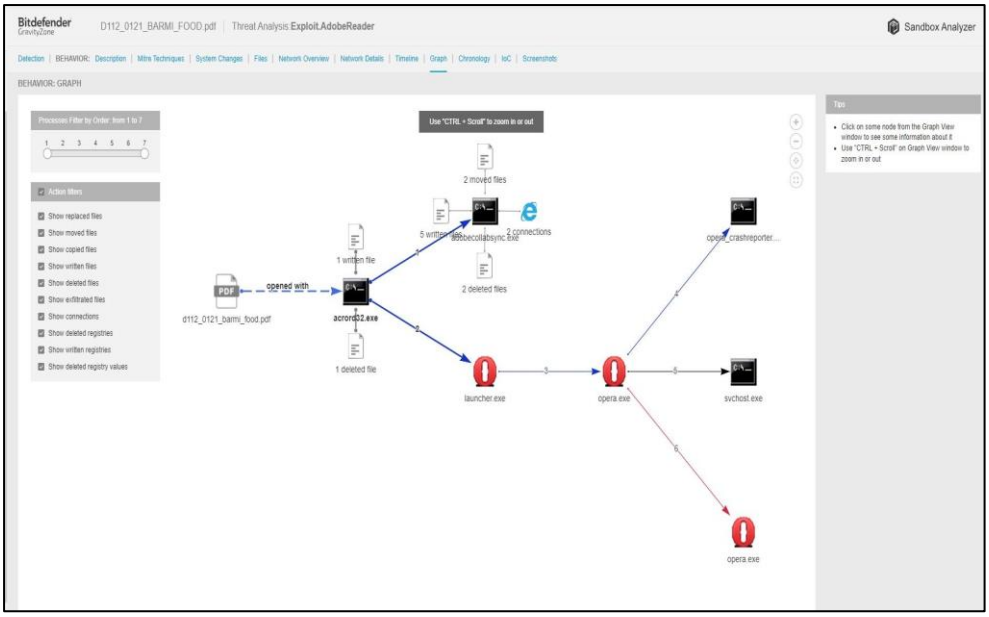
Source: Author's own research.

Table 2. Results of Integrating Machine Learning and Artificial Intelligence functionalities, at the level of the Ministry of European Investments and Projects

Automation period	Protected endpoints	Increasing the cyber protection	Automated detected and remedied cyber attacks	Security vulnerabilities	Security risks
2014-2017	450	200 Workstations	50 %	75 %	25 %
2020-2023	1700	1250 Workstations	75 %	90 %	10 %
2023-2027	3400	3400 Workstations	95 %	95 %	5 %

Source: Author's own research.

Figure 1. Sandbox Analyzer –
Ministry of European Investments and Projects

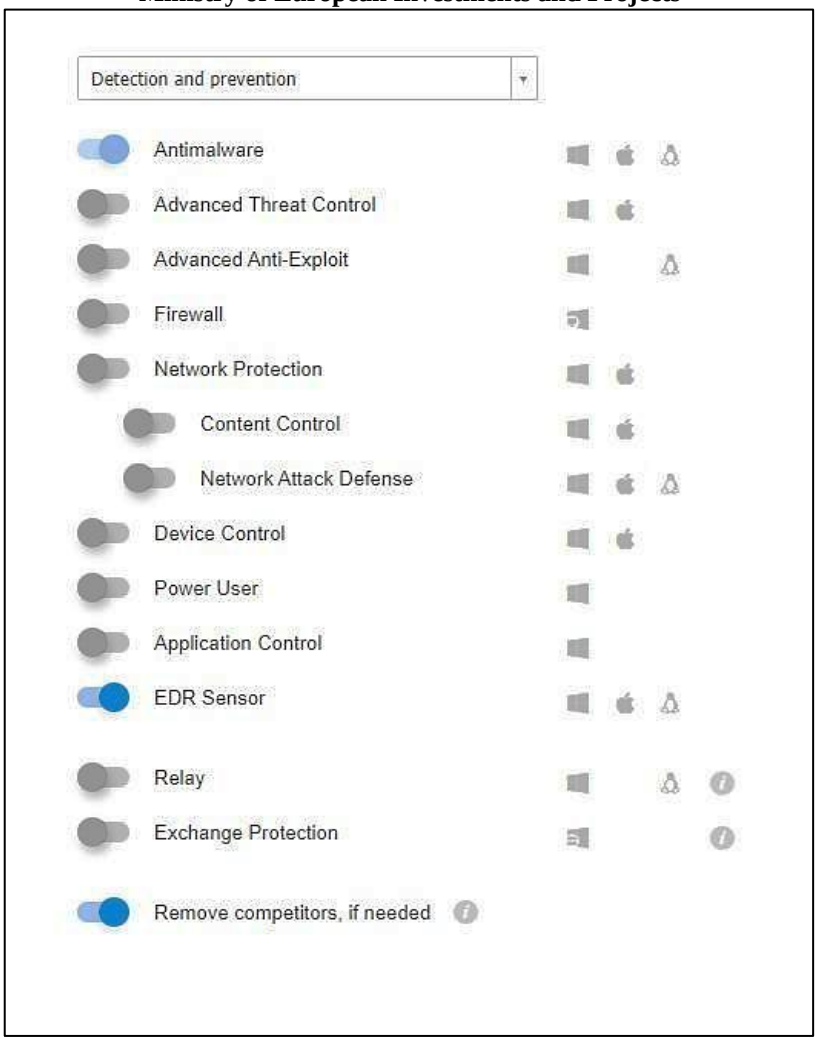


Source: www.bitdefender.com.

Figure 2. Computers – Endpoint policy compliance –
Ministry of European Investments and Projects

Source: www.bitdefender.com.

Figure 3. Endpoint Threat Detection and Response (ETDR) – Ministry of European Investments and Projects



Source: www.bitdefender.com.

6. Conclusions

Using machine learning capabilities and automatic incident investigation, certain activities that should have been performed by a security incident response team will be performed automatically in conditions where MIPE does not currently benefit from an internal SOC (Security Operation Center) structure.

Integrated and automated response flows will enable designated personnel to respond effectively by limiting lateral spread and stopping potential attacks. Threat visualisation features enable focus on specific aspects of investigations, helping to

understand complex detections, and identify the root cause of attacks, thus maximising immediate response capability.

The EDR module provides automated alert prioritisation with one-click remediation features. The EDR module will perform continuous analysis within the organisation, using unique capabilities to identify risk based on hundreds of factors. Providing clear guidance for mitigating potential risks at the user, network, and operating system levels. EDR administration requires low maintenance effort, is easy to implement and integrate into the existing security architecture, compatible with the antivirus solution used at the MIPE level.

The agent is resource-efficient, with low administrative costs in terms of disk space, memory, bandwidth, and CPU resources. The flexibility, scalability, and upgradeability of the complete endpoint protection platform and managed detection and response (MDR) services are necessary in the process of ensuring the cybersecurity standard built at the MIPE level.

By using cutting-edge threat detection technology, including fileless attacks, ransomware, and other zero-day threats. In threat analysis, the event logging feature continuously filters events produced on the endpoint, compiling a prioritised list of incidents for further investigation and response. In the event recording process, continuous monitoring allows data to be passed to the threat analysis module to visualise the results generated by the events involved in an attack.

The Sandbox Analyzer component automatically executes suspicious payloads in a controlled virtual environment. The threat analysis module then uses this analysis to make appropriate decisions about suspicious files, according to the automation achieved through the security policy implemented at the level of the single management console.

Cyber Security incident investigation and response processes will be automated through the IoC search capability, querying the event database to discover possible threats through ATT&CK techniques and indicators of compromise, as well as updated information on discovered threats or other possible malware.

The use of security solutions through intelligent technologies will generate real benefits within the organisation through the necessary configuration in the secure operation standards. Intuitive emerging technologies will optimise the time required to implement new security policies to achieve better monitoring and accurate alerting (EUAC, 2021). The cooperation with the National CYBERINT Center – Romanian Information Service, ensures stability in the cyber defense component, as well as access to the necessary knowledge in carrying out the awareness activity of the importance of ensuring the state of cyber security.

Cooperation to ensure cyber security, participation in seminars and conferences in the field of cyber defense, represent excellent tools for improvement and innovation in the organisation, creating the premises for the assimilation of good practices, in establishing the best decisions for the public institution.

The unified and integrated technologies offer a measurable advantage in obtaining more efficient results, benefiting from unique management consoles and tools adapted to the level of expertise held in the organisation, completed with the

cyber security strategies built by the Cyber Security department of the Ministry of Investments and European Projects.

The budget allocated to innovation in public administration, through specific European funding programs, will create and maintain the necessary stability, especially in critical areas of the national economy, such as the absorption of European funds.

The economy and society will undergo transformations, the role of robotics in industry, and the automation of repetitive processes in organisations will increase considerably. The revolution of emerging technologies brings both benefits and vulnerabilities, threats, and risks, especially in cyberspace, regarding the need to ensure cyber-defense capabilities.

By reinventing governance and computerising public administration, a parallel virtual world will be created, in which the existence of the state, with the balance of the necessary security state, must be protected, so that the cyber environment is safe and secure even for the citizens.

The repercussions of competition in innovation produce major transformations through interoperability and synergy, including in society, simplifying the crowded life of modern man in the era of the information society.

Strategic areas such as the attraction and absorption of European funds, by ensuring cyber security, aiming at the modernisation and computerisation of the public administration in Romania, constituting a national interest for the government's evolution in innovation.

Creating a global framework of security and trust in ICT, with an expansive trend towards automating repetitive processes, will generate the achievement of optimal efficiency (EUAC, 2020). These strategic objectives aim at the creation of scientific and technological excellence, obtaining advantages in innovation through the security and resilience of systems, services, and critical infrastructure of national importance, as well as increasing the degree of cyber security culture among officials in the central public administration.

An important stage will be achieved in the inter-institutional collaboration, for the achievement of the fundamental objectives of the country strategy, the field of funds becoming a critical infrastructure of national interest, through the inherent implications generated in the national economy, all important plans of the current modern society being affected, from the financial, up to economic, social-educational, even political, with all the necessary risks assumed through the decisions applied at the level of future strategies.

The efficient management of the infrastructure and applications intended for the management of European funds, having a particular importance in the evolutionary process of increasing the quality of life, represents the first step towards knowledge, innovation, and development of society in the information age.

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The Impact of the COVID-19 Pandemic on Foreign Investments in Romania Case Study on Brazilian and Indian Investments

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Abstract

A virus originating from China was declared a pandemic at the beginning of 2020. The international epidemiological situation generated by the outbreak of the COVID-19 pandemic has strongly influenced the economic balance. Thus, worldwide in 2020 there were decreases in foreign investments, which are the key element in global economic development. In Romania, according to relevant institutions, foreign direct investments are influenced by cheap workforce, qualified workforce, as well as the availability of natural resources. This paper includes two parts, made up of descriptive research and qualitative research. The descriptive research is based on statistics and data from the official reports of the National Trade Register Office. The aim is to pinpoint the number of firms with foreign participation in the capital during the 2020-2022 COVID-19 pandemic, compared to 2019. Also, the paper identifies the fields of interest for investors from Romania, as well as their nationality. The qualitative research is carried out with the support of the diplomatic representatives of Brazil and India in Bucharest. The method used is the questionnaire-based survey and the goal is to identify Brazilian and Indian investments in Romania during the pandemic. The impact on foreign investments in our country was not devastating; the data indicates that from December 2019 to December 2022, they increased by 7.6 %. As for the number of foreign investors, Italy leads the ranking, but according to the value of the capital subscribed, the Netherlands is at the top of the ranking. During the pandemic, Romania attracted significant Brazilian and Indian investments on the market. The contribution of this paper consists in the fact that it is demonstrated that the COVID-19 pandemic did not affect foreign direct investments in Romania; on the contrary, this period was beneficial.

Keywords: COVID-19, Romania, foreign investments, Brazil, investors, India.

JEL Classification: E22, E32, F1, F21, N76.

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1. Introduction

Foreign investments are the key element in global economic development. The international epidemiological problem generated by the outbreak of the COVID-19 pandemic has strongly influenced the economic balance. Thus, worldwide, but also in Romania, in 2020 there were decreases in foreign investments. The coronavirus pandemic and the inception of the Russia-Ukraine military conflict stopped foreign investments, because investors' confidence in the stability of the market dropped precipitously. It is important to emphasise that both the pandemic and the war offered investment opportunities (Hagiu, Barbulescu, 2022). At the macroeconomic level, the percentage of foreign investments is strongly influenced by the growth of GDP and GDP per capita. On the one hand, the high inflation rate and financial crises negatively impact the index of foreign investments. In Romania, according to relevant institutions, foreign investments are influenced by cheap labour force, qualified labour force, as well as the availability of natural resources, with great potential. Thus, it was identified that the GDP influence foreign investments by 5 % (Carp, 2014).

The purpose of this article is to point out the number of foreign companies in Romania, with participation in the capital during the 2020-2022 COVID-19 pandemic, compared to 2019, as well as the sectors of interest and the nationality of investors. Considering that there are not enough studies on Brazilian and Indian foreign investments in our country, this paper aims to follow their evolution during the pandemic.

2. Problem Statement

As far as Romania is concerned, foreign investments grew rapidly after 2007, the year of the country's accession to the European Union. Thus, many foreign companies started investing in the Romanian market, such as Lafarge Group (French capital); CarpatCement Holding (Danish capital); or Holcim (Swiss capital). In Romania, most foreign investments were in urban agglomerations, and at the country level, the fewest were in the north-east and south of the country, the two regions being the poorest in the country (Popescu, 2012). At the level of the economy of this country, it has been identified that the percentage of foreign investments can be developed by increasing the volume of exports, the trade balance and the balance of payments (Popescu, Brostescu, 2022). The main actor in foreign direct investments in Romania remains the EU, both before and after 2007 (Andrei, 2012). The change in the political regime in 1989 in Romania had a positive impact on foreign investments in this country (Stanciu, 2016). The factors that support Romania towards a long-term development are foreign direct investments, the opening of trade and the workforce. At the same time, the increase in GDP, exports, imports, and the workforce attract long-term foreign investments (Ciobanu, 2020). Romania is an attractive destination for foreign investments, because this country attracts more and more foreign investments. In principle, most foreign investments in our country are European. Currently, in order to receive foreign investments, it is important to maintain a balance in the business environment, as well as in the predictability of the

legislation, the goal being the clarity of the rules and the rights of entrepreneurs; economic infrastructure; transparency in the activity of state bodies; confidence in the Romanian business environment (Pîrvu et al., 2021).

Countries with a high volume of production are more open to invest in Romania, by opening an office/headquarter, compared to foreign companies with a low production. Companies with low production volume prefer exports to the detriment of investments. By attracting foreign direct investment, Romania created new jobs, increased the standard of living, and ensured better protection of consumers and competition (Simionescu, 2018). In the era of globalisation, foreign investments are considered to be an important part in the financial development of countries. For example, the BRICS (Brazil, Russia, India, China, South Africa) represent an attraction for foreign investors, due to the size of the market, the cost of labour, macroeconomic stability, infrastructure, and the large volume of trade (Mudiyanselage et al., 2021).

This work is innovative, because Brazilian and Indian investments in Romania are analysed during the coronavirus pandemic. Thus, the new companies appearing on the market during this period were identified, as well as the values in euros invested. In addition, attractive sectors and fairs in Romania for investors from Brazil and India were researched.

3. Research Questions / Aims of the Research

The purpose of the research is to respond to the issue of the evolution of foreign investments in Romania, during the period of the pandemic, compared to the non-pandemic year, 2019. Thus, the evolution of the number of enterprises with foreign capital on the Romanian market in recent years will be researched. The aim of the research is to analyse the ranking by country of investors in firms with foreign participation depending on the number of companies, as well as depending on the value of the capital subscribed in lei, in the period 2020-2022. Simultaneously, the evolution of investment sectors in Romania, compared to 2019, is also being researched.

The case study of the research is based on Brazilian and Indian foreign investments during the pandemic, namely the sectors of interest for foreign investors, the newly established companies, the amounts invested, but also the fairs of interest, organised in Romania.

4. Research Methods

The research of this paper includes descriptive research and qualitative research. The descriptive research is based on statistics and data from the official reports of the National Trade Register Office. The methods used are observation, analysis, processing, and synthesis of the statistical data. In this paper, the number of enterprises in Romania in the period 2020-2022, compared to 2019; the ranking by country of investors in firms with foreign participation, according to the number of companies; the ranking by country

of investors in enterprises with foreign participation according to the capital subscribed in lei; and the fields of activity of the foreign companies will be presented.

The qualitative research includes interviews with open-ended questions with diplomatic representatives of the Embassy of Brazil and India in Bucharest. The interviews seek to identify the Sectors of interest for Brazilian and Indian investors; Fairs and exhibitions organised in Romania of interest to investors; and the Strategies of the commercial sectors in the embassies, with the aim of attracting foreign investments.

5. Findings

5.1 Descriptive Research

Table 1. Ranking by country of residence of investors in enterprises with foreign participation - December 31, 2019

2019 226.892 companies	
Ranking by country of investors in companies with foreign participation - on December 31, 2019, depending on the number of companies	The ranking by country of investors in companies with foreign participation - on December 31, 2019 according to the amount of the subscribed capital in lei
Italy 21.72 %	Netherlands 21.05 %
Germany 10.31 %	Cyprus 11.03 %
Turkey 7.05 %	Australia and Germany 9.56 %

Source: Data processing from https://www.onrc.ro/index.php/ro/statistici?id=254.

In December 2019, the structure of the value of the social capital subscribed by firms with foreign participation was 48.27 % for Wholesale and retail trade; 31.73 % for the Extractive industry; and 11.23 % for Transport and communications.

Thus, the research shows that in 2019, there were 226.892 enterprises in Romania, of which most were from Italy, depending on the number, and the Netherlands, depending on the value of the subscribed capital in lei. The sector preferred by foreign investors in 2019 was Wholesale and retail trade (48.27 %).

Table 2. Ranking by country of residence of investors in enterprises with foreign participation - December 31, 2020

2020 230.976 companies	
Ranking by country of investors in companies with foreign participation - on December 31, 2020, depending on the number of companies	The ranking by country of investors in companies with foreign participation - on December 31, 2020 according to the amount of the subscribed capital in lei
Italy 21.46 %	Netherlands 21.20 %
Germany, 10.19 %	Cyprus 11.04 %
Turkey, 7.01 %	Australia and Germany 9.58 %

Source: Data processing from https://www.onrc.ro/index.php/ro/statistici?id=254.

In December 2020, the structure of the value of the social capital subscribed by firms with foreign participation was 56.28 % for Electric and thermal energy, gas, and water; 23.82 % for Agriculture; and 5.55 % Financial intermediation.

In 2020, the number of foreign companies in Romania increased by 1.8 % compared to 2019. Italy and the Netherlands remain the leaders among foreign companies in Romania. It is highlighted that in 2020, the sector of interest for foreign investors was that of Electric and thermal energy, gas, and water (56.28 %).

Table 3. Ranking by country of residence of investors in enterprises with foreign participation - December 31, 2021

2021 **236.847 companies**	
Ranking by country of investors in companies with foreign participation - on December 31, 2021, depending on the number of companies	The ranking by country of investors in companies with foreign participation - on December 31, 2021 according to the amount of the subscribed capital in lei
Italy 21.32 %	Netherlands 21.01 %
Germany 10.18 %	Cyprus 11.02 %
Turkey 7.07 %	Australia and Germany 10.41 %

Source: Data processing from https://www.onrc.ro/index.php/ro/statistici?id=254.

In December 2021, the structure of the value of the social capital subscribed by firms with foreign participation was 40.94 % for Agriculture; 34.33 % for the Extractive and processing industry; and 10.10 % Real estate transactions.

In 2021, the percentage of foreign companies in Romania increased by 2.5 % compared to 2020, and the sector preferred by foreign investors is Agriculture (40.94 %).

Table 4. Ranking by country of residence of investors in enterprises with foreign participation - December 31, 2022

2022 **244.215 companies**	
Ranking by country of investors in companies with foreign participation - on December 31, 2022, depending on the number of companies	The ranking by country of investors in companies with foreign participation - on December 31, 2022 according to the amount of the subscribed capital in lei
Italy 21.09 %	Netherlands 21.28 %
Germany 10.16 %	Cyprus 10.77 %
Turkey 7.17 %	Australia and Germany 10.36 %

Source: Data processing from https://www.onrc.ro/index.php/ro/statistici?id=254.

In December 2022, the structure of the amount of the social capital subscribed by firms with foreign participation was 46.57 % for the Extractive and processing industry; 26.48 % for financial intermediaries and insurances; and 16.79 % for Electric and thermal energy, gas and water.

In 2022, the number of enterprises was 244.215 in Romania, a 7.6 % higher than in 2019 and 3% higher than in 2021. Italy and the Netherlands remain the main

actors, but the sector of interest is changing, being the Extractive and processing industry (46.57 %).

5.2 Qualitative Research

5.2.1 Interview with the Former Ambassador of Brazil in Bucharest, Her Excellency Maria Laura Da Rocha

1. Which sectors in Romania have attracted investments from Brazilian businessmen in the last 3 years?

With regard to micro-enterprises, during the pandemic, at the end of 2021, a Brazilian businessman established in Romania opened a food truck with Brazilian food, in the middle of Bucharest, at Piata Unirii. The company is called Hot Brazilian Snacks and sells traditional Brazilian products. In addition, another Brazilian businessman invested in Buzau, a Brazilian fast-food chain. The restaurant is called Brazuca and sells specifically Brazilian products. As far as higher investments are concerned, VTEX, a Brazilian digital commerce company, which entered the Romanian market in 2018, invested US$ 1.5 million in the Romanian platform in 2020, during the pandemic. And the Brazilian Stefanini invested in Romania in 2021, opening an operational security center to meet the needs of the company's customers in the Europe, Middle East and Africa region. The center is run in Bucharest and already has a significant number of highly specialised cybersecurity experts. Currently, the company employs 1800 people.

2. During the COVID-19 pandemic, which international fairs and exhibitions organised in Romania attracted companies from Brazil?

In 2022 at BSDA – International Defense, Aerospace and Security Exhibition for the Black Sea (2022), Brazil was represented by Embraer and Mac Jee. Embraer presented projections and mockups at the fair with the model of the KC-390 Millennium aircraft. The company Mac Jee was present with models of its BGB-82 500 LBS and BGB-84 2000 LBS products, as well as light projections with the Armadillo land defense system.

3. What is the strategy of the Embassy of Brazil in Bucharest to promote Brazilian entrepreneurs and attract Romanian investments, after the imbalance caused by the COVID-19 pandemic?

For 2023, we propose to resume the organisation of the Business Roundtable, to attract more Brazilian businessmen, Romanian entrepreneurs, and authorities from both countries, in order to support and develop the Brazil-Romania economic exchange.

5.2.2 Interview with the Representative of the Commercial Economic Sector within the Embassy of India in Bucharest, Mr. Arijit Laha

1. Which sectors in Romania have attracted the investments of Indian entrepreneurs in the last 3 years?

India's investments in Romania are not that big; according to an estimate they amount to approximately US$ 1-1.5 billion. Romania offers foreign investors some special facilities that Indian investors can take advantage of. One of these facilities are the State Funds for business expansion in Romania or the opening of a new business, preferential rates for utilities and the tax rate, and the rapid allocation of land. Currently, there are approximately 400 Indian companies that have invested in Romania. The attractive sectors are IT, the steel processing industry, and the pharmaceutical industry. The largest Indian investor in Romania is the Liberty Steel Group from Galati (the steel plant), founded by Sanjeev Gupta. In 2020, Liberty Galati completed an investment of EUR 13.5 million, for modernisation. The Indian IT company Yash Technologies, with over 8000 employees globally, entered the Romanian market in 2022.

2. During the COVID-19 pandemic, which international fairs and exhibitions organised in Romania attracted companies from India?

During the pandemic, a delegation of six important members of Tata Advance Systems participated in Black Sea Defense and Aerospace – BSDA 2022, which took place in Bucharest between 18-20 May 2022. Also, many Indian companies participated in the ROMEXPO fairs, mainly at the Rommedica fair, both in 2021 and in 2022.

3. Which is the strategy of the Embassy of India to promote Indian entrepreneurs and attract Romanian investments, after the imbalance caused by the COVID-19 pandemic?

The Embassy of India in Romania is ready to guide all entrepreneurs from Romania and offers all the necessary assistance to those who are interested in investing in India and developing commercial relations with India. The embassy aims to advertise India's tourism and trade in the future, on all possible channels (newspaper, social networks, etc.). In order to attract Indian investments in Romania, the Embassy of India organised a forum and an exhibition between July 27 and July 29, 2022, in partnership with the Chamber of Commerce and Industry of Romania (CCIR).

6. Conclusions

In conclusion, the COVID-19 pandemic did not affect foreign investments in our country. In 2019, there were 226.892 foreign companies on the market, their number increasing every year. In 2022, the number reached 244.215 companies, 7.6 % more than in 2019. Depending on the number, most foreign companies in Romania have Italian capital. Depending on the amount of the subscribed capital in lei, the

Netherlands is the main investor in Romania. The sectors of interest of foreign investors vary every year, from Wholesale and retail trade, to Electric and thermal energy, gas and water or to Extractive and processing industry.

Regarding Brazilian investments, this is an innovative topic, because currently there are not enough studies and analyses on this matter in Romania. During the pandemic, in 2021, Brazilian investments increased, through the opening of two Brazilian-specific restaurants, Hot Brazilian Snack and Brazuca. In addition, investments in the IT sector have experienced expansion, the Brazilian collaborative trade company, VTEX, is investing in 2020, US$ 1.5 million in a platform. And the Brazilian company Stefanini opened an operational security center in 2021. Also, the BSDA – Black Sea Defense and Aerospace 2022 fair attracted the defense companies Embraer and MAC Jee to present their products at the event. Thus, Brazilian investments increased during the health crisis, the main sectors of interest in Romania for Brazilian investors being that of Public Food; IT and Defense.

Regarding Indian investments, the steel plant Liberty Steel Galati is the main Indian company in Romania, investing EUR 13.5 million in 2020 for modernisation. In 2022, Yash Technologies, an Indian IT company, was also opened. BSDA – Black Sea Defense and Aerospace 2022 fair attracted the company TATA Advance Systems, and the Rommedica fair at Romexpo attracted Indian companies from the pharmaceutical industry. Therefore, the main sectors in Romania of interest for Indian investments are the steel processing industry, the pharmaceutical industry, IT, and defense.

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I would like to express my sincere thanks to Professor Mihail Bușu, from the Bucharest University of Economic Studies, for the guidance to choose a topical and interesting topic, regarding foreign investments in Romania, during the COVID-19 pandemic. Warm thanks also to Professor Mihaela-Violeta Dincă, from the Bucharest University of Economic Studies, for all the effort, with the aim of supporting me in my doctoral studies. I would also like to thank Her Excellency Maria Laura da Rocha, the former Ambassador of Brazil in Bucharest, for the interview granted and for the support to follow the doctoral courses. Last but not least, I want to thank Mr. Arijit Laha, the Representative of the Commercial Sector at the Embassy of India, for the willingness to support me with the interview regarding Indian investments in Romania.

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Natural Gas Market Liberalisation in Romania

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Abstract

The liberalisation of the natural gas market in Romania is a very important element in the development of the Romanian economy in general and the development of this sector in particular. In this article, the authors provide an analysis of the gas market liberalisation process, highlighting its long- and short-term effects. The article also gives an overview of the evolution of the percentage of household customers that have switched from the regulated regime to the competitive regime and of the number of suppliers with household customers in their portfolio in the competitive regime. Connections to natural gas distribution systems and the evolution of natural gas prices in a regional context are also discussed in this article.

Keywords: gas sector, liberalisation process, distribution system, ANRE.

JEL Classification: P48, Q48, K32, O13.

1. Introduction

With Romania's accession to the EU and the lack of credible external pressure for further reforms, the Romanian market experienced a real freeze in the period 2007-2011. Liberalisation and prices were frozen, as was further reform of state-owned companies and regulations. However, in the last three years, the gas market has undergone a significant transformation, and in early 2015 the non-household market will be fully liberalised. Unfortunately, for domestic consumers, liberalisation has again been postponed for two and a half years, until 2021 – a measure taken without the agreement of the European Commission and which may lead to further infringement action, as well as merely postponing the issue of affordability without providing a sustainable social support solution. Delays in liberalisation make us more vulnerable to a gas import crisis, reduce state budget

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revenues, discourage projects to develop domestic gas resources, and do not allow us to exploit existing resources without waste.

The liberalisation of the natural gas market in Romania was a complex process, carried out in several stages and marked by a series of important changes and additions to the applicable legislative framework.

Although this framework has fluctuated in terms of the timing of full market liberalisation for household consumers, the general trend has been towards deregulation, in line with Romania's commitments as an EU Member State.

Year 2014: Mandatory gas trading on centralised platforms (for producers)	**Since 2014, the obligation for producers to trade natural gas on centralised platforms has been in place.**
2015: Mandatory gas trading on centralised platforms (for suppliers)	The obligation established in 2014 for producers has started to apply to gas suppliers since 2015.
March 2017 - December 2018: Liberalisation of gas prices for the entire quantity marketed by national producers	In 2017, the price of natural gas was liberalised for the entire quantity marketed by national producers, as follows: - before 31.03.2017, the quantities supplied for regulated consumption[3] were supplied by national producers at regulated set prices; - after 31.03.2017[4] , suppliers to household consumers and CPET[5] switched to competitive from regulated gas procurement.
December 2018: Capping of the domestic producers' selling price to CPET	The competitive operation of the wholesale gas market took place from March 2017 to December 2018, when the authorities[6] reintroduced the obligations on domestic gas producers to sell at a regulated cap price, thus removing significant amounts of natural gas (destined for CPET) from the competitive market.
2020: Liberalisation for household consumers	By *GEO no. 1/2020*, liberalisation of the gas supply market was established for household customers from 1.07.2020[7] .

[3] Representing about 35 % of total natural gas sales.

[4] Follow-up to GEO No 64/2016.

[5] CPET = household customers and heat producers, only for the quantity of natural gas used for the production of heat in CHP plants and thermal power stations, for household consumption.

[6] By adopting GEO no. 114/2018.

[7] Subsequently, by ANRE Order no. 27/2020, the measures to be applied by suppliers to household customers in the regulated market in the period May-June 2020 were established, mainly the submission of price offers valid from 1.07.2020 and notifications containing information on market liberalisation. According to the provisions of the Order of the President of ANRE no. 27 of 23 March 2020, during the period from 1 April to 31 May 2021, natural gas suppliers were obliged to send to household customers in their own portfolio who did not exercise their eligibility right a notification

In July 2020, the Romanian Energy Regulatory Authority (ANRE) carried out an analysis of the Romanian natural gas sector, in the context of the liberalisation of natural gas supply to household customers. Market analyses are tools commonly used by regulators, whereby they aim, in particular, to identify and mitigate possible inefficiencies in the functioning of markets.

2. Problem Statement

In the context of the[8] liberalisation process announced for 1.07.2020, the competition authority found that the number of household consumption sites supplied with natural gas on a competitive basis increased by almost 200,000 in the first six months of 2020, representing an increase of more than 56 % compared to the level in January 2020 (when there were about 295,000 such consumption sites) (Ban, 2012).

Thus, in relative terms, the share of total household customers supplied with natural gas on a competitive basis increased from around 7.8 % in January 2020 to 12 % in June 2020 (Nedelcu, Busu, 2022).

Subsequently, based on the data collected by the competition authority and those received from the regulator, it is observed that in the second half of 2020, after the start of the last stage of the liberalisation process, approximately 585,000 household customers switched to the competitive regime, which meant that, at the end of 2020, the share of customers supplied with gas under the competitive regime, compared to the total number of consumption sites in Romania, was 26.6 % (Nedelcu, Busu, 2022).

Subsequently, household customers continued to exercise their right of eligibility throughout 2021, with preliminary data for August 2021 showing that, of the approximately 4 million consumption sites, for approximately 1.8 million (representing 44.1 %) supply is carried out under a competitive regime following the expression of an option by the household customer (as shown in Figure 7.1) (Grecu et al., 2018).

Also, from the start of the last phase of liberalisation (July 2020) to August 2021, the number of household customers in the competitive regime has increased by about 1.31 million (but about 180,000 of these are new consumption sites, for which supply is automatically provided in the competitive regime) (Haar, Marinescu, 2011).

Furthermore, between August 2020 and July 2021, only 8.4 % of household customers who switched to competition also changed supplier in the process, meaning that the vast majority of household customers remained with their old gas supplier (Bolba et al., 2021).

Thus, the information collected by the Competition Council from natural gas suppliers does not support the hypothesis of migration to the competitive regime of

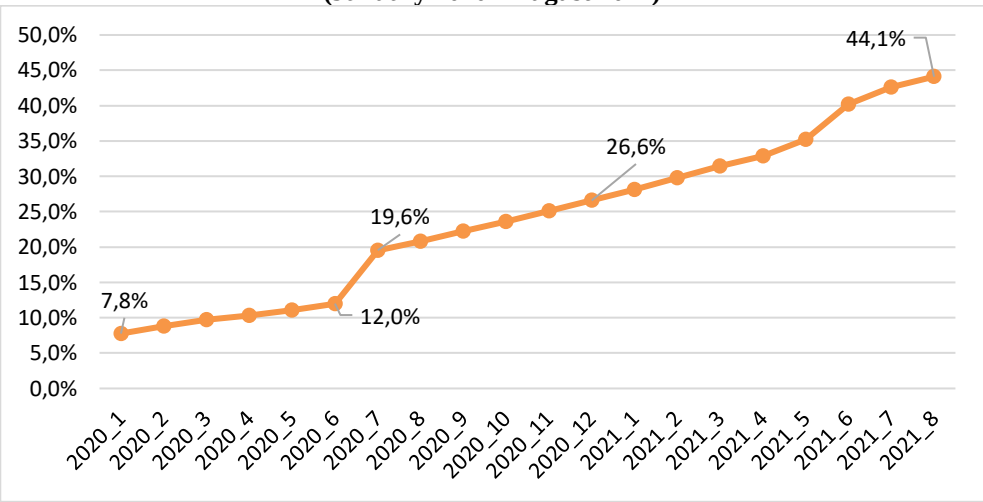
which will have attached a price offer proposed by them for the supply of natural gas from 1 July 2021.

[8] Gas suppliers had specific obligations, set by the regulator, to inform their customers of changes to the supply regime and to communicate the offers under which gas supplies were to be provided from July 2020.

a certain type of consumers, as the average monthly consumption of those who switched to the competitive regime is roughly equal to that of passive household customers (Sobják, 2013; Kennedy, 2005).

3. A Description of the Natural Gas Market

Figure 1. Evolution of the percentage of household customers switching to competition (January 2020 - August 2021)



Source: Own analysis based on data retreived from ANRE.

Before the liberalisation process[9] announced for 1.07.2020, the competition authority found that 86 suppliers were active on the Romanian natural gas market, similar to the number at the beginning of 2020 (84 suppliers). Also, less than 50 % of gas suppliers on the market were targeting household customers.

In the first half of 2020, 31 gas suppliers had household customers in their portfolio to whom they provided gas under the competitive regime.

In the first semester of 2020, only six gas suppliers had more than 5,000 household customers in their portfolio to whom they supplied gas in a competitive regime.

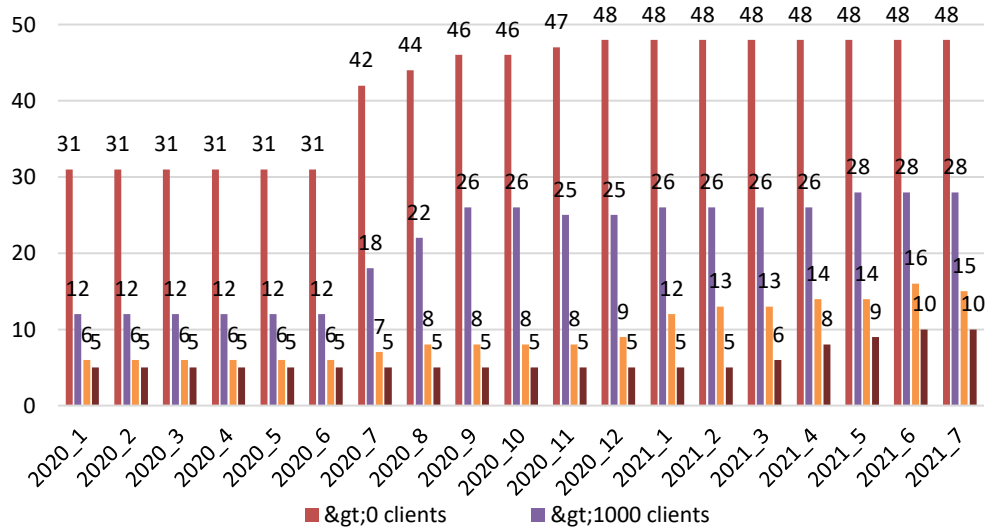
Following the liberalisation process, the number of gas suppliers with household customers in their portfolio to whom they supplied gas on a competitive basis stabilised at around 48.

Also, the number of gas suppliers that each had more than 1,000 household customers in their portfolio to whom they supplied gas under a competitive regime increased to 28.

[9] Gas suppliers had specific obligations, set by the regulator, to inform their customers of changes to the supply regime and to communicate the offers under which gas supplies were to be provided from July 2020.

In addition, the number of natural gas suppliers that each had more than 5,000 household customers in their portfolio to whom they supplied gas on a competitive basis reached 15.

Figure 2. Number of suppliers with household customers in the portfolio, competitive regime (January 2020 - July 2021)



Source: Own analysis based on data retreived from ANRE.

In Figure 2 we could see that there was an increase in the number of suppliers with household customers in the portfolio in the competitive regime, in July 2020.

One of the recommendations that resulted from the public debate on the liberalisation process of the gas market was to adapt ANRE's model offer comparator by including additional filters to make it easier for household customers to choose between offers with a higher degree of comparability. Household customers should be able to select suppliers' offers according to several relevant criteria, such as: type of price (fixed/variable), duration of price validity (expressed in months), type of offer (gas/gas and services/gas and energy), daily subscription component (yes/no), guarantee component (yes/no), method of bill transmission (physical/electronic).

On 18.09.2020, ANRE made available to household gas consumers interested in exercising their right of eligibility a new version of the comparator of standard gas supply offers. It includes additional criteria on the basis of which offers can be selected, ensuring better comparability of the returned results. In the new version of the online comparator, customers can choose to view offers according to price type, subscription component, billing method, guarantee component, contract duration, etc.[10]

[10] For further information, those interested can consult the press release issued by ANRE on this

As of January 2021, the comparator is also available on the Competition Council's website[11].

4. Liberalisation Process of the Gas Market

ANRE has analysed the model offers for the supply of natural gas under a competitive regime drawn up by the licensees at the time of liberalisation, as well as the draft contracts proposed by them to be concluded with household consumers on the competitive market.

The analysis revealed problematic clauses, which, in certain situations, can create barriers for household customers to make an informed choice of the most appropriate supply conditions, and which are sometimes ambiguous. In addition, certain contractual clauses can block, even temporarily, the possibility for household customers to switch gas suppliers.

In this context, ANRE stressed the importance of discouraging this type of behaviour identified at the level of natural gas suppliers to household customers, which can undermine the whole liberalisation process, and recommended the standardisation of a contract format providing for single terms and conditions, presented in a clear, transparent and complete manner. Also, as some aspects of the contract terms proposed by gas suppliers exceed the powers of the competition authority, ANRE communicated the results of its analysis to the National Authority for Consumer Protection.

4.1 Connections to Gas Distribution Systems

Following the adoption, especially in the second half of 2020[12], of primary regulatory acts, amendments and additions were made to Law 123/2012 regarding the connection to natural gas distribution systems. According to them, the distribution operator is obliged to connect all domestic end-customer applicants to the system within 90 days from the date of obtaining the construction permit, with recovery of the connection costs within 5 years.

According to data collected by ANRE in 2020, in Romania there were 3.9 million consumption points belonging to domestic consumers connected to the distribution system, served by approximately 60 natural gas suppliers.

The process of connecting consumers with the natural gas distribution system is a prerequisite for supply activity, and the number of consumption sites belonging to household customers is directly influenced by the stage of this process.

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occasion, available at https://www.anre.ro/ro/presa/comunicate/informare-privind-aplicatia-web-interactiva-comparator-oferte-tip-de-furnizare-a-gazelor-naturale.

[11] http://www.consiliulconcurentei.ro/anre-comparator-gaze-naturale/.

[12] Law no. 155/2020 on amending and supplementing the Law on Electricity and Natural Gas no. 123/2012 and on amending and supplementing other normative acts; Government Emergency Ordinance no. 106/2020 on amending and supplementing the Law on Electricity and Natural Gas no. 123/2012 and on amending some normative acts, approved with amendments and additions by Law no. 290/2020.

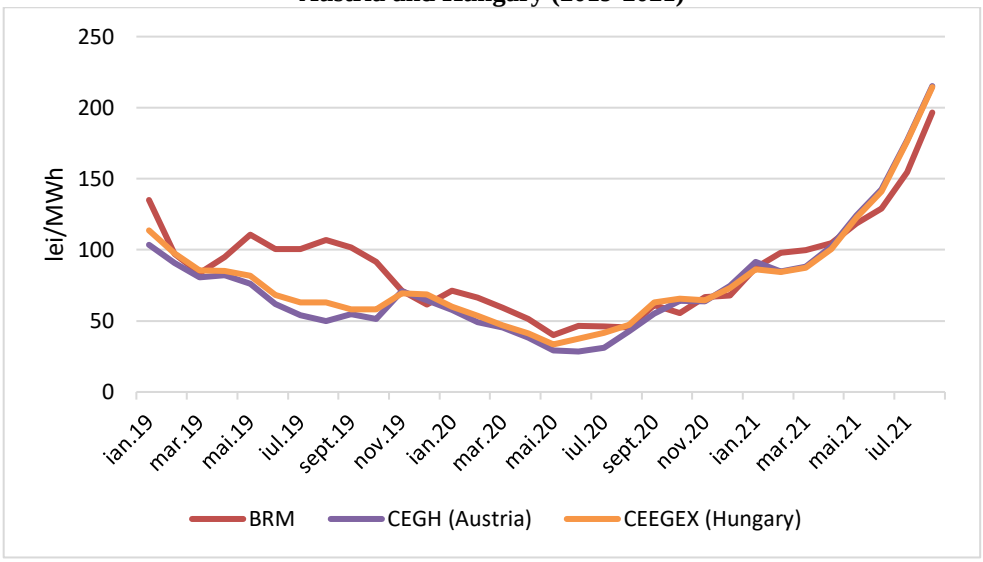
Under these conditions, a steady increase in the number of consumption sites would stimulate the expansion of the market for the supply of natural gas to households, potentially leading to an increase in both the portfolio of existing suppliers and to the emergence of new suppliers on the market.

4.2 Gas Price Developments in a Regional Context

Natural gas is traded either spot, with delivery on the day of trading or the day after trading, or forward, with delivery later than the day of trading.

In Romania, most natural gas transactions are carried out on the platform of the Romanian Commodities Exchange (BRM).

Figure 3. Monthly evolution of gas prices on the day-ahead market in Romania, Austria and Hungary (2019-2021)



Source: National Trading Platforms.

Figure 3 shows the close-to-spot gas price level in Romania, Hungary and Austria, especially in the period 2020-2021.

As can be seen from the above, during 2021, there has been a significant increase in the price of natural gas. This increase was generated more by the combination of specific conditions prevailing in the region, rather than by the process of liberalisation of gas supply to domestic customers.

5. Conclusions

In fact, since the start of liberalisation, a multitude of offers have appeared on the gas market from suppliers, some even combined (gas and electricity, gas and associated services). In addition, household customers who exercised their eligibility after July 2020 were also able to benefit from significantly lower prices than those

in regulated contracts, which shows that, in the absence of the recent combination of unfavourable conditions, the liberalisation process would have continued to generate tangible benefits for household gas consumers.

To sum up, in order to respond to the internal and external challenges in the gas sector, decision-makers need to prioritise an action plan with measures to implement the reforms started in the gas market, for the benefit of investors, consumers, and the state. Ideally, this action plan should be included in the energy strategy developed by the Department of Energy. Unfortunately, however, many of the necessary decisions are too urgent to wait for the strategy to be approved. It should be noted that all these measures have already been approved in various legislative or regulatory programmes, although some deadlines have been missed. This is all the more necessary as opponents of liberalisation (regulated suppliers, industrial consumers) argue that the liberalisation timetables only include price increases and not the measures needed to develop the market and update regulations.

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An Analysis of the Consumer Satisfaction Regarding the Beauty Services in Romania

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Abstract

The authors of this article hypothesise that a salon's or specialist practice's level of client satisfaction will determine whether it succeeds or fails, and that understanding the major variables that affect these levels can help service providers develop their business strategies and improve their operations in the future. In this essay, a research methodology that was developed after reading the literature and tested on Romanian citizens is presented. The population's economic potential, the nation's expanding business climate, and the locales' population densities were taken into consideration when selecting the sample. The current study aimed to determine the variables affecting consumers' satisfaction with beauty services.

Keywords: beauty services, consumers satisfaction, consumer behaviour.

JEL Classification : D11, J28, C38.

1. Introduction

The appearance is becoming more and more significant to people, making the field of beauty more appealing and interesting for both men and women. In recent years, there has been an increase in interest in beauty services in Romania, with both women and men (for hairdressing, beard style, manicures, and pedicures) expressing a strong desire for these services. The number of salons and the number of specialists in the area, both of which have seen considerable year-over-year increases, directly reflect the consumer interest in beauty services. Customers are becoming more conscious of themselves, their physical appearance, and their psychological state, which has led to an increase in demand for beauty services. Customers prioritise their own demands and interests based on their perceived selves. Additionally, this trend may be seen in consumer internet behaviour, particularly in terms of how they get

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information. The studies conducted so far also reflect consumer preferences for beauty services. According to Ekaterina (2017), "Romanians are becoming increasingly attentive to the way they look and feel in their own bodies, and this is largely due to the diversity and accessibility of the offers on this market. "The specific services offered (massage, cosmetics, hairdressing, pedicure, manicure, make-up, and hairdressing, for example) or more general phrases (beauty, beauty salon, make-up, hairstyle, etc.) can be used to identify beauty services.

The progressive expansion of the fragrance services industry is influenced by consumer preference diversity, the recognition of shifting customer needs, and the rate at which the private environment adapts to those needs.

2. Consumer Satisfaction with Beauty Services

The first description of customer satisfaction that has been documented in the literature dates to 1969 and speaks to "the buyer's cognitive state of being adequately or inadequately rewarded for the sacrifices he has made" (Howard, Sheth, 1969, p. 145).

The modern approach offers definitions of satisfaction related to business financial performance, market competitiveness, and the cognitive, psychological, affective, and physical aspects that consumers pursue. The degree of satisfaction experienced is responsible for a business' success or failure, as well as for customers' satisfaction or dissatisfaction with the experience (Wong et al., 2008; Radomir, Nistor, 2013; Busu et al., 2020). According to a 1969 definition in the literature, "the buyer's cognitive state of being adequately or inadequately rewarded for the sacrifices he has made" is the basis for customer happiness (Howard, Sheth, 1969, p. 145).

In the modern approach, satisfaction is defined in terms of a company's financial performance, market competitiveness, and the cognitive, psychological, affective, and physical aspects that consumers pursue. The degree of satisfaction experienced is what determines whether a business succeeds or fails, as well as whether customers are happy with their experiences or not (Wong et al., 2008; Radomir, Nistor, 2013; Busu et al., 2019)). Customers are divided into those who are satisfied with actual things and those who are satisfied with service experiences. The distinction is brought about by the fact that services are intangible, transient, and interdependent, as well as by several influencing variables (Fečiková, 2004; Dimitriades, 2006).

Comparing what was received to what was anticipated forms the basis of all definitions of contentment. A specific level of outcome or expectation confirmation results in satisfaction, and a lower level of pleasure results from a lack of or delayed reaction. A specific amount of customer happiness determines a company's success or failure. Annually, a substantial number of clients are lost from a company's statistics without any obvious explanations for why customers aren't making purchases, but this has a big influence on earnings. Dissatisfied people tend to have negative perceptions, attitudes, and sentiments that have a bigger psychological

influence, whereas content people cultivate positive feelings, emotions, and attitudes about the acquisition (Shun et al., 2001).

3. Influencing Factors in the Choice of Beauty Services

Studies that focus on how consumers make decisions about which services to buy demonstrate that both internal and external variables have a direct impact on people. External elements that affect the customer's purchasing decision include cultural and social influences. According to Harnad (1990), Hofstede defined culture as a group mind-programming that separates people into different categories. Three factors can be used to describe culture:

All the characteristics that make up a culture are interrelated, so if one changes, the others will be impacted as well (Petty, Weinmann, 1997). Culture also establishes the boundaries between various groups that members of a group share. Social variables include the influence of reference groups, such as family, friends, neighbours, and co-workers, as well as social roles and status, on a consumer's choice to make a purchase. According to Cătoiu and Teodorescu (2004, p. 32), reference groups are things that people use to categorise themselves based on similarities in their ambitions, social behaviour, and consumer behaviour. The level of influence that reference groups have on consumer behaviour is lower and unstable.

The information process of perception involves the senses being affected by stimuli. Given the current mental configuration, which is characterised by attitudes, experiences, and motivation, attention is focused on the early stages of information processing and stimulus interpretation (Baker, Baker, 2003; Luo, Bhattacharya, 2006). By contrasting expectations with the perceived service, positioning the service in the consumer's mind, and consumer retention, perception becomes the key to service quality (Luo, Bhattacharya, 2006, p. 216).

In simple terms, even though people are exposed to identical realities, their perceptions can differ substantially from each other. As a result, a talkative salesperson may be perceived by one individual as aggressive and unfriendly while being perceived positively by another. Every individual has a unique viewpoint and will respond in a distinct way (Kotler, Keller, 2006, p. 185).

4. Research Methods

This analysis starts with the formulation of the research questions: Which are the determinants that influence consumer satisfaction with beauty services?

The data collection method was a survey, empirical, non-probability, questionnaire-based method. The instrument of the study used was the questionnaire, which was conducted using the isondaje.ro website. The responses were collected using the snowball sampling method, and emails were sent via emails. The questionnaire contains 30 closed and open-ended questions. The authors used a Likert scale in 7 points for the questions regarding the consumer’s perceptions.

The population on which the research was directed is the population of Romania, regardless of age (people over 18 were selected), gender, educational level, and income who went to a beauty salon between July 2022 and September 2022.

Most respondents are young women, aged 20 to 40, not married, from urban areas (75.1%), with an income of more than 3001 lei per month. The least expensive beauty service that is often used is 300 lei, and the most expensive beauty service has a minimum price of 80 lei. The cost of beauty treatments varies depending on the procedure needed, the brand of items used, the reputation of the practitioner, and the salon's reputation.

The following research hypotheses are the starting point for the statistical processing:

- H1: Each factor affecting the provision of beauty services (frequency, cost, time, social benefits, personalisation of services, advantages of treatments, brand of services, and physical proof) has a significant and favourable impact on the level of satisfaction experienced by the consumer.
- H2: Each factor affecting the cost and frequency of a consumer's repeat purchases (frequency, price, time, social benefits, personalisation of services, advantages of treatments, brand of services, and physical proof) has a significant and favourable impact.
- H3: The frequency of referral to beauty services is considerably and favourably influenced by each factor of beauty services (frequency, price, time, social benefits, personalised services, advantages of treatments, brand of services, and physical proof).

The SERVQUAL model, which has been modified to give a complete, complicated, and detailed picture of the precise aspects that significantly affect a consumer's level of satisfaction with beauty services, served as the foundation for the research model that we developed.

We have kept the five dimensions that Parasuraman, Zeithaml and Berry (1988) identified for the current study, while we have added items to each dimension specific to the field of beauty.

5. Findings

The five characteristics of the SERVQUAL model that have been modified are included in the study model: accountability (social benefits), empathy (service personalisation), dependability (treatment benefits), safety (service brand), tangibility (physical proof), and retention (satisfaction, repeat business, and recommendation). The Cronbach Alpha index was used to further confirm the scales:

- With a Cronbach Alpha index score of 0.915, the responsibility component (social benefits), which consists of 11 items, verifies the scale's measurement of customer satisfaction with beauty services.
- The scale accurately gauges the level of satisfaction felt by consumers of beauty services thanks to the empathy dimension, which consists of 10 items and is confirmed by Cronbach's Alpha value of 0.919.

- The reliability dimension, which consists of 11 questions and is validated by a Cronbach Alpha value of 0.899, indicates that the used model is accurate and assesses the level of satisfaction felt by consumers of beauty services.
- The safety dimension (service brand), which consists of ten items, is validated with a Cronbach Alpha value of 0.920, indicating that it accurately measures the level of pleasure felt by customers of beauty services. To calculate the number of components for each of the questions included in the scale validity analysis stage before, Principal Component Analysis (PCA) is used.

We constructed variables that would be used to establish and define the study hypotheses using the two analyses (Cronbach's alpha and PCA) that we used to identify how the items of the instruments employed grouped into global variables. With the aid of Principal Component Analysis, the operation of averaging the item scores of each extracted component was utilised to generate the construct variables. The database of all the responses provided by the people under investigation was subjected to the process of adding the scores. The responsibility dimension (social benefits) receives a KMO value of 0.900, and the total variance indicates breaking the dimension into two constructs: social benefits and personal image. These construct variables will be employed in the analyses that follow:

- The measure of empathy (personalisation of services) has a KMO value of 0.897, and the further personalisation of services construct accounts for all variances. Benefits of treatments, which measures reliability, has a KMO value of 0.884, and the overall variation is explained by a single construct known as additional benefits of treatments.
- The KMO value for the reliability dimension (service branding) is 0.897, and the overall variation points to the existence of the constructs known as provider notoriety and product notoriety. The research hypotheses could be validated or disproved once statistical tests were applied, depending on the outcomes.

As a result, hypothesis H1 is fully supported, but H2 and H3 are just moderately supported. The level of customer repeat purchases and the level of recommendation of beauty services are not impacted by price in the cases of hypothesis H2 and H3, respectively.

6. Conclusions

In addition to being considered a pioneer in the field, this paper presents a comprehensive picture of beauty services and consumer satisfaction measurement.

The study offers value by presenting a theoretical framework for customer satisfaction outcomes that emphasises the contrasts between expectations and perceptions, as well as the financial implications of a favourable result, symbolised by a level of satisfaction. Practically speaking, the research model's central tenet is the influence of factors typical of the beauty service sector on consumer pleasure, including the influence of satisfaction on future consumer behaviour and the influence of factors on future customer actions.

The research presents a complex, adequate, valid, and specific research model to study the factors influencing the satisfaction of consumers of beauty services and

determine the level of satisfaction based on the consumer benefits obtained from the performance of the beauty services, according to the applied research methodology.

Firstly, this analysis provides professionals and salon managers with a comprehensive and industry-specific tool to identify the most important factors that lead to increased client satisfaction. Secondly, the research determines satisfaction levels and the relationship between satisfaction and periodical customer actions, which are significant markers that can be used to direct future business-level initiatives.

Finally, the beauty consumer satisfaction research model provides leaders and employees with the opportunity to determine the degree of satisfaction perceived by consumers after receiving or reviewing beauty services.

The analysis could be extended by applying the questionnaire to the entire country to include the municipalities. Additionally, an extension could be made by making a comparison of the findings according to the eight regions of the country. By conducting qualitative research (interview/focus groups) among consumers to determine the most prevalent social, psychological, and behavioural aspects as expressed by customers toward an increase in the degree of satisfaction, further changes might be taken into consideration.

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Metaverse Sustainability Through Integrated Digital Leadership and Resilient Entrepreneurship

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Abstract

The Metaverse is an emerging space that is rapidly becoming a new frontier for entrepreneurs to explore. As the world becomes increasingly digitised, building sustainable businesses in the Metaverse requires a unique set of skills and strategies. This paper aims to explore the integrated approach to digital leadership and resilient entrepreneurship as a means of building sustainable businesses in the age of the Metaverse. The literature on the Metaverse is relatively new, but there has been extensive research on digital leadership, resilience, and sustainability in the business world. Previous studies have shown that digital leadership is a crucial factor in driving digital transformation and creating sustainable businesses, while resilience is the key to overcoming the challenges that arise from uncertainty and change. This paper employs a qualitative research approach, using a multiple case study analysis of successful sustainable businesses in the Metaverse and also through a descriptive analysis approach. The research questions include: What are the key elements of digital leadership and resilient entrepreneurship in building sustainable businesses in the Metaverse? How can these elements be integrated to create a successful business model in the Metaverse? The study found that successful businesses in the Metaverse have several key elements in common, including a clear understanding of their target audience and their needs, the ability to leverage emerging technologies to create immersive and engaging experiences, and a focus on creating sustainable business models that align with social and environmental values. This paper contributes to the field of studies by exploring the integrated approach to digital leadership and resilient entrepreneurship in the context of the Metaverse. By providing a comprehensive analysis of successful sustainable businesses in the Metaverse, this paper offers valuable insights for entrepreneurs and business leaders looking to navigate this rapidly evolving landscape.

Keywords: Metaverse, digital leadership, resilient entrepreneurship, sustainable businesses, companies.

JEL Classification: L86, O31, Q40, Q49, M19.

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1. Introduction

The Metaverse is an emerging digital space that is rapidly gaining importance as a new platform for business and social interaction. The Metaverse can be viewed as a collective virtual open space connecting various spaces and converging the virtually enhanced physical and digital reality (Dwivedi et al., 2022). The development of the Metaverse presents unique opportunities and challenges for entrepreneurs, business leaders, and society as a whole. Building sustainable businesses in the Metaverse requires an Integrated Approach to Digital Leadership and Resilient Entrepreneurship.

Digital leadership is a critical element to building sustainable businesses in the Metaverse. Digital leaders need to have a deep understanding of the technologies that underpin the Metaverse, as well as the social and cultural trends that shape this emerging digital space. They need to be able to anticipate and respond to changes in the digital environment, and to develop strategies that are agile and adaptable.

Resilient entrepreneurship is also a critical element of building sustainable businesses in the Metaverse. Entrepreneurs operating in the Metaverse need to be resilient in the face of uncertainty and volatility. They need to be able to identify and respond to emerging opportunities, and to pivot their business models quickly and effectively when circumstances change. They need to be able to build strong networks and partnerships, and to collaborate with other entrepreneurs, businesses, and organisations to create value in the Metaverse.

The purpose of the paper is to examine the relationships between integrated digital leadership, resilient entrepreneurship, and the sustainability of businesses operating in the Metaverse.

The primary purpose of the paper is to explore how integrated digital leadership and resilient entrepreneurship contribute to the sustainability of businesses in the Metaverse. It aims to understand the role of digital leaders in leveraging their understanding of Metaverse technologies and social trends to create sustainable business models. Additionally, it seeks to uncover how resilient entrepreneurs can adapt and pivot their strategies in response to the dynamic nature of the Metaverse, ensuring long-term viability. The article is based on the initial state hypotheses that drive the investigation of the relationships between integrated digital leadership, resilient entrepreneurship, and the sustainability of businesses operating in the Metaverse. These hypotheses propose that integrated digital leadership, characterised by a deep understanding of Metaverse technologies and social trends, will have a positive impact on the sustainability of Metaverse businesses. Additionally, resilient entrepreneurship, characterised by the ability to adapt and pivot business models in response to Metaverse changes, will also contribute positively to sustainability. The integration of digital leadership and resilient entrepreneurship is believed to create synergistic effects that improve the overall sustainability of businesses in the Metaverse, enabling them to effectively navigate challenges and capitalise on opportunities. These hypotheses serve as a guiding framework for the research and provide a foundation for investigating the interplay between integrated digital leadership, resilient entrepreneurship,

and Metaverse sustainability. The hypotheses stated serve as the foundation for the research and guide the investigation of these relationships.

Integration is a key enabler of sustainable businesses and involves bringing together the different elements of a business model – technology, people, processes, and culture – to create a cohesive and resilient whole. It also enables businesses to respond to changing circumstances quickly and effectively, and to pivot their strategies in response to emerging trends and opportunities.

To build sustainable businesses in the Metaverse, business leaders and entrepreneurs must adopt a number of key strategies. These strategies include developing a deep understanding of the technologies and trends that are shaping the Metaverse, to build strong networks and partnerships, to foster a culture of innovation and experimentation, and to develop strategies that are agile and adaptable.

The paper aims to explore the ways in which digital leadership and resilient entrepreneurship can work in the Metaverse, and how this can benefit businesses and individuals alike. By investigating these relationships, the paper aims to provide insights and practical implications for entrepreneurs, business leaders, and stakeholders in the Metaverse. It seeks to identify strategies and approaches that enhance sustainability and enable businesses to thrive in this emerging digital space, and to shed light on the complex dynamics of Metaverse sustainability and provide insights that can inform business leaders, entrepreneurs, and stakeholders in their efforts to build and sustain successful businesses in this digital domain.

This paper also explores several key aspects related to the emergence of the Metaverse in the digital age. It surveys into the role of digital leadership and resilient entrepreneurship in achieving Metaverse sustainability. The paper examines the essential elements that can contribute to this sustainability and explores strategies to integrate these elements effectively.

2. Problem Statement

The Metaverse concept refers to a virtual universe or an interconnected network of immersive digital spaces where individuals can engage in various forms of social interaction, commerce, and entertainment. While the Metaverse has been the subject of science fiction for decades, recent advances in technology have brought it closer to reality.

The term "Metaverse" was popularised by Neal Stephenson in his 1992 science fiction novel "Snow Crash," describing a virtual reality-based successor to the Internet. Since then, the concept has received significant attention and has become a focal point for researchers, technologists, and entrepreneurs. In its envisioned form, the Metaverse is a vast and persistent virtual realm, accessible through various devices and platforms, such as virtual reality headsets, augmented reality glasses, or standard computers and smartphones.

Users can create personalised avatars to represent themselves and navigate through diverse virtual environments that range from lifelike simulations of the real world to fantastical realms limited only by imagination. The Metaverse aims to

provide immersive and interactive experiences, allowing users to engage in real-time social interactions, attend virtual events, explore virtual spaces, and participate in collaborative activities. It allows users to create their avatars and explore different resources on digital platforms (Buhalis et al., 2023).

Metaverse is a new type of Internet application and social form that integrates a variety of new technologies (Ning et al., 2021). The emergence of the Metaverse has presented new challenges and opportunities for building sustainable businesses in the digital age. In order to succeed in this new landscape, an integrated approach to digital leadership and resilient entrepreneurship is essential (Pavlou et al., 2021). As technology continues to play a dynamic role in promoting sustainable entrepreneurship, it is crucial to explore the key challenges and opportunities in this area (Ali et al., 2021). This includes understanding the role of digital technology in promoting sustainable business practices and the importance of incorporating both digital and traditional strategies into sustainability approaches (van der Leeuw, Soylu, 2021).

The Metaverse presents unique opportunities for sustainable entrepreneurship, but also raises important ethical and social questions that must be addressed (Arvidsson, Caliandro, 2021). Building sustainable business models in the metaverse requires a comprehensive understanding of the potential benefits and risks, as well as the ability to navigate complex ethical and social issues. This includes addressing concerns about data privacy, security, and the potential for digital exclusion (Pavlou et al., 2021). Overall, the literature suggests that building sustainable businesses in the age of the Metaverse requires a complete approach that integrates digital leadership, resilient entrepreneurship, and sustainability strategies.

By leveraging the potential of digital technology while also addressing important ethical and social issues, businesses can create sustainable and successful models for the future. As this area of research continues to evolve, it is likely that additional publications will emerge that offer further insights and perspectives on this important topic. For the literature review on the topic of the paper, the sources of information were gathered from Academic Databases, Google Scholar, and Industry Reports and Publications. Also, the use of a combination of relevant keywords to search for literature helped find relevant information. The inclusion criteria included studies that meet the following criteria's: published within a recent timeframe (typically within the past 5-10 years) to capture the latest developments in the field, that were relevant to the topic of the paper, and also information from conference papers and industry reports. The exclusion criteria were for studies or information that was outdated or not aligned with recent trends and advancements in the Metaverse and digital transformation, and that lack credibility or come from unreliable sources or do not contribute substantially to the research topic.

Digital transformation is a complex and multifaceted process that involves leveraging digital technologies to drive organisational change and improve business performance. It encompasses the integration of digital technologies into various aspects of an organisation's operations, strategies, and customer experiences.

As the pressure for environmental responsibility increases, firms can adopt advanced technologies such as artificial intelligence (AI), machine learning (ML), predictive analytics, and the Internet of Things (IoT) to achieve sustainability goals (Ávila-Gutiérrez et al., 2020). These technologies enable organisations to collect, analyse, and leverage data for better decision-making, automate processes, and create personalised experiences. The benefits of digital transformation are significant. It enhances operational efficiency, reduces costs, and improves productivity. By leveraging digital tools and data-driven insights, organisations can make more informed and timely decisions, respond to market changes quickly, and foster innovation.

Digital leadership refers to the ability to lead in a rapidly changing digital environment, and to use digital assets of an organisation to achieve business goals at individual level and also at organisational one (Dimitrios et al., 2013). In the Metaverse, digital leadership will be the key to creating a successful business. Business leaders will need to have a strong understanding of the technologies that power the Metaverse, including virtual and augmented reality, artificial intelligence, and blockchain. They will also need to understand the ways in which users interact with each other in virtual spaces, and how to create engaging experiences that keep users coming back in order to help the organisations move forward with the transition (Frank et al., 2019).

Resilient entrepreneurship refers to the ability to adapt to and overcome challenges in the face of adversity (Liu et al., 2021). In the Metaverse, resilient entrepreneurship will be crucial for businesses to survive and thrive. The Metaverse is a rapidly evolving space, and businesses will need to be able to adapt to changes in technology and user behaviour to succeed. This requires a willingness to experiment and take risks, as well as a strong sense of resilience in the face of setbacks.

There are several ways in which digital leadership and resilient entrepreneurship can work together in the Metaverse (Tsai et al., 2021). One key area is in the development of virtual goods and services. In the Metaverse, businesses will be able to create and sell virtual products, such as clothing, accessories, and even virtual real estate. Digital leaders will be able to use their knowledge of technology to create engaging and innovative virtual products, while resilient entrepreneurs will be able to adapt quickly to changes in user demand and market trends. Another key area is in the creation of virtual experiences. The Metaverse provides a unique opportunity to create immersive and engaging experiences that can be accessed from anywhere in the world. Digital leaders can use their understanding of technology to create innovative virtual experiences, while resilient entrepreneurs can quickly adapt to changes in user demand and market trends.

Overall, the Metaverse presents a unique opportunity for businesses and individuals to explore new and innovative ways of creating value. Digital leadership is a fast, cross-hierarchical, team-oriented, and cooperative approach, with a strong focus on innovation (Oberer et al., 2018). Digital leadership and resilient entrepreneurship will be the key to unlocking the full potential of the Metaverse,

and businesses that are able to successfully navigate this new landscape will be well-positioned for success in the years to come.

3. Research Questions

What are the key elements of digital leadership and resilient entrepreneurship in building sustainable businesses in the Metaverse?

The Metaverse presents a unique set of challenges and opportunities for entrepreneurs looking to build sustainable businesses. As such, digital leadership and resilient entrepreneurship play a critical role in creating successful business models in the Metaverse. Based on the case study analysis, the key elements of digital leadership and resilient entrepreneurship in building sustainable businesses in the Metaverse are based on clear vision and strategy. Clear vision and strategy are essential for building sustainable businesses in the Metaverse. Successful businesses in the Metaverse have a clear understanding of their target audience and their needs, and align their strategy with their vision to deliver value to their users.

A deep understanding of the target audience, the customer focus, and their needs is critical to creating successful businesses in the Metaverse. Successful businesses have a user-centric approach to product development, engagement, and customer service. Another key element is the use of emerging technologies, such as blockchain, VR, and AI, that play a crucial role in creating immersive and engaging experiences for users in the Metaverse. Businesses leverage emerging technologies to create unique experiences that resonate with their target audience. Digital leadership and resilient entrepreneurship are essential to create sustainable businesses in the Metaverse. Digital leadership drives innovation, collaboration, and agility, while resilient entrepreneurship helps businesses navigate uncertainty, adapt to changes in the market, and overcome setbacks.

How can these elements be integrated to create a successful business model in the Metaverse?

To create a successful business model in the Metaverse, it is essential to integrate the key elements of digital leadership and resilient entrepreneurship. The integration of these key elements can be achieved through some strategies. One is to foster a culture of digital leadership that encourages innovation, collaboration, and agility, and develop a mindset of resilient entrepreneurship that helps the business navigate uncertainty and adapt to changes in the market.

Creating a clear vision and strategy that aligns with the needs of the target audience, and is focused on delivering value to the users, in another strategy. By developing a deep understanding of the target audience and their needs, and using this understanding to create user-centric products, unique and engaging experiences for users that are not possible in the physical world, engagement, and customer service is maybe the best strategy. The integration of these key elements will help create a successful business model in the Metaverse. However, it is important to note that the Metaverse is a rapidly evolving space, and businesses must remain agile and adaptable to succeed. Continuous innovation and collaboration, customer feedback, and data analysis are critical for building sustainable businesses in the Metaverse.

4. Research Methods

The research methods used in this study included a combination of literature review and case studies. The literature review provided a broad understanding of the current state of research on the topic of Metaverse sustainability and entrepreneurship. It also helped to identify key themes, concepts, and trends related to the subject matter.

On the topic of digital leadership, the empirical model that was used in order to gain a comprehensive understanding of this subject was collecting unstructured texts for sentiment analysis and text analysis. The collection of unstructured texts, such as online discussions, articles, or social media posts, provided a rich source of qualitative data. In the context of the case studies presented in the paper, researchers can employ sentiment analysis or text analysis techniques to reveal hidden themes, sentiments, and patterns embedded within textual data. This analytical approach has facilitated a more profound investigation into the particulars and contextual comprehension of digital leadership, enabling the capture of diverse perspectives and experiences. It also allowed for a nuanced examination of the contextual details surrounding digital leadership, considering a variety of perspectives and experiences.

By systematically analysing the textual data, researchers can gain valuable insight into the various nature of digital leadership and its implications within the specific case study environment. The case studies involved an analysis of companies that had successfully implemented Metaverse technology with the help of digital leadership and resilient entrepreneurship, during the examination period that took place in Bucharest, over a period of one month. During that period, the companies were closely monitored and evaluated to determine the effectiveness of their strategies and practices in achieving Metaverse sustainability and resilience. The data was collected from a variety of sources, online information, and also company statements.

The sample for the case studies included three companies that had successfully implemented Metaverse technology with the help of digital leadership and resilient entrepreneurship, and for which case studies were found. News and media coverage and also companies' websites and reports were sources of information. The companies were selected based on their reputation for sustainability and innovation, as well as their success in implementing Metaverse technology.

5. Findings

5.1 The Sandbox is a virtual world that allows users to create and monetise their content through the use of blockchain technology. The company has implemented sustainability measures through the use of renewable energy sources to power its servers and by reducing the carbon footprint of its operations. The Sandbox has also implemented a decentralised governance system that allows users to collectively make decisions about the development of the platform, ensuring that the community's needs are met, and has also implemented a user-driven economy that

allows users to earn and spend virtual currency in the platform, creating a sustainable ecosystem that supports the growth of the platform.

Integrated Digital Leadership has been essential in The Sandbox's success by providing strategic guidance and direction for the platform. The company has leveraged digital leadership strategies such as crowdsourcing and user-generated content to drive innovation and growth. For example, The Sandbox has launched several contests and challenges, such as the Game Jam, which invites users to create their own games using the platform's tools and resources. These contests not only encourage user engagement but also provide valuable insights into user preferences and behaviour, which can be used to improve the platform. The platform has gained popularity due to its user-driven economy, where users can create and sell their own virtual assets, such as land, characters, and in-game items. Additionally, The Sandbox has demonstrated its commitment to sustainability by implementing blockchain technology, which provides a secure and transparent way to track transactions and prevent fraud. The platform also uses renewable energy sources to power its servers, reducing its carbon footprint and contributing to a more sustainable Metaverse.

Integrated Digital Leadership has played a critical role in The Sandbox's success by providing strategic guidance and direction for the platform. The company has leveraged digital tools and strategies to drive innovation, inclusion, sustainability, and growth, making it a successful and sustainable business in the Metaverse.

5.2 Facebook has announced its plans to build a Metaverse that is sustainable, inclusive, and equitable. The company has demonstrated its commitment to sustainability by pledging to reach net-zero emissions across its supply chain by 2030 and by investing in renewable energy sources to power its data centers. Facebook has also implemented a user-driven economy that allows creators to monetise their content and earn a living through the platform, creating a sustainable ecosystem that supports the growth of the Metaverse.

The company has implemented a decentralised governance system that allows users to collectively make decisions about the development of the platform, ensuring that the community's needs are met. Facebook has leveraged digital leadership strategies such as user engagement, innovation, and strategic partnerships to drive the growth and adoption of its Metaverse platforms. One of the key ways Facebook has leveraged Integrated Digital Leadership is by building a robust ecosystem of developers and creators around its platforms. For example, Facebook has created tools and resources, such as the Horizon Workrooms, which enable creators to build and share their own virtual reality experiences on the platform. This approach has enabled users to create and share their own content, driving engagement and growth on the platform.

Moreover, Facebook has also demonstrated its commitment to sustainability in the Metaverse by investing in renewable energy and reducing its carbon footprint. Additionally, Facebook has made several strategic partnerships to expand its Metaverse offerings, such as its partnership with Ray-Ban to create smart glasses for

AR and VR experiences. This approach has enabled Facebook to expand its reach and provide users with new and innovative ways to experience the Metaverse.

5.3 Some companies in the energy industry are beginning to explore the potential applications of the Metaverse for their operations and customer engagement.

E.ON, a leading energy company, has implemented virtual reality (VR) technology as part of its strategy for stakeholder engagement. E.ON has utilised VR to provide immersive and interactive experiences for stakeholders, including investors, policymakers, and the general public. One of the key applications of VR for E.ON is in showcasing their renewable energy projects. Through virtual tours and interactive experiences, E.ON allows stakeholders to virtually visit and explore their wind farms, solar installations, and other sustainable energy projects. These VR experiences provide a unique opportunity for stakeholders to witness the scale, functionality, and environmental benefits of renewable energy first-hand.

By immersing stakeholders in a virtual environment, E.ON can effectively communicate the significance of its sustainable energy initiatives. The interactive nature of VR enables users to engage with the virtual environment, learn about the technologies employed, and understand the positive impact on reducing carbon emissions and combating climate change. This helps to build support and generate enthusiasm for E.ON's renewable energy projects. Furthermore, VR allows E.ON to overcome physical barriers and reach a broader audience. Stakeholders from around the world can access the VR experiences remotely, eliminating the need for travel and making it more accessible for individuals who may not have the opportunity to visit the actual energy facilities.

This inclusivity enables E.ON to engage with a wider range of stakeholders and foster a sense of global collaboration in the transition to sustainable energy. By adopting VR as a tool for stakeholder engagement, E.ON showcases their forward-thinking approach and willingness to embrace emerging technologies. They demonstrate a keen understanding of the evolving digital landscape and the importance of leveraging immersive experiences to connect with stakeholders. E.ON can leverage data from VR experiences to gain insights into stakeholder preferences, interests, and concerns. This data-driven approach enables them to tailor their messaging and engagement strategies, ensuring that they effectively communicate the value and impact of their renewable energy projects.

E.ON's digital leadership, combined with the implementation of VR for stakeholder engagement, positions them as a progressive and customer-centric organisation. Through its digital leadership, E.ON sets an example for other companies in the energy industry to embrace innovative strategies that drive stakeholder engagement and contribute to a sustainable energy future. E.ON's implementation of virtual reality (VR) for stakeholder engagement exemplifies its resilient entrepreneurship in the energy industry.

Resilient entrepreneurship refers to the ability of an organisation to adapt, innovate, and seize opportunities in the face of challenges or changing market conditions. By embracing VR technology, E.ON demonstrates its entrepreneurial

mindset and willingness to explore new avenues for stakeholder engagement. They recognise the importance of staying ahead of the curve and leveraging innovative solutions to connect with stakeholders in a rapidly evolving digital landscape. Resilient entrepreneurship also involves taking calculated risks and seizing opportunities. E.ON's adoption of VR for stakeholder engagement showcases their proactive approach to staying at the forefront of industry trends. By investing in VR, they position themselves as pioneers in the energy sector, leveraging cutting-edge technology to enhance communication, build relationships, and drive support for their renewable energy projects.

6. Conclusion

In conclusion, The Sandbox, Facebook, and E.ON are examples of companies that have successfully implemented Metaverse. These companies have leveraged digital technologies and platforms to create immersive and engaging virtual worlds, while also fostering creativity, inclusivity, and sustainability. All three companies have demonstrated a commitment to Digital Leadership and Resilient Entrepreneurship by embracing emerging technologies, building diverse and inclusive ecosystems, and prioritising sustainability in their operations.

The paper sheds light on the key elements and strategies that can help businesses succeed in this emerging digital space. It emphasises the need for a comprehensive approach that considers both technological advances and social and ethical implications. It provides practical insights and implications that can guide entrepreneurs, business leaders, and stakeholders in their efforts to navigate the Metaverse and create sustainable business models.

The findings of this paper highlight the importance of sustainability, community-driven decision-making, and social impact in the Metaverse. Companies like The Sandbox and Facebook have demonstrated the successful implementation of these principles in their virtual worlds. By integrating renewable energy sources, implementing user-driven economies, and partnering with environmental organisations, these companies have shown how sustainability can be prioritised in the Metaverse. Additionally, the adoption of decentralised governance systems and strategic digital leadership strategies has empowered users and driven innovation and growth. These findings provide valuable insights for other companies and academic researchers interested in implementing and studying the Metaverse.

The study also reveals the potential applications of the Metaverse in industries beyond gaming and social media, such as the energy sector. Companies like E.ON have leveraged virtual reality (VR) technology to engage stakeholders and showcase their renewable energy projects. By providing immersive and interactive VR experiences, E.ON has effectively communicated the significance of sustainable energy initiatives, overcoming physical barriers, and reaching a broader audience. This innovative approach demonstrates the importance of forward-thinking digital leadership, data-driven strategies, and resilient entrepreneurship in embracing emerging technologies and driving stakeholder engagement. These findings open up new possibilities for other companies in the energy industry to explore the use of the

Metaverse for communication, education, and building support for sustainable energy initiatives.

As a limitation to the study, the paper relies heavily on theoretical frameworks and case studies based on information provided by the companies analysed. There is a limited amount of empirical evidence provided to support the conclusions. In summary, the study provides strategic insights, helps understand Metaverse dynamics, mitigates risks, leverages technological advancements, addresses ethical considerations, and inspires innovation. By leveraging the knowledge and findings from this study, companies can position themselves for success in the Metaverse and capitalise on the opportunities it presents. For the academic field, it advances knowledge, provides research opportunities, promotes interdisciplinary collaboration, serves as an educational resource, addresses policy and governance considerations, and points to future directions.

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The Impact of Media Politicisation on Media Trust in Romania

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Abstract

The decline in public trust in the media is causing concern in many societies on the world map. In modern democracies, trust in the press is an essential element of political communication, people's perceptions of the political sphere being most often mediated and influenced by the information provided by mass media. In this paper, the authors analyse the impact on media politicisation on media trust using a binomial regression with data collected from the Eurobarometer 96. The main conclusion of the article is that Romanians' trust in political parties has been and remains at low levels, not exceeding 20 % over the last two decades.

Keywords: mass media, public trust, politicisation, impact.

JEL Classification: L82, D72.

1. Introduction

Trust plays an essential role in many human interactions and is a key ingredient of social life (Uslaner, 2002). In communities where there is a high level of trust, people are more likely to cooperate, and this in turn generates more trust (Putnam et al., 1993). At the individual level, trust relationships involve the interaction of at least two parties: one who invests trust and the other who receives this trust (Tsfati et al., 2003). Each party's past experiences shape trust relationships, leading to certain expectations and assessments of the other party's future behaviour (Vanacker, Belmas, 2009). However, the intentions of the other actors cannot be fully known, which implies a certain level of risk and uncertainty in social relationships (Tsfati, 2010).

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Trust becomes essential precisely in situations where it is difficult to verify the intentions of others and their behaviour cannot be controlled. It reduces social complexity by generalising positive expectations of the trusting party about the future actions of other actors (Tranter, Booth, 2019). Given the uncertainty inherent in social relationships, trusting means accepting a vulnerability on the part of the trusting party, who expects to gain rather than lose from the interaction with the other party (Coleman, 1990). In terms of trusting the media, the public accepts a vulnerability and takes a risk when it decides to expose itself to media messages. In general, they can neither verify the veracity of news content, nor know whether journalists adhere to ethical rules (Tully et al., 2020). Such situations abound in our relationship with the media. Often issues reported by media cannot be assessed directly, based on personal experience, and trust becomes the key factor for the public to accept information provided by media as accurate (Kohring, Matthews, 2007). For this paper, trust in the media is the willingness of individuals to be vulnerable to content provided through mass media channels, based on the expectation that the media will operate in a satisfactory manner (Fawzi, 2019).

Trust in the media is part of the broader category of public perceptions of mass media (Helberger, 2019). Perceptions of the media can manifest themselves at different levels: the media as a whole; different communication channels such as television, print, or the Internet; media organisations; types and genres of media content; specific media messages (McLeod et al., 2017). This study focuses on trust in media understood as the public's perception of traditional (TV, radio, print) and alternative (Internet and online social media) communication channels.

2. Modelling the Trust in Media

An important role in shaping perceptions of the media is played by several psychological processes that can tip the balance between trusting and distrusting the media. Perceptual selectivity is a mechanism by which individuals develop a biased attitude towards the media according to their own predispositions, stereotypes, or prejudices. According to the perceptual selectivity thesis, people are more likely to trust information channels that confirm their own biases. On the other hand, they trust less media that provide information that conflicts with their own views. One of the main sources of differentiation between those who trust the media and those who do not trust them is political partisanship, understood as the predisposition of individuals to feel close to and trust a political party. Bias helps individuals guide their attitudes and behaviour according to a simplified grid of reality assessment (Dalton, 2016). Thus, perceptions of media credibility and exposure to different news channels vary according to individuals' partisan and ideological orientations (Cappella et al., 2011).

The relationship between trust, politicisation, and media consumption: theories and hypotheses.

The political sphere can interact with the media system by affecting citizens' assessments of media credibility. For this reason, several studies place trust in the media within the broader framework of public trust in political institutions. This

approach is based on the premise that trust in the media does not occur in isolation. It is formed in a social and political context and is closely linked to public perceptions of other institutions. In other words, the media tends to take the shape and colour of the social and political structures within which it operates. Two main theses dominate the debate on the interactions between media and politics: the mediatisation of politics and the politicisation of media. The mediatisation of politics thesis supports the idea of the centrality of the media in modern democratic processes.

Media primacy reshapes the mechanisms and rules of operation of the political sphere. Political actors are forced to adopt media logics to communicate effectively with wider audiences and to be successful in their actions, thus becoming dependent on the media. Media politicisation emphasises instead the intertwining of the political environment with modern mass communication systems. Some authors even speak of a colonisation of the media by political parties and the transformation of the media into instruments of political propaganda. This phenomenon is more prominent in the polarised-pluralist or Mediterranean model of the media, which has been identified by Hallin et al. (2023) in countries such as Italy, Greece, Spain, Portugal, and France. The Mediterranean model also describes relatively well the media systems of Central and Eastern European countries.

A study by Active Watch showed that in 2014, around 40 % of TV stations were politically affiliated through their owners or directors". The politicisation of the media is also manifesting itself in the extension of divisions and conflict lines from the political realm into the media space.

The polarisation of the public along party lines has implications not only for the functioning of media organisations but also for perceptions of the media. When different media take overtly partisan positions and become direct combatants in political competition, it will be easier for the public to identify connections between media channels and parties. Based on the mechanisms of selective perception discussed above, some individuals will project their trust, and others their distrust of political parties onto the media instrumentalised by them. Therefore, we formulate Hypothesis 1 on media politicisation: Individuals who trust political parties tend to trust the media more than those who do not trust parties. However, it is very likely that not all media channels are equally politicised. Traditional media (TV, print, and radio) may be perceived by the public as being to a greater extent controlled by politicians. Pressure from politicians may focus on television, which is the main source of information about politics for most Romanians.

Hallin et al. (2023) also argue that the prevalence of television over print media in southern European countries is closely linked to a higher level of politicisation of television. It is subject to strong control and greater influence by political organisations that use or try to use this channel to satisfy their interests. On the other hand, the use of the Internet and online social networks segmented audiences, multiplying and diversifying the patterns of media use for political information. Aligning audiences along partisan lines seems more difficult in the context of a much greater diversity of online information sources. This could leave alternative media

freer from political constraints than traditional media. Therefore, we formulate Hypothesis 2 on the differential politicisation of traditional and alternative media. Trust in political parties is more strongly associated with trust in traditional media (TV, radio, print media) than with trust in alternative media (Internet, online social networks).

3. Research Methods

For a detailed examination of the structural dimensions of public trust in the media, we used exploratory factor analysis on Eurobarometer 96 data collected in November 2021.

3.1 Dependent Variable

Eurobarometer 96 measures public trust in different media with the following question (QA8a): I would like to ask you a question about how much trust you have in certain institutions and the media. For each of the following institutions and types of media, please tell me whether you tend to trust them or tend not to trust them: 1. Print media; 2. Television; 4. Internet; 5. Online social networks? We recoded the responses for each of the five media types into dichotomous variables with the following values: '1' for respondents who tend to trust and '0' for the other response options. To check the structural dimensions of public trust in media, we used exploratory factor analysis (principal components and Varimax rotation method). The analysis revealed two factors, corresponding to the two dimensions of public trust in traditional and alternative media. After rotation, the first factor covers approximately 48 % of the variance and the second factor 34 % of the variance. Table 1 presents the items and factor loadings for the rotated factors, loadings less than 0.40 are excluded from the presentation for clarity. The first dimension, bringing together traditional media, is more strongly saturated by the first 3 items: print media, radio, and television. The second dimension, alternative media, is composed of two items: Internet and online social networks. Based on these two dimensions, it is expected that the motivations for trusting or distrusting traditional and alternative media are also different.

Table 1. The items and factor loadings for the rotated factors

Items	Factorial saturation		Communalities
	Traditional media	Alternative media	
Newspaper	0.802		0.702
Radio	0.798		0.745
TV	0.802		0.698
Internet		0.821	0.803
Online social media		0.885	0.811
Eigenvalue	2.11	1.89	
Variance (%)	48%	34.09%	

Source: Own computations.

3.2 Independent Variables

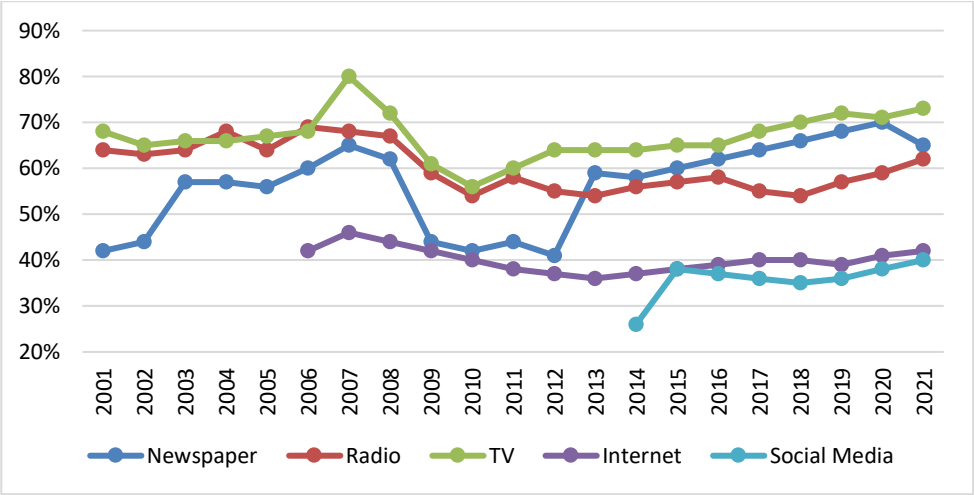
The main explanatory variable is trust in political parties, which is used to highlight media politicisation along party lines. We recorded responses to question QA8a-10 in Eurobarometer 96 with '1' if respondents said they tended to trust parties and '0' for the other response options. Media consumption is the second important explanatory factor, measured by the frequency of use of different media. We recoded the responses to QE3_1-5 on the frequency of use of different media on a scale of 12 0 to 5 as follows: 0 = "not at all"; 1 = "very rarely"; 2 = "2-3 times a month"; 3 = "once a week"; 4 = "2-3 times a week"; 5 = "daily or almost daily". We applied exploratory factor analysis on these recoded variables, and three separate factors of media consumption resulted: television consumption; radio and print media consumption; Internet and online social networking consumption. Therefore, we constructed two additional scales with values from 0 to 5: a print and radio consumption scale (Cronbach's Alpha = 0.653) and an Internet and online social networking consumption scale (Cronbach's Alpha = 0.958).

4. Findings

The first part of the results illustrates the evolution of Romanians' trust ratings in different media (Figure 1). Romanians' trust rates in traditional and alternative media are close to the average trust rates recorded in the European Union. Like other Europeans, the Romanian public tends to trust traditional media more than alternative media. The diachronic series of data presented in Figure 1 shows that television leads the top of trust, with an average trust rate of 64 % over the 2001-2021 period. It is closely followed by radio, with an average trust level of 60 %. Trust in print media is on average 10-15 percentage points lower than trust in radio and television, respectively. On the other hand, alternative media have lower trust ratings: on average only 40 % of respondents trust the internet and around 30 % trust online social networks. The lower public trust in alternative media could also be due to a significant part of the adult population in Romania either does not have access to or does not know how to use the Internet and the online environment in general. The protection of confidentiality of the personal data, as well as the accuracy of the information that needs to be checked, are factors that could also influence the credibility of the alternative channels that could be considered in further research. In a previous survey, we showed that almost half of the respondents to the November 2017 Eurobarometer 86.2 did not use the Internet at all or used it only very rarely.

These data confirm the hypothesis of media politicisation along partisan lines (Hypothesis 1), with the strongest effects in television, followed by print media. On the other hand, trust in parties has weaker effects on trust in alternative media (Internet and online social networks) compared to traditional media, and this confirms the hypothesis of stronger politicisation of traditional media (Hypothesis 2).

Figure 1. The dynamics of the people trust in the media, between 2001-2021



Note: The date represents the percentages of the respondents who declared that they trust the respective channels.
Source: Own computations based on data retrieved from the Eurobarometer 96.

Trust in traditional media fluctuates significantly between 2001 and 2017. The data in Figure 1 suggest three trends in the evolution of public trust in the media: maintaining trust at relatively high levels (2001-2007), a sharp loss of credibility (2008-2010), and stabilisation of trust at a lower level (2011- 2017). From 2001 to 2007, trust in print media increases significantly from 44 % to 68 %, approaching the trust rates in radio and television, which remained at a relatively high level throughout this period. In fact, 2007 represents a peak in trust for all three types of traditional media. The period 2008-2010 is marked by significant decreases in media credibility: trust in television drops from 80 % in 2007 to 54 % in 2010, trust in radio from 72 % to 50 %, and trust in print media declines from 68 % to 42 %. After 2011, trust in traditional media tends to stabilise, but at around 15 percentage points lower than between 2001 and 2007.

What explains the sharp drop in trust in traditional media between 2008 and 2010? Institutional and cultural theories dominate the debate on the erosion of trust in institutions in general and are also applicable to the decline in trust in the media. On the one hand, cultural theories argue that trust in institutions has exogenous causes, being rather an extension of social trust that is acquired from an early age and then projected onto public institutions. Cultural explanations are supported by a number of studies showing that individuals tend to trust the media more when they trust other people.

According to cultural explanations, the erosion of trust in the traditional media in Romania is driven by a decline in social trust, amid the deterioration of people's material resources during the economic crisis (2008-2010). On the other hand, institutional theories argue that trust has endogenous causes, depending on

institutional performance. Therefore, the erosion of trust in the media is seen because of the degradation of media services and content.

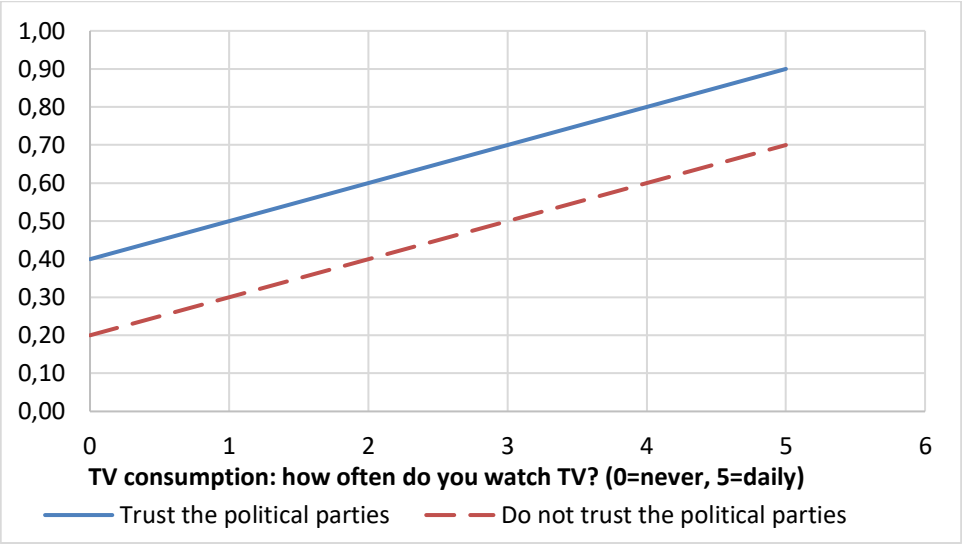
According to institutional explanations, the decline of trust in traditional media in Romania during the economic crisis is due to factors such as the decline in the quality of content and the de-professionalisation of the media in the context of the collapse of the media market. At the same time, there is a growing public perception that the media are deeply flawed and increasingly dependent on the political sphere, amidst the drastic decrease of resources available in the economy. The dependence on funding from politically controlled money has favoured the transformation of the media into instruments of partisan propaganda.

The close links between the media and political parties became evident to the public when various media organisations became directly involved in electoral competition from overtly partisan positions. The economic crisis overlapped with a busy election cycle: local and general elections took place in 2008, and in 2009 the European parliamentary and presidential elections. In this election cycle, the media "stepped out of their positions as supporters of one candidate or another and became active participants in the electoral competition (TVs were fighting with other TVs, journalists with other journalists). The public, as polarised as the media, blamed this conduct". By taking a direct part in the political competition, the media became the target of virulent rhetorical attacks from opposing political elites, which further polarised public perceptions of the media, undermining trust. These developments confirm that trust in the media is formed in a social and political context and is closely related to public perceptions of other institutions. The erosion of trust in the traditional media in Romania is part of a broader syndrome of declining public trust in political institutions during the economic crisis.

The above analysis aimed to show the interdependencies between trust in the media and trust in political parties, on the one hand, and how media consumption influences public perceptions of the credibility of different types of information channels, on the other. In public perception, there are close links especially between traditional media and the political sphere. Those who trust political parties tend to trust the media more than those who do not trust parties. These results confirm that an important manifestation of media politicisation is the differentiation of public trust in the media along partisan lines. However, not all media are equally affected by this trend.

Television is the most politicised channel and, therefore, it is here that the differences in trust between partisans and non-partisans are most clearly seen. Figure 2 graphically confirms the hypothesis of the politicisation of television in terms of public perceptions and trust (Hypothesis 1). People with partisan predispositions (those who trust the parties) are more than 20 percentage points (0.20 on a scale from 0 to 1) more likely to trust television than those who do not trust the parties, controlling for the effect of other factors. The two oblique lines in Figure 2 run almost parallel, which illustrates that the difference between trust levels of partisans and non-partisans holds for both those who do not watch TV at all and the 86.6 % who watch TV daily or almost daily.

Figure 2. Trust in television as a function of trust in parties and media consumption



Note: The graph shows the probability of trusting the TV, controlling for the effect of the other predictors (independent variables) included in Table 1.
Source: Graph developed by the author based on the analysis of Eurobarometer 96 data.

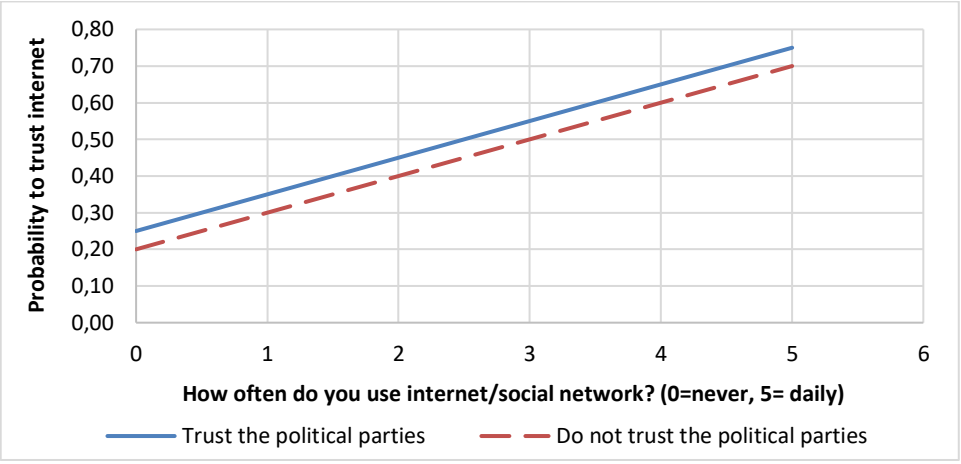
On the other hand, the probability of trusting television increases with the frequency of individuals' exposure to TV content. This relationship manifests itself both in the case of those who trust and in the case of those who do not trust the parties. However, those who do not trust the parties cross the threshold of the 0.5 probability of trusting television (dotted horizontal line) only if they watch TV daily or almost daily. On the other side, those who trust the parties pass the probability threshold of 0.5 even if they only watch TV 2-3 times a month. In this case, individuals seem to extrapolate trust in parties to television, even if they watch very rarely TV stations. Several studies find that party identification provides powerful cues in guiding people's attitudes and behaviour. In the case of the partisans from our sample, trust in parties seems to provide them with sufficient cues for evaluation the credibility of television, even in the situation where the personal experience acquired through direct exposure to TV channels is minimal.

Partisanship has much less effect in influencing perceptions of trust in alternative media (Internet and online social networks). Figure 3 shows the fact that the differences between the probabilities of partisans and non-partisans to trust the Internet (the two almost parallel diagonal lines) are about 10 percentage points (0.1 on a scale of 0 to 1). Therefore, trust in parties has a double effect on trust in television, compared to that on trust in the Internet, which confirms Hypothesis 2 of less politicisation of alternative media in public perception.

The analysis of the data in Table 1 shows that the use of online sources does not erode in a statistically significant trust in television and radio but only in print media. In general, the use of a certain medium of communication tends to strengthen trust

in that environment and affects trust less in other mediums. Furthermore, the effect of using online media on Internet trust is with about 10 percentage points (0.1 on a scale of 0 to 1) greater than the effect consumption of TV programs on trust in television. In conclusion, the interdependence between consumption and trust is stronger in the case of alternative media, while the interdependence of partisanship and trust is stronger in traditional environments.

Figure 3. Trust in the Internet as a function of trust in parties and media consumption



Note: The graph shows the probability of trusting the Internet by the level of media consumption and the party trust, controlling for the effect of the other predictors (independent variables) included in Table 1.

Source: Graph developed by the author based on the analysis of Eurobarometer 96 data.

Figure 3 shows that the differences between partisan and non-partisan probabilities of trusting the Internet (the two almost parallel oblique lines) are about 10 percentage points (0.1 on a scale of 0 to 1). Therefore, trust in parties has twice the effect on trust in television than on trust on the Internet, confirming Hypothesis 2 of less politicisation of alternative media in public perception.

5. Conclusions

Taking the literature on media trust as a starting point, this study aimed to answer the question: to what extent is individuals' trust in different types of media in Romania differentiated along party political lines and according to the consumption patterns of the population?

Second, the paper revealed an interdependence between trust, partisanship, and individual-level media consumption patterns. An important manifestation of media politicisation is the differentiation of public trust in the media along partisan lines. Those who trust political parties tend to trust the media more. The relationships between partisan bias and trust in the media are stronger for television and print than for online. Media consumption patterns seem to reinforce the link between

Romanians' trust in parties and media. Nevertheless, the development of the regulatory framework in the digital media may change the patterns in the future and that could be the object of further research studies.

The more often the media consumers are exposed to a particular type of media, the more they tend to trust that source of information. Exposure is, however, selective to those sources of information that tend to confirm their own criticisms. Therefore, the increased politicisation of the media and selective exposure further polarises the public along partisan lines of conflict.

These results have several practical, theoretical, and normative implications. At the practical level, the interdependence between consumption patterns, trust in political parties, and the media has ambivalent consequences. On the one hand, the consumption of partisan media content reinforces the political beliefs of audiences who trust political parties. In addition, exposure to information sources that confirm and reinforce partisan predispositions contributes to better electoral mobilisation of political party supporters. On the other hand, Romanians' trust in political parties has been and remains at low levels, not exceeding 20 % over the last two decades. Therefore, the affiliation of some media with parties, even if it builds loyalty among the hard core of the partisan public, risks damaging the reputation and credibility of these information channels in the eyes of the wider non-partisan public.

Moreover, most people watch only one TV channel, the main source of information in Romania, and "do not cross-check the information as the exercise of critical thinking requires". The heightened politicisation of the media and selective exposure therefore further polarises the public along partisan lines of conflict.

At the normative level, excessive politicisation of the media can undermine the "watchdog of democracy" function that political theory attributes to the press. The less the media system is constrained by political or economic pressures, the closer it is to the democratic ideal of an autonomous and professional press. On the other hand, a politically controlled media agenda takes second place to the public interest and the public's right to accurate information. Democracy, to function optimally, requires accurate information provided by the media, based on which citizens can assess the political sphere and make informed decisions. Trust is essential for the political communication processes in a democracy. However, as the results of this study show, trust in the media is often closely related to trust in political parties. For the non-partisan public, the close links between media and politics can undermine trust in the media, which is perceived as serving the interests of politicians rather than the public interest. Such perceptions can generate anti-elitist sentiments that can spread throughout society, providing fertile ground for the development of populist movements. Populist discourse deliberately constructs an antagonistic relationship between 'the people' and the 'corrupt elite' in which the press is interpreted as an essentially elitist institution. However, it should be noted that trust in the media is not a panacea. The decline in trust can also be interpreted as an increase in the critical sense of the media consumer who feels the need for accurate information in a public space "parasitised by fake news, propaganda, and PR material that will be recognised as journalism". From this point of view, excessive reliance on the media can be as

undesirable from a normative point of view as acute distrust of the press. Democracy seems to be based on a balance between citizens' trust and their critical attitudes toward both political institutions and the media.

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The Role of the Community in Entrepreneurship – The Case of Vietnam

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Abstract

Communities play an essential role in entrepreneurship development. More specifically, communities not only contribute to maintaining, but also to promoting and supporting entrepreneurship development. Therefore, it makes sense to enhance the role of the community in entrepreneurship. However, the influence of each community is different in impact on entrepreneurship. This study aimed to explore the assessments of the community's role in supporting and developing entrepreneurship. From there we can have a concrete perspective on the relationship between the role of the community and entrepreneurship. The study was carried out based on an online questionnaire survey with 201 community members in Vietnam. The Importance-Satisfaction Analysis was used to analyse the influence of community roles. The results show that Support in promoting products or services is a role that is assessed as important and needs to be developed. The roles of the community in Support for business knowledge and information, Financial support or loan giving, Support for relationships, and Space for exchange and development should be maintained and steadily developed. Community roles in Using services or buying goods and Support for labour need development restrictions. Finally, communities should reduce their investment in Participating in events and exchange activities organised by enterprises, and regularly encourage enterprises. These results contribute to a better understanding of the role of the community in entrepreneurship. Through this article, stakeholders, such as communities, local managers, and policymakers, will have solutions to improve the role of the community. The paper ends with a discussion of the results and implications of the study.

Keywords: community, community role, Importance-Satisfaction Analysis, entrepreneurship, Vietnam.

JEL Classification: L26, M10.

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1. Introduction

Community is people who live within a geographically defined area and who have social and psychological ties with each other and with the place where they live (Mattessich, Monsey, 2004). Furthermore, communities have long been identified as having a role in and influencing entrepreneurship (Lyons et al., 2012) alongside other surrounding factors (Welter, 2011). Besides, many studies have determined that communities are not only resource-rich, but also an effective foundation for business (Martin et al., 2013). Thus, the community is a solid foundation for enterprises to grow stronger (Lyons et al., 2012). Furthermore, Hindle and Moroz (2010) determined that many aspects of the community have an impact on any entrepreneurial process and entrepreneurship of entrepreneurs and business start-ups. On the other hand, Korsching and Allen (2004) considered the support from the community as a catalyst for business projects.

More specifically, communities provide vital services that support entrepreneurship (Darwish, Van Dyk, 2018) through various measures and subsidies (Prijon, 2012). Lyons et al. (2012) determined that communities also engage in activities that facilitate investment and are effective for entrepreneurship. The more supportive the community, the greater the number of potential entrepreneurs who will start new businesses (Gruidl, Markley, 2014). Therefore, building the right environment and community characteristics and promoting entrepreneurship is a significant task for the governments of countries. From there, communities can create the best environment for entrepreneurship and contribute to supporting, sustaining, and promoting the development of entrepreneurship.

The article that attempts to supplement an empirical study on the influence of community roles on entrepreneurship in a particular case is in Vietnam. This study uses the Importance–Satisfaction Analysis (ISA) method for 201 samples collected from community members in Vietnam. From there, the paper aims to present the actual effects of community roles on entrepreneurship. Implications are also provided for the community and local managers to improve the efficiency and quality of community roles, as to well as improve satisfaction and engage more people in starting a business. The paper is organised into the following sections: the first section provides a brief literature review of community role studies for entrepreneurship. In the second part, the research methods used by the authors are provided. The third part covers the research results. Then, the last part is the conclusion and discussion of the research results of the paper, establishing future research directions as well as limitations of the study.

2. Problem Statement

The Role of the Community in Entrepreneurship

The enterprise is a sociocultural phenomenon, and its establishment and operation (success or failure of enterprises) are linked and dependent on the environment in which the enterprise operates (Păunescu et al., 2018; Păunescu, Mátyus, 2020;

Păunescu, Molnar, 2020; Doan, 2022). The surrounding environment can stimulate or promote the operation of enterprises. It is an essential factor in determining the conditions under which the enterprises will operate. Shane (2003) explained that the entrepreneurship phenomenon cannot be explained by environmental forces or by individual factors without the other. This view is based on much scholarly research. They observe that culture, local and state policies, social and physical infrastructure, and even the degree of social interaction profoundly influence entrepreneurial behaviour (Fortunato, Alter, 2015). With different environments, circumstances, and times, entrepreneurial behaviour and intentions will differ (Maresch et al., 2016). Herein, community as a consideration affects all forms and processes of entrepreneurship (Lyons et al., 2012; Doan, 2023).

Many studies have shown that we cannot assume that the impact of community on entrepreneurship is the same because entrepreneurial ability is not just an individual quality. It must include their response to opportunities that appear to be exploited for profit (Lichtenstein, Lyons, 2010). As mentioned above, inherent community factors, such as favourable natural resources, population size, geographical features, etc., can determine how well a business operates. In this situation, the community and entrepreneurship are mutually beneficial, and both reap benefits from the interaction (Lyons et al., 2012).

In effect, the community's role in supporting entrepreneurship is provided by creating culturally supported relationships to share information and opportunities, collaborate for the benefit of the community or region, and create an ecosystem that supports enterprises (Fortunato, Alter, 2011). In addition, communities support entrepreneurs and entrepreneurship not only at the functional level (e.g., access to capital through banks, local taxation, land use policy, and availability of financing options), but also at the relational level (Wilkinson, 1991). From there, the community helps promote an enabling environment that supports entrepreneurs and entrepreneurship (Wilkinson, 1991).

Korsching and Allen (2004) saw entrepreneurship from a broader perspective than community development. They considered community support as a catalyst for entrepreneurial projects (Korsching, Allen, 2004). Additionally, the community provides significant services aimed at supporting startups (Darwish, Van Dyk, 2018) through various measures and grants for entrepreneurship (Prijon, 2012). Lyons et al. (2012) determined that communities also carry out activities that facilitate surplus, savings, investment, and effects on entrepreneurship. However, community developers and leaders should keep in mind that community support makes all the difference. The more supportive the community, the greater the number of potential entrepreneurs who will start new businesses (Gruidl, Markley, 2014).

The role of the community in entrepreneurship is demonstrated through: support through networks (Manyara, Jones, 2007); funding and financial resources (Giudici et al., 2012); creating spaces that foster creativity, innovation, and entrepreneurship (Rieken et al., 2019); support training and skills development (Torri, 2010); participate in business activities (Lyons et al., 2012); provision of natural resources, labor (Lyons et al., 2012); providing important services aimed at supporting

entrepreneurship (Darwish, Van Dyk, 2018); positive impact between social and cultural norms on entrepreneurship (Barazandeh et al., 2015), etc.

However, in addition to positive issues, communities can have a negative impact on enterprise success and entrepreneurship (Lyons et al., 2012). In particular, the lack of incentives to create new entrepreneurs in the community will damage the sustainability of business activities and the business development process in the community (Lyons et al., 2012). It will also hurt communities because entrepreneurship is correlated with economic growth and community development (Lyons et al., 2012).

In summary, the nature and role of any relevant community as an influential factor in entrepreneurship is an issue that should be examined in studies and assessments of factors influencing entrepreneurship (Hindle, Moroz, 2010). In addition to being equipped with useful raw materials, many communities do not fully understand how to support entrepreneurs' start-ups and promote business activities. Communities can engage in activities that have little or no impact on entrepreneurship (Lyons et al., 2012). Therefore, it is necessary to identify and evaluate the roles of the community in entrepreneurship.

3. Aims of the Research

This study aims to identify the role of the community in entrepreneurship in Vietnam. In particular, this paper has attempted to detail the influence of community roles using survey data collected from community members. Additionally, specific assessments of how community roles affect entrepreneurship give community leaders and policy makers a more detailed view of community roles in Vietnam. The research questions in this study are as follows.

1. How important are community roles in entrepreneurship in Vietnam?
2. How satisfied are community members with the community roles?
3. What are the different impacts of the community role in entrepreneurship?

4. Research Methods

4.1 Data Collection

The survey subjects here are members of the Vietnamese community. To ensure the accuracy of the data we collect, we believe it is important that community members know their communities well. Data were collected using an online questionnaire. The structure of the questionnaire consists of three parts: the first part is the participation of the respondents in the community, the second part is the assessment of the relationship between the community and entrepreneurship, and the last part is some personal information of the respondents.

The questionnaires were sent by email or Facebook to community members in rural areas and small towns. The interviewees were randomly selected regardless of gender, age, and region of origin. The survey was conducted in November and December 2022 for members of the community in Vietnam. The sampling method

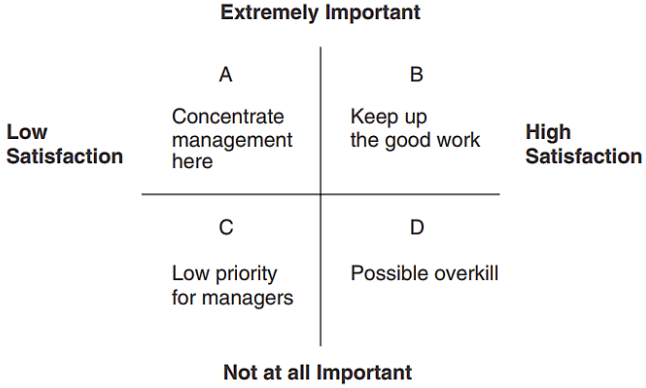
is convenient, not probabilistic. Finally, 201 complete and valid samples were used to perform the analysis.

To capture quantitative information on stakeholders' perceptions of how the community's impact, role, and influence on their decision-making, a 6-point Likert questionnaire (1 = very disagree to 6 = strongly agree, or 1 = least affect to 6 = most influential, etc.) was used in most of the questionnaire. The 6-point Likert question is suggested as an alternative that will eliminate respondents choosing a central score (Gwinner, 2006).

4.2 Data Analysis

This study uses the Importance–Satisfaction Analysis method. The ISA method is based on the Importance-Performance Analysis of Martilla, James (1977), excluding satisfaction instead of performance (Tonge, Moore, 2007). The means of importance and satisfaction for each attribute provided coordinates for the position in a two-dimensional grid, where each quadrant could be summarised as a specific implication for management (see Figure 1).

Figure 1. The ISA Matrix



Source: Tonge, Moore, 2007.

- Quadrant A (focus on development): High importance, low satisfaction. The attributes in this quadrant are considered very important to the customer, but the satisfaction is poor.

- Quadrant B (continue to maintain): High importance, high satisfaction. The attributes in this quadrant are considered essential for customers, and satisfaction is very well.

- Quadrant C (development constraints): Low importance, low satisfaction. The attributes located in this quadrant are considered low satisfaction and not important.

- Quadrant D (reducing investment): Low importance, high satisfaction. The attributes in this quadrant are considered unimportant to the customer, but satisfaction is reasonable.

The ISA model has become a suitable method for understanding and assessing the satisfaction and importance of organisational characteristics (Tonge, Moore, 2007). By examining the points in each quadrant in the matrix, managers can infer attributes that organisations, customers, etc. feels the highest and lowest priority should be given to improving its characteristics. From there, it is often used to provide solutions to strategic-level decisions for your organisation.

5. Findings

5.1 Description of the Samples

The statistical results on the demographic characteristics of the respondents who are members of the community are shown in Table 1. The observations include 23.9% males and 76.1% females. In general, the gender distribution among community members in this study is female. The age of the community members surveyed is between 20 and 60 years of age in the community. The proportion of community members aged 20 to 30 years old accounted for the highest proportion of the sample with 81.1%, followed by 30-50 years old with 17.4%, and older than 50 years old with 1.5%. This disparity is due to the fact that the questionnaire was conducted using the Google Forms tool, so young people are more tech-savvy than the rest. Additionally, the study also focused on young community members to assess the current state of the community' influence on stimulating entrepreneurship.

In terms of work experience, respondents with less than five years of work experience also accounted for the highest proportion (79.1%), and those with more than five years of work experience (20.9%). Besides, unmarried people account for a large percentage (81.1%) compared to married people (18.9%). Regarding residence, 63.2% of the respondents are currently in urban areas and 36.8% are in rural areas.

Table 1. Sociodemographic data in the samples

		N	Percent (%)			N	Percent (%)
Age	<30 years old	163	81.1	**Marital status**	Married	38	18.9
	30-50 years old	35	17.4		Not married	163	81.1
	>50 years old	3	1.5	**Work experience**	< 5 years	159	79.1
Location	Rural area	74	36.8		≥ 5 years	42	20.9
	Urban area	127	63.2	**Gender**	Male	48	23.9
Total		**201**	**100**		Female	153	76.1

Source: Author's own research result.

5.2 The Importance of Community Role

Communities often take steps and activities to provide support for entrepreneurship. To meet the community members' expectations of these support activities, communities must understand the importance of each of these activities in the opinion of community members. Thus, the individual opinion of community

members about the importance of each activity and the role of the community must be clearly defined. Through the analysis of the importance of community roles, this study hopes to provide valuable information for community managers in order to enhance the community role and to be more in line with the needs of community members.

In the significance analysis, a reliability test with the Cronbach alpha coefficient is performed in the significance analysis. After assessment, Cronbach's Alpha of variables is above 0.90, which means that the variables are valid for further analysis (Taber, 2018).

Taking the six answerability levels as an interval scale, more detailed results are visible. Table 2 also shows that the role of the community in Support for relationships has the highest level of agreement compared to the rest of the community roles. Furthermore, the results show that all mean scores for community roles in terms of importance are higher than 4.00, which is a value of slightly high importance. Therefore, it can be concluded that the nine community roles are important in supporting entrepreneurship and local development.

Table 2. The importance of community role

Criteria	Rank	Mean*	Std. Deviation
Using services or buying goods	9	4.13	1.387
Support for labor	6	4.22	1.492
Support in promoting products or services	3	4.24	1.422
Support for business knowledge and information	4	4.23	1.418
Financial support or giving loan	4	4.23	1.399
Support for relationships	1	4.29	1.489
Participate in events and exchange activities organised by enterprises	8	4.20	1.432
Space for exchange and development	2	4.27	1.459
Regularly encourage enterprises	6	4.22	1.425

**: 1 very unimportant – 6: very important*
Source: Author's own research result.

5.3 Satisfaction with Community Role

In this section, an evaluation of the level of satisfaction with the roles of the community is presented. Similarly, the Cronbach's Alpha coefficient is used in the reliability assessment. In this study, the value of Cronbach's Alpha for each variable above 0.90 indicates that the variables are reliable (Taber, 2018).

Considering the six levels of responsiveness as an interval scale, Table 3 presents the mean satisfaction values of the community member. Two attributes, Space for exchange and development, and Regularly encouraged enterprises, are highly rated by community members with a mean value of 3.99. Meanwhile, community members rate using services or buying goods as the least satisfactory.

Table 3. Respondent's satisfaction with community role

Criteria	Rank	Mean*	Std. Deviation
Using services or buying goods	9	3.84	1.309
Support for labor	8	3.90	1.375
Support in promoting products or services	7	3.91	1.342
Support for business knowledge and information	6	3.96	1.399
Financial support or giving loan	5	3.97	1.378
Support for relationships	4	3.97	1.382
Participate in events and exchange activities organised by enterprises	3	3.98	1.365
Space for exchange and development	2	3.99	1.398
Regularly encourage enterprises	1	3.99	1.395

**: 1 very unsatisfied – 6: very satisfied*
Source: Author's own research result.

5.4 Important - Satisfaction Matrix

The comparison evaluation between the results of the importance rating and the satisfaction rating provides valuable information. All nine attributes of the community roles received low ratings from visitors in terms of satisfaction (see Table 4). More specifically, the most negative gap lies in the attributes of Support in promoting products or services (0.33). Furthermore, Table 4 shows that all nine gaps are statistically significant (p-value<0.05).

These findings illustrate that the community still has many problems to solve, such as improving communication activities of products and services, supporting labour resources for the community, promoting the introduction of relationships in the community, etc. Community members have many reasons to feel unsatisfied with the role of the community in Vietnam in stimulating entrepreneurship.

Table 4. Performance gaps between "Important" and "Satisfaction" respondents

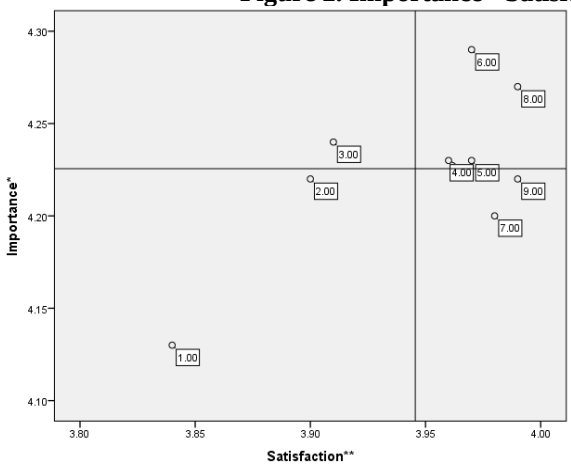
Criteria	Importance *	Satisfaction **	Gap	P value ***
Using services or buying goods	4.13	3.84	-0.29	**0.000**
Support for labor	4.22	3.90	-0.32	**0.000**
Support in promoting products or services	4.24	3.91	-0.33	**0.000**
Support for business knowledge and information	4.23	3.96	-0.27	**0.001**
Financial support or giving loan	4.23	3.97	-0.26	**0.002**
Support for relationships	4.29	3.97	-0.32	**0.000**
Participate in events and exchange activities organised by enterprises	4.20	3.98	-0.22	**0.004**
Space for exchange and development	4.27	3.99	-0.28	**0.001**
Regularly encourage enterprises	4.22	3.99	-0.23	**0.002**

**: 1 very unimportant – 6: very important*
***: 1 very unsatisfied – 6: very satisfied*
****: Results from Pair Sample T-Test*
Source: Author's own research result.

The average satisfaction for all attributes of community roles in Vietnam and the average importance of these attributes are calculated for the sample population. The position of each attribute on the importance-satisfaction grid was determined using the mean scores of importance and satisfaction as coordinates (Ryan, Cessford, 2003). After these calculations are done, they are plotted on a two-dimensional grid. The general mean score for importance and satisfaction was used to determine the position of the axes on the grid (mean importance score = 4.226 and mean satisfaction score = 3.946). Then each property in the grid is then analysed by finding the appropriate quadrant in which it is located (Figure 2).

Figure 2 shows the community member's overall rating of importance and satisfaction with the community's role attributes. On the basis of this visual analysis, four groups of attributes are distinguished:

Figure 2. Importance - Satisfaction matrix



1. Using services or buying goods
2. Support for labor
3. Support in promoting products or services
4. Support for business knowledge and information
5. Financial support or giving loan
6. Support for relationships
7. Participate in events and exchange activities organized by enterprises
8. Space for exchange and development
9. Regularly encourage enterprises

**: 1 very unimportant – 6: very important*
***: 1 very unsatisfied – 6: very satisfied*
Source: Author's own research result.

- Quadrant A should be immediately reviewed by community managers. It is easy to visually see that "3. Support in promoting products or services" is the most important feature of the community in Vietnam that needs to be immediately improved.

- Quadrant B can satisfy community stakeholders, these attributes in this quadrant are important to community members, and they also meet most community member expectations, especially "6. Support for relationships".

- Quadrant C has a lower priority. These attributes are of low level of relevance, so the low satisfaction will not create a significant negative impact on the role of the community in Vietnam.

- Quadrant D has a positive effect on future development because these characteristics are pleasing to the community members, although it is given little attention. In which, "7. Participate in events and exchange activities organised by

enterprises", "9. Regularly encouraging enterprises" can strengthen the enthusiasm of the community in Vietnam.

6. Conclusions

The community plays an essential role in supporting and developing entrepreneurship. These community roles promote entrepreneurship and local development, contributing to community development in general. These communities support all stages of business development from the start of the business to the growth of the enterprises. This article has provided an assessment of the role of the community in entrepreneurship development in Vietnam. From the research results analysed above, these communities have a significant contribution to entrepreneurship development. In general, the assessment of the community roles for entrepreneurship, and the level of satisfaction for the nine community roles, is not commensurate with their importance. The satisfaction average rating values are all lower than their importance. The characteristics with a high gap between importance and satisfaction are Support in promoting products or services, Support for labor, and Support for relationships.

Furthermore, the results show that the support to promote products or services is an important role that should be focused on development. In fact, Supporting the promotion of products and services has always been the most important to promote entrepreneurship, especially for new enterprises. Currently, in Vietnam, there have been many policies and solutions to support the government in promotion and advertising. However, the capacity of communities is still limited. In addition, at the local community level, this problem is weak because there are not many mechanisms, policies, and supports. The community roles of Support for business knowledge and information, Financial support or lending loans, Support for relationships, and Space for exchange and development should continue to be maintained and steadily developed when appreciated for their importance and satisfaction. Communities should continue to enhance their policies and supporting roles for entrepreneurship, focussing on activities that support knowledge, information, and finance for community members; continue to maintain and expand networks and relationships that support community entrepreneurship and enhance space for exchange and development in the community.

Community roles in Using services or buying goods, Support for labor need to be limited in development. Finally, Vietnamese communities should reduce their investment in Participating in events and exchange activities organised by enterprises, and Regularly encourage enterprises. These show that these community roles are not yet necessary for the current entrepreneurship in Vietnam. Also, it also shows that community members need more practical roles for the entrepreneurial activities of the community (it has a high level of satisfaction, but the importance level is lower than the mean value). Therefore, it is necessary to avoid the inefficient activities and roles that take place today. Therefore, community managers should have solutions to improve the community's role and ability to enhance the effective operation of their community. The findings of this study contribute to existing

knowledge and practice on research on the influence of the community on entrepreneurship in Vietnam, in particular, and research on the community role in general.

In addition, the research still has some limitations. The first limitation of the study is the application of the convenience sampling method, often criticised for the representativeness of the collected data. Furthermore, the number of research samples collected is limited, with 201 observations. The third limitation is related to the subjects interviewed in this study from different community groups. Therefore, there is a comparison in the assessment between many community groups in future studies. From there, it is possible to examine differences in the influence of community roles on entrepreneurship. The number of samples and the number of communities surveyed can be increased to ensure generalisability and representativeness of the research. Furthermore, it can be studied on each supporting behaviour of the community role for entrepreneurship using specific scales, and other analytical methods can be combined with the characteristics of local people and entrepreneurs in the area.

From the above research results, we can see that the community has activities that play a role and make significant contributions to entrepreneurship in Vietnam. Therefore, when understanding the factors that affect the development of entrepreneurship, the community is one of the factors that should be taken into consideration. This study serves as a reference to provide a practical outcome of the relationship between community and entrepreneurship in a developing country.

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Electricity Production from Renewable Sources and the Adoption of Electric Vehicles in the European Union

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Abstract

In the context of climate change and the EU's common goal of reducing carbon dioxide emissions for high air quality, we ask whether electric cars will bring environmental benefits and what these will be, and whether they will continue to grow as Europe uses more renewable energy in the future, creating a new prospect for the circular economy. The use of renewable energy plays an essential role in reducing pollution and replacing diesel or petrol vehicles with electric vehicles contributes to the same goal by reducing emissions.

The aim of the current research is to determine and analyse the relationship between the uptake of electric vehicles in Member States, in terms of the share of newly registered electric cars, and the share of electricity generated from renewable sources. The Pearson correlation coefficient will be used to determine the type and strength of the correlation between the share of renewable electricity and the share of electric cars registered in 2020 in EU Member States.

The estimated results of the correlation analysis show a small to moderate relationship between the two indicators, but we will analyse which external factors cause the variables to change in the same direction due to indirect causes or remote mechanisms, as both contribute to the EU's ambition to reduce greenhouse gas emissions and become climate neutral by 2050.

Keywords: renewable energy; electric vehicles; energy sector.

JEL Classification: L94, Q27, Q42, Q56.

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1. Introduction

Renewable energy sources cover solar thermal and photovoltaic energy, hydro, wind, geothermal energy, and all forms of biomass, including biological waste and liquid biofuels. The use of renewable energy reduces the dependency on fossil fuel markets while lowering greenhouse gas emissions and creating new jobs in the process. Europe aims to become the world's first climate-neutral continent by 2050 through a complex package of measures for a sustainable green transition. With the ambitious Climate Target Plan, the European Union plans to reduce the greenhouse gas emissions by 2030 to at least 55 % below 1990 levels (European Commission, 2020).

A critical element for the green transition is the progressive reduction of fossil fuel use. The switch to renewable energy will reduce, but not eliminate the environmental damage completely. The current technology in use for producing renewable energy, like solar cells or wind turbines, does far less damage than mining and oil rigs, but is not completely harmless to the environment due to technological limitations. Battery cells require lithium and other rare metals that require mining, while solar cells use toxic substances in the manufacturing process. European plans to reduce greenhouse gas emissions should, therefore, be accompanied by considerable research and development efforts into environmentally friendly technologies used to produce and store energy. The European Union has pursued an active climate policy by facilitating the integration of renewable technologies into Member States' energy infrastructure. Most of the technologies needed for a full transition to renewables are currently available at low implementation costs. In the long term, the cost of transition would be similar to that of maintaining the existing system if appropriate policies and regulations are continued and improved (Tagliapietra et al., 2019).

2. Problem Statement

The European Union is a signatory to the 2015 Paris Agreement and is helping to achieve the goal of keeping global warming within safe limits for people. The targets developed further through the Green Deal for each member state lead to a competitive and resource-efficient economy. And the most important decision is that of decarbonisation, zero greenhouse gas emissions in the EU. This can be achieved by increasing the share of renewables in the energy mix (Rybak et al., 2022).

The electric car industry is an important element in achieving the EU's targets to reach climate neutrality by 2050, which is encouraged by the fact that electric cars, driven by an independent power source or an internal combustion engine, are growing globally, with low transport costs, are becoming increasingly popular (Markowska et al., 2023). Model specified by most literature sources as the best transport alternative. The International Energy Agency (IEA) reported that electric vehicle sales reached 6.6 million in 2032, doubling from the previous year. The success of electric vehicle development depends largely on factors such as

consumer acceptance of electric vehicles, price and charging time, and charging infrastructure (Razmjoo, 2022).

According to Grzesiak and Sulich (2022), the COP26 declaration, signed in Glasglow in 2021 at the United Nations Climate Change Conference, bans the production and sale of internal combustion vehicles, i.e. diesel, petrol, and hybrid cars, by 2035. As an interim commitment, an average car emission reduction of 55% by 2030 is required (European Commission, 2022).

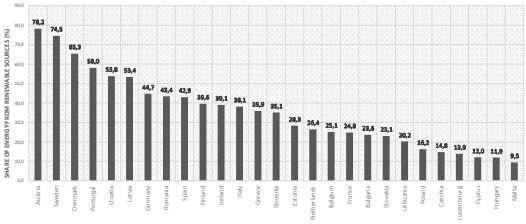
From the second half of 2021, the economic and energy contexts of the European Union have been marked by an exacerbated increase in the prices of energy products, negatively affecting both the population and businesses. Some studies reveal that these high prices were mainly due to the resumption of activities after the Covid-19 pandemic, production bottlenecks, but especially after the first quarter of 2022 due to the military conflict between Russia and Ukraine (Zamfir et al., 2022).

A McKinsey & Company study (2023) reveals that the European Union is the global leader in electric vehicle adoption, with more than a quarter of the world's production. This is also shown by figures published in September 2022 by the European Environment Agency, where the average carbon dioxide emissions of new cars registered in 2020 fell by 12% compared to the previous year, due to the high share of electric cars registered (European Environment Agency, 2023).

3. Methodological Approach

According to data published by Eurostat (b) (2022), the share of renewable electricity reached 37.5 % in 2021, an increase of only 0.1 % compared to 2020. The growth in electricity generated from renewable sources since 2011 (23,3 %) is mainly due to an increase in the wind and solar electricity sources, but also biofuels. Wind (36 %) and hydro (33 %) power generated more than two thirds of the total electricity from renewable sources, white the rest was generated by solar power (14 %), solid biofuels (8 %) and other sources (Eurostat (b), 2022). According to Eurostat (b) (2022), the share of electricity from renewable energy sources is defined as the ratio between electricity produced from renewable energy sources and gross national electricity consumption. The renewable energy sources include hydro power plants and electricity generated by wind, solar, biofuels, and geothermal installations.

Figure 1. 2020 European Union Member States share of electricity from renewable sources



Source: Eurostat (a), 2022.

Austria had by far the highest share among the EU Member States, with more than two-thirds (78,2 %) of the consumed electricity generated from renewable sources, followed by Sweden (74,5 %) and Denmark (65,3 %). The share of electricity from renewable sources was also high, accounting for more than half of the electricity consumed in Portugal (58 %), Croatia (53,8 %) and Latvia (53,4 %). On the opposite end of the scale, Malta (9,5 %), Hungary (11.9 %) and Cyprus (12.0 %) registered the lowest shares of electricity generated from renewable sources in 2020 (Eurostat (a), 2022). Only 12 of the 27 Member States were situated above the average EU value of 37,5 %.

Europe's long-term objective to a low-carbon environment requires a substantial change in the transportation sector, achievable by a large-scale adoption of electric vehicles charged with electricity produced from renewable sources. An increase in electric vehicle use will lower the carbon dioxide and air pollutants emissions from the road transport but generate higher emissions from associated electricity production and continued fossil use in the power sector. Therefore, the additional energy demand will need to be met by an increase in renewable energy production, integrated into the existing infrastructure across Europe. A large number of electric vehicles will require significant additional electricity that may put considerable pressure on the existing infrastructure without new investments. Countries with similar shares of renewable energy production might adopt different management strategies to accommodate the additional charging power needed, depending on their ratio of renewable energy to conventional power generation, the type of renewable energy source and the development of their electrical network infrastructure. According to Kasten et al. (2016), the demand share of electric cars to total electricity demand will reach levels of 4 % to 5 % in several European countries by 2030 and around 9,5 % by 2050 on EU average, with an electric car stock penetration of 80 %.

In 2020, more than half a million electric passenger cars were registered in the European Union, representing more than 5 % of the total number of new cars registered. Netherlands had the highest share of registered electric cars (20,52 %), followed at a considerable distance by Sweden (9,64 %), Denmark (7,17 %) and Germany (6,84 %). At the other end of the ranking are Cyprus (0,18 %), Poland (0,81 %), and Greece (0,84 %), with less than 1 % of the total new registered passenger cars being powered only by electricity.

Table 1. European Union Member States share of electric passenger cars registered in 2020

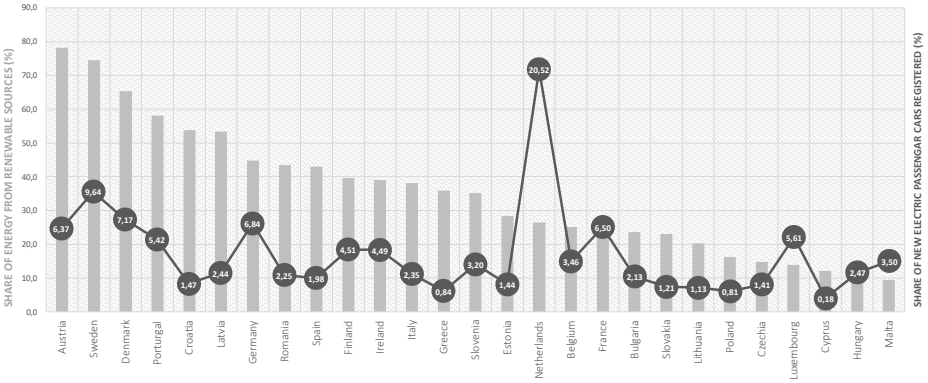
Country	No. of new electric passenger cars registered in 2020	No. of total new passenger cars registered in 2020	Share of electric cars of total new passenger cars registered in 2020 (%)
Netherlands	72.172	351.738	20,52
Sweden	27.661	286.797	9,64
Denmark	14.015	195.468	7,17

Country	**No. of new electric passenger cars registered in 2020**	**No. of total new passenger cars registered in 2020**	**Share of electric cars of total new passenger cars registered in 2020 (%)**
Germany	193.773	2.832.972	6,84
France	114.555	1.761.404	6,50
Austria	15.697	246.233	6,37
Luxembourg	2.455	43.735	5,61
Portugal	7.850	144.803	5,42
Finland	4.219	93.587	4,51
Ireland	4.009	89.295	4,49
Malta	154	4.403	3,50
Belgium	14.957	431.954	3,46
Slovenia	1.745	54.590	3,20
Hungary	3.185	128.896	2,47
Latvia	302	12.355	2,44
Italy	32.480	1.380.818	2,35
Romania	2.825	125.742	2,25
Bulgaria	471	22.158	2,13
Spain	18.232	919.334	1,98
Croatia	519	35.270	1,47
Estonia	265	18.453	1,44
Czechia	2.784	197.353	1,41
Slovakia	918	75.682	1,21
Lithuania	452	40.008	1,13
Greece	671	79.783	0,84
Poland	3.154	388.427	0,81
Cyprus	18	9.838	0,18
EU-27	**539.538**	**9.971.096**	**5,41**

Source: European Environment Agency, 2022.

The aim of the current study is to identify and analyse the relationship between the uptake of electric vehicles in Member States in terms of the share of newly registered electric vehicles and the share of electricity produced from renewable sources. Figure 2 provides a visual representation of the share of renewable electricity and the share of electric vehicles registered in all EU Member States in 2020. Sweden and Denmark ranked second and third in both rankings, while Netherlands (20,52 %) registered by far the highest share of electric cars, with almost 11 percentage points above Sweden (9,64) and 15 percentage points above the EU average of 5,41 %.

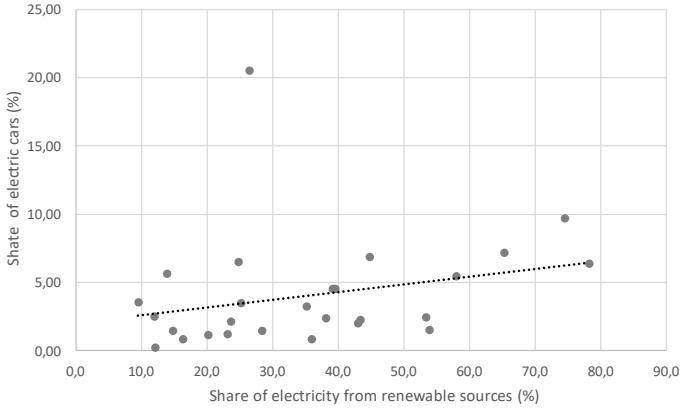
Figure 2. EU Member States share of electricity from renewable sources and share of electric passenger cars registered in 2020



Sources: Eurostat(a), 2022; European Environment Agency, 2022.

The relationship between variables is usually obtained by assessing how specific measures that represent the variables are correlated (Shao et al., 2022). Correlation analysis determines the association or relationship between two or more quantitative variables by measuring the correlation coefficient. For the current analyses, under the assumptions that the variables are independent and normally distributed and the relationship is linear, the Pearson correlation coefficient will be used to determine the type and strength of the correlation between the share of electricity from renewable sources and the share of electric cars registered in 2020 across the European Union Member States. The Pearson correlation coefficient of the analysed data for the 27 Member States is r = 0,26. According to Asuero et al. (2006), a value of r between 0 and 0,29 indicates little or no correlation. Pearson correlation analysis is very sensitive to extreme points that do not fit the general trend of the data, which can have a large effect on the value of r. In the current analysis, Netherlands' share of electric cars is far above average, causing a significant alteration in the value of the correlation coefficient, as observed in the scatter plot diagram depicted in Figure 4. The Pearson correlation coefficient calculated for the adjusted data series, without the extreme value is $r_{adjusted}$ = 0,58, describing a moderate correlation. The results of a t-test suggest this is statistically significant, for an absolute test statistic value of 3,4994 and a corresponding *p-value* of 0,00184, lower than the standard significance level (α = 0,05).

Figure 3. Scatter Diagram - Correlation between EU Member States share of electricity from renewable sources and share of electric passenger cars registered in 2020



Source: Own calculations from Eurostat(a), 2022; European Environment Agency, 2022.

4. Results and Discussion

The results of the correlation analyses show a small to moderate relationship between the share of electricity from renewable sources and the share of newly registered electric cars among the EU Member States. However, this does not necessarily imply a causal relationship between the two variables. The correlation can as well be attributed to a sum of external factors causing the variables to change in the same direction due to indirect causes or remote mechanisms, since both contribute to the EU's ambition on reducing greenhouse gas emissions and become climate-neutral by 2050. Moreover, the relationship might also be affected by time lags. For example, a change in subsidy policies for electric cars at EU level may determine a rapid growth in the number of new electric cars registered, while the shift from fossil to renewable sources in terms of electricity production requires massive investments over long periods of time.

Since most of Europe's electricity still comes from fossil fuels, electric vehicles charged by that source of energy will indirectly generate greenhouse gases. As European countries will progressively transition to green, using fewer fossil fuels, it is reasonable to assume that the infrastructure of electric vehicles and charging stations will develop as well. The increasing number of electric vehicles will contribute to the reduction of greenhouse gases up to a certain limit. A large share of electric vehicles will have implications for the electricity production and distribution infrastructure in terms of investments, expansion efforts, and, possibly, innovation. Integration of EU policies and investment decisions across the energy and road transport sectors becomes very important. When electric car penetration reaches higher levels, the extra electricity demand will become a relevant factor within the energy systems, impacting the operation of power plants and energy infrastructure, at local, national, and European level, depending on the respective

status of the energy system (Kasten et al., 2016). The capability of electric vehicles to have a significant impact on the EU's ambition of reducing the greenhouse gas emissions and becoming a climate neutral economy by 2050 depends on the source of electricity used to charge the vehicles: renewable, nuclear power or fossil fuel sources. In the long run, in terms of total emission balances, electric mobility can lead to significant reductions in carbon dioxide and most air pollutant emissions and become a relevant part of a future sustainable transportation system.

5. Conclusion

The rather large differences in the development and adoption of electric or hybrid vehicles between the countries analysed may be the result of different implementations of support policies in the respective countries, but also of the level of development of the population.

Electric car technology is certainly the sustainable transport mode of the future in all EU Member States, due to its high energy efficiency, almost non-existent carbon emissions and low noise, it can be considered a viable solution for climate change mitigation, which is why each country encourages the population through various significant governmental actions, but also through charging infrastructure benefits.

Based on the results, we note that there are different drivers in the development of electric vehicles, e.g. the deployment of electric vehicles requires new technologies, especially batteries, fast charging stations, adequate investments, government support for manufacturers and government subsidies for buyers, affordable prices for consumers, funding for battery research, tax exemptions, and appropriate charging station infrastructure.

Moreover, when talking about the limitations of this study and the debate on the subject in possible future works, we can say that financial support for the development of electric vehicles is the most important factor that can create at European Union level policies to encourage and recover less developed countries in this respect, such as Cyprus, Poland, Greece, for a big step towards a faster transition to a green economy.

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Current Competition Issues in the International Context of Inflation

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Abstract

The current international context of inflation has triggered changes in the economic behaviour of individuals and of undertakings. The specific literature has already evaluated the possible effects of competition on inflation. The present paper brings a new perspective, dealing with the consequences of inflation in the field of competition, assessing anticompetitive behaviour of undertakings occurring in the current context of inflation at global level. Increasing prices are nowadays a major problem for consumers as well as for producers. Undertakings have explained the increased prices as related to the high inflation rates. Competition authorities have nevertheless investigated whether such price increases are really inflation-related or if there are anticompetitive agreements on increased prices using the general context of inflation and aiming at enhanced profits for undertakings. Such an investigation is presented in the present paper as a case study based on the information from the Romanian Competition Authority. The paper brings in question to what extent the increase in price levels is related to inflation and to what extent it can be assessed as an anti-competitive agreement between actors with market power. As a research method, the present paper uses metadata, data from National Competition Authorities as well as from the European Commission as a Supranational Competition Authority, case studies, and economic indicators provided by Eurostat. The research approach is based on an international, multidisciplinary perspective, presenting possible measures and solutions to avoid anticompetitive behaviour in the given economic context of inflation.

Keywords: competition, inflation, anti-competitive behaviour, market power.

JEL Classification: G15, G41, O16, O52.

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1. Introduction

In the current global context of inflation, changes occurred in the economic behaviour of both individuals and undertakings. Increasing prices in the current inflation context is nowadays a major problem for consumers and producers. Competition usually contributes to ensuring fair prices for consumers. Competition policy, as well as competition law enforcement, may play an important role in trying to mitigate the negative consequences of inflation.

In this inflationary context, a research question to be addressed is to what extent the increasing prices are related to the market situation and if there is the possibility that some important market actors with market power use this context to increase prices in order to make more profit. Undertakings have explained the increase in prices as related to the high inflation rates. In order to clarify this aspect, competition authorities, such as the Competition Council in Romania, have investigated the price increases in several sectors in this context.

The goal of the present paper is to research to what extent the increase of price levels is related to inflation and to what extent it can be assessed as an anticompetitive agreement between actors with market power.

As a research method, the present paper uses case studies (e.g., an investigation of the Romanian Competition Council), metadata, data from National Competition Authorities as well as from the European Commission as a Supranational Competition Authority, case-law of the Court of Justice of the European Union.

Given the international context of inflation, the present paper analyses which authorities may play a role in dealing with the relation between inflation and competition issues. The present paper asks the question which might be the role of National Competition Authorities in this context and if supranational competition authorities, such as the European Commission might as well play a role.

Another question to be addressed is to what extent, in this context, an ex-ante regulation is needed or if an ex-post control should rather be applied.

The research approach is based on an international, multidisciplinary perspective, assessing behaviour in the given economic context of inflation.

The novelty and originality of the present paper is given by the multidisciplinary research approach, combining aspects of law and economics in an international view, with a strong focus on the current global focus of inflation that affects the global economy as well as the consumers worldwide.

2. Problem Statement (Literature Review)

2.1 The Concept of Inflation

Inflation is defined by Gregory Mankiw as an increase in the overall level of prices in the economy. The cause of inflation is growth in the quantity of money. This happens when, for example, government (by its National Bank) creates a too large quantity of money. This idea is also expressed in the principle number 9 formulated by Gregory Mankiw, stating that prices rise when the government prints too much money (Mankiw, 2018).

2.2 The Current Global Inflationary Context

In the current context of increased inflation at global level, the demand increases related to the pandemic and the lockdowns have to be considered. There have been supply shortages as a consequence of the pandemic and there are still shortages as a post-pandemic consequence. The war in Ukraine and the related problems (e.g. increase of energy prices) have increased the inflation trends (OECD, 2022). The increase of energy prices had a domino effect, resulting in increased prices for many categories of goods and services.

2.3 The Relation between Inflation and Competition

In the studied specific literature, the role of competition in mitigating inflation has been assessed. The specific literature has already evaluated the possible effects of competition on inflation. The opinions studied in the literature states the current inflationary episode not connected with the enforcement of competition law enforcement. The inflationary episode did not lead to concentration (European Central Bank, 2022).

There appears to be no correlation between high inflation rates and concentration, according to the studied literature. The inflation rates in the current inflationary context vary from country to country. The inflation rate in the Netherlands in March 2022 was more than twice that of France., but the concentration ratios did not vary accordingly. On the other hand, sectors where energy consumption is important and which have an inelastic demand were affected by the energy crisis. The energy costs caused inflation in these sectors (OECD, 2022).

The present paper is in line with the present research. It brings a complementary view, a new perspective, dealing with the consequences of inflation in the field of competition, assessing anti-competitive behaviour of undertakings occurring in the current context of inflation at global level.

3. Research Questions / Aims of the Research

In the current international inflationary context, a research question to be addressed is to what extent the increasing prices are related to the market situation and if there is the possibility that some important market actors with market power use this context to increase prices in order to make more profit. The aim of the research is to find out if the explanation given by undertakings according to which they have increased prices due to the high inflation rates is valid.

The goal of the present paper is to research to what extent the increase of price levels is related to inflation and to what extent it can be assessed as an anticompetitive agreement between actors with market power.

The present paper examines which authorities may play a role in dealing with the relation between inflation and competition issues. It asks the question which might be the role of National Competition Authorities in this context and if supranational competition authorities, such as the European Commission might as well play a role.

Another question to be addressed is to what extent, in this context, an ex-ante regulation is needed or if an ex-post control should rather be applied.

An overview of the studied topic with practical application in Romania is presented.

4. Methodology

The present paper is mainly a theoretical review article, so that it relies on opinions stated in the studied specific literature. The theoretical aspects are complemented by a case study from Romania that reflects the topic studied on the Romanian market.

As a research method, the present paper uses case studies (e.g. an investigation of the Romanian Competition Council), metadata, data from National Competition Authorities as well as from the European Commission as a Supranational Competition Authority, case-law of the Court of Justice of the European Union.

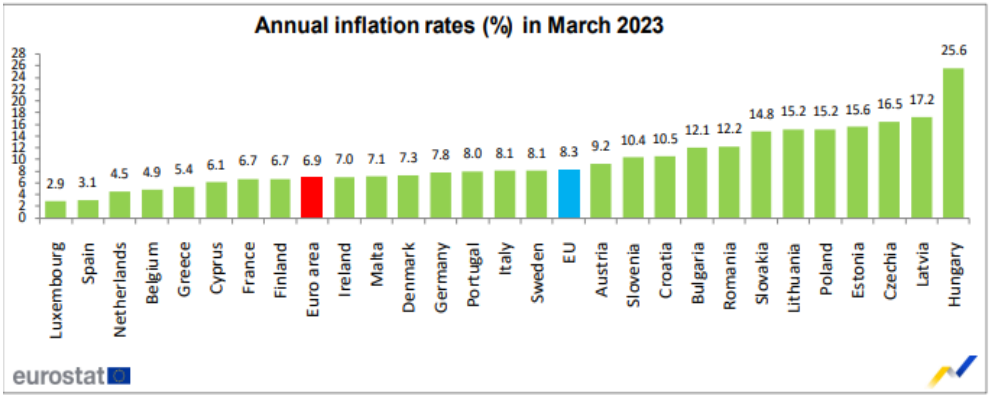
The research approach is based on an international, multidisciplinary perspective, assessing behaviour in the given economic context of inflation.

The novelty and originality of the present paper is given by the multidisciplinary research approach, combining aspects of law and economics in an international view, with a strong focus on the current global focus of inflation that affects the global economy as well as the consumers worldwide.

5. Findings – Results and Discussions

Due to the current inflationary context, very high inflation rates have been registered worldwide. According to the data provided by Eurostat, the situation regarding inflation in the European Union is presented in Figure 1.

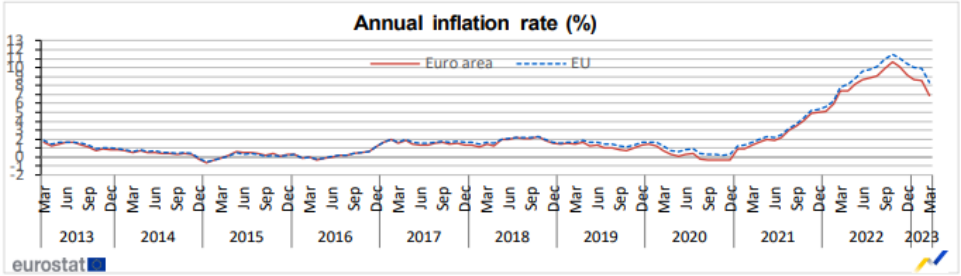
Figure 1. Inflation in the European Union



Source: Eurostat, 2023.

Changes in inflation rates are reflected in Figure 2, where the current inflationary context is clearly represented.

Figure 2. Development of the annual inflation rate in the European Union



Source: Eurostat, 2023.

The detailed data regarding inflation in the European Union which reflect the current inflationary context is reflected in Table 1.

Table 1. Inflation rates in the European Union

Inflation rates (%) measured by the HICP

	Annual rate							Monthly rate
	Mar 22	Oct 22	Nov 22	Dec 22	Jan 23	Feb 23	Mar 23	Mar 23
Euro area	7.4	10.6	10.1	9.2	8.6	8.5	**6.9**	0.9
EU	7.8	11.5	11.1	10.4	10.0	9.9	**8.3**	0.9
Belgium	9.3	13.1	10.5	10.2	7.4	5.4	**4.9**	0.2
Bulgaria	10.5	14.8	14.3	14.3	14.3	13.7	**12.1**	0.6
Czechia	11.9	15.5	17.2	16.8	19.1	18.4	**16.5**	0.3
Denmark	6.0	11.4	9.7	9.6	8.4	8.3	**7.3**	-0.2
Germany	7.6	11.6	11.3	9.6	9.2	9.3	**7.8**	1.1
Estonia	14.8	22.5	21.4	17.5	18.6	17.8	**15.6**	0.7
Ireland	6.9	9.4	9.0	8.2	7.5	8.1	**7.0**	0.9
Greece	8.0	9.5	8.8	7.6	7.3	6.5	**5.4**	1.6
Spain	9.8	7.3	6.7	5.5	5.9	6.0	**3.1**	1.1
France	5.1	7.1	7.1	6.7	7.0	7.3	**6.7**	1.0
Croatia	7.3	12.7	13.0	12.7	12.5	11.7	**10.5**	0.9
Italy	6.8	12.6	12.6	12.3	10.7	9.8	**8.1**	0.8
Cyprus	6.2	8.6	8.1	7.6	6.8	6.7	**6.1**	1.3
Latvia	11.5	21.7	21.7	20.7	21.4	20.1	**17.2**	0.8
Lithuania	15.6	22.1	21.4	20.0	18.5	17.2	**15.2**	0.7
Luxembourg	7.9	8.8	7.3	6.2	5.8	4.8	**2.9**	0.2
Hungary	8.6	21.9	23.1	25.0	26.2	25.8	**25.6**	0.8
Malta	4.5	7.4	7.2	7.3	6.8	7.0	**7.1**	1.4
Netherlands	11.7	16.8	11.3	11.0	8.4	8.9	**4.5**	0.2
Austria	6.6	11.6	11.2	10.5	11.6	11.0	**9.2**	0.6
Poland	10.2	16.4	16.1	15.3	15.9	17.2	**15.2**	1.1
Portugal	5.5	10.6	10.2	9.8	8.6	8.6	**8.0**	2.0
Romania	9.6	13.5	14.6	14.1	13.4	13.4	**12.2**	0.9
Slovenia	6.0	10.3	10.8	10.8	9.9	9.4	**10.4**	0.5
Slovakia	9.6	14.5	15.1	15.0	15.1	15.4	**14.8**	1.3
Finland	5.8	8.4	9.1	8.8	7.9	8.0	**6.7**	0.4
Sweden	6.3	9.8	10.1	10.8	9.6	9.7	**8.1**	0.5
Iceland	5.0	6.4	7.0	7.2	8.1	8.8	**8.6**	0.7
Norway	4.7	8.4	7.3	6.3	8.0	7.2	**7.3**	0.9
Switzerland	2.2	2.9	2.9	2.7	3.2	3.2	**2.7**	0.0

Source dataset: prc_hicp_manr

Source: Eurostat, 2023.

Due to the current international inflationary context, prices have increased in the European Union. In Romania, there have been prices increases for several products even after the pandemic and even more than in other countries of the European Union. In this context, the Romanian Competition Council started an investigation in March 2023 in order to find out if the explanation given by undertakings according to which they have increased prices due to the high inflation rates is valid. The investigation of the Competition authority aims to investigate if such price increases are really inflation-related or if there are anti-competitive agreements on increased prices using the general context of inflation and aiming at enhanced profits for undertakings. Such an investigation is presented in the present paper as a case study based on the information from the Romanian Competition Authority.

The Competition Council investigates 13 producers of sunflower oil, butter and sugar regarding possible agreements regarding price fixing on the market of these products (sunflower oil, butter, and sugar). There are suspicions regarding the intention of some producers to use the general inflationary context in order to achieve more profit by concluding anticompetitive agreements. This type of anti-competitive behaviour is easier to hide given the international context of increased inflation rate.

The organised dawn-raids were performed at the companies where there were such suspicions of anticompetitive agreements. In the sunflower oil sector, dawn raids have been organised in the following companies: Bunge România SRL, Expur SA, Prutul SA, and Ardealul SA. In the market of butter, dawn raids have been organised in the following companies: Albalact, Covalact, and Dorna Lactate (part of the Lactalis Group), Friesland România SA, Lacto Food SRL and Olympus Milk Producing Factory Brașov. For the sugar market, the following companies have been investigated: Agrana România SRL, Pfeifer & Langen România SRL, and Lucsor Impex SRL (Consiliul Concurentei, 2023).

According to competition regulations (European Union Competition Law – Article 101 TFUE and Romanian Competition Law), agreements which have as their object or effect the prevention, restriction, or distortion of competition within the internal market are incompatible with the internal market (Consolidated Version of the Treaty on the Functioning of the European Union, 2012). Price fixing is prohibited (Legea Concurentei, 1996).

The investigation is still ongoing. If the results of the investigation prove that there have been anticompetitive agreements, sanctions will be applied. The actions are in line with the European Commision (2023). As seen in the presented case study, the Competition Authority has a major role in clarifying this issue.

6. Conclusion

The present paper analyses to what extent the increasing prices in the analysed sectors are related to the market situation of the international inflationary context and if there is the possibility that some important market actors with market power use this context to increase prices in order to make more profit. The investigation conducted by the Romanian Competition Council is still ongoing. The research

results will be updated according to the results of the investigation, when they will be released.

The topic is of great interest and will be further developed. The research results will be used as a basis for further research, which will for sure be needed.

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Technology – Friend or Foe of Large Companies? The Impact in the Development of Innovative Strategies

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Abstract

Should we fear technology or rather embrace it and identify how we can position it as a necessary and useful weapon in the war to differentiate yourself in the marketplace as a company? The impact of technology not only comes from among companies, but also contributes to the evolution of mankind and individuals. The way in which managers act, but also the way in which managers respond to the needs of clients by integrating technology in all business areas, refers to digital transformation.

Today's organisational environment is often defined as frantic, disorganised, or even chaotic. From the lowest hierarchical level in organisations, employees believe that they experience a high pace of change and observe both in their own organisation and in others progress for technologies, nanotechnologies, robotics, and engineering. All these contribute to the development of the economy, but also contribute to the development of society.

When a business manages to obtain more profit, or when a business manages to have more benefits than its competitors, we talk about competitive advantage. The competitive advantage can be measured by observing the company's indicators compared to competitors such as costs, management, brand, technology used, and many others (Barney, 1991). Existing studies have mainly adopted a resource-based view to explain the effect of green innovation on firms' competitive advantage.

The paper consists of three chapters and presents both approaches to the specialised literature and the analysis of the evolution of the impact of technology in large companies.

The first chapter focuses on theoretical concepts about digitisation, Artificial Intelligence, and Machine Learning, while the second part focuses on existing data at the level of Romania, the European Union, and beyond.

At the same time, the paper will end with a series of proposals for the integration of technology into the strategy development process in large companies.

Keywords: artificial intelligence, machine learning, impact, strategies.

JEL Classification: O10.

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1. Introduction

Guimarães et al. (2018) state that differences in competitive advantage have been suggested to stem from the valuable, rare, inimitable, and non-substitutable resources of eco-innovation practices, including material resources (e.g., financial subsidies for new energy vehicle manufacturers), featured products (e.g., desulphurisation equipment), and support systems (e.g., management systems). Over time, the ecological innovation strategy had no influence in a short period of time and had no an impact. In this sense, in order for the invocation strategy to have an impact, it was necessary to integrate these norms into the organisation. When a series of initiatives are implemented and set in motion, when specific actions are implemented, it can be said that the competitive advantage will be achieved, especially for environmental strategies.

Many managers, company employees, or people involved in change management and in the implementation and development of strategies confuse certain terms or consider them to mean the same thing. Confusion often occurs between the term digitisation and the term digital transformation. When analogue information is converted, transferred, into digital information, it is a digitisation process. On the other hand, when the way in which the stakeholders (clients, suppliers, or companies among them) start to interact differently, it is about something else and not digitisation. When added value is brought through the process and the way in which digital products or digital technologies are used for added value means that we are talking about digitisation and not digitisation. Most of the time, the digitisation process considers how certain processes can be optimised and how manual procedures can be reduced and brought into the digital world. Digitisation often goes further than optimisation; it goes toward adding value at the end of the process and contributing to competitiveness and competitive advantage.

2. Theoretical and Practical Perspectives

It is necessary to change the organisational culture, including the implementation of digitalisation in the company. Digital transformation refers to an efficient way to use digital technologies. In the process of digital transformation, man has a more important main point than the technology itself, because the change and implementation of practices occurs through human intervention. People with digital skills can bring about change in organisations using technological tools as efficiently as possible. So, you can see the difference between digitalisation and digitisation (Factory, 2021).

The world has entered an unprecedented turbulent era that reflects the intertwining forces of technological, biotechnological, and communications advances (Glassman, Zell, Duron, Posner, 2005).

Managers must observe the vagaries and increased competition of a new global market, along with the incessant demands of customers for improved product and service quality, accompanied by their limited loyalty to their service and product providers.

A series of both direct and indirect networks are activated when companies use digital technologies. (Shapiro, 1985) as part of the business model to create and capture its value (Zott, 2001). When a number of users use a certain offer, but more and more users are constantly added, more and more value is created. Creating value inevitably attracts more and more users who, in turn, create more value. These direct effects and indirect effects that create added value can be seen in companies such as Facebook or Amazon. Also, in this sense, the companies Apple, Microsoft, or Alphabet (known as Google) and many others can also be given as an example.

This proposal is disputed for the adherents of neoclassical economics (Afuah, 2013). In these theories, it is assumed that there are other factors that really contribute to the creation of added value, other characteristics that refer to the network help to add value. A recently proposed feature concerns the ability of actors to drive experiential learning through machine learning techniques. This learning is possible by collecting large volumes of data that are analysed using machine learning techniques.

In order to produce major changes at the level of products and services, new tools have appeared. These tools are Artificial Intelligence, abbreviated AI, but also Machine Learning, abbreviated ML. The promotion of these tools and their use change the perspective of business models, but also change a series of company ecosystems (Lakhani, 2020).

Artificial Intelligence and Machine Learning have not only become popular because they help managers make decisions more easily, but they have also become popular because of the way they can respond to various complex requirements from clients. These AI and ML tools respond more and more to the sophisticated needs of clients and begin to satisfy increasingly complex needs that are difficult to answer in a shorter time than other tools compared to AI and ML.

However, customer feelings towards such AI/ML services can be volatile and subject to influencing factors (e.g. leaning) beyond the results achieved. Like any business element, they can represent not only opportunities, but also fears. If we talk about how processes can be optimised or how they contribute to innovation, then AI and ML will be seen positively by the organisation and its employees. But when people worry that they might lose their jobs because of technology or when they can intervene in security issues, AI and ML are not seen favourably, representing real challenges for some who may be reluctant to change.

From the point of view of advantages and implementation in terms of technology, both AI and ML were analysed by specialists to understand the phenomenon and how it can be adapted for the relationship and expectations with customers. But there have been quite little analyses with these technologies, they can help managers in their decision-making processes or in management-type studies (Fredstrom, 2022).

Incorporating AI and ML into products and services involves substantial innovation on the part of firms. In specialised practice, especially in the field of marketing, the studies focused more on the advantages of using artificial intelligence and machine learning and less on possible negative effects. We observe how texts can be automatically generated based on a brief or even photos based on elements

desired by the user. By uploading a photo of a client, thousands of variants and poses can be generated in which the person can be based on a brief without the need for manual changes by design specialists, copywriting, and many others involved. We also observe the execution speed of these technologies, which lasted from a few seconds to a maximum of a few minutes.

Unavoidably, a war arises between both artificial intelligence and machine learning. Followers and fans of one compared to the other. Research shows that Artificial Intelligence at first glance seems to be more easily accepted in change management than machine learning. It seems easier to convey when a service or product is more innovative than another if AI-type technology also intervenes. Thus, a strong association between innovation and AI is observed. The more alternatives there are to choose from, the faster purchase decisions are made (Fredrickson, 1984). Unfortunately, Machine Learning is seen in the market as a communication link between organisations and clients that dehumanises legal entities more and more. Indeed, faster communication and decision making can be done, but the experience may suffer.

Artificial Intelligence and also Machine Learning can be key elements in forecasting. Thus, the more managers know about the future, the more appropriate decisions they can make and think about sustainable and impactful strategies.

3. Analysis and Observations

Table 1 shows a mapping of the levels that people have in terms of digital skills and competences at the EU level. – 27 countries in 2020; at EU level – 28 countries in the period 2013-2020; by countries.

Regarding digitisation, Romania is in the last place in terms of digital skills. This fact represents a major impediment in the development of the business environment. Multinational companies come with the necessary knowledge, but without the skills of employees and their skills related to digitisation, the integration of Machine Learning-type systems is increasingly difficult to integrate.

Table 1. People's level of digital skills

	2015	2016	2017	2019
European Union - 27 countries (from 2020)	54	54	55	56
European Union - 28 countries (2013-2020)	55	56	57	58
European Union - 27 countries (2007-2013)	55	56	57	:
European Union - 15 countries (1995-2004)	59	60	61	:
Belgium	60	61	61	61
Bulgaria	31	26	29	29
Czechia	57	54	60	62
Denmark	75	78	71	70
Germany (until 1990 former territory of the FRG)	67	68	68	70
Estonia	65	60	60	62
Ireland	44	44	48	53
Greece	44	46	46	51
Spain	54	53	55	57

	2015	2016	2017	2019
France	57	56	57	57
Croatia	51	55	41	53
Italy	43	44	:	42
Cyprus	43	43	50	45
Latvia	49	50	48	43
Lithuania	51	52	55	56
Luxembourg	86	86	85	65
Hungary	50	51	50	49
Malta	53	50	57	56
Netherlands	72	77	79	79
Austria	64	65	67	66
Poland	40	44	46	44
Portugal	48	48	50	52
Romania	26	28	29	31
Slovenia	51	53	54	55
Slovakia	53	55	59	54
Finland	74	73	76	76
Sweden	72	69	77	72
Iceland	:	:	85	85
Norway	80	75	77	83
Switzerland	:	:	76	77
United Kingdom	67	69	71	74
Turkey	23	28	34	36

*Source***:** Eurostat, 2022.

Our life is surrounded by technology, and our life is intertwined with technology. Whether we are talking about looking for a vacation, planning it, or even navigating to another country, or we are talking about shopping at a distance, technology is present. Information can be provided faster or even entertainment can be accessed faster and easier with the help of new technologies.

We manage to be connected with global teams from all over the world, we work remotely, we talk to people from different corners of the country, and all these things happen with the help of people's computers, mobile phones or tablets and many other smart devices.

The public environment has also started to embrace technology, and we are seeing extensive procedures that can now be done from home remotely. Even the experiences at the supermarket have reduced human contact with the possibility of paying for your purchases yourself. Unfortunately, many generations fail to adapt to technology and embrace it, while the new generations do not perceive a life without these technologies (Schirmer, 2022).

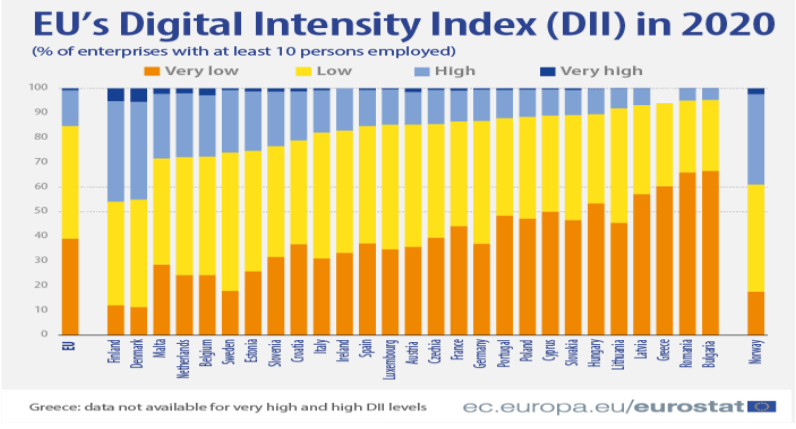
We previously discussed the fact that digitisation does not mean the same thing as digitisation. Some companies choose to implement one of the two, others both. It is certain that many companies are forced to retrain their employees to know how to use these technologies in a minimal format, while for the new generations, it becomes an indispensable requirement of the labour market. Digital transformation

in companies becomes an assumed long-term change process that cannot be substituted for a one-off project. Digital change thus becomes an assumption of organisational behaviour, of the type of interaction with clients and of changing and adapting objectives. Agility is what can define companies in a good sense in this context (Forbes, 2018).

The competitiveness of companies will increase as long as various technologies are adopted, but the area of relations and services will definitely improve. During the pandemic period, but also immediately after, it was shown that where companies embraced these systems, they managed to overcome this period more efficiently. It was also proven during this period that technology is indispensable to society and business.

In 2020, according to studies, it was proven that only 1 % of companies in the European Union, companies that at that time had at least 10 employees, managed to reach a very high level of use of digital technology, while 14 % managed to reach a high level of technology use. Most of the enterprises reported in 202 a series of low (46 %) or even very low levels of digitalisation use (39 %). Compared to 2018, the Digital Intensity Index (DII) indicated an overall improvement throughout the European Union, with increases reported at both very high (+5.0 percentage points – pp) levels of technologisation and high levels (+0.4pp). DII measures the level of use by companies of various digital technologies, and its indicator (0-12) is calculated by how many of the 12 selected digital technologies were or are being used by companies. The higher the score recorded by the analysed companies in the countries in the list, the higher the intensity of the use of digital business technology; the fluctuations range from very low to very high. The data analysed and transmitted by Eurostat show that 9 % of the largest firms in the European Union marked a very high DII and 42 % a marked high level, while only 2 % of medium-sized firms marked a very high level of intensity, and a quarter (25 %) scored an increased DII. Only 0.4 % of small companies managed to obtain a type of very high digital intensity; respectively, only 12 % registered a high DII. (Eurostat, 2021)

Figure 1. EU's Digital Intensity Index



Source: Eurostat 2020.

Countries such as Finland and Denmark (both Finland and Denmark with 5 %) and Belgium registered 3 % were the countries in the European Union area that registered a high level, proving that they are digitised, while other countries managed to have the more than 2 % of the analysed companies have a very high level of DII.

On the other hand, compared to the other analysed countries, we observe that in Bulgaria and Romania, with a process in both of 66 % or Greece with a percentage point of 60 %, Latvia (57 %) and Hungary (53 %), most of the companies have a low DII; this fact shows that there are no investments in digital technologies sufficiently extensive or complex, unfortunately insufficient for these economies (Figure 1).

The European Commission has big plans; on the other hand, of the assumed objectives, it is desired that at least 90 % of small and medium-sized enterprises (SMEs) at the EU level should reach [in 2030 a basic level of digital intensity. What does this level mean? It means to use at least four types of technology to reach a minimum level of digitisation. In 2020, three out of five small and medium-sized companies, i.e., (60 %) from the entire European Union managed to reach at least a basic level of digital intensity, compared to 89 % of the companies analysed as large (Eurostat, 2021).

Comparing perhaps traditional efforts to bring about change when we talk about digital transformations, these are difficult enough to achieve and implement.

Transformations in organisations are always difficult, but when digital changes are attempted, it is even more difficult. The success rate for implementing and changing digital systems is low. Research shows that less than 30 % of the situations in which these processes are initiated are successfully completed. According to the analyses made by agencies such as McKinsey, digital transformations are difficult enough. The analysis shows that 16 % of respondents to the questionnaire said that their organisations' digital transformations have successfully improved performance or that they have done them to sustain long-term change. For 7 % performance confirms that it has improved; however, those improvements have not been sustained in the long term. Even companies that we assume have digital knowledge, such as high tech players or media and telecommunications companies, confirm that they "struggle" with the implementation and adaptation of technology in their work. Among these mentioned industries, unfortunately, the success rate of implementing digital technologies does not manage to exceed 26 percentage points. The instruments in which the technological challenge is more severe and does not exceed 11 percentage points and starts from 4 are instruments for the manufacturing of cars, the pharmaceutical industry, and the oil and gas industry. We note that the success rates can, of course, also vary depending on the complexity, the number of employees, and the size of the company. In companies with less than 100 employees, there are almost three times more chances to register a successful digital transformation that is not one-time but long-term than companies with more than 50,000 employees or even more. (McKinsey, 2018)

Even if a process and effort to change digitalisation in organisations is completed successfully or not, the results obtained can indicate a series of common denominators of the digital transformations of these times. First of all, we can say

that most companies choose to look inward when they decide to make such changes, this fact being supported in the study conducted by McKinsey and resulting in 68 % of those who answered. Less than half of their respondents stated that their goal was to launch or launch prototypes of new services or products, or to develop new and extensive partnerships through digital channels. Digital transformations also seem to tend to be large scale in an exhaustive manner. Eight out of ten say their change efforts involved either multiple functions across companies, business centers, or even all company departments. At the same time, the integration of technology, which we are discussing and analysing, plays an important role in terms of digital transformations. On average, respondents say that the companies they work in consider that they use an average of 4 out of 11 technologies, "traditional web tools being cited most often and used in the vast majority of these efforts". "At the same time, the results of successful transformations show that these organisations deploy more technologies than others. This might seem counterintuitive, given that a broader suite of technologies could lead to more complex execution of transformation initiatives and, therefore, to more opportunities for failure. But organisations with successful transformations are more likely than others to use more sophisticated technologies such as artificial intelligence, the Internet of Things, and advanced neural machine learning techniques." it is mentioned in the analysis made and cited here (Mckinsey, 2018).

A total of 5 billion people worldwide use the Internet today, a correspondent of 63 % of the total world population. Also, the number of Internet users is constantly increasing. The latest data shows that "the world's connected population grew by nearly 200 million in the 12 months to April 2022."

Currently, there are fewer than 3 billion people who remain "unconnected" to the Internet, with among these people located in South and East Asia and Africa. This aid that there is still a long way to go before humanity can achieve the goal of having access to anything, anywhere, anytime, and the quality of people's access to the Internet is also a very important aspect for everyone. However, Internet users continue to grow at an annual rate of over 4 %, and current trends suggest that two-thirds of the world's population should be online by mid-2023. In addition, the ongoing coronavirus pandemic continues to have a significant impact on Internet user research, so actual user numbers and growth rates may be higher than current data suggests. The vast majority of internet users in the world – 92.4 % – use a mobile phone to get information or connect online in the relaxation area, entertainment, or conversations with friends. For surfing the Internet, users connect mostly from mobile phones in a higher percentage than from desktops, laptops, computers, and similar devices. Although these figures are mainly for spending time, two-thirds of the active population with technology also use web versions for everyday work, more than ever in the recent remote work period (Digital Around the World, 2022).

4. Findings and Conclusions

In this work, the classical methods of analysis of various specialised works on the topic, research in specialised journals and books in the field were conducted. The

analysis was also carried out based on data from sources such as Eurostat. Data were extracted and interpreted according to the table above.

The data analysis and interpretation method was used. The data analysis period was carried out in the second part of 2022 and the beginning of 2023.

Technology (Machine Learning and Artificial Intelligence) is not only an infrastructure that can help develop products and services, but is an integral part of developing a strategy and anticipating the future.

Large companies must embrace technology and integrate it into decision-making, and also in defining strategies.

New programs based on Artificial Intelligence and Machine Learning can help teams formulate the most appropriate messages and develop innovative approaches based on a brief.

Also, in the development of visual concepts, technology helps to create images based on keywords sent to special programs.

From the automatic reading of a text, to the relief of repetitive work, technology comes to the aid of humans and companies.

Technology will be part of the areas of human education and will be indispensable at the workplace. Therefore, the economy will be impacted by technological development.

From accounting to the development of forecasts, technology will know how to automate systems and learn to make decisions on its own.

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Achieving Strategic Agility in the IT Industry through Scenario Planning

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Abstract

Today we live in a highly connected world, where change is unstoppable and unpredictable. Companies must navigate continuous challenges, explore future avenues, and survive in a highly competitive business environment. Taking into account the framework of turbulent changes, strategic agility has become an attractive opportunity for companies. Strategic agility represents the ability of a company to sense and respond to external change, providing a relevant response in a timely manner. In this respect, we aim to explore the use of scenario planning through the three dimensions of strategic agility: strategic sensitivity, leadership unity, and resource fluidity. Focusing on the IT industry in Romania, the paper outlines how strategic agility dimensions are applied with the help of the scenario planning method. The research questions follow a threefold approach, the paper aiming to determine what is strategic agility, the existence of a relationship between strategic agility and scenario planning, and how is strategic agility applied through scenario planning. The outcome aims to add valuable insights to the literature on the topic of strategic agility, its three dimensions, with application to IT through the support of scenario planning method. Thus, the paper's findings can be a guiding point for management teams in their decision-making endeavour, both in strategic and operational terms, fostering a wide view angle on possible opportunities to explore.

Keywords: strategic agility, scenario planning, IT industry, decision making, Romania.

JEL Classification: M10, O14.

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1. Introduction

In the context of continuous change, the business environment is highly volatile, and companies face numerous uncertainties. To properly manage market dynamics, companies must adopt a strategic approach in how they interact and respond to change. Additionally, research by Păunescu and Argatu (2020) underlines that the identification of risks and weaknesses, along with the appropriate communication of the efforts undertaken to stakeholders, can bring an increase in the financial performance of an organisation and protect its business value and the accumulation of competitive advantage.

In this respect, strategic agility enables companies to deal with such changes by sensing and responding quickly to them in an effective way. Kale et al. (2019) agree that agility is crucial for enterprises, especially when faced with changes, market risk, and uncertainties. Agility provides the relevant structure for managers and leaders to continue to maintain a flexible approach and adapt to internal and external environments. In addition, Tsilionis and Wautelet (2022) define agility as a multifaceted concept that encompasses both top-down and the bottom-up collaboration and is based on initiatives that can provide a rapid response when faced with organisational challenges. Moreover, agility is frequently associated with dynamic capabilities, meaning the abilities required to develop competitive advantages and expand through innovation.

Shams et al. (2021) highlight that dynamic capabilities encompass the main three attributes usually associated with strategic agility, namely strategic sensitivity, collective commitment, and resource fluidity. The authors acknowledge that organisations should be able to operate in a challenging environment and make decisions quickly, while being aware of internal dynamics in the firm and having the ability to reconfigure business structures and resource configuration. Furthermore, Adomako et al. (2022) reveal that dynamic capabilities do not refer only to improved firm performance, but also to organisational learning, as the ability to exploit opportunities is founded on the business response when faced with changing market circumstances. Leaders play a key role in understanding the challenges faced by the company and building the internal knowledge base through technological and networking capabilities, internal organisational culture, and its values as vital for improving the capabilities of strategic agility. In this sense, providing a clear direction on how the organisation configures internal and external knowledge is crucial. This is an important competency in management skills and an expression of overall organisation performance (Shams et al., 2021). Chan and Muthuveloo (2020) highlight that human capital development and high- performance systems, as well as the organisational culture, are major attributes of organisational capabilities. Having strong and firm organisational capabilities can help organisations better face a dynamic and challenging environment. Knowledge is the foundation of the organisational capabilities processes; therefore, organisations that are focused on the dissemination and interpretation of knowledge usually result in being more innovative and agile.

The capacity to adapt to market changes and identify opportunities in times of ambiguity is an important component of agility called strategic sensitivity. In order to develop competitive advantage, companies must prepare to participate in both local, national, and international markets. Agility is a concept usually defined related to the development of competitive advantage, as companies act in an agile manner when faced with a "variable and unpredictable environment". When looking to ensure agility adoption, companies should consider several factors, amongst which strategic partnerships, high quality, flexibility, and adaptation to change (Kale et al., 2019). Technological capabilities are crucial for the competitive advantage achieved by the organisation. Firms that have good performance in this sense can better foster innovation and perform several internal activities more efficiently. In addition, the networking capability provides an advantage for companies to gain access to more resources and achieve better communication with different partners. Furthermore, the authors agree that having strong networks is beneficial for organisations when faced with challenging market contexts. Having fruitful relationships with suppliers and customers can help companies overcome market difficulties and better exploit market opportunities (Adomako et al., 2022).

Arsawan et al. (2022) describe several indicators used to measure organisational agility. These include having the capacity to take advantage of opportunities in the market, 'exhibit sensitivity to environmental changes', and increase the speed of decision-making. All of these metrics are connected to dynamic capabilities that have resulted from managerial competencies and the implementation of internal collaborative processes. Strategic flexibility is deeply based on dynamic perceptions of the market and the ability to influence resources. Resources are in turn influenced by the knowledge flow existing within the organisation, and scholars agree that the companies that manage to increase the value of organisational knowledge can achieve stability and become more innovative faster. Strategic partnerships provide a series of benefits to companies by helping them meet early customer expectations and introduce new products in a timely manner. Several scholars acknowledge that agility is directly correlated to human performance, the technologies, and processes within the firm. In this sense, three metaskills are identified, namely strategic sensitivity, leadership unity, and resource fluidity. Strategic sensitivity encompasses a thorough understanding of the environment, and this concept ensures that agility is correlated to firm performance. By being aware of the changes within the market and being able to assess information quickly, businesses 'can gain competitive advantage and improve their performance' (Kale et al., 2019).

Doz and Kosonen (2008) also introduced strategic agility as an ability of the company to sense and react to changes taking place within the business environment. The authors advise that strategic agility is a generic concept, which can be enhanced through three key dimensions: strategic sensitivity, resource fluidity, and leadership unity.

As companies aim to stay ahead of competitors, it is critical to ensure consistency and capture market opportunities, including during turbulent times. The current paper focuses on the first dimensions of strategic agility, strategic sensitivity,

which in the acceptance of Doz and Kosonen (2010) allows companies to sense change through superior anticipation approach. Given this, scenario planning represents a way to achieve strategic agility by providing an outlook on various decision-making options.

The purpose of this paper is to answer the following research questions: (1) What is strategic agility? (2) Is strategic agility related to scenario planning? (3) How is strategic agility applied through scenario planning? The paper opens with an overview of the literature, emphasising key theoretical insights about the topic, followed by methodology which describes the research method used and its implications. Next, the paper outlines the findings of the analysis and main takeaways in the conclusion section.

2. Problem Statement

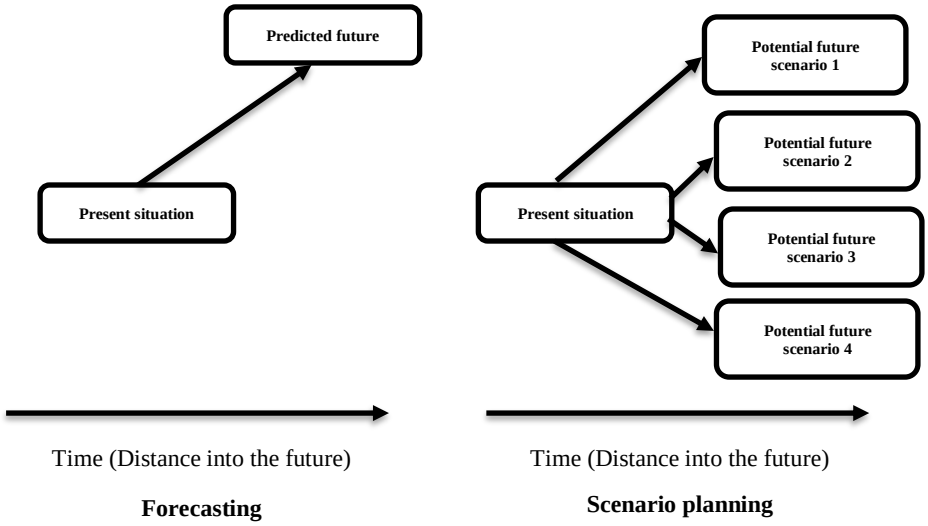
As companies experience various changes over their life cycle, they need to acknowledge the impact of change and how they can mitigate its generated risks and turn unexpected change into opportunities while staying relevant and competitive within the business environment. Christofi et al. (2021) advise that strategic agility represents a concept that is used cross-industry, but considering it is widespread, there are still gaps to be covered by the literature. However, the authors indicate that in recent years there has been increased interest in the topic. The same view is supported by Elali (2021) who argue that recent worldwide events such as the global pandemic or the global financial crisis from 2008 have provided evidence that anytime the business environment can face unexpected change. The author advises that strategic agility represents a tool to successfully manage change, help companies navigate across uncertainty, and extract value from unexpected situations. The current paper aims to fill the gap of using strategic agility through scenario planning for IT companies. At the same time, Varum and Melo (2010) advise that there is a gap in research when it comes to scenario planning application in business, hence the authors encourage researchers to explore the topic and recommend its use mostly to corporate environments.

Doz and Kosonen (2008) note that strategic agility embeds three dimensions: strategic sensitivity, resource fluidity, and leadership unity. According to the authors, strategic sensitivity represents a company's ability to sensing opportunities and risks and frame them in a strategic manner as a response to change. When it comes to resource fluidity, Doz and Kosonen (2008) indicate that it is an ability of the company to mobilise and reshuffle resources to secure efficient reaction to change. Furthermore, the authors advise that leadership unity, the third dimension of strategic agility, complements strategic sensitivity and resource fluidity, and represents the ability of the company to secure collective commitment through the contribution of leadership teams.

Further on, scenario planning is regarded by Doz (2020) as a way to enable strategic sensitivity and achieve strategic agility. The author indicates that scenario planning, together with anticipation and experimentation, allows companies to have a wider perspective on how to approach upcoming changes and properly assess

decision making. Dean (2019) makes a clear distinction between scenario planning and forecasting. This difference between the two approaches is reflected in Figure 1:

Figure 1. Distinction between forecasting and scenario planning



Source: Authors' own representation adapted from Dean (2019).

As outlined in Figure 1, Dean (2019) advises that forecasting and scenario planning should not be confused, as forecasts provide a single-point perspective of the future, while scenario planning provides multiple angles of potential future outcomes. The same view is supported by Peterson et al. (2003), who indicate that forecasting focuses on a particular perspective, while scenario planning is a more complex method, which encourages creativity and broadens the perspectives over a situation.

It is significant to note that valuable pivotal research on the topic of scenario planning was brought about by Schoemaker (1995). The author's work continues to remain relevant and timeless, as his research mixes theoretical and practical perspectives on scenario planning. In the view of Schoemaker (1995), scenario planning represents a creative tool to explore the future, opening opportunity for strategic thinking and rational decision making. The author advises that scenario planning can help companies during both regular business decision times, but it can make a significant difference when prepared in anticipation of crisis situations. According to the author, scenario planning provides key alternatives for exploration, which can consider both favourable and more challenging times for a company. As a result, Schoemaker (1995) considers that scenario planning enables strategic preparation and unlocks proactive thinking for managerial teams.

3. Research Questions / Aims of the Research

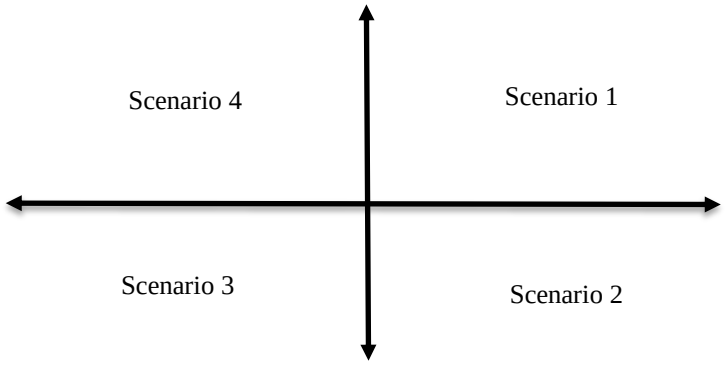
According to the valuable research insights summarised previously, the paper aims to provide an answer to three research questions: (1) What is strategic agility? (2) Is strategic agility related to scenario planning? and (3) How is strategic agility applied through scenario planning?

The research questions are formulated by referring to research by Dean (2019), who underlines a differentiation between forecasting and scenario planning. In addition, the paper's aim is constructed based on Arsawan et al. (2022), who argue that the organisations which can boost the utility of their organisational knowledge can attain innovation at a faster pace. A supplementary basis for research questions' formulation is provided by research on the conceptualisation of strategic agility, scenario planning, and the utility of scenario planning in the fulfilment of strategic agility (Christofi et al., 2021; Doz, 2020; Doz, Kosonen, 2008; Doz, Kosonen, 2010; Schoemaker, 1995).

4. Research Methods

For the current paper, the author has used Dean (2019) to apply scenario planning as a research method. The first step of the scenario planning method is *Scoping*, where certain assumptions must be developed to serve as a scope of work in analysing what potential scenario might occur. Secondly, the *Information search* step helps to identify additional data and details about the assumption defined under the first step of scenario planning, which may be coupled with identifying certain *Trends or uncertainties* step while conducting the analysis. As per Dean (2019), the key stage of scenario planning process is represented by the *Scenario building* step. Under this milestone, the author advises that scenario planning can encompass up to eight or more scenarios, but the most recommended number of scenario planning is four, also known as two-axes scenario planning. The below Figure 2 outlines this model of scenario planning.

Figure 2. Scenario building with two-axes scenario planning



Source: Authors' own representation adapted from Dean (2019).

It is significant to note that Dean (2019) encourages the use of two-axes scenario planning to limit the number of scenarios developed and to provide a more concise and focused approach on possible alternatives in securing a relevant decision. The last two steps of scenario planning process as per Dean (2019) represent *Strategy definition* and *Monitoring* steps. Through these two steps, one may ensure that the scenarios developed contribute as actual input to strategy development. At the same time, monitoring the evolution of defined scenarios over time is critical in securing a proper wrap-up of this research method.

As per Weigel and Ruecker (2017) an area where scenario planning is applied is represented by the procurement process. Nielsen and Saha (2018) confirm the applicability of scenario planning in the case of the procurement process. In this respect, for the current paper, using Dean (2019), the authors aim to outline the use of scenario planning as a way of to achieve strategic agility in the case of a potential procurement investment of a large IT company operating in Romania. For clarity, the procurement process proposed by Weigel and Ruecker (2017) is summarised in Figure 3:

Figure 3. Procurement process

Source: Authors' own representation adapted from Weigel and Ruecker (2017).

According to Weigel and Ruecker (2017) the procurement process is founded with identification of a need or demand of the company. The next steps of the process, tendering, and evaluation of tendering seek to gather input from external vendor, which is analysed based on evaluation criteria developed by the company to secure best decisions for business award to vendors. Further on, Weigel and Ruecker (2017) claim the following steps of the procurement process refer to the actual execution of the selection decided within award step. Under these milestones, purchase orders are created and sent to selected vendor, then followed up bilaterally by the company and vendors, which receive these purchase order requests.

A similar view is shared by Varum and Melo (2010), who indicate that scenario planning represents an approach embraced by managerial teams in developing strategy across business processes. According to the authors, applying scenario planning on a business process may provide a pre-experience of the impact of a potential change and a key business decision. Despite its wide usage across various situations, Varum and Melo (2010) advise that in business, scenario planning can represent a support in analysing various options to ensure best decision. Peterson et al. (2003) agree with Varum and Melo (2010) and indicate that scenario planning represents a useful tool to managers, leaders, and in general to key decision makers, helping them to balance on various options before selecting a final direction for their challenge.

Tapinos (2013) argues that scenario planning represents a method that is embraced by corporate companies, as it simplifies complex decision making. As advised by the author, this method enables managerial teams to have a clear overview on potential outcome decisions. It provides leaders with the possibility to strategize without any commitment and understand opportunities and risks available for each option. A similar view is shared by Chermack et al. (2001) who advise that scenario planning is used by large companies to manage uncertainty. According to the authors, scenario planning is used by corporate companies as an opportunity to learn and explore, which contributes to enhanced competitive advantage.

5. Findings

To begin with, under *Scoping*, following the first step of scenario planning as per Dean (2019), the author introduces a scope of work, summarised in the below Table 1. According to Weigel and Ruecker (2017), in procurement, this step is also known as assessment of demand.

Table 1. Assumption for Scoping step

Scope of work
Company needs: An IT multinational company operating in Bucharest, Romania, intends to renew by May 2024 all the laptop devices used by its employees through a consolidated investment.
Volume: 4,500 laptops
Countries in-scope: 35 countries
Timeline: May 2023-December 2023
Models' distribution: Standard performance=1500 High performance=2500 Premium performance=500
Decision forum: IT Department, Procurement Department, Executive Management
Objectives and wanted position: Commercial: a) Secure standard price for all devices across locations. b) Reduce the allocated budget through consolidated investment. c) Signed contract with selected vendors. Technical: d) Level 3 support across all locations.
Candidates: Invite top five suppliers in the market.

Source: Authors' own representation.

Next, Dean (2019) recommends the use of *Information search* step for scenario planning, while Weigel and Ruecker (2017) recommend the use of *Tendering* for procurement. Starting with the above assumption of the scope of work, multiple vendors can be invited to provide their proposals to these requirements. To help in projecting the best possible alternatives, both Dean (2019) and Weigel and Ruecker (2017) recommend having an analysis step. It may be *Trends and uncertainty* step

or *Tender evaluation* as per Weigel and Ruecker (2017). The authors recommend the use of a generic and objective evaluation matrix based on the requirements defined under the *Scoping* step. In the case of the current paper, an evaluation matrix may be developed as follows, per Table 2:

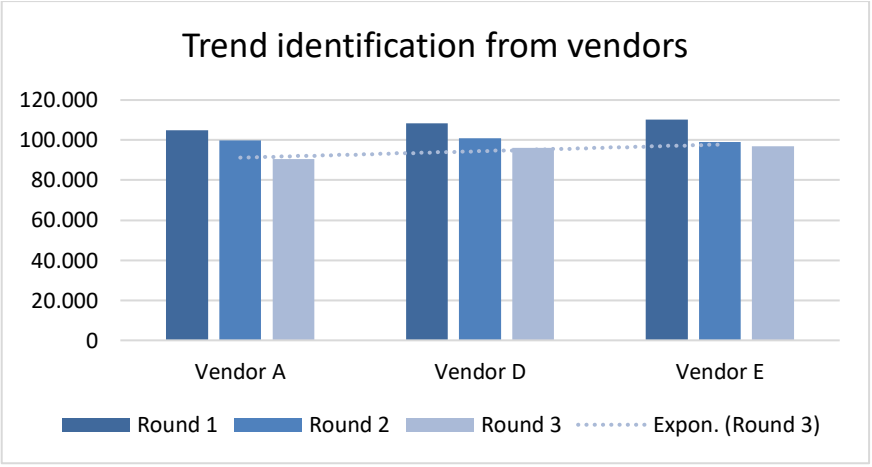
Table 2. Evaluation matrix

Criteria		Vendor				
		A	**B**	**C**	**D**	**E**
Price	Round 1	105,000	116,250	116,250	108,500	110,250
	Round 2	99,750	113,500	113,500	101,000	99,000
	Round 3	90,500	113,500	113,500	96,000	97,000
Budget		Yes	Yes	Yes	Yes	Yes
Contract		Yes	No	No	Yes	Yes
Support		Yes	No	No	Yes	Yes

Source: Authors' own representation.

As advised by Dean (2019), building on the work of *Scoping* and *Information search* steps, the below trends may be observed in the tendering behaviour of the vendors. Figure 4 outlines that in round 3, vendor A provided the lowest proposal, followed by vendor D and E, which have close proposals.

Figure 4. Trend identification in scenario planning

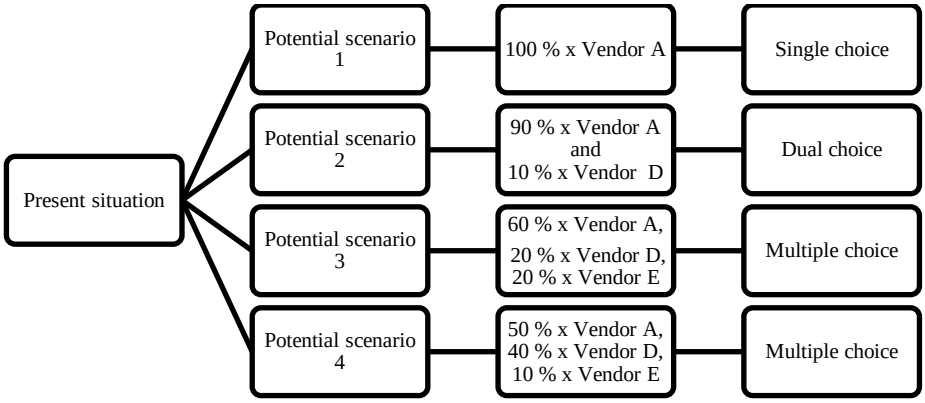


Source: Authors' own representation.

Based on the above data, as per Dean (2019), one can develop *Scenario building* step, and according to Weigel and Ruecker (2017) the *Awarding* step may be decided based on the available options defined as potential future scenarios. In this respect, multiple award options may be considered. It is significant to note that some vendors, such as vendor B and vendor C, do not meet all the criteria of the evaluation matrix, and hence they will be excluded from the scenario planning analysis due to the lack

of compliance with the company's requirements. The building of scenario planning has been shown in Figure 5:

Figure 5. Scenario planning building



Source: Authors' own representation.

As outlined above, starting from a defined assumption, scenario planning enables the development of multiple perspectives. In this case, the company may select either a single vendor to invest from or follow a dual and multiple source strategy. In line with Dean (2019), scenario planning provides various commercial alternatives which may be generally explored by any company which is looking to secure efficient decision making for financial investments. These options for commercial decision in the case of an IT company may serve as guidance for other leaders faced with similar decisions about their investment in technology and not only.

Weigel and Ruecker (2017) argue that through negotiations, tendering can be improved and contribute to a more cost-effective investment. Coupled with scenario planning, the company may assess the costs incurred for each potential future scenario, together with evaluating other selection criteria defined in-house. Nielsen and Saha (2018) confirm that mapping scenario planning in procurement can outline to managers the opportunity of a potential unexploited choice, and it can be carefully reviewed without bringing any risks to the business.

Depicting the utilization of scenario planning in an IT organisation operating in Romania and conducting a procurement process for laptop device renewal, the paper confirms previous research (Christofi et al., 2021; Elali, 2021; Varum, Melo, 2010), who claim that organisations may be subject to unexpected modifications anytime and that research on strategic agility and the applicability of scenario planning in business presents gaps to be filled. Secondly, the paper's findings are in line with studies recognising the high utility of organisational knowledge, strategic agility, scenario planning and the identification of risks and weaknesses in learning and reaching competitive advantage (Arsawan et al., 2022; Chermack et al., 2001; Dean, 2019; Doz, 2020; Doz, Kosonen, 2008; Doz, Kosonen, 2010; Kale et al., 2019; Păunescu, Argatu, 2020; Schoemaker, 1995; Tapinos, 2013).

6. Conclusions

Navigating in conditions of uncertainty demands organisations to assess all possible outcomes of a strategy and choose the one with the highest added value. Research holds that displaying continuous concern in this sense is a differentiator between proactive organisations and slow-paced ones. Firstly, the paper aimed to outline what strategic agility represents. With the help of Doz and Kosonen (2010), the authors introduced the definition of strategic agility, together with its key dimensions: strategic sensitivity, resource fluidity, and leadership unity. At the same time, scenario planning has been presented as a method to achieve strategic agility. Based on Dean (2019), the authors presented how scenario planning can be used in combination under the assumption of an IT company investment driven through the procurement process. This approach shows that scenario planning is a versatile method that offers multiple perspectives for a given situation and allows decision making.

The authors recommend that the scenario planning proposal introduced through the current paper can serve as a reference for managerial teams facing decision making on both strategic and operational decisions, especially in the IT industry. Using scenario planning, one can sharpen its awareness on potential opportunities and risks, having a wider view on multiple potential cases which can be explored prior to execution.

At the same time, the current paper aims to contribute to the literature gap on the topic of scenario planning identified by Varum and Melo (2010), who highlighted the insufficiency of research on the applicability of this instrument in the business context. The findings of the paper indicate the potential effects of scenario planning in procurement as a business process. Furthermore, this approach may introduce a greater understanding of the potential contribution of the scenario planning method in the development of a sustainable strategy and the addition of confidence in decision-making.

A research limitation of the paper is the sole focus on the procurement process of the IT organisation that was the subject of the research, and the non-inclusion of other processes performed by the organisation.

Further research may explore the implementation of the scenario planning tool in procurement activities conducted by other organisations operating in the IT field in Romania.

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The Impact of Artificial Intelligence on Employment in the European Economy

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Abstract

In recent years, the influence of artificial intelligence on economic systems has garnered considerable attention. The current state of the scientific literature on the topic shows that artificial intelligence has effects on productivity, employment, income distribution, and economic growth. It also influences several economic sectors, including manufacturing, transport, customer service, finance, and banking. On the one hand, artificial intelligence has the potential to significantly increase productivity and efficiency, which can result in economic growth. However, artificial intelligence also has the potential to disrupt employment and lead to income inequality. This paper examines the effects of artificial intelligence on employment by using the qualitative methods of the case study and document analysis. Moreover, data mainly sourced from Eurostat is analysed. The findings indicate that artificial intelligence has the potential to considerably boost productivity and economic growth, but may also result in job displacement and wealth disparity. In addition, the results show that artificial intelligence contributes to the automation of jobs and the creation of new ones. Furthermore, the impact of artificial intelligence on employment depends on the economic sector in which it is implemented.

Keywords: artificial intelligence, employment, European economy, productivity, income distribution, economic growth.

JEL Classification: E24, O31.

1. Introduction

Throughout the previous years, a marked escalation in artificial intelligence has emerged that has significant implications for global financial structures. Diverse assessments have scrutinised how this technological innovation influences productivity increase and marketable opportunities while equally regulating income distribution as well as economic growth overall. Analysts of all sorts, from academia

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to governmental sectors alongside businesspersons, are meticulously watching over the integration of artificial intelligence across various industries.

As the progression of artificial intelligence technology persists, concerns about its influence on jobs and wealth disparity has become substantial. Artificial intelligence has the opportunity to greatly increase productivity and proficiency, which may lead to economic growth. Despite this possibility, it also presents a chance to lower employment rates and augment inequality in income distribution. The effect of artificial intelligence concerning work opportunities is not consistent amongst sectors of activity; thus, policymakers must analyse individualised impacts within each sector to proceed appropriately with intervention plans.

This paper analyses the impact of artificial intelligence on employment in the European economy, proving that artificial intelligence has the potential to considerably boost productivity and economic growth, but may also result in job displacement and income inequality.

Moreover, the paper shows that artificial intelligence contributes to the automation of jobs and the generation of new ones and that the impact of artificial intelligence on employment depends on the economic sector in which it is implemented.

This paper also comes forward with a case study on the effects of artificial intelligence in the manufacturing sector, namely, Siemens' Factory of the Future.

2. Problem Statement

The swift progression of artificial intelligence holds significant consequences for global economic welfare. Researchers have been extensively studying how it can impact employment, income allocation, productivity, and overall financial expansion. Multiple evaluations conducted by experts such as Acemoglu and Restrepo (2019) and Brynjolfsson et al. (2018) conclude that diverse industries can benefit from increased productivity levels of employees alongside enhanced profitability, leading to boosted economics through artificial intelligence utilization.

As per academic research, the utilization of artificial intelligence technology has led to certain professions being rendered obsolete, particularly those that require monotonous and repetitive tasks (Autor, 2015; Frey, Osborne, 2017). Workers who may lack adaptability skills could face grave difficulties in discovering new employment opportunities, persistently widening income inequalities, and increasing job losses along the way (Arntz et al., 2016; World Economic Forum, 2018). Furthermore, it should be noted that artificial intelligence's impact on various sectors is not uniform or proportionate; some are more susceptible to displacement than others (Brynjolfsson et al., 2018).

It is imperative for policymakers, business leaders, and academics to comprehend the implications of artificial intelligence on employment opportunities, as well as income distribution. Several research studies have explored policy measures such as training programs aimed at helping workers adapt better to changing job markets while simultaneously reducing inequality in wages (Frey, Osborne, 2017; World Economic Forum, 2018), recognising that inclusive growth necessitates

active intervention from national governments. Others (Acemoglu, Restrepo, 2019; Brynjolfsson et al., 2018) highlight how vital it is for authorities to undertake steps proactively that promote development across all sectors while ensuring that the advantages of artificial intelligence are widely disseminated.

Artificial intelligence is making a formidable impression in pivotal domains, specifically manufacturing, transportation services, customer services, the financial sector and the banking sector.

The manufacturing sector has incorporated artificial intelligence to streamline production by adopting automated quality control measures, predicting equipment maintenance requirements, and managing inventory in real time. Consequently, the application of artificial intelligence leads to increased productivity rates coupled with reduced costs while maintaining an increased level of product quality, as outlined by Renner (2020).

Within the transportation sector, artificial intelligence has become a valuable tool for improving safety and optimising traffic management. With this innovative technology at their disposal, autonomous cars can now operate with greater efficiency while minimising fuel consumption. Furthermore, intelligent transportation systems have been developed using artificial intelligence in various sectors, such as smart traffic control mechanisms to predict vehicle maintenance issues in advance and provide immediate demand-responsive transport services, among others (Gray, 2022).

The employment of chatbots, virtual assistants, and recommendation systems that harness artificial intelligence is becoming more widespread in customer care to heighten customisation while expediting service delivery in a bid for enhanced interaction with customers (Chinn, 2023).

The use of artificial intelligence has also been increasingly observed in the banking and financial sectors, primarily for purposes such as customer relationship management, risk evaluation, fraud identification, and investment choices. This utilisation of artificial intelligence-based algorithms leads to improved precision levels and efficacy ratios while simultaneously boosting client satisfaction rates. Real-time monitoring protocols can track financial transactions seamlessly; credit scoring standards can also be discharged expeditiously through these mechanisms. Investment portfolio supervision activities have thus become more methodical due to swift responses hinged on automatic decision-making processes fuelled by artificially intelligent systems (Joshi et al., 2022).

The report "Future of Jobs" by the World Economic Forum (2018) highlights that artificial intelligence is increasingly being utilised in various economic domains, which could lead to alterations in employment opportunities and skills development. Also, a statement titled "Artificial Intelligence for Europe" (European Commission, 2018) reinforces how artificial intelligence can have an immense influence over multiple sectors of the economy and urges responsible use aligned with ethical standards pertaining to this technology.

Despite thorough research on the effects of artificial intelligence on employment and income distribution, there is a gap in understanding its precise implications for

the European economy. It is crucial to conduct specialised investigations into artificial intelligence's repercussions specific to Europe since most available literature focuses either globally or at country levels.

The purpose of this paper is to address the research gap on the impact of artificial intelligence on employment and income inequality in Europe. The focal point will be identifying which sectors are most affected by artificial intelligence as well as its influence on job creation and displacement within the European landscape. By exploring these topics through a European lens, this article contributes knowledge that offers valuable insights into how artificial intelligence elicits outcomes within this context.

The article's focus on the European economy renders it significant. This examination will impart a more intricate perspective of artificial intelligence's impact within Europe in contrast to earlier studies that examined its influence at either global or country-levels with regard to earnings and job distribution.

3. Aims of the Research

Through the synthesis of primary sources and the pinpointing of areas for further exploration, this paper aims to furnish a thorough analysis regarding the influence of artificial intelligence on job opportunities and income distribution in Europe.

Furthermore, its purpose is to discern the sectors within the European economy that experience detrimental or advantageous effects caused by artificial intelligence. These impacts are described in terms of job losses and employment generation.

Finally, this paper seeks to analyse the impact of progress in artificial intelligence on employment and income distribution within specific industries.

4. Research Methods

This paper examines the effects of artificial intelligence on employment by using the qualitative methods of the case study and document analysis, as well as statistical data.

The utilisation of the qualitative case study approach in research offers several benefits, including the provision of an in-depth perspective on a specific scenario and adding a valuable example to affirmations made beforehand.

To collect data, a diverse range of literary sources, scholarly articles, and research articles were used as corroborative evidence.

The statistical data utilised in this paper was primarily sourced from Eurostat (2022), the World Economic Forum (2017, and 2018), and the European Centre for the Development of Vocational Training, shortened CEDEFOP (2021). Subsequently, the data was analysed to identify the underlying patterns.

5. Findings

The World Economic Forum (2017) states that artificial intelligence is transforming industries and affirms that this technology is projected to add

$16 trillion to the global economy by 2030. Thus, artificial intelligence has the potential to greatly contribute to economic growth.

The potential impact of artificial intelligence on wages, income distribution, and economic inequality is a topic of concern due to its potential for disruption.

The increasing demand in sectors that develop or thrive due to the use of artificial intelligence leads to the need for proficient personnel with artificial intelligence proficiency. This may result in a growth in their remuneration, whereas a considerable number of individuals could encounter a reduction in wages or even experience joblessness. The impact of artificial intelligence on mid-skilled workers is a concern, as their wages may be subject to downward pressure (Korinek, Stiglitz, 2017). This is due to the comparative advantage of high-skilled workers, who not only demonstrate greater productivity by using artificial intelligence but also possess the ability to perform a greater number of tasks. The alterations in labour demand may potentially exacerbate the distribution of income by influencing aggregate wages. As artificial intelligence solutions increasingly replace repetitive labour, there is potential for a concomitant increase in productivity and overall income growth, albeit with a corresponding rise in inequality.

According to the report "Use of artificial intelligence in enterprises" published by Eurostat (2022), the implementation of artificial intelligence within commercial organisations situated in the European Union has undergone a magnified trajectory during recent years, with 8 % of businesses in the European Union having incorporated artificial intelligence technologies in 2021.

Moreover, large businesses in the European Union employed artificial intelligence technologies in 28 % of cases in 2021, and businesses in the technology and communication sectors used artificial intelligence the most in the same year.

Furthermore, 53 % of businesses in the European Union that employed artificial intelligence in 2021 bought commercial ready-to-use artificial intelligence systems or software. Thus, there is a high interest in new technologies in the European Union.

According to Eurostat (2022), certain economic activities exhibit a higher degree of reliance on artificial intelligence compared to others. This observation suggests that artificial intelligence may be of greater significance in specific tasks or endeavours.

The year 2021 witnessed a noticeable prevalence of enterprises utilising artificial intelligence in the information and communication sector, accounting for 25 %, and professional, scientific, and technical service activities, accounting for 18 %. In all other economic activities, the proportion of enterprises utilising artificial intelligence was less than 10 %. The percentage values varied across different sectors, with the highest being 9 % for electricity, gas, steam, air conditioning, and water supply, and the lowest being 5 % for transport and storage, as well as construction.

Some occupations are more susceptible to automation than others. Occupations that are highly susceptible to automation are those that involve a substantial proportion of tasks that can be automated, such as the operation of specialised technical equipment, routine tasks, or non-autonomous tasks. Additionally, occupations that place less emphasis on communication, collaboration, critical

thinking, and customer service skills are also at greater risk of being taken over by artificial intelligence. This would be the main cause of job destruction.

As per a recent report by CEDEFOP (2021), the European Union observed a significant automation risk in certain occupations in the year 2020. The top three occupations that were identified as being at high risk for automation were subsistence farmworkers, handicraft and printing workers, and other manufacturing workers. In contrast, the jobs that were found to be the least prone to automation were those of business managers, CEOs, officials and legislators, and technical managers.

Additionally, as reported by CEDEFOP (2021), the European Union's top three occupations with a high risk of automation between 2020 and 2030 are represented by cleaners and helpers, construction workers, and sales workers. Some of the occupations with the lowest risk of automation between 2020-2030 are ICT technicians, forest and fishery workers, CEOs, officials, and legislators.

The main conclusion that can be drawn from these statistics is that jobs in the manufacturing sector are more susceptible to automation than others.

As of late, the manufacturing sector has seen swift transformations owing to state-of-the-art technologies. Among these advancements is one that stands out: artificial intelligence being integrated into factories.

Siemens AG (Siemens) is a multinational technology corporation. Its activities encompass the fields of electrification, automation, and digitalisation. The firm creates, develops, and manufactures items, as well as installs complicated systems and projects. It also offers a wide variety of customised solutions for specific needs. Siemens spearheads the revolution of artificial intelligence's integration into factories with their "Factory of the Future" (Ohr, 2021).

The Siemens Factory of the Future embodies a transformational deviation from customary manufacturing practices, where artificial intelligence is utilised to empower independent and self-educating mechanisms that refine production procedures and augment efficiency. An imminent outcome of artificial intelligence implementation in this factory involves its capability to harness voluminous data sets along with machine learning algorithms for actionable insights as well as predictive analytics. Through real-time analysis applied to extensive pools of information obtained via sources like machines, sensors, and/or production lines, artificial intelligence can recognise patterns and trends while detecting anomalies, fostering proactive decision-making, and outputting preventative measures optimised towards minimising downtime and enhancing productivity effectively.

Moreover, cognitive capabilities embedded in artificial intelligence have revolutionised the Siemens Factory of the Future. Robots and machines are now able to perceive their surroundings, reason logically, and make informed decisions based on the facts presented before them. This has given rise to a new age of collaborative robots, or cobots, that can operate safely alongside humans by helping with various tasks such as assembly work, packaging activities, and quality control assignments with ease. Cobots that feature artificial intelligence integration possess dynamic learning abilities through human interactions, allowing them to adapt appropriately

while handling changing production requirements. This results in enhanced precision levels and flexibility within manufacturing processes, thus always leading to very good performance outcomes.

One notable influence of artificial intelligence within the Siemens Factory of the Future is its capacity to attain elevated degrees of customisation and personalisation in manufacturing. By means of digital twins – computer-generated duplicates that capture all physical properties and procedures and are endowed with intelligence coming from artificial intelligence – production scenarios can be simulated, tried out for new designs, and performance validated before actualising them physically. Consequently, reducing waste material and increasing tailor-made products while meeting client requirements simultaneously results in improved consumer satisfaction levels along with augmented competitiveness on the part of manufacturers.

Nevertheless, the Factory of the Future's employment of artificial intelligence technology creates ethical issues that must be addressed regarding data confidentiality, safeguarding sensitive information from privacy invasion, and its effects on labour. It is imperative to secure trust by making certain that these systems are transparent and accountable while ensuring compliance with regulations and standards in order for them to gain extensive acceptance in manufacturing circles.

6. Conclusions

In conclusion, the implementation of artificial intelligence has the capacity to significantly enhance productivity and foster economic expansion; however, it can also lead to the displacement of jobs and the exacerbation of wealth inequality.

Furthermore, artificial intelligence plays a role in both job automation (which leads to job losses) and the creation of new jobs.

The influence of artificial intelligence on labour depends on the sector in which it is integrated. The manufacturing sector is more prone to automation than other sectors, a fact that is also supported by the example of Siemens' Factory of the Future.

The limit of the results of this paper is that the data employed come from years other than 2023 (the year in which this paper was written), but the results are still pertinent, as this paper offers an overview of the impact of artificial intelligence on employment in the European economy, an impact that must be measured over multiple years.

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Investigating the Effectiveness of Digitalisation on SMEs Performance: The case of Western Balkans

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Abstract

This study aims to assess the level of digitalisation of Small and Medium Enterprises (SMEs) and its influence on the economic performance of SMEs in Western Balkan countries. We use panel data from Enterprise Surveys (ES) for the years 2018 to 2020 to address the study topic. The European Bank for Reconstruction and Development (EBRD), the European Investment Bank (EIB), and the World Bank Group (WBG) collaborated on the survey. The selected countries are Albania, Bosnia and Herzegovina, North Macedonia, Kosovo, and Montenegro. The questionnaire helps us comprehend the challenges faced by businesses in the private sector. The performance of SMEs is the dependent variable used in the empirical analysis. Sales and labour productivity are the variables used in our article to assess the performance of the organisation. The vector of independent variables, on the other hand, consists of information about the enterprise's age, size, ownership structure, legal status, accessibility to formal banking services, and ownership by gender. Moreover, we will concentrate on the ES questions below to estimate the degree of digitisation of SMEs: (1) Does the establishment have its own website? (2) Started or increased business activity online? (3) Started or increased remote work arrangement for its workforce? Preliminary empirical research results have shed light on the positive effect of digitalisation on firms' performance. However, the magnitude and statistical significance are different among the countries included in the sample.

Keywords: firm performance; digitalisation; innovation; entrepreneurship.

JEL Classification: L25, L26, J23, L21.

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1. Introduction

With the development of the first computers, there has been a process known as "digital transformation." These inventions enabled the need to adopt innovative perspectives and insights from international actors in business and society.

Some firms have quickly adopted new technology to make better their operational and strategic goals, while others have lagged due to outdated business models, rigid organisational structures, and a lack of an innovative mindset.

The effects of internal management models and service digitisation will drive firm growth to a turning point. The recent COVID-19 outbreak turned out to be the driver for society's overall search for new channels for sharing expertise, goods, services, etc. That led to the emphasis being placed on new viewpoints, including how to incorporate a new understanding into their sustainability business strategies in addition to how to survive the present situation. The society was not prepared to face these new demands because the pandemic was an unpredictable situation. The companies encountered difficulties since the adoption of new technology was a quick process; staff were shown the new tools one day and required to use them the next. As a result, there was a significant amount of pressure on everyone in the circumstance. Even before the epidemic, there was pressure, but it took time for people to accept and be aware of the benefits that digitisation provides.

Numerous researchers have examined and investigated the effect that digitalisation has on performance and productivity at both the micro and macro levels in their studies. Our study focuses on the Western Balkans because their total measurements have not yet been discovered. Although having a large impact on the economy of the region, the majority of the businesses in this area are organised as SME. Even though there are fewer businesses here than in other parts of Europe, it is still crucial to look at how much digitalisation is being adopted and what impact it is having, especially because some of the neighbour countries have made some steps toward becoming EU members.

2. Problem Statement

Small enterprises are the foundation of the Western Balkan economies and serve as a bridge for their economic convergence and path toward EU membership, according to the annual Report from the Western Balkans Enterprise Development and Innovation Facility (WB EDIF) for the year 2022. Between 60 % and 80 % of the region's working population is employed by small and medium-sized enterprises (SMEs), which is more than is average for the EU.

During the pandemic, SMEs counted 99.8 % of all enterprises and 81.9 % of the working population in Albania. Most SMEs were in the tourism and food services, as well as trade sectors, and were hit hardest during this period (European Commission, 2021).The 102,405 micro, small, and medium-sized enterprises in Albania constituted 99.8 % of all enterprises in the country's economy in 2020. The trade sector anticipates the greatest growth in SMEs' activity throughout 2020 (39 %), followed by the recently created categories

of accommodation and dining (16.4 %) and transportation, information, and communication (8 %). (INSTAT, 2022).

In Bosnia and Herzegovina, the categorisation of SMEs differs throughout the economy. The 31 726 SMEs in Bosnia and Herzegovina constituted 99.46 % of all enterprises in the country's economy in 2020. SMEs accounted for 63.14 % of business sector employment in 2020. (Statistical offices of the FBiH and the RS, 2021). Employment size is the only principle to classify SMEs for Kosovo. In Kosovo, there were 91.9 % microenterprises, 6.8 % small, 0.15 % medium-sized businesses, and only 0.66 % large businesses in 2020. SME employment expanded well as, comprising nearly 75.5 % of all employment in the economy. (Kosovo Statistics Office). In Montenegro is used the standard definition of SMEs by employee size, but differ on the other criteria concerning annual income and assets. With 48 % of all SMEs in the economy concentrated in the distributive trade sector, which includes wholesale, retail, and the repair of cars and motorcycles, this sector has experienced the largest decrease in business activity since 2017.

In 2020, 99.3 % of North Macedonian enterprises were micro and small companies, 0.6 % were medium-sized enterprises, and only 0.1 % were large enterprises (MAKStat, 2021). Micro, small, and medium-sized firms (MSMEs) employed 74 % of North Macedonia's formal workforce in 2020 and produced around 68 % of the sector's overall value (MAKStat, 2021).

Almost all the countries refer to the same way how they classify SME, conform EU standards with any exception due to accounting indicators like turnover and asset size.

2.1 Digitalisation and Performance

The process of organisational transformation through the adoption of digital technologies is known as "digitalisation" (Sebastian et al. 2017; Vial 2019). This refers to internal management tools, digital platforms, and digital infrastructure that support the internal performance evaluation and decision-making.

The seven categories of digital technologies are social, mobile, big data, cloud computing, Internet of Things (IoT), platform development, and AI-related technologies (Sturgeon 2019). Digital technologies are a combination of computerised information and communication technologies (Sebastian et al. 2017; Vial 2019). In this context, digitalisation or digital integration of enterprises can help firms gain and sustain competitive advantages by improving their organisational flexibility and resilience (Briel et al. 2018). In case of restricted or crises situation, such as the COVID-19, many enterprises gain competitive advantage due to their attitude and speed of adopting new technologies.

Another way how digitalisation fosters enterprises` performance relates to the way the resources are managed and how quick does the enterprise respond to the issues raised due to day-to-day operations. Digitalisation allows companies to increase operation efficiency, to broaden their innovation efforts, and to better allocate their resources (Manyika et al., 2015).

The concept of enterprise performance is an economic and accounting indicator. Enterprise performance can be explored in two dimensions; first on output maximisation and second to input minimisation perspective. In this context, performance indicators that are oriented to output maximisation refer to net sales, market share, ROA or ROE, revenue, net profit, etc., while according to input control and minimisation usually are used cost control indicators. Hence is there any effect or relative relationship between digitalisation integration and enterprise performance? Many studies focus on finding any significant relationship.

According to Bughin et al. (2017), digital intelligence is positively correlated with financial performance. This means that a higher score of digital intelligence has a positive impact on revenue, EBIT, and company growth after controlling for industry, company size, and location. The digital transformation of SMEs lies in leveraging new technologies to ensure the scalability and elasticity demanded by costumers. Our study tries to give a new insight to what happened to SMEs in Western Balkans during 2018-2020, a tough period from specific country's perspective, and followed then by the COVID-19.

3. Research Methods

We used panel data from the Enterprise Survey (ES) from 2018 to 2020 to investigate the relationship between digitisation and performance. The European Bank for Reconstruction and Development (EBRD), the European Investment Bank (EIB), and the World Bank Group participated in the survey (WBG).

The selected countries are five of the Western Balkan Countries: Albania, Bosnia and Herzegovina, Montenegro, Kosovo, and North Macedonia. The dataset's questions enable us to comprehend the challenges faced by businesses in the private sector. Data is collected based on company experiences and how companies evaluate their operational environment. In Table 1 we summarise some descriptive statistics to observe the variation in the sample.

Table 1. Descriptive statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
Labour productivity	1520	2.239	1.444	0	7.722
Sales growth	1520	15.375	2.977	6.215	24.061
Small	1520	.435	.496	0	1
Medium	1520	.334	.472	0	1
Foreign	1520	.105	.307	0	1
Female	1520	.985	.122	0	1
Exporter	1520	.322	.467	0	1
Age	1520	19.836	14.395	2	205
Manufacturing	1520	.372	.483	0	1
Service	1520	.264	.441	0	1
Sole proprietorship	1520	.336	.473	0	1
Partnership	1520	.42	.494	0	1
Website	1520	.753	.431	0	1

Source: Authors calculations.

In our paper, the enterprise performance is measured in terms of sales, employees' productivity to catch operational and accounting indicators. On the other hand, the vector of independent variables is composed of enterprise characteristics such as enterprise age, size, ownership structure, legal status, access to formal banking services, and gender ownership.

Moreover, to capture the digitalisation level of SMEs, we will focus on the following ES questions: (1) Does the establishment have its own website? (2) Started or increased business activity online? (3) Started or increased remote work arrangement for its workforce?

To identify the level of digitalisation and its level of contribution to enterprise performance, we use the following model:

$$Y_i = \beta_0 + \beta_1 Digitalization_i = \pi r^2 + \gamma X_i + \mu_i \qquad (1)$$

where:

Y_i – is one of the elements of an enterprise's performance that is measured by worker productivity and sales growth;

$Digitalisation_i$ – determines whether a website has been adopted and whether there are any online sales;

X_i – is the vector of variables including the size, age, status, foreign ownership, location, exporter, and female ownership.

In both cases, a country dummy variable was also included to catch any differences between countries under analysis.

5. Findings

According to the responses of the enterprises in different countries regarding website creation and online sales across the Balkans, we see from the data that by Bosnia and Hercegovina leads the line. At the end there are Albania and Montenegro with the lowest level of website presence of enterprises. To understand factors affecting the digitalisation of enterprises in the Western Balkan countries, we run logistic regressions on the fact if establishment have a website. The regression is carried out independently for each country.

First, the regression was performed for Albania. The website creation is significant due to the size of the enterprise if it is an exporter and due to ownership. So, even though the significance is low, medium enterprises are oriented to have a website compared to small enterprises. The fact that the enterprises in Albania export, leads them to have a website in order to expose their activity and have a wide range of customers. The fact that the enterprise operates domestically or internationally, makes the difference. The most significant variable that affects the fact of having a website relates to the ownership. The enterprises that have mainly foreign ownership are more oriented to have a website (Table 2).

Table 2. Logistic regression for Albania

Website	Coef.	St.Err.	t-value	p-value	[95% Conf	Interval]	Sig
Age	.01	.013	0.75	.451	-.016	.037	
Manufacturing	-.144	.293	-0.49	.623	-.718	.43	
Services	.129	.279	0.46	.644	-.418	.677	
Small	.205	.295	0.70	.487	-.373	.784	
Medium	.5	.3	1.67	.096	-.088	1.088	*
Exporter	-.47	.279	-1.68	.093	-1.017	.078	*
Female	.077	.288	0.27	.789	-.487	.641	
Foreign	-.846	.399	-2.12	.034	-1.628	-.063	**
Finance	.017	.235	0.07	.941	-.442	.477	
Constant	.202	.381	0.53	.596	-.544	.949	
Mean dependent var	0.597	SD dependent var	0.491				
Pseudo r-squared	0.040	Number of obs	377				
Chi-square	20.226	Prob> chi2	0.017				
Akaike crit. (AIC)	508.182	Bayesian crit. (BIC)	547.505				
*** *p<.01, ** p<.05, * p<.1*							

Source: STATA Output.

The factors that affect having a website in Bosnia and Herzegovina are size and access to external financial resources. Unlike Albania, small enterprises tend to have a website. Also, the enterprises that use external resources to finance their activity are more engaged to have a website. Other factors are insignificant (Table 3).

Table 3. Logistic regression for Bosnia & Herzegovina

Website	Coef.	St.Err.	t-value	p-value	[95% Conf	Interval]	Sig
Age	.003	.01	0.27	.783	-.016	.021	
Manufacturing	-.055	.373	-0.15	.883	-.786	.676	
Services	-.145	.312	-0.47	.642	-.756	.466	
Small	-1.078	.343	-3.14	.002	-1.75	-.405	***
Medium	-.434	.361	-1.20	.23	-1.142	.274	
Exporter	.588	.36	1.63	.102	-.117	1.293	
Female	-.305	.323	-0.94	.346	-.939	.329	
Foreign	-.315	.379	-0.83	.406	-1.059	.428	
Finance	.517	.281	1.84	.066	-.033	1.068	*
Constant	1.479	.445	3.32	.001	.606	2.352	***
Mean dependent var	0.754	SD dependent var	0.431				
Pseudo r-squared	0.065	Number of obs	362				
Chi-square	26.355	Prob> chi2	0.002				
Akaike crit. (AIC)	397.446	Bayesian crit. (BIC)	436.363				
*** *p<.01, ** p<.05, * p<.1*							

Source: STATA Output.

For Kosovo, the only factor that affects the enterprises to have a website is the size. Small enterprises are more eager to have a website than medium ones. Other factors are insignificant (Table 4).

Table 4. Logistic regression for Kosovo

Website	Coef.	St.Err.	t-value	p-value	[95% Conf	Interval]	Sig
Age	.015	.014	1.07	.284	-.012	.041	
Manufacturing	.268	.295	0.91	.363	-.31	.846	
Services	0	.	.	.	.	.	
Small	-2.206	1.05	-2.10	.036	-4.264	-.148	**
Medium	-1.942	1.058	-1.84	.066	-4.014	.131	*
Exporter	-.036	.367	-0.10	.922	-.756	.684	
Female	-1.1	.697	-1.58	.115	-2.465	.266	
Foreign	-.035	.865	-0.04	.968	-1.729	1.66	
Finance	-.28	.291	-0.96	.337	-.851	.292	
Constant	2.757	1.087	2.54	.011	.626	4.887	**
Mean dependent var	0.727		SD dependent var		0.446		
Pseudo r-squared	0.045		Number of obs		271		
Chi-square	14.376		Prob> chi2		0.072		
Akaike crit. (AIC)	321.389		Bayesian crit. (BIC)		353.808		
*** p<.01, ** p<.05, * p<.1							

Source: STATA Output.

The regression results for Montenegro are more complex. Having a website is heavily affected by the size, operating in the domestic or international market, and the gender of the owner. Enterprises of small and medium size, that operate internationally, thus export in international markets and have a female owner tend to have a website. The significance of the factors mentioned is high in all the cases.

Table 5. Logistic regression for Montenegro

Website	Coef.	St.Err.	t-value	p-value	[95% Conf	Interval]	Sig
Age	.023	.016	1.42	.154	-.009	.055	
Manufacturing	-.142	.432	-0.33	.743	-.989	.705	
Services	0	.	.	.	.	.	
Small	-3.006	.724	-4.15	0	-4.424	-1.587	***
Medium	-1.775	.734	-2.42	.016	-3.213	-.337	**
Exporter	1.267	.638	1.99	.047	.017	2.517	**
Female	-1.523	.637	-2.39	.017	-2.771	-.275	**
Foreign	1.038	.849	1.22	.222	-.627	2.702	
Finance	.383	.448	0.85	.393	-.496	1.262	
Constant	1.8	.76	2.37	.018	.31	3.29	**
Mean dependent var	0.580		SD dependent var		0.495		
Pseudo r-squared	0.275		Number of obs		150		
Chi-square	56.156		Prob> chi2		0.000		
Akaike crit. (AIC)	165.931		Bayesian crit. (BIC)		193.027		
*** p<.01, ** p<.05, * p<.1							

Source: STATA Output.

Compared to other countries, we see that enterprises that operate in North Macedonia differ in industry they operate, the size, and access to finance. So, enterprises that offer services are more engaged to have a website rather than manufacturing ones despite the size small or medium. Even small or medium enterprises have a website at a high significance. And last, access to external financial resources is significantly related to having a website (Table 6).

Table 6. Logistic regression for North Macedonia

Website	**Coef.**	**St.Err.**	**t-value**	**p-value**	**[95% Conf**	**Interval]**	**Sig**
Age	.043	.013	3.34	.001	.018	.068	***
Manufacturing	.292	.313	0.93	.35	-.321	.904	
Services	.832	.307	2.71	.007	.231	1.434	***
Small	-1.12	.377	-2.97	.003	-1.858	-.382	***
Medium	-1.12	.381	-2.94	.003	-1.866	-.374	***
Exporter	.547	.348	1.57	.116	-.135	1.23	
Female	-.436	.304	-1.43	.151	-1.032	.16	
Foreign	-.186	.565	-0.33	.741	-1.294	.921	
Finance	.619	.256	2.42	.016	.117	1.121	**
Constant	.102	.469	0.22	.828	-.818	1.022	
Mean dependent var		0.672	SD dependent var			0.470	
Pseudo r-squared		0.124	Number of obs			360	
Chi-square		56.704	Prob> chi2			0.000	
Akaike crit. (AIC)		418.764	Bayesian crit. (BIC)			457.625	
*** p<.01, ** p<.05, * p<.1							

Source: STATA Output.

As we can notice from the coefficients in the tables above generally small enterprises have lower propensity to adopt website in their business activity, and this result is statistically significant in the case of all Balkan countries except for Albania. Female ownership of firms tends to lower the probability of being digital only in the case of Montenegro. The use of external financial resources, exporter, and foreign firm increases the probability of digitalisation of enterprises. The factor that does not affect neither of the enterprises in the countries listed is age.

Table 7. Regression results on performance using dummy variable for countries.

Firm performance	**Sales growth (1)**	**Labour productivity (2)**
Online sales	.0148**	.0038*
Website	.00012	.00001
Manufacturing	-.0705	.0265
Service	.0032**	.00103**
Size	.1626***	.0344***
Age	-.1984***	-.0031**
Foreign	.00008	.0033**
Legal status	-.00251	-.0907
Exporter	.0030*	.0166**
Female	-.07674	-.0729

Firm performance	**Sales growth (1)**	**Labour productivity (2)**
Country dummy	Yes	Yes
Constant	1.705	.495
Nr. of observations	1520	1520
R squared	.3143	.4207

Source: STATA output.

$$Sales\ growth_i = \beta_0 + .0148 Online\ sales_i + \gamma X_i + \mu_i \quad (2)$$

$$Labor\ productivity_i = \beta_0 + .0038 Online\ sales_i + \gamma X_i + \mu_i \quad (3)$$

Empirical results show that enterprises adopting online sales exhibit higher labour productivity and sales growth than others. The results are statistically significant, but the magnitude tends to be low. The size of the firms matters when it comes to adoption of the digitalisation: the larger the firm, the more likely to have a propensity towards the online business activity. Enterprises that are involved in export activities are more likely to spend in the digitalisation to maintain their global market relationship. Manufacturing sector enterprises are less likely to have sales growth or labour productivity changes if compared to the services-sector enterprises. Moreover, younger, and foreign enterprises are more likely to adopt digitalisation in their business activities. However further investigation is needed to evaluate if a time lag may exist in the adoption of online activities and its impact on productivity of firms.

6. Conclusions

This study gives an opportunity to better understand the behaviour of the SME toward shifting their activity from traditional activities to online. Digital platforms helped much in this direction, even though not all SME show the same attitude to the change. Serbia and BiH showed the same attitude to adopting digital platforms higher than other countries due to their common economic and politics profile. Albania and Montenegro are the lowest of the list, even though in Albania recently there are many opportunities presented by Albanian government, the EU and NGO that emphasise and give floor to many startups and SME to further be engaged in new technologies. In our opinion, the results of the study showed that economic programs implemented by governments affected and fostered the adaption of new technologies by SME. Many governments shifted their public services toward e-governance platforms, where enterprises can provide public services online.

Second, we conclude that manufacturing enterprises do not gain advantage in aspect of sales growth or labour productivity, which means that new policies should be adapted to the specific industries SMEs operate in, as well as the business functions that are subject to transformation, as challenges and changes vary by sector/function. Third, there should be more evidence, comparable data, specific industry studies, and business cases to inform all relevant actors, i.e., SMEs themselves, of course investors, insurers, service providers, business associations, business partners, online platforms, which are major enablers of

digitalisation and potentially key source of data and evidence on the SME digital transformation. The study is based on a survey, but as we mentioned, it would be a great help if the analysis will be performed on industry basis. Further research is required to determine whether the adoption of digitalisation has a lagged performance effect because our study's use of cross-sectional data has limitations.

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Impact of Relationship Quality on Customer Loyalty: A Study in the Banking System

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Abstract

In recent times, the notion of relationship quality has attracted a lot of interest in the domains of consumer behaviour and marketing. This research aims to investigate the influence of service quality, intimacy, and ethics as antecedents on the elements of relationship quality (satisfaction, trust, and commitment) and loyalty in the Vietnamese banking business. Utilising the mediating function of relationship quality, this research seeks to enhance the understanding of the factors influencing customer loyalty. A survey of 302 bank customers in Vietnam was conducted. The findings show that service quality and ethics have a substantial impact on customer trust, satisfaction, and commitment, resulting in greater loyalty. Furthermore, the study provides managerial implications for Vietnamese banks to improve their service quality and ethical standards to develop customer trust and commitment, resulting in increased customer loyalty in Vietnam's banking industry.

Keywords: Service quality, intimacy, ethics, relationships quality, customer loyalty.

JEL Classification: M10, M21, M31.

1. Introduction

Customer loyalty is a critical element for businesses operating in highly competitive environments such as the banking system (Athanasopoulou, 2009). Building and maintaining strong relationships with customers is essential for banks to ensure their long-term success. The banking system in Vietnam is extremely crucial to the country's socioeconomic growth and has become increasingly competitive. According to SBV (2022), 68 % of adults in Vietnam have a bank account as of mid-2022. To gain a competitive edge, banks must maintain customer

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loyalty, which is more valuable than acquiring new customers and leads to repurchase and positive word of mouth (Ferguson et al., 2006). Loyal consumers are also more beneficial because they are more likely to purchase extra services and are less price-sensitive (Lee-Kelley et al., 2003).

Relationship quality, which encompasses satisfaction, commitment, and trust, is a crucial factor affecting customer loyalty (Ibrahim, Aljarah, 2021; Ivens, 2005). However, relationship quality antecedents have not been fully identified and are easily confused with other definitions (Roberts et al., 2003). The antecedents vary in different contexts and fields of research, for example, in finance. Bejou et al. (1996) refer to customer orientation, selling orientation, ethics, salesperson's expertise, and duration of the relationship. In the retail sector. Liu et al. (2011) proposed playfulness, service quality, and intimacy as antecedents. In the organisational context, employee ethics are considered an antecedent (Schwepker Jr, 2013). In the context of emerging economies such as Vietnam, there has been no research to address the employee's ethics towards the quality of relationships with customers, and the antecedents of the quality of relationships affecting loyalty via the mediating role of relationship quality in the banking system. In addition, the research question is what aspect of the quality of the relationship will affect loyalty? What is the impact relationship between these antecedents and the quality of the relationship? What is the level of effects of relationship quality on loyalty? Therefore, this study will focus on clarifying the antecedents of relationship quality based on aspects such as Service Quality, Intimacy, and Ethics affecting loyalty through the intermediate role of relationship quality (Trust, Commitment, Satisfaction), thereby supplementing the theory of quality of relationships in the banking field in Vietnam.

By examining how relationship quality can operate as a mediator between relationship quality and other related quality antecedents, such as service quality, intimacy, and ethics, the current research seeks to fill a deficiency in the literature. Bank executives and managers can improve the quality of the relationship and customer loyalty by being aware of the elements that influence it. The study findings will provide important information on how relationships affect customer loyalty and will also make pertinent recommendations for the banking system.

2. Literature Review and Hypotheses Development

2.1 Linking between Service Quality and Satisfaction, Trust

Existing studies have shown that strengthening service quality may increase consumer trust and satisfaction (Jih et al., 2007; Park, Tran, 2020). According to Crosby et al. (1990) claimed in their relationship quality model that service provider competence greatly influences relationship quality, while consumers' impression of service quality validation favourably affects relationship quality. Several studies have examined service quality in many industries, including telecommunications (Zhou et al., 2019), banking (Nataraj, Rajendran, 2018; Park, Tran, 2020), and retail (Jih et al., 2007). According to a recent study, service quality, defined as the whole quality of the service that consumers feel after using it, has a beneficial influence on

relationship quality, which includes customer satisfaction and trust. The following hypothesis is proposed:

H1a. Service quality has a positive effect on customer satisfaction.

H1b. Service quality has a positive effect on trust.

2.2 Linking between Intimacy and Trust

Intimacy, defined as the level of closeness between customer-provider relationships, is considered a crucial element in building trust in customer-provider relationships (Mulia et al., 2021). Customer intimacy involves activities that ensure customer satisfaction with every interaction they have with a company (Liu et al., 2011) or customising products and services to match customers' specific demands (de Waal, van der Heijden, 2016). According to Lloyd and Luk (2011), the relationship between service staff and consumers is the most important aspect in determining customer intimacy. Liu et al. (2011), excellent service during customer-employee interactions results in increased customer intimacy and loyalty, leading to enhanced profitability (Xu, van der Heijden, 2005). Intimacy can be established through both direct and indirect means (Froehle, Roth, 2004) and has a critical role in consumer attachment to a service provider and the establishment of a valued and convenient relationship with a firm (Lloyd, Luk, 2011). Mulia et al. (2021) found that this degree of intimacy, regarded by the customer as a source of happiness, can lead to increased trust in the organisation. Based on these observations, the following hypothesis is proposed:

H2. Intimacy has a positive effect on trust.

2.3 Linking between Ethics and Trust, Commitment

In banking, the ethical behaviour of salespeople has a profound effect on consumer loyalty, and trust is seen as a critical component in establishing customer trust and loyalty (Wijaya et al., 2022; Alrubaiee, 2012). Moreover, a salesperson's confidence in their management may encourage ethical conduct (Wijaya et al., 2022). As the behaviour of salespeople can significantly influence the customer's perception of the organisation, particularly in the service environment, their ethical behaviour is vital (Zeithaml et al., 2006). In light of these findings, the following theory is proposed:

H3a: Ethics has a positive effect on customer trust.

Morgan and Hunt (1994) defined commitment as a promise of the longevity of a transactional relationship, and this concept is crucial for developing long-term partnerships. Alrubaiee (2012) found a positive association between corporate ethics and commitment, indicating that ethical values strongly influence organisational commitment (Hunt et al., 1989; Fu, 2014). As a result, the idea presented below is offered:

H3b: Ethics has a positive effect on customer commitment.

2.4 Linking between Satisfaction and Loyalty

Customer loyalty is closely related to customer satisfaction (Kotler, Keller, 2016). Customer satisfaction is defined as the customer's sentiments of pleasure or displeasure due to the discrepancy between the perceived quality of a product or service and their expectations (Kim et al., 2004). It is a critical factor that contributes to a company's success, as it leads to positive customer perceptions and repurchases (Zhou et al., 2019). Customer loyalty is essential to a company's long-term survival and prosperity (Kim et al., 2004), and it has been demonstrated that customer satisfaction leads to increased customer loyalty (Alawneh, 2013; Caceres, Paparoidamis, 2007; Singh, Sirdeshmukh, 2000). Customer loyalty cannot always be exclusively affected by satisfaction; it can also be influenced by other elements, such as trust (Gerpott et al., 2001). As a result, the idea presented below is offered:

H4: Satisfaction has a positive effect on customer loyalty.

2.5 Linking between Trust and Loyalty

The interrelation between customer loyalty and trust is essential for businesses and consumers (Chiou, Droge, 2006). Brand trust has a positive impact on brand loyalty and plays a vital role in establishing strong brand connections with customers (Bunn et al., 2000). Trust drives consumer behaviour and enhances customer relationships, leading to increased customer loyalty (Liu et al., 2011; Rahmani-Nejad et al., 2014). According to the research of Shamdasani and Balakrishnan (2000) and Vieira et al. (2008), trust is a necessary precondition for consumer loyalty. Additionally, trust enhances brand loyalty in brand communities based on social media (Laroche et al., 2012) and is the result of the cumulative effect of service engagement (Chiou, Droge, 2006). The following hypothesis is proposed:

H5: Trust has a positive effect on customer loyalty.

2.6 Linking between Commitment and Loyalty

Customer loyalty is characterised as an unwavering desire to keep a valued connection, and customer commitment is a significant driver of loyalty (Caceres, Paparoidamis, 2007; Alrubaiee, 2012). Dedicated customers have a strong emotional commitment to a brand, which leads to increased brand-related attitudinal loyalty, such as positive word of mouth and repurchase (Ferguson et al., 2006). Strong customer loyalty has also been connected to stronger intentions to suggest and purchase (Ivens, 2005; Singh, Sirdeshmukh, 2000). The following hypothesis is proposed:

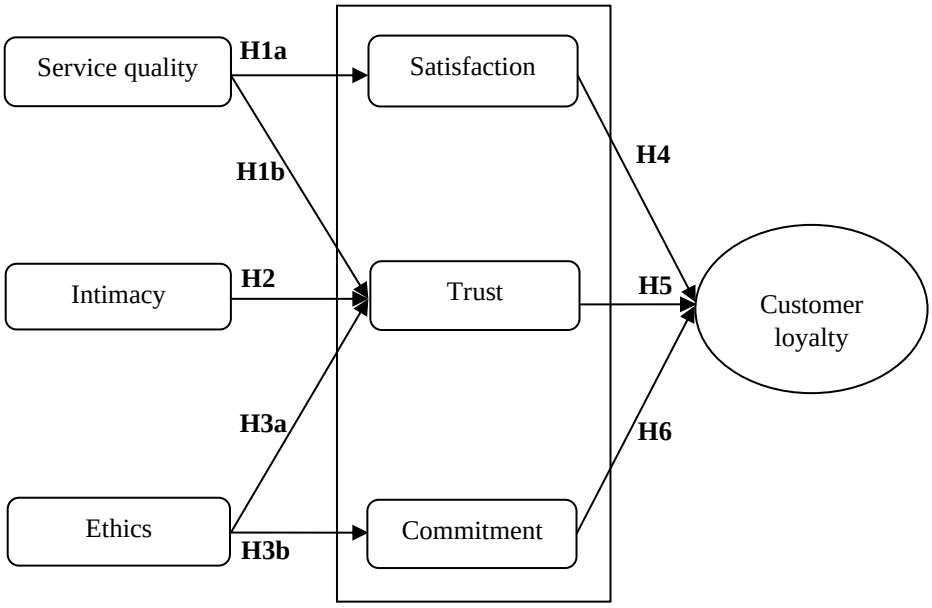
H6. Commitment has a positive effect on customer loyalty.

3. Methodology

3.1 Conceptual Model

Based on prior research, the conceptual model for this study (Figure 1).

Figure 1. The conceptual model



3.2 Research Design

The research design of this study is qualitative, utilising non-numerical techniques to gather and analyse data, and numbers were assigned to statements to gauge individuals' level of agreement or disagreement. To assess various relationships, regression calculations were performed using IBM SPSS version 25 and AMOS 24. The research design was chosen on the basis of the study objectives.

3.3 Participant's Design and Selection

This study sought to investigate the connection between relationship quality and customer loyalty in the Vietnamese banking sector among customers who used banking services. The target demographic was selected based on the research objectives and allowed for the assessment of the impact of relationship quality on loyalty in a banking system. According to Hair et al. (2010), it is necessary to have at least five times as many variables as those observed. A minimum sample size of 140 with 28 observed variables was determined. The participants were randomly selected to ensure that all members of the population were equally represented.

Participants could score their level of agreement or disagreement with each statement on a 5-point Likert scale using the survey questionnaire used in this study. The survey was carried out over eight weeks in November and December 2022, and to examine the correlations between factors, data were analysed using regression calculations with IBM SPSS version 25 and AMOS 24. The aims and goals of the study had an impact on the qualitative research design, which used a nonprobability convenience sampling approach to gather and evaluate the data.

3.4 Questionnaire and Measurement

The data collection questionnaire was divided into two sections, the first of which asked about the respondents' demographics and the second of which asked about Vietnam's banking services. The second section comprises 28 questions that examine seven latent variables: service quality, intimacy, ethics, satisfaction, trust, commitment, and loyalty The 7 factors were as follows: (1) trust, which was assessed using 08 variables from the study of Shamdasani, Balakrishnan (2000); (2) intimacy, which was measured using 03 variables from Liu et al. (2011); (3) ethics, which was measured using 03 variables from Alrubaiee (2012); (4), (5) customer satisfaction, which was assessed using 04 variables; commitment, which was measured using 03 variables from the study of Alawneh (2013); and (6) trust, which was evaluated using 04 variables from Vieira et al. (2008), and (7) loyalty, which was measured using 03 variables from Nataraj and Rajendran (2018). A qualitative study was conducted to assess the suitability of the scale after it was translated from English to Vietnamese and vice versa. This method involved double-handed discussion, and there were 13 subjects interviewed, including 3 bank leaders and 10 devoted customers who frequently use banks' services. A total of 302 observations were included in the quantitative study. The SPSS 25 and AMOS 24 reliability analyses revealed that all of the scales were reliable, with Cronbach's alpha values > 0.7. The discovery factor analysis (EFA) removes minor parameters by examining factor loading coefficients and variance. Analysis of the confirmation factor (CFA); Analysis of the SEM linear structural model to evaluate the proper model with data and to assess the research model's proposal assumptions.

4. Result and Discussion

4.1 Descriptive Statistics

Customers who utilised service banking were given 330 surveys as part of the study. Following the screening procedure, 302 valid votes were collected, with a response percentage of 91.52 %. Statistical analysis and association testing were performed. For the demographic and descriptive analysis, SPSS version 25 was utilised. Table 1 shows that there is a large gender discrepancy in involvement (male = 44%, female = 56 %). The majority of individuals who participated (37.4 %) were between the ages of 41 and 50. The research included 74 adults over the age of 50 years. The majority of survey respondents (38.7 %) earned between 5 and 10 million VND per month, had a university degree (78.53 %), and worked as a freelancer (35.4 %).

Table 1. Descriptive statistics

Characteristics	Number	Frequency (%)
Gender		
Male	133	44.0
Female	169	56.0

Characteristics	Number	Frequency (%)
Age		
< 30	36	11.9
31-40	113	37.4
41-50	79	26.2
> 50	74	24.5
Education		
High School and lower	22	7.3
College	125	41.4
University	117	38.7
MA/MSc	38	12.6
Occupation		
Officer	97	32.1
Freelancer	107	35.4
Retired	25	8.3
Other	73	24.2
I**ncome**		
<5 million VND	26	8.6
From 5 million to < 10 million VND	117	38.7
From 10 million to < 15 million VND	77	25.5
≥ 15 million VND	82	27.2
Total	302	100

Source: Primary data.

4.2 Evaluate the Reliability of the Scale

Table 2 shows that all CR values > 0.7, with values [0.833 - 0.906], demonstrating the scale's dependability. Furthermore, the AVE values are acceptable, ranging from [0.510 - 0.763] > 0.5. For all factors, the MSV values are lower than the AVE values. These findings demonstrate that the scale has separate values for each of the seven criteria, and Standardized Regression Weights range from [0.718 - 0.945]> 0.5. (Hair et al., 2010). Therefore, it can be concluded that the scale of 7 factors achieved convergence value and discriminant validity since the variables within each component are more closely associated with one another than the variables in other factors.

Table 2. Inter-construct correlations and Average Variance Extracted from each construct

Vari-ables	CR	AVE	MSV	MaxR(H)	RQ	SAT	TRU	LOY	INT	CMM	ETC
RQ	0.879	0.510	0.102	0.884	**0.714**						
SAT	0.900	0.694	0.133	0.907	0.216**	**0.833**					
TRU	0.882	0.660	0.133	0.926	0.174**	0.365***	**0.812**				
LOY	0.906	0.763	0.048	0.916	0.001	0.220***	0.182**	**0.873**			
INT	0.884	0.719	0.089	0.924	0.1234	0.184**	0.299***	0.025	**0.848**		
CMM	0.828	0.617	0.078	0.833	0.065	0.051	0.132	0.151*	0.280***	**0.785**	
ETC	0.833	0.625	0.102	0.838	0.320***	0.240***	0.176**	0.044	0.187**	0.135*	**0.790**

Note: ***,**,* significant at 1 %, 5 %, 10 %.

Source: Results from data analysis.

4.3 Exploratory Factor Analysis (EFA)

According to the data in Table 3, the KMO value is 0.818, which is greater than 0.5. The Bartlett test also has a Sig = 0.00 (<0.05), significance level, indicating that the variables are correlated and acceptable for component analysis. According to the factor analysis, the conditional analysis conditions are appropriate, as indicated by Eigenvalues of 1,550 (> 1) and a total variance removed of 63,834 % (> 50 %). Furthermore, the factor analysis reveals that 28 observations can be classified into 7 factors, with all variables having factor loadings larger than 0.5, demonstrating their importance.

Table 3. KMO and Bartlett's test and total variance explained

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.818
Bartlett's Test of Sphericity	Approx. Chi-Square	4753.952
	df	378
	Sig.	.000
Extracted variance		63.834%
Initial eigenvalues		1.550

Source: Results from data analysis.

4.4 Confirmatory Factor Analysis (CFA) and SEM Standardized

Table 4: The results of the analysis revealed a $\chi 2$ = 468.479, df = 313, and a p-value = 0.000. The value of Cmin/df = 1.497, which was less than 2, and CFI, Tli, and GFI > 0.9, while RMSEA= 0.041<0.05 (Hair et al., 2010; Hu, Bentler, 1999). These results indicate that the model has a good fit and is suitable for data collection.

Table 4. Confirmatory factor analysis (CFA) and SEM standardized

	CMIN ($\chi 2$)	df	P-value	CMIN/df	GFI	TLI	CFI	RMSEA
Result	468.479	313	0.000	1.497	0.965	0.960	0.899	0.041
Criteria				< 2	> 0.9	> 0.9	> 0.9	< 0.05

Source: Results from data analysis.

4.5 Estimated Result

We will check six hypothesised relationships between the variables in the proposed model. Table 5 shows the estimated result of the structural equation model. Three coefficients have been unveiled statistically significant at 1 % (p-value <0.01), besides, two coefficients were 5 % (p-value < 0.05), and two others were 10 % (p-value < 0.1). However, one coefficient is not statistically significant.

Table 5. Estimated result

			Estimate	SE	CR	*p*-value	Conclusion
Satisfaction	<----	Service quality	.228	.077	3.550	***	Accepted H_{1a}
Trust	<----	Service quality	.121	.081	1.857	*	Accepted H_{1b}
Trust	<----	Intimacy	.263	.059	4.297	***	Accepted H_2
Trust	<----	Ethics	.087	.072	1.283	.200	Rejected H_{3a}
Commitment	<----	Ethics	.142	.051	2.060	**	Accepted H_{3b}
Loyalty	<----	Satisfaction	.110	.064	1.802	*	Accepted H_4
Loyalty	<----	Trust	.134	.097	2.068	**	Accepted H_5
Loyalty	<----	Commitment	.175	.066	2.828	***	Accepted H_6

Note: ***,** significant at 1%, 5%, 10%
Source: Results from data analysis

In detail, the quality of service has positive impacts on customer satisfaction and customer trust when clients make transactions with the bank. Then, H1a and H1b are confirmed at 1 % and 10 %, respectively. On the same direction, intimacy is positively connected with customer trust, as well as ethics positively connected with customer commitment. Therefore, H2 and H3a are accepted at 1 % and 5 %, respectively. The estimated result concludes that three variables including customer satisfaction, trust, and commitment have positive effects on the loyalty of customer at 1 %, 5 %, and 10 %, respectively. Likewise, H4, H5, and H6 can be confirmed. However, H3a cannot be confirmed due to the insignificant coefficient (P-value > 0.1).

5. Managerial Implications

The impact of relationship quality on customer loyalty in the Vietnamese banking system has significant managerial implications.

In theory, this study contributes to the current body of literature on the subject by providing complete knowledge of the interplay between the numerous components that contribute to customer loyalty. It emphasises the complex nature of customer loyalty and how it may be impacted by various interdependent and linked variables of relationship quality.

Firstly, the practical consequences of this study for banking management in Vietnam are important, and it highlights the significance of service quality in

determining customer satisfaction, which leads to customer loyalty. Banking executives must try to provide high-quality services while regularly assessing and improving service quality to ensure customer satisfaction.

Secondly, the study illustrates the positive impact of ethics on trust, implying that unethical activity by banks can significantly erode customer faith in the bank. Banking executives should be aware of this and ensure that they adopt and maintain high ethical standards in all of their business interactions to keep customer trust.

Thirdly, the study demonstrates the beneficial impact of intimacy on trust and the good impact of ethics on commitment, implying that tight and personal connections with consumers, as well as intimacy to ethical practices, may help create and retain customer trust and commitment. Banking executives should seek to develop intimate and personal ties with their consumers, as well as use ethical procedures to encourage customer trust and loyalty.

Finally, the study emphasises the beneficial influence of satisfaction and intimacy on customer loyalty. Banking executives should consequently focus on meeting customers' demands, increasing customer satisfaction, and encouraging customer loyalty to the bank. This may be accomplished through individualised offerings, proactive customer service, and ongoing customer interaction.

6. Conclusions

The study will examine how service quality, ethics, intimacy, trust, satisfaction, commitment, and loyalty affect customer loyalty. A qualitative study technique was adopted, and a survey of 302 Vietnamese customers who used financial services was conducted. The outcomes of the study demonstrated that service quality and ethics harmed trust. Furthermore, trust harms loyalty. On the other hand, service quality positively affected satisfaction, intimacy positively influenced trust, and ethics positively influenced commitment. Furthermore, satisfaction and intimacy have a beneficial impact on loyalty.

The study's outcomes have significant managerial implications for Vietnamese banks. Banks should focus on enhancing service quality and ethics to increase customer trust. This would not only boost consumer satisfaction, but also commitment, which would eventually lead to increased customer loyalty. Building trust and intimacy with the customer is critical for increasing their loyalty. Banks must deliver high-quality services while adhering to ethical standards to develop their customer relationships and promote consumer loyalty.

While this study gives useful insights into the impact of relationship quality on customer loyalty in the Vietnamese banking system, it has certain drawbacks. First off, it is possible that the sample size of Vietnamese banking clients is not representative of the country's entire population, and the study's conclusions could not hold for all users. Second, since the responses were self-reported, there is a chance that perceptual biases affected the findings. Third, the study's focus on the Vietnamese banking sector may not be suitable for other areas.

Future research may expand on this study by looking at additional characteristics that may influence customer loyalty, such as consumer expectations or brand value.

Another area of potential study interest is the impact of technology on the link between customer loyalty and relationship quality, since the advent of digital banking requires understanding how technology influences customer loyalty and relationship quality. A future study might examine the relationship between customer behaviour and relationship quality over time to establish the long-term durability of customer loyalty and the effectiveness of relationship building techniques.

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Study on the Present and Future Requirements of the Labour Market in 7 Development Regions of Romania

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Abstract

As a result of the emergence of new business models, the role of intellectual capital increases steadily, and, in addition to human capital, the relational capital acquires a growing importance in all strategies, public policies, and also the business plans of companies. From this perspective, the correct understanding of the logic of the triple helix, that of the synergistic relationship between the government, business, and university environments, becomes essential for switching from a knowledge-centred education to one focused on sustainable cognitive skills and abilities. Considering that, in any country, the labour market is in a state of continuous mobility, with changes in the occupational structure of the workforce, reflecting the main trends of economic development, within the BREIT project, a team from the Bucharest University of Economic Studies (ASE) carried out a phenomenological research study, conducted among employers in 7 development regions of Romania, aimed at contributing to the knowledge of current educational and economic realities, in order to develop quality educational services, adapted to these realities and to facilitate the integration of university graduates in the market work. The results of this research were transmitted and discussed during thematic meetings, with a large number of partner companies from all these development regions, ensuring the representativeness of the sample and the relevance of the conclusions drawn.

Keywords: triple helix; intellectual capital; relational capital; business performance; quality educational services.

JEL Classification: A11, I25, J60, M51.

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1. Introduction

The good social and professional integration of university graduates is given by a number of factors, among which we mention: initial and continuous training, the personality and motivations of those involved, the opportunities they can access, the support given by higher education institutions to students in developing the required skills on the labour market, developing partnerships with employers, etc.

The *"Internships and professional guidance activities for students enrolled in the Business Administration and Economics and International Business (BREIT)"* project, carried out in the period 2020-2023, came with the opportunity for its beneficiaries, students from the Faculty of International Economic Relations (REI) and Business and Tourism (BT), to develop both professional and transversal skills, so as to successfully complete the transition from education to integration on a labour market.

The project started from the need to complete university-level professional training with the practical-applicative vectors required by a defining human capital market for the tertiary and quaternary economy. Most employers believe that human resources are the most valuable capital of an organisation; therefore, they require graduates to have a set of professional and transversal skills, absolutely necessary for workplace productivity and professional and social resilience.

The dynamic series of data consulted by the experts of the project, the research carried out at the level of employers and graduates, the results obtained after the processing of a complex documentary base, show that, in the context in which job profiles and employers' requirements are changing at an increasing speed high, students must develop the skills required in professional activity, right from school (ADR Centre, 2020; ADR West, 2020).

The analysis of the level of development of the various regions of Romania shows us that they are unequal from this point of view. The studies carried out within the project show the disparities regarding the level of socio-economic development existing between these regions, but also the needs for the infusion of highly qualified labour force, which will activate at the level of these regions (ADR Muntenia, 2021; ADR Northwest, 2020; South-East ADR, 2014; South-East ADR, 2020; Southeast ADR, 2021).

2. Characterisation of Romania's Development Regions

In any country, the labour market is in a state of continuous mobility, with changes in the occupational structure of the workforce, reflecting the main trends of economic development. The growing demand for certain occupations and the difficulties in finding a job for people with outdated professional knowledge and skills is influenced by several parallel processes, the most important of which are: the multidimensional and multistage advancement of the globalisation process, the sectoral changes taking place in the economy, the dramatic intensification of competition on commodity markets, the full manifestation of the technological vector, the increase in the level of tertiarisation of the economy, and the emergence of a quaternary sector.

According to the European Centre for Vocational Development and Training (Cedefop, 2018), the size of the workforce is continuously decreasing, from 8.8 million in 2020 to 8.2 million in 2030.

At the level of the main economic sectors, the largest increases in employment rates will be in sectors such as: professional services, health and social assistance, as well as education. Most of the new jobs will be for agricultural workers and for specialists in intellectual and scientific occupations, in the social and legal fields. Although the total demand for the low-skilled will be the lowest, it will still account for 25 % of all new jobs – the third highest share in the EU. The relative increase in employment in Romania is expected to be, in the period 2016-2030, at a level of 2.78 %, much lower compared to the EU (6.16 %).

From an administrative point of view, Romania is divided into 8 regions: North-West, Centre, North-East, South-East, South-Muntenia, Bucharest-Ilfov, South-West Oltenia, and West. They present certain particularities regarding their economic structure, which makes certain sectors play a decisive role in their development. In the North-East and South-West regions, a large share of the population is engaged in agricultural activities (North-East ADR, 2020; ADR SV Oltenia, 2015; 2019). The civilian population is mainly employed in industry and construction in the West and Centre regions, and in services in the Centre, West and Bucharest-Ilfov regions (ADR Centre, 2014; 2021; ADR West, 2014; 2020).

Also, there are regions with an important tourist potential (the Bucovina area in the North-East region, the coast and the Danube Delta in the South-East region, etc.), their economic developments also being influenced by the level of use of this potential. At the end of March 2020, the statistical territorial regions with the highest registered unemployment rates were South-West (4.9 %) and North-East (4.3 %). The regions with the lowest levels of the unemployment rate were Bucharest (0.8 %) and West (2.0 %). The main types of employers are multinational companies, non-profit/state-owned companies, private companies, and NGOs (European Commission, 2021a; 2021b).

3. Research Methodology

The present study was carried out in seven regions, respectively: South, South-East, North-East, South-West, West, North-West, Centre (not Bucharest Ilfov, an ineligible region within the project), it was carried out by survey on questionnaire base distributed to at least 20 entities from each development region where the project was implemented.

The research carried out among employers aimed *to* identify their perception regarding:

- present and future requirements of the labour market in the regions where the project was implemented;
- the criteria followed when hiring a graduate with higher economic studies for an executive position, from the point of view of personal traits and skills;
- the quality of ASE graduates and the expectations of future employers;

- opinions regarding the educational offer of ASE and the necessary measures that the university could adopt to improve the quality of graduates and their insertion on the labour market.

The applied questionnaire contained 12 questions (11 questions with closed answers and one with open answers). Some of the 11 closed-ended questions also had another *section*, where respondents could also provide spontaneous answers.

The answers obtained were processed and presented by the expert members of the implementation team in the final report of the project and in this work.

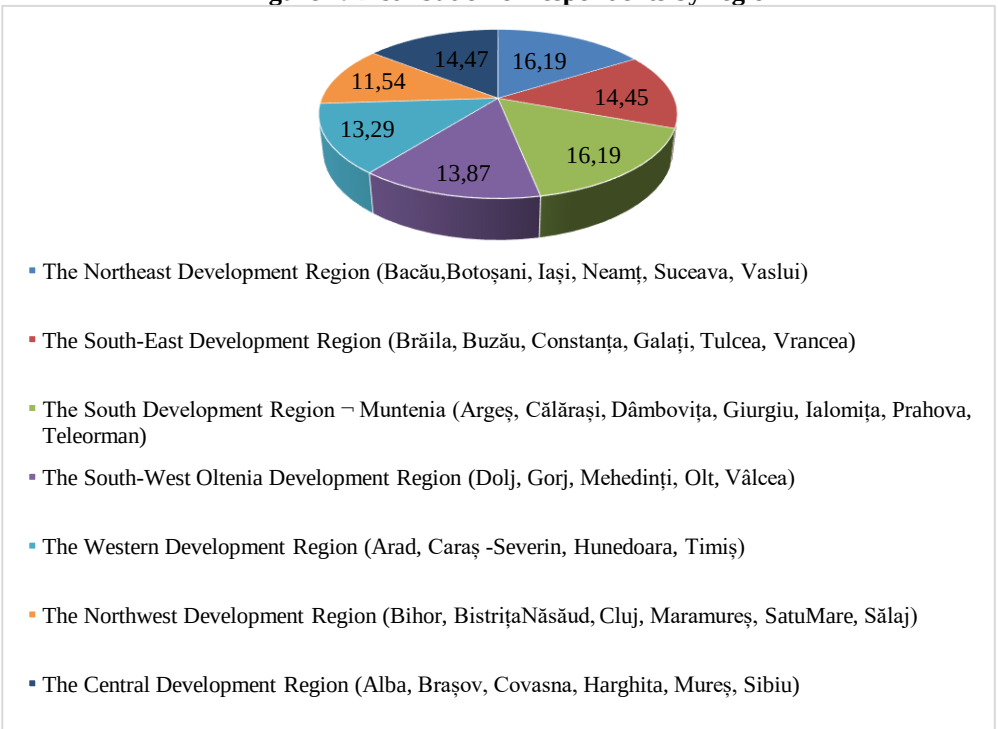
The questionnaire was self-administered, online, being sent by e-mail to employers from all the regions where the project was implemented, using a Google Drive form that allowed the generation of an electronic database that was the basis of the study, during September - November 2021.

4. Participants and Information about the Organisations Participating in the Study

The group of employers included 172 respondents. The questionnaire was sent to more than 2500 email addresses, obtained both from the university database and from the public contact data of employers in Romania.

The distribution of respondents by region was balanced, between 11.54 % and 16.19 % reaching the minimum threshold proposed in the project for each individual region.

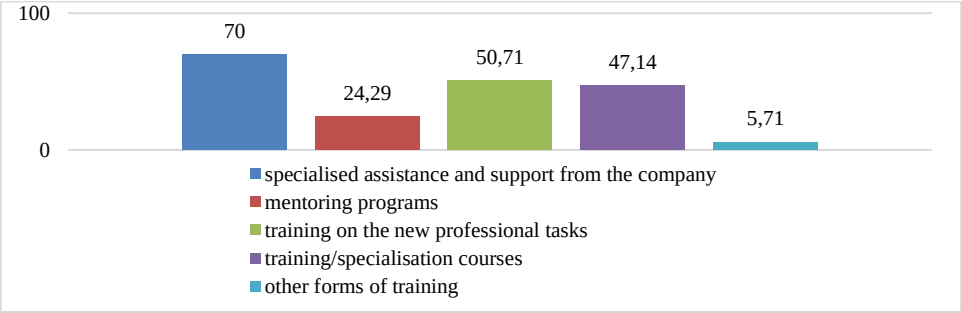
Figure 1. Distribution of respondents by region



Source: Author's own calculations.

Employers were questioned on how they help new employees to integrate and develop professionally, their answers being illustrated in the figure below (Figure 2). Almost three-quarters of companies offer new employees assistance and support from specialised staff (70.57 %). A percentage of 51.47 % of respondents mention training for new professional duties, 25 % mention the organisation of mentoring programs.

Figure 2. The activities through which companies develop their employees



Source: Author's own calculations.

The employers' representatives were asked to indicate to what extent they consider the following criteria important when evaluating a graduate of higher education, *with a view to employment in an executive position, in a position that requires economic training:*

Table 1. The importance of the hiring evaluation criteria for an executive position

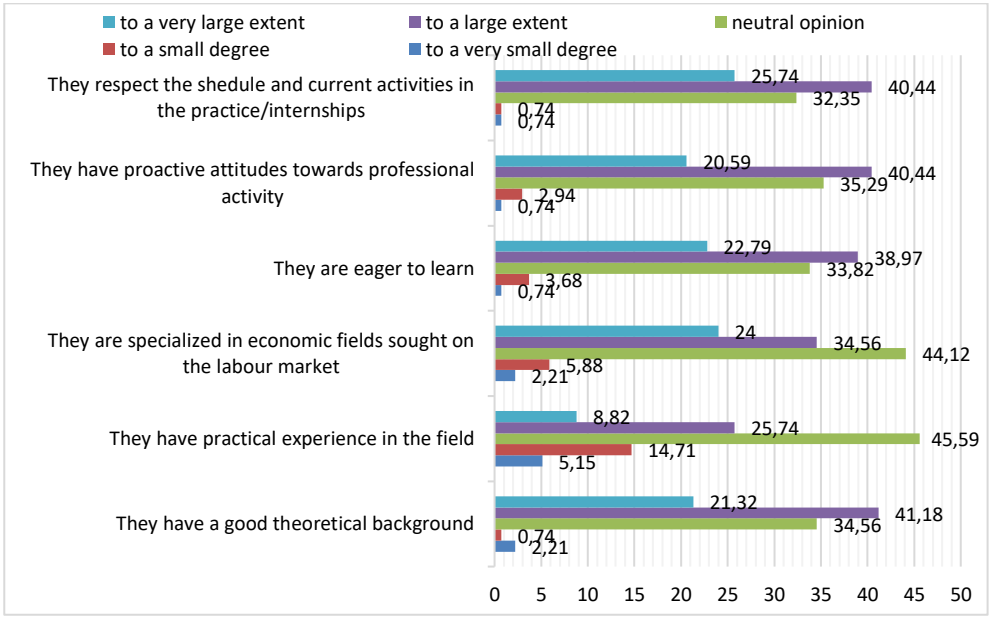
Evaluation criteria's	To a very small extent	To a small extent	Neutral opinion	Largely	To a very large extent
Willingness to continue the learning process	0.00%	3.57%	5.71%	42.86%	47.86%
The ability to organise and plan one's own activity	0.00%	2.86%	5.00%	47.86%	44.29%
Attention to detail	0.71%	1.43%	8.57%	50.00%	39.29%
Participation in decision making	0.71%	8.57%	25.71%	42.86%	22.14%
Team spirit	0.00%	1.43%	6.43%	40.00%	52.14%
Responsible behaviour in relation to work duties	0.00%	0.71%	0.71%	32.14%	66.43%
Awareness of own strengths and weaknesses	0.00%	2.86%	12.14%	52.14%	32.86%
Creativity and innovative spirit	0.71%	5.00%	13.57%	42.14%	38.57%
Ability to handle boundary situations	0.71%	3.57%	14.29%	41.43%	40.00%
Desire for personal and professional development	0.00%	1.43%	8.57%	36.43%	53.57%
Flexibility and willingness to adapt to change	0.00%	2.14%	10.71%	42.86%	44.29%

Evaluation criteria's	To a very small extent	To a small extent	Neutral opinion	Largely	To a very large extent
Stress resistance	0.00%	2.86%	16.43%	41.43%	39.29%
Initiative	0.00%	0.71%	10.00%	47.14%	42.14%
Emotional intelligence	0.71%	0.71%	15.00%	47.14%	36.43%
Confidence	0.00%	1.43%	11.43%	49.29%	37.86%
Analytical thinking	0.00%	2.14%	10.00%	47.86%	40.00%
Sociability	0.00%	2.14%	12.14%	45.00%	40.71%
Ethical behaviour	0.00%	0.71%	6.43%	35.71%	57.14%

Source: Author's own calculations.

To this question, the respondents were asked to evaluate how important they consider each of the criteria related to: personal traits, skills, abilities, and competences, when evaluating a candidate for employment in an entry-level position with higher economic education. Very high scores were obtained: responsible behaviour in relation to work tasks, desire for personal and professional development, ethical behaviour. Respondents appreciate the fact that ASE students/graduates respect the schedule, have proactive attitudes, are eager to learn, are specialised in the economic fields required on the labour market, and have practical experience in the field, but especially that they have good theoretical training.

Figure 3. Traits valued by employers in ASE students/graduates



Source: Author's own calculations.

In the next question, the respondents were asked, based on the interactions they had with ASE students/graduates, to appreciate the extent to which certain aspects related to the employers' offer are important for them.

Table 2. Expectations of students/graduates from the perspective of employers

Important employment aspects for students/graduates from the perspective of employers	To a very small extent	To a small extent	Neutral opinion	Largely	To a very large extent
Learning opportunities at work	0.00 %	7.86 %	8.57 %	50.71 %	32.86 %
Facilities for continuing professional development	0.00 %	5.00 %	17.14 %	45.00 %	32.86 %
Career advancement opportunities	0.00 %	5.00 %	4.29 %	44.29 %	46.43 %
The package of benefits offered by the employer	0.00 %	2.86 %	9.29 %	35.71 %	52.14 %
Relations with the management team	0.00 %	4.29 %	24.29 %	40.71 %	30.71 %
Relations with team members	0.00 %	7.14 %	12.86 %	41.43 %	38.57 %

Source: Author's own calculations.

From the point of view of employers, the most important expectations of ASE students/graduates are related to the benefits package and career advancement possibilities.

Employers' representatives were asked what they consider important for a young university graduate to find a job.

Table 3. Important criteria in finding a job by students/graduates, according to employers

Important criteria in finding a job	To a very small extent	To a small extent	Neutral opinion	Largely	To a very large extent
Professional experience (practice, internship, other jobs, etc.)	1.43 %	10.71 %	19.29 %	39.29 %	29.29 %
Communication skills	0.00 %	0.71 %	5.00 %	51.43 %	42.86 %
Knowledge of at least one foreign language of international circulation	0.71 %	5.71 %	11.43 %	44.29 %	37.86 %
Advanced digital skills	0.00 %	0.71 %	11.43 %	47.14 %	40.71 %
Proactive attitude towards work	0.00 %	0.00 %	6.43 %	39.29 %	54.29 %
Good theoretical training	1.43 %	6.43 %	17.86 %	52.86 %	21.43 %
Teamwork skills	0.00 %	2.14 %	7.86 %	50.71 %	39.29 %
Experience in volunteer activities	6.43 %	13.57 %	33.57 %	25.71 %	20.71 %

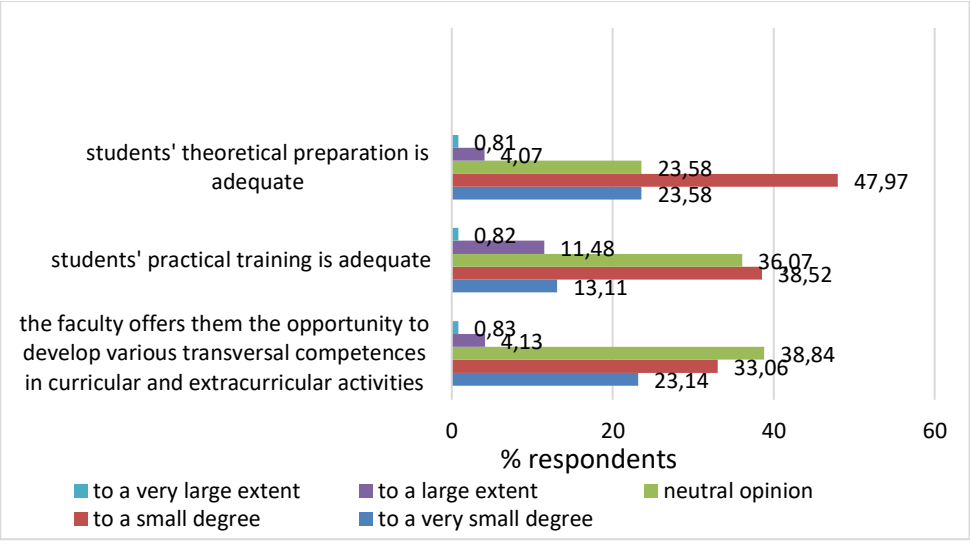
Source: Author's own calculations.

As follows from the answers obtained, employers seek and appreciate a number of aspects. The most important criteria, in the opinion of employers, are the proactive

attitude towards work and communication skills, the other criteria being taken into account.

The next researched aspect referred to the way in which respondents appreciate the quality of the educational offer of the two faculties of ASE (REI and BT), the most appreciated characteristic by employers that the university offers to students, being the students' theoretical training.

Figure 4. How do the partners appreciate the quality of the educational offer of the two faculties of ASE (REI and BT)



Source: Author's own calculations.

Regarding the proceedings that the representatives of the two faculties should do for a better preparation and integration on the labour market of students/graduates, the responding employers mentioned: organising activities/projects in partnership with employers, increasing the share of practically applied activities, and involving more many specialists/practitioners in professional activities.

Respondents were asked to mention at least three fundamental aspects from the perspective of professional activity in the economic field (study subjects, study topics) that ASE students should study for a better specialisation. The most frequently mentioned aspects were: *practice* (internships carried out since the first year of college and every year, internship, applied activities, volunteering in companies, faculty, student organisations); *combining theory with practice* (involvement in projects based on real case studies, which involve direct interaction with the economic environment - "real life management/marketing situations that have applications in real life", market studies and the impact on a field, "problem solving", role-playing games, familiarisation with processes / programs / technologies used in companies); *partnerships with employers* (research projects with employers, conferences, meetings).

According to the respondents, students should develop *their skills* such as: *digital skills, operation with specific programs* (excel, IT training at the level of computer scientist and in communication at the level of media presenter, Excel, Word, Power Point); *communication; foreign languages; teamwork.*

Students should study more about: economic legislation (about commercial companies, constitutive acts of a company, legislation applicable to the economic field, the specifics of international commercial operations, the internationalisation of companies and the way multinational companies operate); financial education (real financial calculations, financial management); organisational culture (work ethics, organisational relations, interaction with colleagues, adaptability to the eco-system at the workplace, knowledge of the specifics of the various departments of companies); company accounting; financial and accounting supporting documents.

Qualities such as: the ability to use modern work tools easily are appreciated by students; the desire for self-improvement, self-development, self-surpassing; teamwork/collaboration; perseverance and consistency; motivation; proactivity; curiosity; desire to learn; synthesis capacity; distributive attention; numeric memory; responsibility; involvement; devotion; emotional intelligence; stress management; critical thinking; discipline; desire for continuous learning; initiative; passion for the job; punctuality; collaboration; discretion; adaptability; analytical thinking; the determination; organisation; prioritising tasks; synthesis capacity.

The employers appreciated that, for a better integration on the labour market, students should benefit from a series of services in the university such as: counselling and career guidance, personal development and soft-skills activities, guidance and tutoring in carrying out internships practice, information on labour market trends.

5. Conclusions

It should be remembered from this research what employers appreciate as good practices but also the expectations regarding ASE students and graduates in order to improve their skills. All the representatives of the employers who responded declared that they are open to collaboration and cooperation with the university and had suggestions for improving the educational programs and services provided by it. Among them we mention: increasing the weight of practical activities in the preparation of students, proactive approach to educational strategies and educational plans, offering guidance and counselling service packages, developing partnerships with the socio-economic environment, etc.

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Changes in the Contribution of Tourism to the Economy of the EU Member States Under the Impact of Crises

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Abstract

The year 2020 represents a turning point for both the global economy as a whole and the tourism sector in particular. After a sustained upward trend over a decade, tourism was one of the biggest "losers" of the pandemic crisis. Based on these assumptions, this paper proposes an analysis of the changes in the contribution of the tourism sector to the economy of EU Member States from a macroeconomic perspective. To achieve this objective, several research questions were addressed: (1) Was tourism more affected than the economy as a whole? (2) In which direction did the crisis have a greater impact on tourism: on the contribution to GDP or on the employed population? (3) Did the share of international tourism in total domestic tourism change? and (4) what about the contribution of tourism to member countries' exports? To answer these questions, a quantitative analysis was conducted based on secondary data – the statistics provided by the WTTC: Total contribution of the travel and tourism sector to GDP, Total contribution of the travel and tourism sector to employment, Share of tourism in exports, Share of international tourism in the total domestic market. The main results show that the tourism sector has been severely affected in terms of its contribution to GDP, exports, and labour market, and has lost its economic productivity.

Keywords: tourism sector, crisis, macroeconomic impact, GDP, labour market, European Union member states.

JEL Classification: L83, Z31, E60.

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1. Introduction

Despite its resilience in recent decades (during the 2007-2009 financial and economic crisis, 2014-2016 Ebola outbreak, various terrorist attacks), tourism was one of the hardest hit sectors of the economy during the pandemic crisis (Corbisiero, Monaco, 2021), suffering significant losses in all segments. Starting in March 2020, and then several more times when the pandemic situation required it, many businesses in this sector stopped or reduced their activity, resulting into lost income for both tourism businesses and workers (Kniffin et al., 2021; Williams, 2021), while tourist flows decreased, either for objective reasons – travel restrictions – or for subjective reasons – tourist behaviour.

In the case of the tourism industry, the health crisis also had an increased impact for reasons that are characteristic of the sector: from an economic perspective – the large proportion of SMEs (micro) and the importance of the activity for local communities, including due to its impact on training (macro), but also from a social point of view – the impact on vulnerable categories (women, young people, unqualified employees) who traditionally represent an important part of the workforce in the sector.

Therefore, it is essential to acknowledge that tourism is a labour-intensive activity that provides many jobs for skilled and unskilled workers, as well as for people who encounter/face difficulties in finding a job (Sun et al., 2022). The study by Sun et al. (2022) examines how the decline in international tourism consumption affects tourism employment and the potential for income loss.

Thus, the COVID-19 epidemic had a far greater destructive impact on the travel and tourism (T&T) industry than previous studies suggested (Škare, Riberio Soriano, Porada-Rochoń, 2021).

The European Union (EU) groups heterogeneous internal markets in terms of structure and development, with countries where tourism is a key industry, as evidenced by the significant contribution to GDP and employment (Greece, Croatia, Cyprus, or Malta – economies with a high degree of dependence on tourism), but also mature economies – the top tourist destinations in the Mediterranean (Spain, France, or Italy), where the contributions to GDP and employment are significant, especially if we refer to the size of the economies (2nd to 4th places in the EU).

This paper is organised as follows: Problem Statement – which provides a synthetic overview of previous work strongly related to the topic, Research Questions/Aims of the Research – where the study's propositions, research questions, and hypotheses were stated, Research Methods – which provide information about methods, data sources, observation units, and time period, Findings – where the main results of the work are synthesised, and finally Conclusions – which highlight the main findings related to the objectives and hypotheses, and also the main limitations and future research directions.

2. Problem Statement

Humanity has faced several health crises over the years, caused by viruses that have been studied by specialists. For example, since 2006, Jonung and Roeger have produced a report estimating the potential macroeconomic impact of a pandemic in the EU using a quarterly macroeconomic model. In various pandemic scenarios, the authors quantify the macroeconomic costs of a pandemic, i.e., the costs in terms of lost output due to illness and death, measured as reductions in GDP growth and/or declines in GDP levels. They focused on two sectors of the European economy that were expected to be very strongly affected, namely tourism and trade (Jonung, Roeger, 2006). Enilov and Wang (2022) provide new evidence on the causal link between international tourist arrivals and economic growth. The current 2019 COVID pandemic has demonstrated the sensitivity of regional economies dependent on tourism and hospitality to external shocks (Watson, Deller, 2021).

Sun et al. (2021) tried to develop an analytical model to investigate the vulnerability of tourism employment during the COVID-19 pandemic to better understand how tourism losses affect local employment, which is analysed from different perspectives. The authors use two indicators to define employment vulnerability, namely job losses and unemployment in tourism. Other research papers target crisis resilience by examining how workers develop resilience during the COVID-19 crisis (Tuan, 2021).

Sanabria-Díaz, Aguiar-Quintana, and Araujo-Cabrera (2021) present different public rescue COVID-19-related strategies for the tourism and hospitality sector, at the individual level (for tourists), at the business level (for tourism companies), and at the destination level (for EU countries) from the perspective of stakeholders. Dreshaj et al. (2022) studied tourism demand in a panel analysis based on a GMM (generalised method of moments) model for countries in the Mediterranean region and showed the positive impact of previous demand on current demand in times of crisis.

Figini and Patuelli (2022) develop a methodological tool to estimate the total contribution of tourism to output, gross value added, and employment; their article examines the economic contribution of tourism to GDP. In the context of tourism-based economies, Kim and Marcouiller (2015) found that stronger economies recover faster than weaker ones when hit by exogenous shocks. Watson and Deller (2021) examine the negative impact of external shocks on tourism-dependent economies by looking at resilience and the degree of recovery. In a complementary direction, other authors have approached the topic from the perspective of crisis management (Sönmez et al., 1999) and global practical and theoretical approaches to recovery solutions after unprecedented crises (Cheer et al., 2021).

3. Research Questions / Aims of the Research

The aim of the study is to provide an analysis of the changes in the contribution of the tourism sector to the economy of the EU Member States under the influence of the pandemic crisis.

To achieve this general objective, four main research questions were addressed:

(1) Was the tourism sector more affected than the economy as a whole?

(2) In which direction was the impact of the crisis on tourism more pronounced: on the contribution to GDP or on the labour market?

(3) Did the share of international tourism in total internal tourism change?

(4) How has the contribution of tourism to member countries' exports changed?

The main descriptive hypotheses related to the literature review and research questions are as follows:

(i) the characteristics of the sector (labour-intensive, direct relationship with the consumer), travel restrictions, and consumer behaviour have made tourism more vulnerable to health crises than other sectors of the economy and the economy as a whole;

(ii) the regulatory measures and policies adopted during the health crises focused on reducing the impact, with an important social component – protecting jobs and vulnerable workers (women, low education); as a result, the economic efficiency (productivity) of the sector decreased, so that the impact on the labour market was stronger than the GDP formation;

(iii) the share of domestic tourism has increased and the share of exports of tourism services in the country's total exports has decreased, due to an accumulation of different factors: domestic tourism is more resilient and has recovered faster, foreign travel is more sensitive to restrictions and pandemics, and tourism exports are so-called internal exports, i.e., tourism activities take place within the territory of the exporting country.

4. Research Methods

To test the hypothesis and achieve the objective of the paper, a quantitative study was conducted. Secondary data on EU member states provided by the World Travel and Tourism Council (source) for two points in time – the last year before the pandemic (2019) and the last available official data (2021) were used. The analysis was carried out in two stages – first, the empirical analysis of the main indicators and second, the analysis of the processed indicators.

The main indicators considered for all EU countries, which covered 2019 and 2021, are presented in Table no.1.

Table 1. Research variables

Variables	Measure unit (%)	Abbreviation
The total contribution of the T&T sector to GDP	T&T GDP in total country GPD	Total_GDP
The total contribution of the T&T sector to employment	T&T employment in total employment GPD	Total_ empl
The share of tourism in the exports	T&T exports in total country exports	Exp
The share of international tourism in the total domestic market	International tourism revenues in total domestic tourism market	Int

Source: The authors, based on WTTC methodology.

The following formulas were applied for each EU member state:

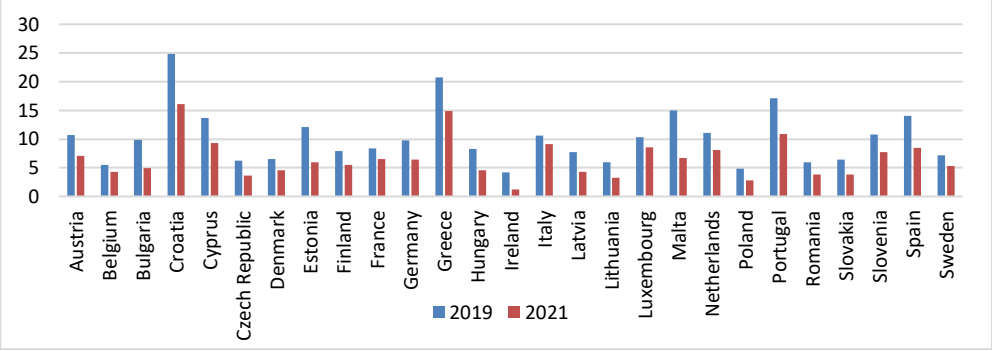
- The evolution of the GDP contribution= ($Total_GDP_{2021}$ - $Total_GDP_{2019}$) / $Total_GDP_{2019}$ * 100 (1)
- Employment contribution evolution = (Total_ empl $_{2021}$ - Total_ empl $_{2019}$) / Total_ empl $_{2019}$ * 100 (2)
- Tourism $Efficiency_{2019}$ = Total_GDP $_{2019}$ / Total_ empl $_{2019}$ (3)
- Tourism $Efficiency_{2021}$ = Total_GDP $_{2021}$ / Total_ empl $_{2021}$ (4)
- International tourism share evolution = (Int $_{2021}$ - Int $_{2019}$) / Int $_{2019}$ * 100 (5)
- The share of tourism in the evolution of exports= (Exp $_{2021}$ - Exp $_{2019}$) / Exp $_{2019}$* 100 (6)

5. Findings

5.1 The Socio-economic Impact

In 2019, Croatia (24.8 %) and Greece (20.7 %), followed by Portugal (17.1 %), Malta (15 %), and Spain (14 %), recorded the highest shares of tourism contribution to the economy from among the EU Member States (Figure 1). On the other hand, the lowest contributions were of 5.5 % (in Belgium) and even below 5 % (Poland - 4.8 %, Ireland - 4.2 %). In 2021, the share of tourism in the economy of the EU Member States reaches a maximum of 16.1 % (Croatia), with Greece (14.9 %) and Portugal (10.9 %) among the top 3 states with more than 10 %, while Ireland, Poland, and Lithuania have registered the lowest values.

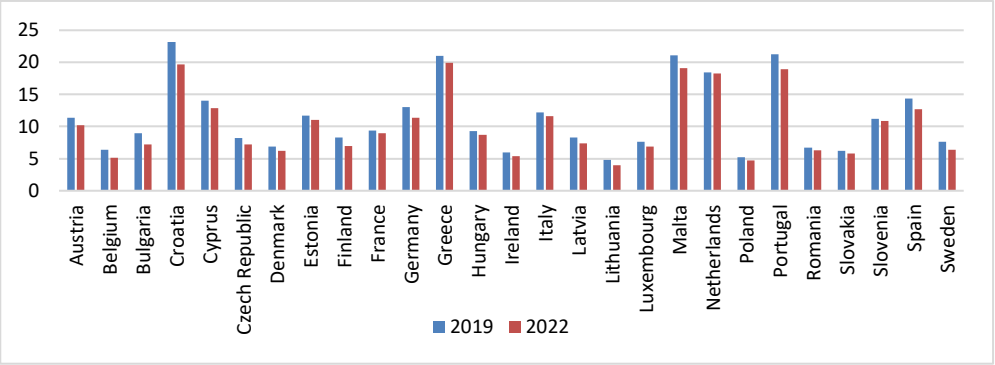
Figure 1. The Contribution of Tourism to GDP



Source: The authors, based on WTTC data (WTTC, 2022).

In terms of employment (Figure 2), the percentage of the population employed in tourism and related sectors ranged from 23.2 % in Croatia, followed by Portugal, Malta, and Greece (where each recorded about 21 %), to about 5 % in Poland and Lithuania. In 2021, one in five people employed in the economy worked in tourism and related sectors (in Greece, Croatia, Malta, and Portugal), while Poland and Lithuania ranked last with less than 5 %.

Figure 2. Tourism Contribution to Employment



Source: The authors, based on WTTC data (WTTC, 2022).

For the the 2019-2021 timeframe, the strongest relative impact on the contribution of tourism to GDP was recorded in Ireland (a decrease of 71.4 %), with the share exceeding 50 % in Malta, Bulgaria, and Estonia. Relatively smaller impacts were recorded in Luxembourg (-16.5 %) and Italy (-14.2 %). As for the decline in the contribution of tourism to GDP measured in percentage points (p.p.), the most affected countries were Croatia (a decline of 8.7 percentage points), Malta (with a loss of 8.8 p.p.), and also Portugal, Estonia, or Greece (around -6 p.p., each).

The impact on the labour market was also reflected in a reduction in the share of tourism in the total number of jobs in the Member States' economies. The relative impact rate ranged from a decrease of more than 20 % in Belgium and Bulgaria to a decrease of only 2.7 % in Slovenia and of 0.5 % in the Netherlands. As a result, differences in the reduction in contribution, measured in percentage points, were insignificant in the Netherlands (0.1 p.p.) and were less than 1 percentage point in 14 of the 27 Member States. In contrast, the decline in the contribution of tourism to employment was strongly felt in Croatia (3.5 percentage point drop in the share), Portugal (-2.4 p.p.), and Malta (-2 p.p.).

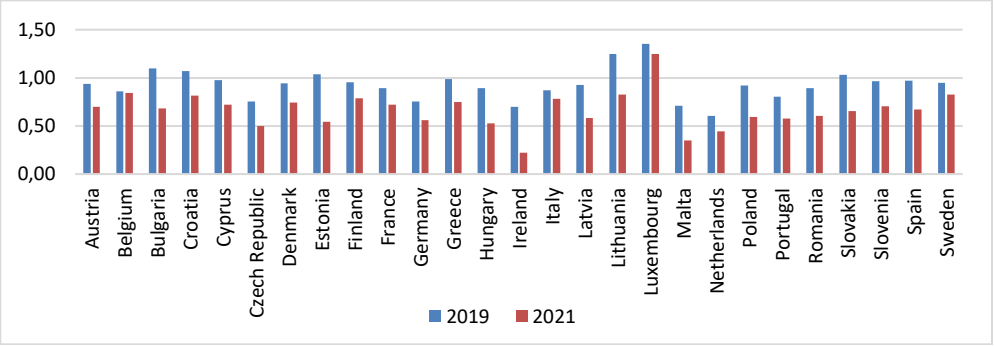
5.2 Changes in the Sector GDP / Employment Efficiency

Regarding the differences in the impact on the GDP and on the employed population, we note that the negative impact of the pandemic crisis has almost invariably been reflected more strongly in the formation of the GDP. Thus, the difference in the rate of development is the largest in the case of Ireland (-61 p.p.), while in eight other countries, the contribution to GDP decreased by at least 30 p.p. and up to 45 p.p., while only in three out of the 27 countries (Italy, Luxembourg, Belgium) the registered decrease was of less than 10 p.p.

The sector efficiency, calculated as the ratio between the share of GDP and the share of the employed population (Figure 3), was above 1 in only six EU member states, with Luxembourg (1.36) and Lithuania (1.25) well above. While 11 other countries recorded values between 0.9 and 0.99 and five others between 0.8 and 0.89,

the economic productivity of the tourism sector in the Czech Republic, Germany, Malta, Ireland, and the Netherlands was significantly lower (0.6 – the minimum value). In 2021, only in Luxembourg, the efficiency ratio was above 1 (1.25), in all other countries the indicator was lower than 0.85, with extremely low values in Malta (0.35) or Ireland (0.22).

Figure 3. The Share of Tourism in GDP / Share of Tourism in Employment Ratio

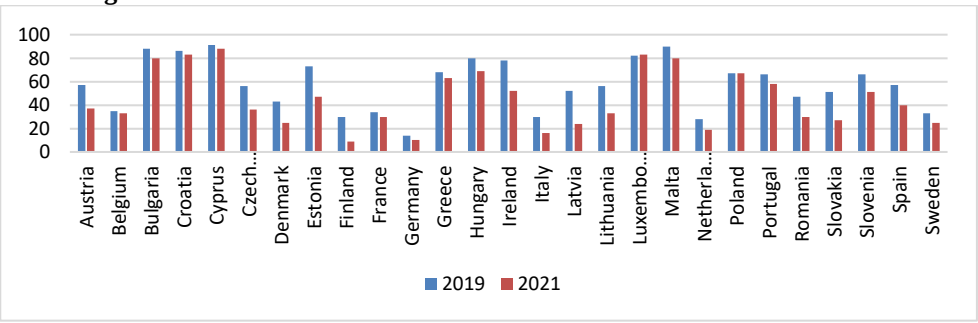


Source: The authors, based on WTTC data (WTTC, 2022).

5.3 Changes in the International Tourism and Tourist Exports

In 2019, the share of international tourism (inbound tourism) in the total internal tourism (domestic tourism + inbound tourism) was of 91 % in Cyprus, 90 % in Malta, 88 % in Bulgaria, and 86 % in Croatia. The differences between the EU internal markets were considerable: the share of international tourism was around 30 % in Finland, Italy, or the Netherlands and reached a minimum of 14% in Germany. Five of the 27 Member States maintained a share of international tourism in the total internal travel of 80 % or more in 2021, while the share fell to 16 % in Italy and 10 % in Germany, and reached the minimum value of 9 % in Finland.

Figure 4. The Share of International Tourism in the Total Internal Tourism



Source: The authors, based on WTTC data (WTTC, 2022).

The first observation related to the changes in international tourism is that, except for Luxembourg, where the share of international tourism has increased by 1 percentage point (but this corresponds to a growth rate of only 12 %), and Poland,

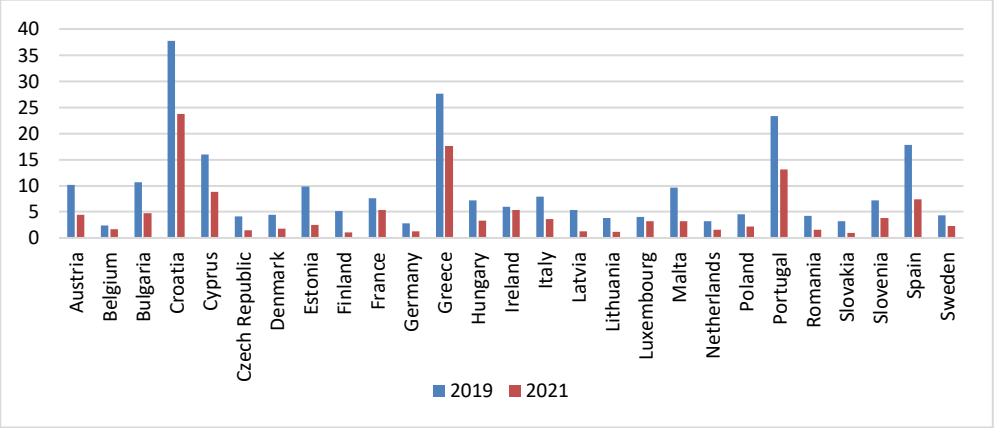
where the values for 2019 and 2021 remained at the same level, in all other EU Member States the share of international tourism in domestic tourism has decreased.

In 8 out of 27 countries, the share of international tourism decreased by more than 20 p.p., with the largest differences in Latvia (28 p.p.), Estonia, and Ireland (26 p.p. each), and in 7 other countries, the decrease was between 10 and 20 percentage points. In terms of development rate, the decrease in the share of international tourism was higher than the average in Finland (-70 %, corresponding to 21 p.p.), Latvia (-53 p.p.), and Ireland (-5 p.p.), Latvia (-53.8 %, 28 p.p.), but also Italy and Slovakia (about 47 % each), while in Cyprus or Croatia the decreases were much smaller (3.3-3.5 %, 3 p.p. each).

Another important observation is that in 2019, the share of international tourism was higher than that of domestic tourism in 18 out of 27 countries, while in 2021 this number decreased to only 11 countries.

In 2019, Croatia held the record for the share of tourism exports in total exports, with 37.7 %, while Greece (27.6 %) or Portugal (23.3 %), but also Spain (17.8 %) or Cyprus (16 %) also had extremely high values. The Netherlands, Slovakia, Greece, or Belgium only exported tourist services in insignificant percentages, of around 3 % or even less. Even though Croatia, Greece, and Portugal remained among the European countries with the highest tourism share in 2021, the percentages were significantly lower, by 10 percentage points or more (23.7 % in Croatia, 17.6 % in Greece, 13.1 % in Portugal). The decline in the export share was observed in all EU countries, and no less than 13 states having recorded a share of tourism in total exports below 2.5 % in 2021.

Figure 5. The Share of Tourism Exports in the Country's Total Exports



Source: The authors, based on WTTC data (WTTC, 2022).

Consequently, the sharpest declines in the share of exports were recorded by Croatia (14 p.p., -37 % rate), Spain (10.4 p.p., -58.4 %), Portugal (10.2 p.p., -43.8 %) and Greece (10 p.p., -37.1 %). In contrast, the share of tourism exports in total exports decreased by less than 1 percentage point in Luxembourg, Belgium, and Ireland. As far as the development rate is concerned, the decreases of 75 % or more in

Estonia, Latvia, or Finland should be highlighted, corresponding to a decrease in the share of tourism exports by 7 and 4 p.p., respectively.

6. Conclusions

Regarding the first research question, the first conclusion that can be drawn is that tourism was more affected than the economy as a whole, which confirms the first hypothesis. Considering the previously mentioned results, we can confirm the second hypothesis and answer the second research question: the impact of the crisis was felt more in the GDP formation than in the labour market. Answering the third question, we can partially confirm hypothesis 3: The share of international tourism in the total internal tourism decreased during the COVID-19 crisis in the EU member states almost without any exception. Answering question 4 and hypothesis 3, it is confirmed that the share of tourism in the member countries' exports has decreased during the crisis.

The results provide empirical evidence that supports and complements previous studies on the relationship between tourism and economic vulnerability (Sun et al., 2021), on changes in economic contribution in times of crisis (Figini, Patuelli, 2022), or on the negative impact of external shocks (Watson, Deller, 2021). However, as a limitation of the research, we consider that the approach exclusively from the relative perspective of macroeconomic indicators provides only an overview of the impact of the health crisis on tourism in relation to the economy of EU member states. In further research, the problem studied could be completed by analysing the sectoral in relation to the measures and strategies adopted by the authorities during the pandemic.

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At the Beginning of the Road. An Exploratory Research of Fair Trade Coffee in Romania

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Abstract

While globally it is growing by more than 20 % per year, on the Romanian market the commercial phenomenon of fair trade is still in its infancy. In this context, this article proposes a research on the importance of fair trade coffee for Romanian consumers and how its marketing helps producers in different parts of the world. The article is based on an exploratory methodology to identify entities (shops, cafes, etc.) and brands selling fair trade coffee in Romania. The results of the analysis show that, without the help of retailers, fair trade coffee goes unnoticed by Romanian buyers, due to its initially high price compared to other 'generic' types. In addition, Romanians are in the habit of obtaining information from other sources and paying little attention to labels. As a result, only a small proportion of Romanians are aware of the existence of the fair trade logo.

Keywords: Romania, coffee, fair trade, brands.

JEL Classification: F1, L81, P36.

1. Introduction

In the face of inequalities between states, poverty and malnutrition, the polarisation of consumption and production (especially in the developed world) and under pressure from some NGOs, the need for fair trade is growing. The need for projects in this direction is driven by the need to help food-insecure countries to help their own people to feed themselves (Mionel, 2017).

Every year, 1 October is International Coffee Day, a 'vice' with a history dating back about a thousand years. Coffee is considered a soft commodity and the world's main source of caffeine. Coffee beans were discovered by chance and later first cultivated in the Kaffa region of Ethiopia (Weinberg, Bealer, 2002). From here the

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coffee spread to the Arab world through Egypt and Yemen. Later, the people of Yemen began to grow coffee for commercial purposes. The origin of the word coffee may come from the Arabic word *quahwek*, which means 'stimulant/drive' (Moceanu, 2018). From the Middle East, coffee spread to India, Indonesia, and the Americas, but also to Italy through trade relations between North African and Venetian merchants. From Venice, it was then introduced to the rest of Europe and widely accepted in 1600, when Pope Clement VIII described it as nothing more or less than a 'Christian drink', despite its Arab-Muslim origins. In addition, the first coffee shop was opened in Constantinople in 1475, while in Europe, the first coffee shop was opened in Italy in 1645 (Tănase, 2013). Since then, the consumption and importance of coffee has grown steadily, becoming one of the most sought-after global agricultural products.

After fossil fuels (oil and gas), precious metals (gold and silver), and copper, coffee is today the world's most traded commodity (Thaxton, 2022). Around 2.25 billion cups of coffee are consumed worldwide every day (Yaqub, 2023). As well as being used for direct consumption, it is also decaffeinated to provide the caffeine needed to make other types of beverages, pharmaceuticals, and cosmetics. There are two types of coffee sold worldwide: *Arabica* (70 % of the world's total) and *Robusta* (cheaper and easier to produce) (Szenthe, 2019). With a coffee shop on every street corner in every major city, coffee has become one of the world's top products, in high demand around the world, and the third most widely consumed beverage after water and tea.

Considering the year that coffee was introduced to the country, Romania has been a traditional consumer of coffee from the very beginning, with the first documented coffee shop in Bucharest dating back to 1667. It is the café opened by a Turk from Constantinople, located in the place where the National Bank of Romania is today, roughly in the centre of the capital (Moceanu, 2018). With such a rich history as a coffee-consuming country, it is no wonder that it has been „part of Romanian culture for centuries, with Romanians being among the most active consumers of coffee in Europe", says Ciobanu (2018). Romania, for example, is now modestly supporting producer countries by selling 'fair trade' coffee in coffee shops, supermarkets, petrol stations, and the like. When Romanians choose fair trade coffee, they are implicitly investing in the quality of life of families and producing communities. A fair trade coffee producer invests around 25 % of the money they receive in improving the standard of production and the quality of the coffee. Coffee is one of the world's most popular drinks, and 80 % of its production comes from the millions of farm workers who depend on it for their daily livelihoods.

The novelty of this research is obvious, as Eastern Europe, unlike the West, is less interested in fair trade products. Our paper aims to fill the gap observed in the literature on the acute lack of research in the field of selling fair trade products in Romania in general and fair trade coffee in particular. However, despite the truth evoked by the above figures/values, the results of our analysis show that the high price compared to other 'generic' types of coffee causes many Romanian consumers to bypass the stands and coffee shops that sell fair trade coffee. In addition, as

Romanians tend to pay little attention to the labels on coffee packaging, only a small proportion of Romanians are aware of the existence of the fair trade logo and the true meaning of the whole concept.

2. Literature Review

2.1 The Main Worldwide Coffee Producers

Coffee is currently grown in around 50 countries. The hierarchy of the top ten coffee-producing countries is led by Brazil, which manages to supply more than 1/3 of the world's coffee bean production (ICO, 2020). Brazil produces over 3.5 million tons, seconded by Vietnam. The following places are occupied by Colombia, Indonesia, Ethiopia, Honduras, India, Mexico, Uganda, and Peru. Brazil has been the world's leading producer for more than 150 years. Its plantations cover more than 27,000 km^2. This country differs from other producers in the way it dries: the grains are left to dry in the sun (Szenthe, 2019).

On the other hand, Vietnamese coffee is known as the basis for a drink that is mixed with condensed milk, of which Vietnam produced 1.8 million tons in 2022. Production in the country has grown rapidly, from just 6,000 tonnes in 1975 to almost two million tonnes today. This increase has made Vietnam the second largest producer in the world.

Coffee is one of the world's most valuable and traded tropical agricultural commodities, produced by smallholder farmers, many of whom are unable to make a living. Global production varies due to weather, disease, and other factors, resulting in an unstable market characterised by price volatility. Price volatility has a direct impact on farmers. There are many links in the supply chain. The first link is the farmer, followed by the trader, processor, exporter, roaster, retailer, and the chain closes when the coffee reaches the final consumer. When farmers sell their coffee, they have no idea where it will end up (Fairtrade Foundation, 2019a).

Table 1. The hierarchy of major coffee producers according to the Human Development Index (HDI)

Producing country	**Coffee production (*metric tonns*)**	**GNI/per capita (*PPP $*)**	**The place in the HDI hierarchy**	**HDI Category**
Mexico	273.000	17.896	86	high
Brazil	3.558.000	14.370	87	
Columbia	858.000	14.384	88	
Peru	270.000	12.246	84	
Indonesia	642.000	11.466	114	
Vietnam	1.830.000	7.867	115	
India	329.100	6.590	132	medium
Honduras	390.000	5.298	137	
Uganda	255.000	2.181	166	low
Ethiopia	441.000	2.361	175	

Source: Rodriguez, 2023; UNPD, 2022.

Given the precarious economic situation of most producer countries (see Table 1), fair trade certification, coffee consumption, and the psychological impact of the idea of certification on consumers are helping producer countries by providing the necessary financial support in the form of a fair price for the quantities produced. At international level, the Human Development Index, which ranges from 0 (the poorest countries) to 1 (the richest countries), classifies countries into four categories: very high, high, medium, and low. According to this ranking, among the major coffee producing countries, Mexico, Brazil, Colombia, Peru, Indonesia, and Vietnam are in the high category, while India and Honduras are in the medium category. Uganda and Ethiopia, the least developed producers, are in the low category, with values of 0.525 for the former and 0.498 for the latter (UNPD, 2022). The consolidation of fair trade has an unexpected impact on the economically vulnerable population involved in coffee cultivation in these countries, while the multiplier effect brings even more horizontal benefits than expected. In this context, militant fair-trade organisations and associations have a key role to play globally, as shown below.

2.2 Fair Trade Organisations and Associations

Research into fair trade coffee cannot be carried out without a thorough analysis of the concept, the organisations involved, and the principles that govern this type of trade. The term *fair trade* has been around for more than 130 years. „Historically, the first person to warn of the injustices of international trade was Eduard Douwes Dekker, a Dutch writer. His writings, based on his own experience, satirised the injustices of the Dutch East Indies government in Batavia (Indonesia). In the novel Max Havelaar, the author evokes the story of a colony manager on the Indonesian island of Java, who is deeply affected by the mistreatment of workers in the Asian colony" (Mionel, Mionel, Moraru, 2014, p. 110). The name of the novel is the one that will give the first name of fair trade certified coffee (Smith, Barrientos, 2005).

Fair Trade Organisations (FTOs), also known as Fair Trade Enterprises, define the concept of fair trade as a trading partnership based on dialogue, transparency, and respect, which aims to achieve greater fairness in international trade (Hutchens, 2010). It contributes to sustainable development by improving trading conditions and guaranteeing the rights of marginalised producers and workers, especially in the global South (Elad, 2013). The FTO has a very clear mission: to support producers of Fair Trade products in developing countries. However, its mission cannot be achieved without the help of consumers, who play an active role in supporting producers by buying products whose packaging bears the fair trade logo. Awareness-raising and campaigns also have a role to play in changing existing trade rules and practices (WFTO, 2018c).

In order to be easily recognisable and to give confidence that the products purchased are fair trade, it has been internationally agreed to draw a specific logo. This logo is a certification mark registered for goods from producers in developing countries. The brand is only used on products certified to FTO standards to

encourage people to buy them (Fairtrade Foundation, 2019b). Internationally, there are several fair trade logos on different products (Figure 1). To avoid confusion and feelings of mistrust, consumers need to understand and be aware of the meaning of each logo (Hestian, 2013).

Figure 1. Fair trade logos

Source: Hestian, 2013.

The Fairtrade logo is a registered mark provided by the Fairtrade Labelling Organisation (FLO). It is most commonly found on product labels in supermarkets. To use the logo, companies must comply with international Fairtrade standards agreed by FLO. The standards are agreed through research and consultation with producers, traders, NGOs, academic institutions, and the Fairtrade Foundation. The Fairtrade Foundation does not certify individual products, but assesses a whole business. According to Frăsineanu (2018), fair trade certification has very strict rules, and therefore „not every company can be certified as a fair trade producer. There is a simple verification method, the list of certified producers worldwide can be consulted on the organisation's website". Once a company is certified, it can add the fair trade logo to any of its products.

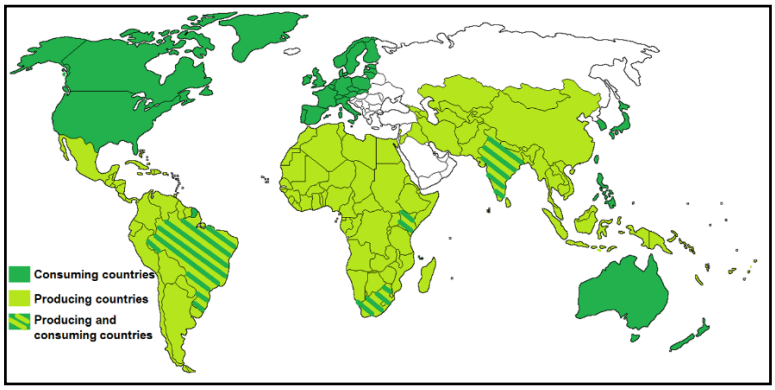
The logo symbol is similar to the yin-yang, but it is also said to represent a person with an upraised arm, with green grass below and blue sky above, leading to unspoilt nature, the freshness of the green grass carpet and a pollution-free blue sky. Instead, some say that the fair trade symbol can be seen as a parrot, a fish, or simple leaves (Hestian, 2013), which are all natural elements.

The BAFTS logo is the fair trade certification of the British Association for Fair Trade Shops and Suppliers. BAFTS is an association of independent shops and suppliers who work with fair trade producers who are considered disadvantaged. Its purpose is to promote the ethics and practices of fair trade and to make the principles of fair trade known to the world. Membership is determined by an annual assessment to ensure that members can provide clear evidence of compliance with the principles (BAFTS, 2019).

The World Fair Trade Organisations (WFTO) is a global community. Its main goal is to unite all businesses that put people and the needs of the planet first. More than 350 partners and 1.3 million farmers and workers in the 70 WFTO member

countries (Davies, 2014), from Africa, Asia and Latin America, as well as Europe, Anglo-Saxon America and Asia-Pacific (Frăsineanu, 2012), see this community as a new business model based on social mission (WFTO, 2018a). On the other hand, the Fair Trade Federation (FTF) is an Anglo-Saxon American trade organisation that strengthens and promotes organisations in the USA and Canada. The FTF is part of the global fair trade movement, building fair and sustainable trading partnerships and laying the groundwork for real opportunities to reduce poverty (Fair Trade Federation, 2019). According to Mionel (2017), with the exception of some Eastern European countries, the Balkans, Russia, Turkey, and almost all Middle Eastern countries, the rest of the countries participate substantially in the global fair-trade network (Figure 2).

Figure 2. The global fair trade network



Source: Mionel, 2017.

2.3 Fair Trade Products, Principles and Sales

Internationally certified fair trade products include: bananas, chocolate, cotton, flowers, gold, cold drinks and juice, herbs and spices, confectionery and snacks, rice grains and cereals, tea, wine, beauty products and, last but not least, coffee (Fairtrade Foundation, 2019c). As we can see, the fair trade logo appears on both 'simple' products such as coffee, cocoa and bananas, and 'composite' products such as chocolate, biscuits and ice cream. The rule for certification is that at least 20 % of the ingredients must be fair trade.

The smooth functioning and practical application of the fair trade concept cannot exist without respect for the ten basic principles of fair trade. The principles are presented in a logical order so that producers can benefit from all the knowledge and experience gained during the WFTO. These principles aim to: (1) create opportunities for economically disadvantaged producers, (2) show transparency and accountability, (3) apply fair trade practices, (4) ensure fair payment, (5) prohibit child labour, (6) commit to non-discrimination, (7) ensure women's equality, economic empowerment and freedom of association, (8) ensure decent working conditions, (9) strengthen the working capacity of marginalised producers, and (10) promote fair trade and protect the environment (WFTO, 2018b).

In 2019, global sales of fair trade products amounted to around €9 billion. This was an increase of more than 5 % on the previous year and has continued to grow steadily since then. The European Union is by far the most important region for the sale of such products, accounting for 2/3 of the total. The countries that spend the most on fair trade products are the UK (€2 billion), Germany (€1.3 billion) and France (€561 million) (Fairtrade International, 2018). It is instructive for the present study that more than half of the turnover comes from the sale of coffee (59 %), followed by bananas, cocoa, flowers, and cotton plants and seeds.

3. Research Methodology

As the Internet is a pragmatic tool for data collection (Sheehan, 2002) and an increasingly influential tool for identifying sources of information, the research methodology used the main online search engines to obtain information. As the research was exploratory (Stebbins, 2001), only data relating to the fair trade phenomenon were taken into account. Thus, we referred to the general data, the theoretical ones, as well as the data concerning Romania.

First of all, the research successively and logically deals with the theoretical aspects of the phenomenon under analysis. In order to extend the research to the Romanian context, the specificities of fair trade coffee have been outlined, through the analysis of the main world producers and their economic profile, the presentation of the profile organisations and associations and promotional logos, as well as a brief analysis of the products and principles of fair trade. Furthermore, in the second part of the research, with the help of the Google search engine, the certified brands and units for the sale of fair trade coffee, which have a significant impact on consumers, were identified on the Romanian market.

4. Romania: Results and Debates

A study carried out in 2015 under the auspices of the European Union and the Committee of the Regions, entitled *Local and regional authorities promoting fair trade*, identified four dimensions of awareness and recognition of the concept of fair trade in European Union countries.

In the classification made by the aforementioned report, Romania is placed in the last category, namely a country in which the level of awareness and recognition of the concept of fair trade is low or even non-existent. On the last dimension of Table 2, Sen, Garnizova and Negencov (2015) undertake a further division, as follows: (1) countries that reported sales of fair trade products, and (2) countries with negligible sales of fair trade products. The group of countries in the first sub-category includes Estonia, Latvia and Lithuania, where sales of fair trade products have been carried out by Finnish FLO quality labelling organisations. Following Finnish support, in October 2014 the Estonian district of Hiiu became the country's first 'fair trade town'. In fact, the aforementioned district was the first in a programme that today operates in more than 2222 cities around the world. On the other hand, the second subcategory included countries such as Romania, Bulgaria, and Greece,

where the sale of fair trade products is presented as a very slow development (Sen, Garnizova, Negencov, 2015).

Table 2. The level of awareness and recognition of the fair trade concept in a selection of European countries

Dimension	State
High awareness raising and recognition	The UK, Germany, Belgium, Austria, Sweden, the Netherlands, Ireland
Medium to high awareness raising and recognition	France, Italy, Spain
Medium to low awareness raising and recognition	Poland, Czech Republic, Slovenia
Low or no awareness raising and recognition	Bulgaria, Romania, Portugal, Latvia, Lithuania, Greece, Estonia

Source: Sen, Garnizova, Negencov, 2015.

The precarious situation of trade in coffee and other certified fair trade products on the Romanian market must be seen in a historical context, as the past has left its mark on Romanian society. Before 1989, due to the communist regime, Romania was unable to create associations or non-governmental organisations that would support the principles of the fair trade movement. However, in recent years, the countries of Central and Eastern Europe, and therefore Romania, have been responsible for developing initiatives in the field of fair trade and promoting various activities and partnerships in this field. A factor in the regional support for the development of fair trade is the existence of the European 2020 Agenda, which is inspired by many of the national reform programmes (OECD, 2014).

One of the main reasons why Romania is still at the beginning of its fair trade coffee commercialisation efforts is the lack of information and awareness among consumers about the importance of fair trade products and what they can do for producers (Popa, 2012). On average, only 1/3 of Romanian coffee consumers attach importance to the concept of fair trade (Forbes Romania, 2019). Most of the time, when choosing a package of coffee from the shelf, the Romanian consumer chooses according to the price, without asking too many questions about its origin, the conditions under which it was produced and by whom. Somewhat the same argument is used by Frăsineanu (2012), who clearly states that "Fair trade products have a high price from the beginning. It often exceeds the price of some products (...) with a large market share." For example, young Romanians are completely uninterested in global issues and say that it is rather unimportant for them to buy a type of coffee from the fair trade supply chain. The 35-44 age group is more aware, with greater knowledge and concern about the international social environment, the value of labour and the correct price for coffee production. In addition, Romanians do not pay attention to coffee labels, they do not get information from coffee packaging, but from the Internet and by word of mouth (Reveal Marketing Research, 2019).

However, there is a countervailing attitude among Western coffee consumers, who want to know the history of the product they buy, especially when they know

that their choice has supported disadvantaged communities. In Romania, there are several coffee shops that are tentatively managing to sell Fair Trade certified coffee to consumers through the stories they tell. Consumers thus support disadvantaged communities through the so-called 'fair trade premium', which is paid on top of the agreed price and is invested in social development projects: building schools, hospitals, access to water and electricity (Duțu, 2010). Thus, for a cup of coffee costing one euro, the consumer pays a 'fair trade premium' of 10 eurocents to the small producer who harvests the coffee in developing countries (Racheleanu, 2017). However, as a Romanian proverb says: "One flower does not make a spring", so it will take much more than a few coffee shops dedicated exclusively to selling fair trade coffee for the phenomenon to spread in Romania.

Data from a study conducted in 2019 shows that in Romania, the preferences of coffee consumers are quite polarised. More than 80 % of consumers prefer coffee from the mass brands - Jacobs (38.2 %), Lavazza (20.8 %), Nescafe (12.8 %) and Tchibo (8.6 %). The other brands spontaneously mentioned by the respondents register small percentages, below the value registered by Tchibo, but interestingly, Julius Meinl, a brand that sells and promotes fair trade coffee (more than other brands), stands out clearly. It is worth noting that this brand is preferred by the young categories (18-24 years old) and the young half of the adult category (up to 45 years old) (Reveal Marketing Research, 2019).

It is quite possible that Julius Meinl's preferences are due to its strong presence in hotels, restaurants, and coffee shops. On the Romanian market, this is due to the fact that fair trade certified coffee is mainly present on the shelves of online shops, supermarkets, coffee shops, and petrol stations. Even in the main retail chains, the presence of fair trade coffee is extremely limited and, as expected, only well-known brands are found on the shelves (Frăsineanu, 2010). In addition, according to Năsui (2020), fair trade products will also be marketed through special shops run by volunteers (World Shop), who will also be involved in education and information activities. Unfortunately, in Romania there are no physical shops dedicated exclusively to the sale of fair trade products, which are mainly promoted by social enterprises.

Among the brands with a tradition of promoting and selling fair trade coffee on the Romanian market, the most visible are Starbucks, Julius Meinl, Viva and Esquires Coffee. There is also a small number of assortments compared to the total range of coffee sold: Malongo, Tchibo, Dallmayr, Delhaize, and others. Among the most popular brands in Bucharest, Starbucks is by far the most important, extensive, and visible: 27 coffee shops. The coffee shop brand segment recorded an increase in sales of 30 % in 2017 and 18 % in 2016, the highest percentage increase in Europe in the last two years (Ciobanu, 2018). Moreover, Starbucks and Esquires Coffee were among the champions at the time. Unlike Starbucks, Esquires Coffee seems to be on the verge of withdrawing from the Romanian market, despite having started with a lot of optimism (Roșca, 2019). Instead, for 40 years, Starbucks coffee shops have been committed to serving high quality, responsibly grown, fair trade coffee. Since 2010, the most popular coffee assortments have been served in all 52 Starbucks

coffee shops in Romania and are 100 % fair trade certified (Starbucks, 2019). In comparison, Julius Meinl can be found in approximately 2300 coffee sales units across the country and in major retail chains (Panaete, 2017).

6. Conclusions

The present research, in its most general lines, draws attention to the importance of the link between hard work and fair payment. It forces Romanian consumers to think critically and to be open about the fairness of the payment for a consumed product, in this case coffee. On the one hand, the paper is a necessary reading to familiarise oneself with the subject and it is a trigger for an absolutely inexhaustible understanding and awareness of the importance of fair trade in general and fair trade coffee in particular. On the other hand, the research focuses on the Romanian market and the most popular commercial units promoting fair trade coffee, thus neglecting the niche cool coffee shops in the city centre, due to the lack of official data.

The observed data lead to the conclusion that it will take a long time for the fair trade coffee market to consolidate and that, at the moment, Romania is only at the beginning of its journey, like a child learning to keep its balance as well as possible. Information and, above all, the support of the media and large retailers play an important role in keeping the balance and reaching maturity (market and consumers). And, although it is not easy, the combined involvement of retail chains and NGOs could give an unexpected impetus to the current stage of fair trade in Romania, and the recognition of the logo could become increasingly popular, raising awareness even more than it is now.

What is certain, however, and at the same time detrimental to the purchasing power of Romanians, is that fair trade coffee is more expensive than branded coffee, which has a large market share, and few companies have chosen to bring such products to Romania. As a result, as Frăsineanu (2012) noted earlier, „their low rotation speed has to be compensated somewhere, both by the retailers and by the importers. A handicap, in front of which there are few companies willing to risk their money". And although we find more and more such fair trade products in Romania, most of them in the coffee, cocoa, and chocolate categories, they are not yet widespread, because not all retail chains are seriously involved in listing such products on their shelves.

The article has some limitations due to the lack of concrete data measuring the level of awareness and adoption of fair trade labelled coffee on the Romanian market. As a consequence, future analyses should investigate the awareness of fair trade coffee among Romanian consumers. Also, based on the information provided here, there is a need for quantitative research on the level of visual identification of fair trade symbols, the meaning of this standard for coffee, and the aspects with which Romanians associate the fair trade movement. Moreover, future research should also focus on the extent to which Romanian consumers are willing to adopt this type of coffee and how much they are willing to help needy farmers by buying fair trade products.

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The Development of Sustainable Leadership for Tomorrow

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Abstract

The paper summarises the best managerial practices and principles of success of the most prolific managers, researchers, and specialists in personal development at this time. The successful businessman/businesswoman respects the ethical and moral standards of his time.

As a practical part, the article presents three successful ideas, two famous iconoclasts, and a new business idea. The 3 ideas of success with impact for humanity are: marriage, laws of motion, and universities. A special importance is given to iconoclasts like Henry Ford and Picasso. The COVID-19 pandemic necessitated the emergence of a new business in tourism: the Cube Concept, which responds to the need for social distancing.

At the conclusions, the matrices of the main traits of the leaders/entrepreneurs of tomorrow are detached, following the strong ideas of the analysed literature and the presented case studies.

Keywords*:* the matrix of sustainable leadership, case study, iconoclast, business in tourism, Rentakub.

Jel Classification: A12, B21, D.85.

1. Introduction

Tomorrow's leader is based on solid principles and focuses on business partners. To be human, warm, approachable, and empathetic. Castro (2007) considers that ,,the intangible values are: forgiveness, discipline, responsibility, commitment, honour, generosity, sacrifice, cooperation, tolerance, creativity, humility, understanding.''

According to Allal-Cherif et al. (2023), ,,sustainable entrepreneurship means: environmental activism, open sustainable product innovation and suppliers as true long-term partners.'' Mead (2018) concludes that ,,business, society and nature are related and we have to be resilient with our innovation goals''.

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Alvehus et al. (2022) conclude that ,,to understand the framing of leadership situations, is multimodal approaches involving time, space, materiality and attention are necessary ''.

Vanichchinchai (2023) considers that ,,leadership and culture are strongly connected with human resources''. According to Tari et al. (2023), Li et al. (2023), leaders may ,,inspire their employees to achieve organisational goals''. Andrade (2023a) conclude that ,,psychology can help leaders understand themselves'' and Alvehus (2021) considers that ,,leadership involves choices of Others being influenced by various practices like management, discipline, manipulation.'' Kopnina (2016) concludes that ,,environmental sustainability can be learned by business students using case studies''. For these reasons, the author use case studies to understand tomorrow leadership.

2. Leaderships, Types of Leaders

According to Ford et al. (2021) ,,the ways to evaluate leadership success are task accomplishment, group integration and maintenance outcomes". Lundmark et al. (2022) found ,,a good relationship between role clarity, employee well-being, and laissez-faire leadership". Birasnav et al. (2023) consider ,,that an internal school competent workforce needs a total quality learning-oriented leadership".

According to Ogaga et al. (2023) and Srivastava et al. (2023), ,,there is a good relation between ethical leadership, sustainability of firms and firm behaviour". Jain (2023) considers that ,,spiritual leadership means interpersonal trust and knowledge sharing." and Hoang et al. (2023) conclude that ,,trust in leader facilitates innovative behavior".

According to Rabiul et al. (2023), Andrade (2023b) and Iqbal et al. (2023) ,,servant leaders play an important role in helping others to become creative self-efficacy" .

Topic (2023) and Lewis et al. (2023) consider that ,,feminine women demonstrate feminine leadership styles". Liu et al. (2023) conclude that ,,relation-oriented leadership and human resource management processes increase the employee performance". Silver et al. (2023) consider that ,,resolving selective destructive behaviour and resolving generalised manifestations of destructive leadership have the same severity". According to Tura (2020), there is ,,an important correlation between leadership style, work experience and dependent variable employee turnover intention" and Hilton et al. (2023) conclude that ,,transformational leadership can help improve employee job satisfaction".

3. Case Study

Sikarwar (2017) considers that ,,cases bring to life events that managers have to deal with on day to day basis". According to Yin (2017), ,,a case study is a detailed examination of a particular case (or cases) within any individual, group, organisation, belief system, or action".

Marriage is a norm in written society, it is good for the stability of society, it represents a lifelong commitment to another person, and it is based on love for the most part, not on the choice of the parents. 55 % of UK marriages last! Stevenson, apud Fardon (2010) considers that "Hope and love tend towards a perfection never realised and which become the salt and pepper of life."

According to Fardon (2010) the university originally ,,meant a community of teachers and scholars. The first three universities, Bologna, Paris and Oxford date from the 11th century and were financed by the Church. In the medieval arts, there were seven liberal arts: grammar, rhetoric, dialectics; arithmetic, music, geometries, and astronomy. However, the first university in the world is the Qayrawan Islamic School in Fez, founded in 859 AD. Today, the university professor still occupies academic chairs. The purpose of the university is to protect teachers and students from everyday temptations to learn about life in a completely different way. Thus, the great minds in science made their first discoveries at the university.

Newton's laws of motion and gravity show that the further an object moves in a circle, the slower it must go to give it the impulse to maintain a constant course. Thus, Newton demonstrated that every movement, large or small, on Earth or in outer space behaves according to these universal laws. These laws opened the way to Enlightenment!"

According to Berns (2010), ,,successful iconoclasts have the ability to connect on a social level that transcends the idea of self. (Berns, 2010) In this sense, to be successful, they use familiarity and reputation. Picasso was a maestro in this sense. He was very productive, creating over 13,000 paintings and 300 sculptures, being an even more prolific artist. People were attracted to him because of his charisma, being a real social magnet. He was what we call today, a true network node, practically creating a true social network. Picasso shows that by increasing familiarity with the world through exposure and productivity, you can shrink your own universe".

Berns (2010) considers that ,,Ford is a good example of how iconoclasts deal with fear. The first step is acknowledging that fear permeates any business. Once the fear is recognised, the next step is to deconstruct and reevaluate it. Ford also points out that when fear is broken down, it is found that the fear of losing money is at the root of it. Ford is a model of how the restructuring of the fear of failure, how it is possible to learn from mistakes, allows a negative potential to be transformed into a positive one".

According to Barabasi (2017) ,,the market is a oriented network: the companies, the financial institutions, the government and all the potential economic players are the knots". Powell (1996) considers that ,,in the network, the option is to create debts and dependences on long term".

Barabasi (2017) concludes that ,,the visible element for present is passing from the vertical structure to plate network, which many connections between knots". According to Sabie et al. (2020) ,,transpersonal dimension means that people understand as individuals, as groups and as organisations".

A Business Idea: The Kub (Rentakub). With an initial investment of 250,000 euros, a tourism entrepreneur laid the foundations of a holiday village in Slănic Moldova, a project that represented the beginning of Rentakub, a network of "cubes" offering tourist accommodation.

The idea started from the desire for the tourist to feel as if he were in a holiday home that he would share with his family. It is a way to be in the middle of nature without sacrificing comfort, as these cottages offer the conditions of a premium hotel. Rentakub is a meeting concept in the Nordic countries aimed at tourists interested in accommodation in their own holiday home, eager to learn about different accommodation concepts. A particularly important aspect, especially during the pandemic: accommodation in the mini-vacation houses in the Rentakub network is carried out without human interaction. Tourists stay exclusively online and receive the access code from the website by SMS, 24 hours before the stay. The Rentakub concept is developed by attracting new network partners who want to start a business in the field of tourism. For the development of the Kubs, any area or city with tourist potential in Romania is suitable, especially since the area will be one of the important criteria for the degree of occupancy with tourists.

4. The Matrix of Sustainable Leadership for Tomorrow

Carnegie (1997) considers that the ways to become agreeable: ,,show a sincere interest in those around you, smile, someone's name for him is the sweetest music, be a good listener, shape your speech according to the interlocutor's interests, do it in such a way that your interlocutor to feel important". Hill (1998) identifies the following causes of failure: ,,the wrong choice of life partner, exaggerated caution, wrong choice of vocation, lack of concentrated effort, inability to collaborate with others, gaps in education, procrastination, lack of perseverance, one or many essential fears".

According to Khushk et al. (2023), ,,authentic leadership incorporates self-awareness, moral perspective, respect for others, and expresses their personal values. Women as leaders establish supportive social relationships, possess mentorship, manage hard tasks".

Collins (2017) identifies 5 hierarchical levels, according to the table below:

Table 1. The five hierarchic levels

Level 5	Level 5 Director	Builds excellent stamina through a mixture of modesty and will.
Level 4	Effective leader	It catalyses commitment and pursues a rigorous vision, stimulating performance.
Level 3	Competent manager	The principal purpose is effective pursuit of objectives.
Level 2	Team member involved	Collaborating effectively with other members.
Level 1	Individual with special qualities	Talent, knowledge and diligence.

Source: Collins, 2017, p. 40.

Level 5 leaders ,,build a company that can function without them. For this, people are selected based on their compatibility with the purpose and essential values. The values that employees are passionate about and that they would not give up really matter".

J. Maxwell (2009) talks about the following ,,qualities for a 360-degree leader: be your own exceptional leader, be willing to do what others refuse, invest in relationship chemistry, become a reliable player, be better tomorrow than you are today, complete yourself teammates". Boddy (2016) considers that ,,Robert Maxwell is a corporate psychopath and even a sociopath because the scores highly on the psychopathy measure used in his research.''

According to Tapscott (2011) ,,the values of the Net Generation are: freedom, customisation, vigilance, integrity, collaboration, fun, speed, innovation". Ridderstrale and Nordstrom (2007) recommend: ,,to love your neighbour, to appreciate the values, not to count the money every moment, to give from yourself, to know the wishes of the scientists".

Covey (2000) considers that ,,the quality of life implies: acceptance and love, challenge and growth, purpose and meaning, fairness and favourable occasions, life balance. This involves: personal sentimentality of the household, the managerial context, the professional challenge, the long-term and short-term perspective, ecological balance".

According to Stewart (2007) ,,successful business people have: passion, curiosity, work ethic, excellence" and Greene (2015) considers that the ,,strategies for achieving mastery: connecting to the environment, using strengths, training, assimilating details, broadening the vision, listening, synthesising".

Table 2. The matrix of sustainable leadership

Level	Name	Qualities
Level 7	Top leader	Holistic, ability to synthesise, vision, emphasis on values, chemistry of relationships, excellence, strategies, patient
Level 6	Responsible leader	Analysis and synthesis, focus on the result, empathy, tactics, Calm, synergy
Level 5	Proactive leader	Delegation, setting goals and objectives, content analysis,
Level 4	Mid-level leader	Time management, balance, growth orientation
Level 3	Proactive member	Self-discipline, propose improvements
Level 2	Active member	Punctuality, Work ethics
Level 1	Prepared individual	Diligence, professional skills

Source: Own considerations of author.

Each level implies different degrees of love, knowledge, truth, common sense.

5. Conclusions

All good thinking is first an idea! And, after, it becomes something practical: an article, a conference, a business company. Those two forces that make humanity go forward are the iconoclasts. From Ford we have the car and from Picasso we have the network, who is very good in business. From the point of view of tourism, the Rentakub concept for pandemic time is one of the best answers.

To make the matrix of sustainable leadership, first step is the leadership literature, second is the case study concept, and third is the hierarchical levels of Collins, because good ideas are coming from other good ideas!

The main contribution of the author is the matrix of the sustainable leadership on seven hierarchical levels. The most important qualities for level seven are: holistic, vision, excellence, values, strategies, and for six level: synergy, empathy, tactics, results. To go from level one to level two and from level two to level three and so on, you need abilities, competences, habits, knowledge and know-how.

The sustainable leader matrix has implications for universities, companies, local, regional, national and international authorities, to any leadership from level 1 to level 7.

The following research aims to validate this matrix by selecting some top multinational companies and identifying such leaders from level 1 to level 7. This will show you the close connection between theory and practice, being useful to both students and managers from different fields, as well as authorities and businessmen/businesswomen.

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Between East and West: Geopolitical Perspectives for Young Arab Migrants in Romania

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Abstract

Romania is becoming an emerging destination for young migrants from Arab countries. In this paper, we adopt a transnationalist position in terms of geopolitical comparisons between host and home countries in order to understand the perspectives that young Arab migrants in Romania have. The qualitative research is based on data collected through twenty semi-structured, psychographic interviews (conducted between January 2020 and November 2021) with young Arab migrants (aged 18 to 29) living in Romania. Findings reveal that the return to the home countries is not a valid option due to lack of security and stability. Instead, most young Arab migrants see their future in Romania thanks to better employment opportunities and living conditions. This also opens up the possibility of a transnational relationship between Romania and the sending countries, with the migrants settling in Romania on the long-term while also maintaining contact with the home countries thanks to improved transportation and communication technologies.

Keywords: migration, resilience, geopolitical perspectives, Arab migrants.

JEL Classification: F22, J15, J61, O15.

1. Introduction

As Mitchell (2018) remarked, the discipline of international relations or geopolitics by and large ignored migration for most of the 20th century, leaving it to other fields of economic or sociological interest. This research paper aims to fill part of this gap on geopolitics and international migration by looking at the strategic

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migration decisions and geopolitical perspectives reported by young Arab migrants living in an emerging destination country from Eastern Europe, Romania. In order to do this, we use Wallerstein's "World Systems Theory", separating between first world, second world and third world countries, in order to explain mobility flows. We consider migration as a geopolitical phenomenon, influencing both the decision to leave the native country, as well as the integration and development opportunities in the host country or other potential receiving countries.

We identify that Arab migrants from conflict areas develop a detachment from their home countries and an attachment to Romania, which makes them reinterpret geopolitical relations in a transnationalistic vein.

This study contributes to the Romanian migration literature in three ways. First, the study adds to Romanian migration research by departing from the previous, overused academic focus on outgoing migration; it does so by focusing its attention on incoming migration amongst young people of Arab origin. The research highlights the importance of considering various groups within migration studies and provides information on the experiences of young Arabs who move to Romania.

Second, the study demonstrates that transnationalism alters the ways in which young Arab migrants relate to their home countries and, in turn, also alters their perspectives on life or career possibilities.

Third, the study identifies the motivations or aspirations that lead young Arab migrants to make the choice of staying in Romania (i.e., attractive labour market, higher quality of life), as well as the downside of such decisions (i.e., inability to see family members).

By enlarging the scope of Romanian migration research towards incoming Arab migrants, this study contributes with valuable information not only to the local and international academia, but also to public or private policymakers.

2. Problem Statement

As Riaño (2022) observes, geopolitics are important when aiming to understand the choices of migrants or their resilience opportunities when migrants pursue the integration process in a welcoming country. Ashutosh and Mountz (2012) identified that the geopolitics of migration are produced from two sources: they everyday state practices in the home or in the host society, respectively, the strategies of migrants to move and resettle. Thus, the authors identify a microsocial, as well as a macrosocial dimension to the geopolitics of migration. Nevertheless, a vast majority of research mainly pleads for a macro perspective. Both Bernard et al. (2017) and Coddington et al. (2020), for example, believe that political control practices lead to transformations in migration patterns and in the wider geopolitical sphere (or lack of control practices, we might add, which conduct to chaos and crisis as triggers of migration, as viewed by Mountz and Hiemstra, 2014).

Délano (2009) observes that international migration is a result of a diadic relationship between host state and home state, as well as political interests, narratives, or traditions that might fit into the ecosystem of such international relations.

First and foremost, the role of Romania as a country of destination for international migrants needs to be understood in a geopolitical context. Bilger (2018) claims that Central and Eastern Europe (of which Romania is part) underwent profound geopolitical landscape transformations since the 1990s (fall of the Iron Courtain, the dissolution of the Soviet Union, transition from a planned economy to a free market economy, etc.), which gradually transformed this part of the continent into an attractive transit or host territory for international migrants. The democratic revolutions and the economic reforms of the early 1990s were followed by the integration into the European Union, which created new opportunities for cultural exchange, trade, or cooperation, also leveling economic disparities to other parts of the world.

Bilger continues by highlighting that, next to these geopolitical transformations of the CEE space, if one also considers the recent geopolitical tumultus in Arab countries (the Arab Spring protests, the Civil War in Syria etc.), then it should be no surprise that Central and Eastern European countries become a favoured destination for Arab migrants. Similarly, Syed Zwick (2022) points out that Arab migrants who left their home countries due to persecution or conflicts are more likely to pursue a migration path towards Europe.

This evolution of CEE countries into destinations for international migrants might well be what Mitchell and Sparke (2020: 1046) understand under "geopolitical constructions of safe space": spaces (as countries) that offer enough security for migrants who want to flee from spaces of geopolitical conflicts (and yet do not have sufficient resources to make a living in a "core country"). A safer environment than at home, better living standards, and access to higher opportunities in terms of education or employment, makes Romania a targeted destination by Arab migrants (Cimpoeru et al., 2023).

3. Research Questions / Aims of the Research

The aim of this research paper is to investigate the geopolitical perspectives of young Arab migrants in Romania. We conceptualise the geopolitical perspectives as a construct based on Wallerstein's "World Systems Theory", according to which there is a geopolitical division of the world in core countries (first world), semi-periphery countries (second world), and periphery countries (third world) which may explain the mobility flows (Manafi et al., 2019). In light of this research paper, we consider migration as a geopolitical phenomenon in itself: following the logic of Vaidis and Otis (2020), international migration results from geopolitical conflicts that force populations to search for a better future abroad. Although we acknowledge that geopolitical conflicts are not the only factor determining international migration, we shall further conceptualise migration based on this idea of Vaidis and Otis which, if being added to Wallerstein's Theory, leads us to the following assumptions, which we shall also use as hypotheses of the research:

H1: Geopolitical conflicts (apud. Vaidis, Otis, 2020) force populations of periphery contries (apud. Wallerstein) to move to semi-periphery countries such as Romania;

H2: Once arrived in Romania, migrant populations will evaluate their perspectives still based on a structural/geopolitical comparative analysis of conflicts (dangers) and opportunities between the host country (Romania), the home country and other potential receiving countries.

While accepting these research hypotheses, if Romania is to be seen in this research paper as a nexus of migrant decision-making, then we also need to highlight the geopolitical and geographical role of Romania (a return to Ravenstein's roots of migration theory, some might argue, yet of utmost importance for understanding the findings of this research): Romania is positioned between sending countries to its east and powerful receiving countries to its west. This positioning meant that, for a considerable period of time, mainly during the 1990s, 2000s, and the first half of the 2010s, Romania played the role of a transit country. However, the Syrian refugee crisis of 2015 easily started to change Romania's role in the international migration marketplace. At the request of the European Union, the Romanian Government gradually increased the quotas of third-country workers admitted to the domestic labour market, from 5,500 in 2015 to 100,000 each in 2022 and 2023. According to the most recent available data from the International Organization for Migration (IOM), there were 705,000 international citizens living in Romania in 2020 (roughly 3.7 per cent of the total population). With such figures, Romania should also be regarded as a destination country, not only as a transit country, and, in such a case, its geopolitical implications in the lives of migrants should be considered. The growing number of migrants living in Romania strengthens Skeldon and Walton-Roberts' (2000) idea that Eastern Europe is an emerging core (or a potential core): a first-world in the making, which involves that such countries are no longer to be seen as transit country for migrants, but actually as attractive destination countries. However, the same authors continue, due to persisting structural imbalances, such societies risk to be confined to their semi-peripheral condition.

Therefore, our research question asks what are the geopolitical perspectives of young Arab migrants in Romania? In the attempt to provide an answer to this question, the research paper emphasises a transnationalistic view that is set to configure the geopolitical relations between Romania and the sending Arab countries based on a set of social, economic, political, etc. events unfolding here and there. The question is centered around the possibility of re-migration (return of young Arab migrants to their native countries) versus the possibility to continue their lives in Romania or in other parts of Western Europe. Thus, geopolitical perspectives are herein envisioned around the structural relationship between host and home countries. As shall be seen, although migration ultimately remains an individual choice of the migrant, the wider, macro-, and structural conditions of either the home or the host country cannot be removed from the discussion that shapes the geopolitical perspectives for migrants.

4. Research Methods

This paper results from the research work in the EU Horizon 2020 project "EMpowerment through liquid Integration of Migrant Youth in vulnerable conditions (MIMY)" (EU funding under grant agreement number 870700).

The study takes the form of a qualitative research. Data was collected through open-ended, semi-structured interviews that had the aim to investigate the subjective responses of young Arab migrants living in Romania. One of the advantages of using semi-structured interviews is that they allow the capture of detailed insights from migrants who went through particular situations in their lives, which is of utmost importance when conducting research on Arab migrants, since many of them come from war-torn countries such as Syria, Iraq or Afghanistan, or from countries with peculiar economic situations.

Data was collected between January 2020 and November 2021, thus overlapping with the COVID-19 pandemic, which posed some issues and forced the research team to conduct most of the interviews online, per Zoom.

The overarching goal of the MIMY research project was to provide a better understanding of the vulnerabilities and resilience mechanisms of young migrants in Europe (in the scope of the project, young being defined as aged between 18 and 29), hence what motivated the choice of using semi-structured interviews, as through them participants to the study were encouraged to openly share their views on their vulnerabilities, as well as resilience mechanisms. There were 20 interviews conducted with Arab migrants in Romania (9 males and 11 females).

In the upcoming sections of this paper, a coding system is going to be used in order to protect the identities of the respondents. The coding model is [MY1_RO_Bucharest_m], whereby "MY1" represents the chronological order in which the interviews took place (in this example, we would talk about the first interview in the list), then "Bucharest" or "Iasi" shows the city of the migrant's residence (these were the two sites where interviews were conducted), while "m" or "f" shows the gender.

One of the challenges met during the data collection period was that, due to the COVID-19 related restrictions, the authors were faced with some difficulties in identifying respondents, because access to various institutions working with Arab migrants was limited. Eventually, participants were identified through either formal or informal networks. Further on, several gender-related differences were observed, as women were more open toward participating in interviews than men were, which is also an explanation of the slightly higher number of female respondents.

Table 1 offers a demographic presentation of the 20 interviewees, with their respective gender ("m" of "f" in the code), age (at the moment of the interview), country of origin, length of residency in Romania and professional status (at the moment of the interview).

Table 1. Demographic presentation of the interviewees

Code	Age	Home Country	Years in Romania	Status at Time of Interview
MY1_RO_Bucharest_f	26	Syria	3 years, 6 months	Student, employed
MY2_RO_Bucharest_f	28	Sudan	5 years	Student, unemployed
MY3_RO_Bucharest_f	20	Syria	8 years	Student, unemployed
MY4_RO_Bucharest_f	20	Cameroon	2 years	Student, unemployed
MY5_RO_Bucharest_f	29	Algeria	2 years	Student, unemployed
MY6_RO_Bucharest_f	21	Syria	4 years	Student, unemployed
MY7_RO_Bucharest_f	27	Azerbaijan	1 years	Student, unemployed
MY8_RO_Bucharest_f	20	Yemen	1 years	Student, unemployed
MY9_RO_Bucharest_f	20	Afghanistan	4 years	Student, unemployed
MY10_RO_Bucharest_f	21	Lebanon	4 years	Graduate, employed
MY11_RO_Bucharest_f	24	Sudan	1 year, 2 months	Student, employed
MY12_RO_Bucharest_m	30	Syria	1 year, 6 months	Graduate, employed
MY13_RO_Bucharest_m	30	Syria	6 months	Graduate, employed
MY14_RO_Bucharest_m	28	Syria	4 years	Student, unemployed
MY15_RO_Bucharest_m	29	Syria	3 years	Graduate, employed
MY16_RO_Bucharest_m	26	Yemen	4 years	Student, employed
MY17_RO_Bucharest_m	21	Palestine	6 years	Student, unemployed
MY18_RO_Bucharest_m	20	Lebanon	3 years	Student, unemployed
MY19_RO_Bucharest_m	20	Afghanistan	1 year, 2 months	Student, unemployed
MY20_RO_Bucharest_m	23	Yemen	2 years	Student, employed

Source: Own collection of data from the interviews.

5. Findings

Most of the migrants interviewed reported that they see their future in Romania since here they have more career opportunities than in the native countries. Although the return to the home countries was regarded by many as an emotional choice, the rational decision made the migrants decide not to return to the native countries, but pursue a career in Romania. The decision to continue their careers in Romania was mainly influenced by two socio-economic factors: that the labour market in Romania is far more appealing than the one in the native country and also the fact that migrants saw Romania as a developing country, a status out of which they believed that even more opportunities might arise. Such preferences for labour market access opportunities are confirmed by the findings of Temel and Aca (2022), who show that the increased mobility of Arab migrants is largely determined by the opportunities on the European labour markets.

One of the research findings was that some of the migrants considered it an advantage that Romania was still a „second-world" country and not yet a fully developed, „first-world" country such as Western-European states. Most of them associated this status of Romania with a better quality of life, better living opportunities, and a faster and easier integration:

"In other (more developed) countries in Europe, there are a lot of migrants. They are there from a longer time period 20-30 years, from the first time war erupted in Afghanistan. Now they have a better life. If I had gone to countries

like Germany or Sweden, it would have been more difficult to be successful" (MY9_RO_Bucharest_f)

"There are stories of Syrians aiming to go to Germany. They ask me if I want to go there, since I obtained my paper. But I do not want. For them it is just a trend, but for one of my age, a stable living style is perfect. I like Romania, I've come to love the country, I want [to obtain] the Romanian nationality. Here it is cheap [to live], Germany is much more expensive than Romania, even if they pay you more. In Romania, the economy is sustainable; for my offspring it is a better opportunity. For them to settle in, to grow, to blend in to society, [here it] is better. I want to stay here, to work, to integrate. The trend is Germany, they [other Syrians, n.a.] go to Germany, they do not read information about the country, they use only Facebook for information, that's way they do not integrate" (MY15_RO_Bucharest_m)

"My brother told me to move to him [in Norway, n.a.], but I think it is hard to move to another country, to try again. I got used here, I got used to work, to the language, to the stability, and it seems very hard after all these years to move to another country, to start over, to learn the language again […]. Especially since I have one more year and I can apply for citizenship" (MY14_RO_Bucharest_m)

"I am sometimes afraid to hear something bad about my family, now or in the future. Other than that... about my job I am not afraid, because that depends on me, on my study, on how hard I work. I am afraid to still feel this loneliness, to still feel empty. If I go to live in another country, I am going to feel the same, or I am not going to find the right partner to spend my time with, and I am going to feel like nothing changed, like I'm still empty from the inside" (MY18_RO_Bucharest_m)

As mentioned, the opportunity cost of the decision to stay in Romania on the long term is given by the inability to see family members in the future. Even so, for Arab migrants at least, the decision to continue in Romania was made easy when compared to the conflict situations in war-torn home countries, which Arab migrants wanted to avoid at any price, for them and for their children:

"I want to make sure that my kids don't leave in a war zone country. That's definitely a priority when choosing the country, for sure, 100 % sure. Even if this means giving up my studies. You never know when war hits you, nobody knows it" (MY3_RO_Bucharest_f)

Thus, returning to the home country is not a valid option for Arab migrants, as it is associated with lack of security and stability, a fact also confirmed by Vesek (2021). As one of the migrants mentioned, he might visit his home country for a short period on a holiday, but resting there is not a choice since there is no future there because of the war:

"I can go back to Syria only for visiting; even if I go back, I have nothing to do there, there is no future in Syria" (MY14_RO_Bucharest_m).

Despicable realities in some Arab countries such as Syria or Afghanistan made migration to Romania become an opportunity to escape pressure caused by military, economic, political or social circumstances in the home countries (Faraj, 2022). Although, at the end of the day, migration remains a personal decision, the fact that several interviewees mentioned that they would not return to their home countries

but, instead, pursue a career in Romania also leads to a structural dimension of migration, which places Romania and the home countries in a Wallerstein-like world system that brings along the question of geopolitical perspectives for migrants.

Moreover, the statement made by [MY14_RO_Bucharest_m] is in line with recent findings of Bilecen (2022), who shows that the everincreasing transnationalism substantially changes the ways migrants relate to their home countries and the ways in which they perceive re-migration: while transportation and communication technologies improve, return migration tends to become even more cyclical ("*I can go back to Syria only for visiting*") rather than permanent, with migrants preferring to settle in the receiving country and to maintain occasional ties to their home country.

As a result, migrants often shift their loyalty towards the host country, becoming more involved in local community life or in social activities. For example, one participant to this study opened an "Arab Cultural Center" in her city of residence in central Romania. Such a civic engagement demonstrates the changing nature of global migration in light of transnational behaviour: migrants are no longer simply passive recipients of the host country's culture, but they actually become active social agents who contribute to redefining identities, by matching the cultures of destination and of origin.

The recent 2023 Turkey – Syria earthquake in February revealed yet another facet that makes more and more Arab migrants adopt a transationalistic stance with respect to geopolitical perspectives to the home countries, namely the peculiarities of the humanitarian aid sector in Syria, but, by extrapolation, in other Arab countries as well. The earthquake unfortunately showed that some Arab countries cannot handle such major catastrophes or events; in this context, returning migration to the home countries would do nothing else than to increase the pressure on an already weak aid system (Oxford Analytica, 2021), and hence why many migrants prefer long-term residence in the receiving country.

Many migrants interviewed made it clear that the obtainment of a permanent residency permit and Romanian citizenship is an objective for the future, which is an indication that they see their future in Romania (MY15_RO_Bucharest_m, MY14_RO_Bucharest_m). Acquiring legal status becomes synonym with an extension of the period of stay in Romania. As demonstrated by other studies, the longer the of duration of the stay of Arab migrants in the host country, the higher their desire to remain there (Vesek, 2021). Therefore, we believe that (local) governments or public authorities, in order to be able to design policies beneficial to both the migrants and the host country, need to take into account this changing nature of transnationalism and the ways in which Arab migrants immerse themselves in the local societies, by mixing forms of social and cultural involvement.

6. Conclusions

Framing the analysis of the Arab ethnics' migration to Romania within a geopolitical perspective helped us reveal the complexity of decision-making associated with international migration. Beyond individual experiences, our research

shows, migrants make decisions on whether to stay or to move back or further away by pursuing comparative analyses between their current place of residence (Romania) and their home country or another potential host society. Variables in the decision-making process include family, friends, opportunities for labour market access, political situations, etc.

Our findings revealed that Arab migrants from conflict areas developed a detachment from their home countries and an attachment to Romania, which made them reinterpret geopolitical relations between the sending countries and the receiving country in the light of transnationalist behaviour: re-migration to the home countries is only seen as a temporary solution (i.e., short visits on holidays), while the long-term future is understood to be in Romania (thanks to better living opportunities, easier labour market access, etc.). While temporary visits to the home country may offer a short sense of comfort by rejoining with family members or friends, this is not seen as a long-term solution once migrants have settled in the Romanian society, not is re-migration to another host country, as this move is associated with supplementary difficulties and re-adaptation challenges (MY14, MY15, MY18).

Re-migration becomes even more difficult when the Arab migrants settle in the Romanian society by learning the language and adapting to the cultural norms ("*I think it is hard to move to another country, to try again. I got used here, I got used to work, to the language, to the stability, and it seems very hard after all these years to move to another country, to start over, to learn the language again*"). Once such forms of acculturation occur, migrants tend to develop more serious plans of settling in permanently.

The implications of this research paper for policy-makers are diverse. Considering that the number of Arab migrants in Romania is increasing, such a trend should be used to strengthen economic and political ties between Romania and MENA countries, or, as Castles (1999) pointed out, international migration should be used as an opportunity for (geopolitical) cooperation and development.

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Informed Consent Statement

Informed consent was obtained from all participants in the study.

Conflicts of Interest

The authors declare no conflicts of interest. The funders did not participate in designing and writing this research paper, nor in the decision to publish the results at ICESS 2023.

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International Trade and Containment Measures during the COVID-19 Crisis

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Abstract

The COVID-19 pandemics generated a health crisis, but also an economic crisis that manifested globally and determined economic disturbances at various levels. Due to the rapid spread of the COVID-19, governments all over the world took measures to contain the virus and its health-related effects. However, the measures also impacted the economic life of countries, companies, and individuals. The present paper focuses on the study of the linkage between the containment measures taken by authorities to limit the spread of the virus (measured via the Stringency index) and one important economic activity, the international trade of a country (looked at as both exports and imports). The study considers two European countries, Romania and Poland, respectively, and the analysis comprises the main years of the pandemics, 2020 and 2021. The methods employed are descriptive analysis and inferential analysis, via the correlation analysis. The results illustrate that there is a negative association between the measures taken by authorities to diminish the spread of the COVID-19 virus and the international trade of the countries, with stricter measures being linked with decreases in international trade. However, for the overall period 2020-2021, the links are weak in both countries, and the exports and imports have been influenced differently in Romania as compared to Poland. The paper contributes with more evidence on the influence of the COVID-19 containment measures on the economy.

Keywords: COVID-19 crisis, international trade, containment measures, Romania, Poland.

JEL Classification: F18, F40, I15.

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1. Introduction

The COVID-19 pandemics generated a health crisis, but also an economic crisis that manifested at global level and triggered economic multi-layered disturbances (Tudorache, Nicolescu, 2021). Due to the rapid spread of the COVID-19, governments around the world took numerous measures to contain the virus and its health related effects. These measures also impacted the economy from different perspectives, including at the country level. Various researchers investigated the containment policies taken by national authorities and how they influenced different aspects of societies by looking at how COVID-19 containment measures impacted trade (Lucio et al., 2022) or the epidemic curves (Cascini et al., 2022) or how they interact with politics (Plümper, Neumayer, 2022). Despite the differences in the scope, the stringency, and the duration of the government-imposed measures taken to limit the COVID-19 spread in different countries, they impacted the economic life in those countries.

The present paper focuses on the study of the linkage between the containment measures taken by governmental authorities to diminish the spread of the virus and the international trade of a country. The main objective is to identify the existence or not of a relationship between the evolution of containment measures taken by national governments and the evolution of international trade of countries (seen as exports and imports, separately). For this purpose, the study analyses the situation in two European countries, Romania and Poland. The analysis refers to the main years of the pandemics, 2020 and 2021. The methods used are descriptive analysis and the correlation analysis.

The main aim of the research is to shed more light on the influence that the containment measures taken by authorities during the COVID-19 pandemics had on the evolutions of the international trade at the country level during the same period.

2. Literature and Problem Statement

In the face of a rapid spread of the COVID-19 virus globally and the associated health problems, governments had to take measures to limit the impact of the COVID-19 on the health of the population. From the very beginning of the COVID-19 the measures taken were based rather on non-pharmaceutical public health policies that included restrictive interventions such as physical distancing, wearing face masks, and eye protection, as well as lockdown measures and travel restrictions, and also case finding, contact tracking, and isolations (Cascini et al., 2022). Later on, starting 2021, pharmaceutical interventions, such as vaccinations were taken, but at the same time the non-pharmaceutical restrictions were imposed during the whole period of the pandemics, including periods as late as 2022 (Cascini et al., 2022).

The purpose of taking such measures was to try to manage the pandemics and to diminish the negative effects of the virus on the populations' health. However, the containment policies adopted by governments to limit the spread of the virus, had unfavourable economic and social side-effects (Plümper, Neumayer, 2022).

Negatively affected by the containment measures were the economic activity and the international trade flows, as studied by Lucio et al. (2022), who found in Spain that the negative effects were concentrated in the first wave of the COVID-19 pandemics between March and May 2020 and that the containment measures had larger effects on companies' exports than on imports. In this way, they illustrate that the drop in demand was a main contributor to the reduction of trade flows in Spain. They also called for more studies on the effects of containment measures on international trade during the COVID-19 pandemics. The present paper answers such calls and comes to bring more information about the relationship between containment governmental policies and measures during the COVID-19 and the international trade flows at the country level (total exports and total imports of the country) in two other European countries, Romania and Poland. The value added of the paper refers to the extra evidence brought about the association between restrictive measures and international trade flows in two different European countries.

3. Research Question and Aims of the Research

The present paper has the general aim to identify the existence of a linkage between the international trade at country level and the containment measures taken by the respective country during the COVID-19 health crisis. Therefore, the research question is the following:

"How is international trade connected with the governmental measures taken to contain the COVID-19 spread, during the pandemics?"

The analysis is conducted for two selected European countries, namely Romania and Poland, and the objectives of the research are: a) to analyse the evolution of the overall containment measures taken in Romania and Poland during the pandemics; b) to identify how the containment measures influence the international trade of countries during the pandemics; and c) to compare Romania and Poland with respect to the influence of their governmental measures during the COVID-19 period on their overall international trade.

4. Research Methods

In order to answer the research question and to reach the above objectives, two countries are included in the analysis, Poland and Romania, as the largest (in terms of population) countries in Central and Eastern Europe that are members of the European Union. The present paper considers two types of analyses: a) first, a descriptive analysis about overall containment measures taken in the countries, during the COVID-19 pandemics and about the evolution of their international trade (total exports and total imports) during the same period of time, and b) second, an inferential analysis that looks to the level of correlation that exists between the exports and imports of the country and the measures taken by authorities to contain the COVID-19 virus spread during the pandemics period. The intensity of the restrictive governmental policies is measured through the Stringency index. The

period of analysis comprises years 2020-2021 as the main years of the COVID-19 pandemics (Tudorache, Nicolescu, 2023).

The indicators analysed are:

a) the Stringency index calculated on a daily basis by the Oxford Coronavirus Government Response Tracker. The index measures the overall level of strength of the containment measures taken by governments to limit the spread of COVID-19 during the pandemics, based on nine main indicators as presented on the official source: "school closures, workplace closures, cancellation of public events, restrictions on public gatherings, closures of public transport, stay-at-home requirements, public information campaigns, restrictions on internal movements and international travel controls". The index takes values from 0 to 100 and the closer the index is to 100, the stronger are the restrictive measures. For this analysis, the index has been computed as a monthly indicator, as a simple average of all daily levels of the index. The source of data for the stringency indexes was the Our world in data database.
b) the total exports and the total imports of the country, as monthly indicators. The source of data used is the World Trade Organization database.

The correlation analysis was conducted in order to measure the association between the two variables and the extent to which changes in one variable determines changes in the second variable. Pearson coefficient (r) is used to measure the direction and the strength of the association between the two variables (Schober et al., 2018). In terms of direction of the association, the positive directions illustrate the movement of the two variables in the same direction and the negative directions illustrate the movement of the variables in opposite directions, while the strength of the association is low when the Pearson coefficient approaches zero and is high when it approaches one (Laerd Statistics, 2020).

The correlation was conducted in the present study and the Pearson coefficient was computed in order to analyse if there is a linear relationship between the evolution of exports and imports and the strictness of the governmental policies implemented to contain the virus during the pandemics in the two countries.

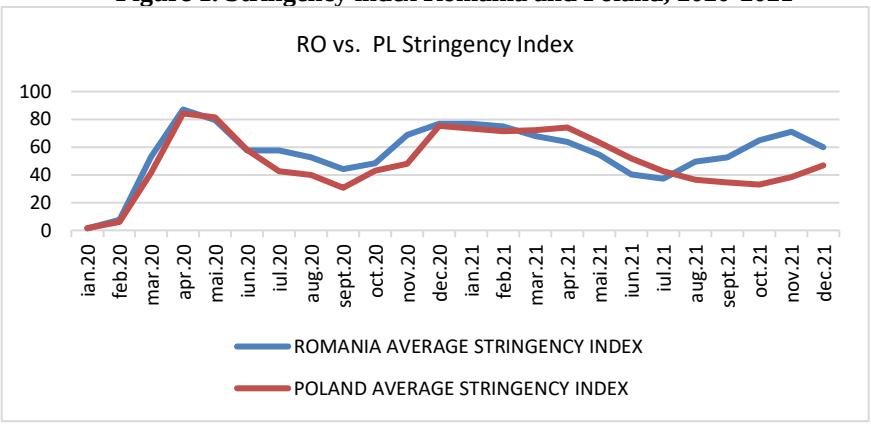
5. Findings

5.1 Descriptive Analysis

The Stringency index proposed by Oxford Coronavirus Government Response Tracker presents on overall the strictness of the measures taken by authorities to slow down the COVID-19 spread and it is a good tool to follow the evolution of the governmental measures at country level, as well as to compare the containment measures in different countries.

It is known that the strictness of the governmental measures taken to contain the spread of COVID-19 followed the evolution of the virus incidence and of the number of deaths associated to COVID-19 (Cascini et al., 2022), so accordingly the Stringency index also followed the COVID-19 evolutions. Figure 1 presents the evolution of the Stringency indexes in Romania and Poland.

Figure 1. Stringency index Romania and Poland, 2020-2021



Source: Authors' based on Oxford Coronavirus Government Response Tracker, data available at https://ourworldindata.org/covid-stringency-index.

The analysis of the evolution of the Stringency indexes in the two selected countries, as presented in Figure 1, reveal a number of aspects:

a) the shape of the evolution of the Stringency index in 2020-2021 has waves, similar to the waves of the COVID-19;
b) the strictest measures were taken in both Romania and Poland in the first wave of the COVID-19 (March-May 2020), when the values of the Stringency indexes reached levels of 80-84 in Poland and 80-87 in Romania;
c) the pattern of the Stringency index in the two countries was similar over the years 2020-2021, but without having the same levels in the same periods of time. The levels of the containment measures depended in each country of the levels of the COVID-19 spread, which came in waves that manifested differently in various periods of time in different countries (Tudorache, Nicolescu, 2023);
d) during the whole period 2020-2021, there were certain containment measures implemented in each of the two countries at any time, with the Stringency index not going bellow 30 (September 2020) in Poland and bellow 40 (June 2021) in Romania;
e) on overall, Romania had stricter measures than Poland as: Romania had the highest Stringency index higher than the Polish upper peak (87 compared to 84); Romania had a higher minimum of the Stringency index compared to Poland (40 as compared to 30); there were more periods with stricter measures in Romania than in Poland, and the average two-year Stringency index was higher in Romania than in Poland (56 as compared to 49).

The analysis of the evolution of international trade in the two countries in the period 2020-2021 is presented in Table 1 and in Figure 2. Both similarities and differences can be observed in the evolution of international trade in the two countries in the analysed period.

Table 1. International trade in Romania and Poland, 2020-2021

Months/Countries (monthly, mill. $)	Romania		Poland	
	Exports	**Imports**	**Exports**	**Imports**
January 2020	6282	7761	22486	22384
February 2020	6445	7876	22447	21756
March 2020	5961	8019	21926	22081
April 2020	3159	4960	15428	15712
May 2020	4068	5466	17774	16580
June 2020	5417	6939	22025	19379
July 2020	6324	7878	23009	22365
August 2020	5404	7230	22002	20938
September 2020	7108	8961	26138	24367
October 2020	7331	9482	27731	25707
November 2020	7096	9008	27949	25963
December 2020	6123	8551	24921	24394
January 2021	6520	8018	24941	23441
February 2021	6934	9290	26561	25909
March 2021	7688	10447	29875	29292
April 2021	7374	9531	28652	26895
May 2021	7148	9379	28095	28167
June 2021	7441	9753	29291	28791
July 2021	7445	10108	27555	28302
August 2021	6609	8712	26205	27606
September 2021	7399	9970	29390	29694
October 2021	7519	10446	30146	30530
November 2021	8014	10533	31876	32366
December 2021	7296	10014	28047	31125

Source: World Trade Organization.

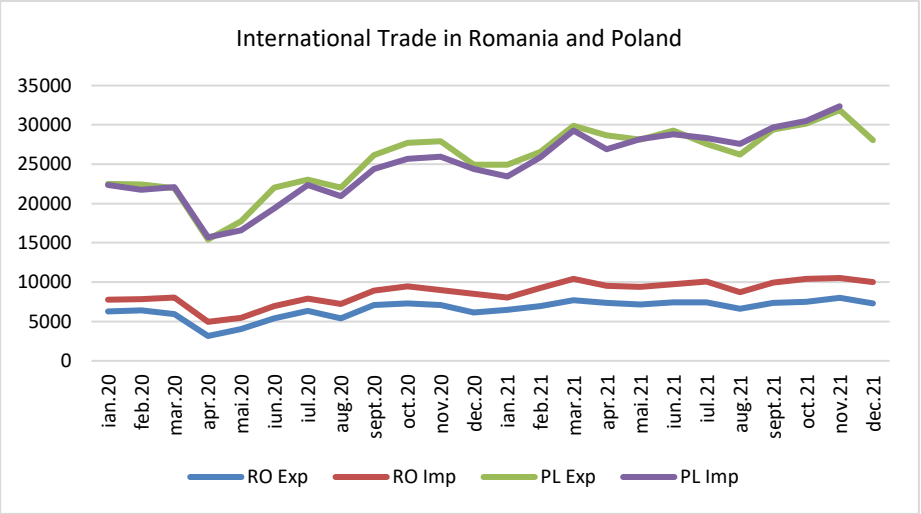
In terms of similarities, it can be observed that:

a) both countries encountered a sharp decrease in both exports and imports when COVID-19 outbroke;
b) in both countries, the evolution of exports and imports came in waves during 2020-2021.

In terms of differences, it can be observed that:

a) Poland had a more intense international trade activity as the monthly values of both exports and imports in Poland were higher than in Romania in 2020-2021;
b) in Romania imports were higher than exports during the entire analysed period, whereas in Poland, the balance between exports and imports varied, with the tendency of exports being higher than imports in more periods;

Figure 2. International trade in Romania and Poland, 2020-2021



Source: Authors' based on World Trade Organization, data available at https://www.wto.org/english/res_e/statis_e/merch_trade_stat_e.htm.

c) the evolution of international trade in Poland had steeper waves than in Romania during the COVID-19;

d) in Poland, the international trade had an increasing trend (in spite of the waves), whereas in Romania, international trade was relatively constant (with very smooth almost inexistent waves) during 2020-2021.

5.2 Correlation Analysis

Table 2 presents the results of the correlation analysis. The analysis of the association between the evolution of international trade and the containment measures taken during the pandemics proved to be negative, but rather weak. In other words, in both countries, Romania and Poland, a higher level of containment measures is associated with decreases in both exports and imports of the country.

Table 2. Correlation between the Stringency index and international trade

Countries	Pearson coefficient Stringency index with exports/1 mill.inh.	Pearson coefficient Stringency index with imports/1 mill. inh.
Romania	-0.23875	-0.11607
Poland	-0.1575	-0.1977

Source: Authors' own research.

These results are consistent with other authors' findings who found, for example, that Spanish exports decreased more in destination countries that adopted stricter containment measures (Lucio et al., 2022). Similarly, Liu et al. (2021) stated that both the demand factors and the containment measures taken by governments

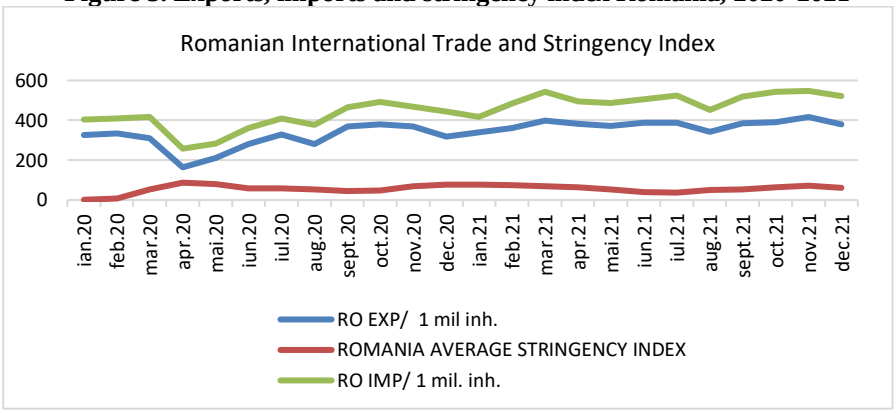
represent better explanations for the trade reduction related to COVID-19, than supply factors or other types of voluntary measures.

However, for Romania and Poland the association is rather weak with values of the correlation coefficient bellow 0.25 (Laerd Statistics, 2020), illustrating that even though the international trade flows are negatively associated with the COVID-19 restrictions, for the main two years of the COVID-19 pandemics, the intensity of the association is not very strong for the overall period, as opposed to the first wave of the pandemics (second quarter of 2020), when trade flows decreased more in those countries that adopted very stringent containment measures (Lucio et al., 2022).

However, in Romania, the negative association was stronger in the case of exports, illustrating that an increase in the Stringency index is associated with a larger decrease in Romanian exports than in Romanian imports. In case of Poland, the situation was reverse, as the Stringency index was stronger correlated with the Polish exports than the Polish imports.

Figures 3 and 4 also present graphically the evolutions of exports and imports and of the stringency index for both Romania and Poland.

Figure 3. Exports, imports and stringency index Romania, 2020-2021

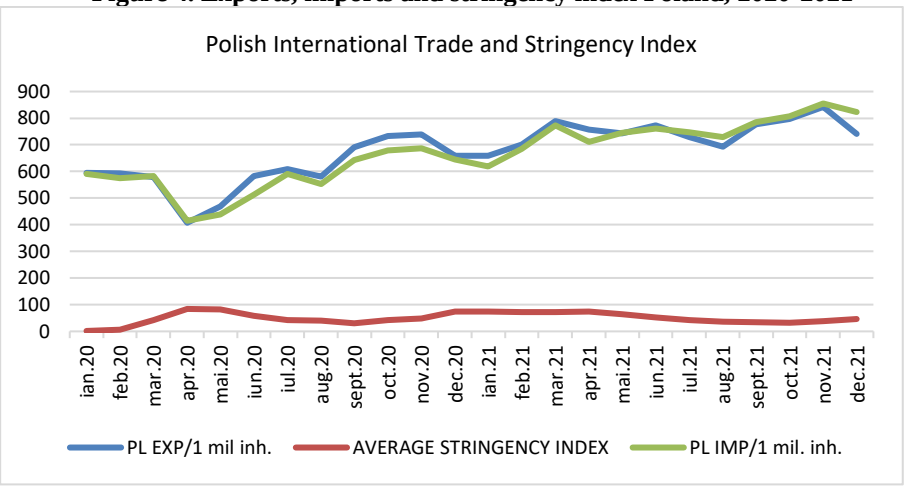


Source: Authors' based on Oxford Coronavirus Government Response Tracker, data available at https://ourworldindata.org/covid-stringency-index and World Trade Organization, data available at https://www.wto.org/english/res_e/statis_e/merch_trade_stat_e.htm.

From these evolutions it can also be noticed that when the steepest decreases in exports and imports took place in both countries (March-May 2020 – the first wave of COVID-19), the highest levels of the Stringency indexes were met.

This reveals in the case of both countries, in the first wave of the pandemics the sharp decrease of imports and exports took place together with a strong increase in the Stringency index, namely in the strictness of the governmental measures implemented to contain the spread of the COVID-19 virus. Later on, the variation of the governmental measures did not vary so much as international trade varied. The containment measures were kept at certain levels they were not reduced to zero, even in periods in which the COVID-19 incidence decreased.

Figure 4. Exports, imports and stringency index Poland, 2020-2021



Source: Authors' based on Oxford Coronavirus Government Response Tracker, data available at https://ourworldindata.org/covid-stringency-index and World Trade Organization, data available at https://www.wto.org/english/res_e/statis_e/merch_trade_stat_e.htm.

6. Conclusions

This paper analysed the evolution of the containment measures taken by governmental authorities during the COVID-19 pandemics, the evolution of international trade flows, and the way the two variables are linked, in Romania and Poland for the period 2020-2021. The results illustrate that when the restrictive measures were stronger at the beginning of the pandemics, the international trade flows were more negatively affected. At the same time, for the whole analysed period the association between the governmental containment measures and international trade flows was negative and weak in both countries. However, in spite of the fact that similar patterns of the governmental measures were noticed in the two countries, the stringency level of the measures was slightly higher in Romania than in Poland. The international trade flows in Poland had stronger fluctuations during the pandemics, as compared to the Romanian international trade flows, that were flatter. At the same time, in Romania exports seem more affected by the restrictions, while in Poland imports seem more affected by the restrictions. The conclusion is that the governmental restrictions affected the international trade flows during the pandemics, but differently from one country to another due to differences in types of measures, stringency of measures and their durations.

The paper contributes to the literature related to the COVID-19 crisis by bringing more eviddence about the relationship between the restrictive measures and their economic impact, with emphasis on international trade flows.

The limitations of the paper are related to the low number of countries considered and the discussion of the restrictive measures as an overall index, while different types of measures might have different influences on the economy and foreign trade.

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Crossroads in the East: CEE's Approach to Post-Pandemic Continental Systems and Global Politics

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Abstract

The research overlooks the CEE' spaces, through the prism of international relation's core paradigms, by understanding that a plenitude of global dynamics and connex unfolding paved the way for a transitory stage between relative uncertainty – negative certainty. Thus, it addresses the matter of how CEE actors interacted in the post-pandemic period, by underlining recent continental and global vectors and, subsequently, their synergic modulations. As such, paralleled by unprecedented geopolitical, geoeconomic, and geostrategic shifts, recent developments created a suite of contradictory movements across the international systems. Therefore, by examining present socio-economic and political evolutions, juxtaposed with prospective trends, we can observe CEE's emerging role. Hence, we can underline that some regional actors' pursuit of independent pathways has become more stringent during the pandemic, hindering at times further EU consolidation or integration efforts.

Additionally, observing public narratives or voting patterns, which balance towards authoritarian capitalism, makes us oversee demos' perception regarding CEE' statehood and EU participation, aspect which bridges EU integration with sovereignty losses, altering foreign policies' implementation.

Hence, as post-pandemic data suggests, there seems to be a soft reset on these inclinations, as the area performed relatively better, all whilst receiving considerate support from the bloc, repositioning itself in the continental networks, especially through a sustainable socio-economic integration. Also, considering continental and global reordering, EU's strategic initiatives implementation proves to impactfully alter CEE's trajectories, generating results like those recorded during the accession periods, especially under co-managed multilevel interconnectedness frameworks. Furthermore, closer binding of CEE, both between itself and toward the EU's core, alongside its larger neighbourhood, enables Brussels to take steps towards a resilient knitted community and strengthens its actorship, agency and autonomy.

Keywords: Central and Eastern Europe Affairs, European Union integration, post-pandemic development, International Cooperation, Macroeconomics.

JEL Classification: F500; F530; F550; F590; H700; O190.

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1. Introduction

If we oversee how cyclical hegemonic power cycles operate, we can note that COVID-19 might represent the 21st century first game changer momentum, especially for small powers, dissipating across all socio-economic, political, and institutional assemblages. Throughout the emergence of systemic manoeuvrings, the CEE arena, came out from the pandemic with relatively modest backdrops, if not even gained a better intra and inter-actor positioning (Baranovsky et al., 2019). Albeit this fact, overcoming future crises, especially across the socio-economic realms, will require CEE actors to possess increased resilience and faster readjustment capabilities, as they must ride through highly shifting global and continental affairs (Miranda, 2021).

Therefore, by exploring how these states adapted in the past, we can oversee the patterns they will mostly likely employ when dealing with the new post-pandemic realities. Aspects which will be filtered through IR and macroeconomic lenses, in juxtaposition with a selection of empirical evidence. As such, the interpretation draws from these spatial and temporal boundaries, in parallel with EU's frameworks and commonly presented global changes, using situational analysis, accounting for the multifactorial impact, all while contouring some remarks about prospective pathways.

2. Frameworks and Approaches: New Systemic Modulations

By analysing the speciality literature, we can underline how the pandemic fostered the establishment of new interconnections and frameworks across the international arena, enhancing latent fractures and palettes of threats for both statal and non-statal actors. The erosion of global orders was exacerbated by these processes, as mid-2010s uncertain systems were replaced by negative certainty, a specificity which encapsulates adverse causalities, even though some believe it is merely a by-product of global developments (Kaplow and Gartzke, 2021). Hence, as conceptualisations showcase, even the simple existential presence of emerging threats seems to demand well-founded, long-term, responsible, altruistic, sustainable governance, and self-restraint.

Moreover, seeing how the pandemic generated a tragedy of the commons, we can expect clashes between states to occur even in a post-COVID world. Thus, since fighting the virus and its adjacent effects represented mostly a national burden, growing anti-globalisation tendencies, fuelled by populist-dogmatic narratives, forced authorities to employ isolationist and protectionist toolboxes (Alexandri, Janoschka, 2020). This led to a paradigmatic approach towards threats, especially in quantitative policymaking, an aspect felt across regional powers.

Thereafter, it became clear that current challenges and their drivers present intertwined suites of specificities, so complex that even hegemonic powers struggle to meaningfully contain them on their own. (Allen et al., 2020; Yang, 2020) This meant that a reassembly of international formats was required, balancing globalisation and self-sufficency, as most actions demanded collective action-taking

to mitigate risks and increase future resilience. Thus, states were forced to choose between consolidation / reasonable globalisation; integration / fragmentation; encapsulation of foreign threats/ communitarian intersections; dominance of national interests/ accounting for global ones, amongst others (Zhou, 2023).

Apart from these paradigmatic divergences, an ideological wall arose as authorities sought to balance necessary control exertion (interventionism) or the respect of democratic freedoms and individual liberties. As Orwell's Problem demonstrated, and Borrell (2020) put it „the temptation is great, we can come to a digital form of authoritarianism, … leading to an erosion of personal freedoms, … as we have gone beyond Orwell", concerns were raised that restrictive measures might over last the pandemic, especially across CEE countries, leading to difficult internal climates.

Moreover, another impediment takes the form of socio-economic fluctuations, in which a key role is played by nation-states' craftsmanship, or cross-border measures (for CEE being those under the EU's aegis or through the B9, 3SI, DRS, etc. umbrellas). Hence, international communities are generally tasked with creating new social contracts, tied together by growth prospects and welfare guarantees, all which account for pre-pandemic avenues and post-pandemic realities. Aspects particularly necessary across societies marked by the crisis model exacerbation and distrust towards neoliberal solutions, as they faced: deepening social inequalities, disenfranchisement from elites, migratory flows, asymmetrical security issues, increased monetary, financial and fiscal turbulences, economic slowdown or recession, all vectors that brew societal dissension movements. (Stiglitz, 2019)

Therefore, any continental or global reordering will go against a suite of traditional challenges – from environmental, climate, energy, or food security all the way to great power competition, armed conflicts, insurgencies, intra-organisational tensions etc., especially since „the pandemic is likely to strengthen existing geopolitical dynamics" (Borrell, 2020). As such, within the post-communist spheres, nation states employed divergent position from those of leading powers to fulfil their desiderates, contrary to an integratory logic.

3. Overlapping Spheres: CEE's Currents across Current Events

From CEE's revolutionary moments, a profound societal re-rooting took place, moulding economic, socio-cultural, and political landscapes, in a bid to create a modern(ised) identity. A transition, underlining in behavioural patterns a prospective cvasi-positivist vision and reminiscences of missed „Belle Epoque", peaking during the pandemic, as milestones were regionally celebrated, from 1-2 decades of NATO adhesion (12 countries), to one 1-1.5 in the EU (10 countries), in parallel with other preparing for their accession. (Orlowski, 2019) Thus, population satisfaction and preference for these frameworks are quite high, in line with Eurostat measurements.

Hence, we can observe how even a politically euro-sceptic Warsaw, economically reserved Prague, or alternatively oriented Budapest exceeded EU-28 median rankings, with solely Sofia and Zagreb falling behind

(Eurobarometer reports). Furthermore, since values remained constant throughout the post-pandemic period, this highlights the growing public's inclination toward Western interconnections.

Albeit this fact, an in-depth analysis underlines the adoption of a second-class Europe mentality, vision only accentuated by some uneven spill over of continental socio-economic advancements. For instance, as Pew Research Center's reports prove, even though within the CEE space the proportion of favourable attitudes was higher than those in older Member States, the values remained stagnant or even decreased (Wike et al., 2019).

This can be explained since freed from USSR's grip, CEE states embarked on a revisionist and integratory journey founded on two pillars: strategic, operational, and security driven transatlanticism (NATO/US partnerships) and socio-economically pushed westernisation and Europeanisation (EU/GP cooperation), both required a comprehensive transfer of power. Thus, this transaction-based model was spined by political factions into an ostracised loss of capacities, only exacerbated by crisis times, although the citizens tend to embrace this redistribution as a necessity, if it bears tangible benefits.

Illustrative of how this phenomenon can be counteracted is the example of Poland and Romania, as established regional powers, economically and politically committed to regional development, which, when faced with definitory pushbacks, from Brexit, COVID-19 to Russia's war in Ukraine, they only strengthened their ambitions in implementing recovery strategies in the CEE space (Razvan, 2022).

Furthermore, as the Eurobarometer suggests, the populations of both countries approve of further inclusion in the EU bloc (approx. 70 %), their main source of satisfaction is from infrastructure projects (80 %), environmental impact (70 %), rule of law and democratic consolidation (55 %), security and defence (75 %), global prestige (60 %). Aspects that represent strategic intervention areas that can be regionally scaled when seeking renewed allegiance to EU's programs, and which can form the basis of a new pan-European closeness, as studies in the pandemic proved that 60-70% of people positively regarded Brussels' actions, more than national authorities.

Moreover, programmatic approaches and enhancement of support programs, can prove beneficial for post-pandemic coagulations, as Globsec (2022) notes that positive consequences and societal cascading are making more than 50 % of CEE's citizens to feel European, without weakening their national sentiments, leading to shared cross-border closeness. However, in several similarly ranked states, the data suggests increased patriotic perspectives, with a spike during the pandemic, which correlates with nuanced opinions when it comes to deepening European ties or even expansionist prospects (Kavalski, 2021).

This means that post-pandemic East-West approaches will be sedimented upon a dissatisfaction with limitations of national capacities, or even fear of further losses, alongside a rather positive outlook of EU evolutions and its impact (Nasir, 2022). Idea further reflected when overseeing CEE foreign policy stances, as they adopt flexible positions and defend their redlines, even to the point of sabotaging grander

plans, if necessary, from Hungary's vaccine or energy imports, Poland's electric car transitioning, Czechia's industrial alliances, as way of example.

These dualistic approaches were accentuated during the last crises, especially as the student-teacher relation with Brussels reached its maturity and CEE nation-states become more of a partnership of equals, with the latter aspiring to preserve pre-eminent membership benefits while minimising obligations, even if it meant accepting that autonomous pursuits weaken the community's cohesion.

Furthermore, socio-economic stats showcase how by 2019 GDP growth (absolute and relative) in CEE was three times that of EU-27 medians, whereas unemployment remained below the average (2.0 to 6.3 % compared to 6.7-7.5 %). (EEF, 2020) Similarly, negative state budgets varied between 0.2-0.7 %, below the Eurozone, or even reached positive levels 0.3-2.1 %, and as the list can continue, it is worth noting that these achievements are due to EU market access and financial support schemes. (EEF, 2022) In addition, the tripling of CEE's GDP per capita and PPP, alongside associated values, greatly impacted the continental economy, as some estimated that the EU MS compensated almost 80 % of their FDI and indirect expenditures through these growths (Ban, Adascalitei, 2022).

Otherwise, even though the potential of CEE is proven across a variety of indicators, donor countries are not interested in expanding the CPF, believing that they have met their aims. The aspect was best observed during CAP negotiations, one of CEE's priorities, as MFF positions sought to restrain Green Deal's ambitions and steer away into other strategic areas.

Albeit these contexts, which paved the way for prospective „tigers" in the area, CEE remained a peripheral area to EU's overall growth, as for instance during the pandemic, with shares of 22.4 % of the population their participation on the bloc's GDP was 10.5 % and, respectively, 7.1 % in tertiary exports. A peripherality also preserved in values from productivity, competitiveness, innovation, or complexity, all but small exceptions, and mostly proven in their globalisation, as indexes ranked a handful of CEE states on par or above their Western counterparts, meaning flows are regionally and continentally oriented, generating a co-dependency with the EU (SEI, 2019).

Whereas in economic terms consolidation is required, social periphery is closing faster, since CEE's prominent role in supranational decision making was accentuated, particularly due to the war which marked post-pandemic Europe. Hence, in current and forthcoming elections, CEE countries are seen consolidating their collective positions, monetising their common political weight, and shaping budgeting, migration, institutional etc. policies with a rather consistent lobbying system (Orenstein, Bugaric, 2022).

Also, this coagulation enables the region to spearhead its own initiatives, from Warsaw's European Reunification Declaration, V4's pandemic funds, to B9's post-war US and NATO mediation, 3SI's North-South doctrine, amongst others, bypassing Franco-German core's interests and promoting closeness regionally and with WB6 or EaP partners, as part of the expanded neighbourhood. These interlinkages can bear results, as V4's 2012 Friends of the Cohesion Policy group

(17 states) prevented MFF reduction in the 2014-2020/2021-2027 cycles, arguing for increased allocation towards CEE' strategic areas (Frumkin, 2019). This intertwined expression of will works even better when backed by others, as Budapest, Bratislava, and Prague, along with Paris, made quite a stance on the preservation of nuclear energy, showcasing a comprehensive capacity to outwardly engage in continental politics.

Moreover, prior to COVID-19, riding a strengthened socio-economic wave and reaffirmed geopolitical capabilities, CEE states tended to reduce their EU alignment, advocating (in a form of economic patriotism) for preferential budgeting. Thus, these trajectories, coupled with the pandemic effects, led some to push for decentralisation, embracing ideas like a Europe of Fatherlands (Orenstein, Bugaric, 2022).

Instances of the bloc's impeachment, although producing some electoral breakthroughs, were mostly contained, fading after the pandemic, although this democratic erosion can further generate EU-wide en-bloc rifts, if developments are not made to support not only CEE's economic growth but also a (re)consolidation of democratic practises, rule of law, and civil societies, especially under existing socio-political dichotomies (internal and external).

4. Pandemic Support: Brussel's Reaffirmation in The CEE

As data suggests, CEE presented increased resilience when faced with the pandemic, partially due to less permeated borders (lower globalisation hubs and relative diversity), share of highly affected sectors (production-oriented), moderate density and elder populations. Also, the socio-political climate, based on previously centralised mechanisms, meant easier enforcement of stricter measures, maintaining higher support rates (55-72 %). Additionally, having a head start, introducing bans before WHO's declaration of the EU as an epicentre, enabled faster socio-economic reopening and reduced expenditures.

In parallel, whereas healthcare is not a direct EU competence, regional formats took primacy, an instance being Romania's early PPE manufacturing, distribution and stocking lines, supporting regional or continental flows and a sense of solidarity. These interlinkages enabled increased country branding and facilitated, when faced with 2nd waves, demands for support, as 68 % of CRII funds were directed to CEE.

Thus, these dynamics led to lower GDP, unemployment, deficit, and inflation rates being recorded, especially compared to Eurozone partners. However, as the long-term support for businesses and access to financial lines become scarcer, it is possible that West-East growth rates to converge, especially as more established economies possess a wider inventory (assets, FDI attractiveness, demographics, etc.). Albeit this prospective, in the meanwhile pan-European recovery programs (SRII, SURE, RRF, etc.) seems to position the CEE countries on a sustainable growth pathway, as the Commission juxtaposed MFF 2021-2027 avenues with 2021-2023 Next Gen short-term interventions, fostering recovery and alignment with clear strategic lines (Porte, Jensen, 2021).

Otherwise, the post-pandemic MFF frameworks, although altered by recent evolutions, maintain core directions (from migration, defense, infrastructure to

digitalisation, youth and sustainability), many already entrenched into CEE's economic developments, reaffirming the latter's intertwined financial measures with the EU's prospects, especially by sparing burdensome national external borrowings. Also, such assistance measures, pioneered by Berlin and Paris, have geostrategic advancements, as they secured CEE's cross-institutional support and gained their pledges to follow sound economic policies and ambitious reforms.

Through this *de jure* symbiosis (support schemes – integratory and development strategies), a *de facto* reinforcement of supranational norms occurred, CEE stepping towards what some consider prerequisites for enhanced economic standardisation or socio-political unification. (Entin, Galushko, 2021) Brussel further sealed this situation, described as safeguarding EU's global primacy in a post-pandemic world where nation-states have no future, by assuming the common debt of the MS, as it means renewed attributes, without the hassle of singular financial bodies (Brzechczyn, 2020). Hence, as the necessary grants are knitted with subsequent strategies (Green Deal, EU's DTS, Global EU, etc.), alongside mechanisms which creates convergence of interests (the need to convince MS/EU institutions of the priorities order), CEE entered a game where their political willpower is direct at maximising external benefits through a collaborative mentality. Although setting new directions, the negotiation processes led to new balancing acts, as some CEE states blocked the Quartet from limiting funds to most affected economies, while Brussels menaced the cutting of several fundings due to rule of law or human rights issues. A stalemate, which will mark prospective endeavours, was reached after the pandemic's ups and downs which shifted continental dynamics (EU's initial slowness and loss of credibility – rise of national autonomy and agency – Brussel's traction gained through support schemes).

5. CEE in The World: From Continental Players to Global Systems

Although I. Krastev (2017, 20-50) mentioned that disintegration never occurs in the periphery, CEE's post-crisis evolutions will shape European affairs, with a close attention being paid on their foreign policy dimensions. This is because their position already transcended that of the limitrophe region, which V.L. Tsymbursky (1999, 140-143) defines as geopolitically contested spaces bordering civilisational platforms, especially as Europe's geostrategic epicentre moved East, overlapping interests, including those of tertiary actors, within and without the region. Thus, catching on the wind-change, especially noting the demand for leadership-based foreign policy crafting to fill-in power voids, CEE leveraged their geostrategic and geoeconomic positions, as a switch from pre-pandemic inertia towards postured, complex, encompassing and collaborative interference into the global systems.

Therefore, EU's reorientation is most likely to showcase a greater political and economic impact on CEE's ties beyond traditional boundaries, as they will shift how regional initiatives (V4, 3SI, B9, DRS, etc.) and international ones (14+1, BRI, NATO, etc.) are conducted, especially towards a continental recentring, as for instance Rail/Via Baltica or Carpatica are seeing operational plans shifted. Thus, we can note how emerging projects focus primarily on clustering CEE spaces, unifying

their socio-economic links, and turning across the N/S and E/W axes. (Pavlicevic, 2019; Schimmelfennig, 2021) Also, even though regional programs exist, generating their own micro-*modus operandi,* their size does not yet replace EU intervention, especially when it comes to tackling major challenges. Yet, these structures have become a double-edged sword, as they engage in trajectories divergent from the bloc, especially when interacting with tertiary powers.

As such, from the pandemic, but mainly considering current tensions, CEE countries shifted their foreign affairs behaviour toward military-industrial complexes, promoting programmes with security and defence undertones, arguing that they bear the burden of ensuring NATO's most threatening flanks. (Labov, 2019) This revamped transatlanticism ensured their position at the negotiations table and created new brokerage opportunities, especially regarding pan-European affairs. A tendency which can mean a new instrumentalisation of global politics and regional emergence, especially as CEE states have managed to place high-ranking officials in key structures. (Romania's NATO DSG, Czechia's EDA Dir., etc.).

Additionally, CEE has already implemented steps to establish themselves as a gateway of international flows, and subsequently gatekeeper, independent of EU, setting new boundaries in their larger neighbourly relations, through careful narrative building and convergence, especially towards Belarus, Russia, Serbia, etc. Attitudes which denote a regional willpower to shift historical memories and present-day factuality into cohesive actions, bearing cross-structural repercussions, although some interest-driven band wagoning still occurs.

6. Conclusions

We can note that the synergy of negative factors, against a complicated international context, will be a determinant vector for CEE's ambivalent role in international processes. Hence, this dynamic will grow in parallel with their own processes of constructing a collective identity and increasing their external socio-economic initiatives.

In this sense, a responsible instrumentalisation of Brussels' resources will enable them to become pivotal and attractive points, if innovative and integratory solutions are taken towards a continental harmonisation. As CEE states gain traction, their public imagery seems to support such trajectories, despite surfacing populist discourses, if tangible benefits are provided for the sovereignty losses.

However, despite the current increased autonomy, agency, and capacity, especially in light of Eastern challenges, the global role of CEE will remain linked to the EU, although the former retains increased influence or even an equal position when it comes to matters concerning the developments of WB6 or EaP. Whereas for the post-Brexit union, CEE can serve as an eastward bridge head (dispersing power and socio-economic influence), while returning increased added-value to the community, if properly engaged in the community.

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Under the Microscope – Analysing how the EU's Energy Policies have been Impacted by the EU Green Deal Initiative

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Abstract

A game changer for the European Union in terms of energy policies, this is how the European Green Deal was presented in 2020, when the initiative was launched. But game changers are more of an expectation than a rule, from a Union that has historically been sluggish in reaching internal consensus and progressing its policies. In this paper, I will research the magnitude with which change has resulted in the formulation of policies, due to the EU's Green Deal, whilst also analysing the impact of the Renewable Energy Directive and its iterations, over the years.

Keywords: European Union, energy, policy, development.

JEL Classification: D78, J18, N14, P18.

1. Introduction

On December 11, 2019, European Commission President Ursula Von der Leyen unveiled the European Green Deal, an ambitious plan designed to transform Europe's economy and EU policymaking. This article aims to closely examine the Green Deal and its impact on EU policies, particularly in the energy sector, which is expected to undergo significant changes. Energy is a major contributor to carbon emissions, with electricity and heat production alone accounting for 31.20 % of the EU's CO_2 emissions in 2019 (EEA). Additionally, this article explores a key proposal from 2021: the revision of the Renewable Energy Directive, which sets one of the Union's decarbonisation targets. By analysing the evolution of the Renewable Energy Directive and comparing it to the changes brought about by the Green Deal, we seek to determine the extent of the program's influence on decarbonisation policy.

Policy subsystems, composed of decision-makers within specific policy areas, strive to monopolise policymaking to advance their interests. However, this monopoly does not maintain a permanent equilibrium; instead, it leads to temporary stability. A shift in the intensity of interest, often triggered by changes in how actors

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and the public perceive a particular policy, can ignite a time of transformation through positive feedback. This feedback-driven change can cascade and eventually reach a tipping point, where negative feedback stops the process.

Previous studies have examined post-crisis financial reforms and long-term changes in energy policy (Burns, Clifton, Quaglia, 2018). Notably, an extensive analysis spanning 1968 to 2010 revealed that, while dynamics for change existed in the EU, the institutional structure consistently impeded the pace of change (Benson, Russel, 2010). These studies highlight the impact of the EU's institutional framework and the presence of veto-players on the extent and speed of public policy change. In this article, we aim to test these conclusions and evaluate their relevance in the context of EU energy policies.

The research methods employed in this study include process tracing analysis, which examines the 2009 Renewable Energy Directive and its subsequent revisions in 2018 and 2021. We will compare these documents to identify historical events and trends that influenced the directive and determine whether a punctuation occurred with the implementation of the European Green Deal. Qualitative sources will be utilised to study changes in the broader political context and the perception of policies. Through this analysis, we expect to gain insights into the transformative impact of the Green Deal on the EU's energy policy. The practical implications of this research lie in improving our understanding of the dynamics of policy change in the EU and informing future decision-making processes.

The structure of the paper is as follows: Section 2 provides a comprehensive overview of the European energy policies evolution, in time. Section 3 presents a short overview of the research questions that this article proposes, while Section 4 presents the research methodology utilised. In Section 5, we present our findings from our analysis, discussing the extent of change brought about by the Green Deal and its implications for decarbonisation policy. Finally, Section 6 concludes the article by summarising the key findings, discussing their practical implications, and suggesting avenues for further research.

This paper introduces novel insights into the European Green Deal's impact on EU energy policy. It offers a comprehensive analysis of the institutional framework, examines the momentum for climate action, explores the roles of different actors, and evaluates the proposed revisions in the Renewable Energy Directive III (REDIII). By addressing these elements, the paper provides a fresh understanding of the Green Deal's transformative potential for sustainable energy policies in the EU.

2. Problem Statement

In 2009, the Renewable Energy Directive (REDI) was finally adopted after lengthy negotiations (EP & COEU, 2009). This directive was the first of its kind, setting a binding framework to encourage the development of renewable energy. The European Union has been concerned with sustainability in energy policymaking since the 1990s (Knodt, Ringel, 2020), due to a growing environmentalist movement in the 1970s, 1980s, and 1990s, as well as international climate diplomacy throughout the 1990s. This led to environmental protection being mentioned in the

Maastricht Treaty and later on, white papers declaring it as one of the EU's main objectives alongside the security of supply and market competitiveness. In 2001, the RES-E directive was adopted, which had only non-binding objectives for Member States. However, this was not enough to explain the adoption of a much more stringent and binding legislative proposal like the first Renewable Energy Directive. Positive feedback supporting a refocusing of energy policies on sustainability started to become strong at that time, as renewable energy sources became popular and well-perceived in the media. Empirical evidence shows that a majority of the Financial Times' articles published around the time of RED I's negotiations were positive on the topic of renewables, praising their potential and publishing articles with titles such as "Renewables to emerge leaner, fitter, stronger" (Scott, 2022).

The first significant aspect of the new directive is the targets it sets. It aims to achieve a 20 % share of renewables in the Union's energy mix (EC, 2009), and initially, the Commission proposed increasing this target to 30 % depending on further international commitments (Solorio, Jorgens, 2020). However, this never happened in the end. These targets are not uniform across Member States but rather vary depending on their situation and renewable energy potential.

The second important feature of the directive is its innovative governance system. It requires Member States to create national renewable energy action plans (NREAPs) from a template designed by the Commission, detailing how they will work towards their respective targets (EC, 2009). The Commission then reviews these plans and makes recommendations. The plans also include declarations by Member States on their expectations regarding renewable electricity production and whether they will need to buy or sell renewable electricity production surplus (EP & COE, 2001).

The third important feature is the lack of a specific support scheme for renewables (Solorio, Jorgens, 2020). The Commission has tried to promote a market-based "tradeable guarantees of origin" system, where consumers buy a certain amount of renewable electricity each year defined by the Member State, and its purchase is guaranteed by a certificate whose sale generates revenue for the electricity producer (Held, 2014). However, because Member States have been reluctant to drop their respective national systems, REDI remained neutral in terms of support schemes, acknowledging both systems as relevant.

Finally, biofuels and biomass are recognised by REDI as renewable energies (EC, 2009), but they are also subject to sustainability criteria, as their production can have negative effects on the environment. Sustainability criteria are quite loose, and the Commission will further investigate the issue in the following years, leading to more stringency in those criteria.

These four features of the directive are novel and major because they will remain sticking issues in the coming revisions of the directive and had important implications for Member States' energy policy. The EU did not fully have an energy competence, but policy entrepreneurs and ensuing positive feedback accelerated the venue change regarding energy policy from Member States to the

Union. All this hints at REDI being the result of a "Downsian mobilisation." (Baumgartner, Jones, 2009).

Despite the adoption of the Renewable Energy Directive, interest in renewable energies and sustainability did not decrease. In fact, the number of articles published on the subject increased from 29 to 51 between 2011 and 2014, compared to the previous period (Knodt, Ringel, 2020). However, the tone of the coverage shifted from being mostly positive to being critical of renewable energy sources. In 2011, only about 25 % of the analysed articles had a positive tone on renewables. This improved in 2012, but the negative coverage remained strong, and in 2013 and 2014 it became majoritarian once again. This change in tone can be explained by two factors: the ongoing economic crisis and the overall failure of climate diplomacy during COP15 in Copenhagen (Burgin, 2020).

Concerns over energy prices and competitiveness of the EU's industry started to be increasingly present in renewable energy-related media coverage, and EU energy companies expressed concerns over the Union's decarbonisation plans. Furthermore, the European Union decreased its ambition in terms of climate diplomacy, as some EU leaders felt that the Union had failed to play its leadership role during COP15(Burgin, 2020). The increasing importance of energy security as a political priority for the EU also reinforced this trend.

As a result, between 2011 and 2014, the Union's sustainability momentum died down, and the adoption of policies in support of renewable energies slowed down at the European level. Therefore, the support for renewables within the subsystem decreased, and because of the lack of intervention at the macropolitical level, the support policies for renewables remained largely unchanged.

After 2015, momentum starts to build up again for renewables. This can be seen as the Financial Times' coverage of renewables becoming positive again (Ward, 2017). The FT's focus moves increasingly toward subjects such as EU energy companies calling for more ambition on renewables, though criticisms are still present (for instance, regarding the rise in energy prices caused by renewable energy development) (Pooler, 2015). The presence of this type of narrative clearly shows that this new positive feedback is not fully dominant yet. Regarding EU policies, The Financial Times also publishes more articles stressing the climate urgency and the need for EU action, in particular in the context of COP21 (Weinger, 2015). Criticisms about the Union not doing enough for renewables also started to appear. For instance, some articles point out to the increasing administrative burden for companies involved in renewables (Clark, 2015). Furthermore, coverage started to increasingly cover utility companies' decisions or positions regarding renewables: this is a sign that, after initial resistance, many of them are now focusing on renewables. In a sense, these energy sources have entered the realm of normality within the EU's energy mix. This comeback of positive feedback for renewable energy support can be explained by several factors. First is the creation of the energy union in 2015. If the debates around this program were mainly about security of supply at first, Western and Nordic Member-States successfully managed to add references to sustainability within its policy goals, giving new assurance

to businesses that the EU is still committed to supporting renewables (Knodt, Ringel, 2020). Another factor is the success of COP21 in Paris, which gave new impetus to the fight against climate change, and new, higher targets for the EU and its Member-States to reach (EC, 2020). This would directly lead the Juncker Commission to propose the 2016 "Clean Energy for all Europeans" communication, aiming at a roadmap for new policies to be presented to reach the objectives set during the COP21.98 This renewed presence of positive feedback supporting further action to promote renewable energy sources gives the EU a new window of opportunity to act, and propose a recast of the Renewable Energy Directive.

In the past, there was some positive feedback supporting more use of renewable energy sources, but there was also negative feedback from the Commission. In 2014, the Commission was split between those who supported renewable energy targets and those who preferred a market-based approach. President Barroso ultimately decided to keep a 27 % renewable energy target at the EU level (Burgin, 2022), but this decision was not challenged by stakeholders since the renewable energy federation EREC had collapsed. NGOs were more focused on revising the ETS, so support for high-binding renewable energy targets was weaker. Negotiations on REDII started with a proposal for a less stringent framework and a moderate increase of the target, but a strong coalition of Member States opposed going beyond what was proposed by the Commission (Bocquillon, Maltby, 2020). This led to a stalemate. In 2017, there was a new attempt to review the RED, and this time, Germany was less supportive of binding targets while Italy and Spain became strong advocates of them. France and Luxembourg also started to play a leading role in pushing for the 27 % target. Central and Eastern European countries were still opposed to high targets and nationally binding ones, but the European Parliament led by Claude Turmès and his team promoted a 35 % target. Although the Parliament failed to obtain nationally binding targets, it was successful in raising the level of the target to 32 % (Bocquillon, Maltby, 2020).

During the period between the first and second Renewable Energy Directives, there was alternating positive and negative feedback toward renewable energy. There were doubts about the sustainability of biomass and bioenergy, which led to the conclusion that stronger sustainability criteria were needed. The legal basis for national plans switched to the Governance Regulation, giving the Commission more power to scrutinise their content and implementation (Solorio, Jorgens, 2020). The Commission failed to establish a European support scheme, but did impose constraints on state aid rules, which eventually led to the banning of Feed-in Tariffs. REDII also facilitated renewable energy permitting processes, which had been a bottleneck for deployment.

During this time, the policy image and the EU renewable energy subsystem evolved due to continued support from Western and Northern Member States, resulting in a small increase in the renewable energy target proposed by the Commission in 2014. However, there was still resistance within the Council and the Commission's preference for non-nationally binding targets, leading to a more incremental change rather than a clear punctuation. After COP21, there was a new

burst of enthusiasm for renewable energies due to climate diplomacy, a resurgent environmental movement, and increased competitiveness. This led to positive feedback and an evolution of the subsystem, with many Member States becoming more supportive of renewables. The second Renewable Energy Directive caused a much more incremental change, but change, nonetheless.

3. Research Questions / Aims of the Research

This research paper aims to investigate the hypothesis that the European Green Deal caused a significant change in EU energy policymaking. Using a comparative case study, the study will examine the extent of its impact on the Union's energy policy.

4. Research Methods

The case study will be based on three types of qualitative sources, enabling us to study changes in the broader political context and the way policies are perceived. This article employs a process tracing analysis to examine the evolution of EU renewable energy policies, with a specific focus on the 2009 Renewable Energy Directive and its subsequent revisions in 2018 and 2021. The purpose is to examine the evolution of EU renewable energy policies over the last decade. By comparing the different versions of the Directive, we aim to identify historical events and trends that have influenced it and determine if a punctuation really occurred with the implementation of the European Green Deal.

The study relies on three types of qualitative sources to provide a comprehensive understanding of the changes in the broader political context and the perception of policies. These sources will be used to compare the different versions of the Renewable Energy Directive and to investigate the impact of the European Green Deal.

The specific documents used in this article for analysis are: The 2009 Renewable Energy Directive; The revisions of the directive in 2018; The July 2021 Commission proposal for the Renewable Energy Directive; several articles, studies, and institutional reports.

By examining these documents and conducting a comparative analysis, the study aims to shed light on the evolution of EU energy policies, the influence of historical events and trends, and the potential punctuations in policy brought about by the European Green Deal.

5. Findings

In this section we will present key findings on the impact of the European Green Deal's impact on EU energy policy. We will also discuss the institutional framework and the roles of different entities in the legislative process, while clarifying legal terms within the EU context. The section will explore the momentum for climate action and changes in the renewable energy policy subsystem, examining the roles of various actors, including the European Commission, Parliament, Council, energy

utilities, and NGOs. The proposed Renewable Energy Directive III (REDIII) will also be presented, highlighting target increases and incremental changes.

The European Green Deal is a comprehensive policy framework introduced by the European Commission in December 2019. It aims to make the European Union the world's first climate-neutral continent by 2050 and sets out a roadmap for transitioning to a sustainable and low-carbon economy. The Green Deal covers various policy areas, including energy, transportation, agriculture, the circular economy, biodiversity, and more.

Within the institutional framework of the EU, the European Commission plays a central role in proposing legislation and driving the implementation of the Green Deal. The European Parliament and the Council of the European Union are also involved in the legislative process, providing scrutiny and approval of proposed measures. Member States of the EU are responsible for implementing and enforcing the policies and directives at the national level.

To better understand how the EU legal system functions, we must clarify the differences between its legal terms:

- Directives are like guidelines that set goals for EU member states to achieve within a certain timeframe. Member states have flexibility in how they turn these goals into their own national laws. Directives aim to align laws and regulations across member states while allowing for some adaptation to national circumstances.
- Policies are broad strategies adopted by governments or organisations to address specific issues or achieve certain goals. They outline the principles, objectives, and approaches to follow in a particular area. Policies can include various instruments such as laws, regulations, directives, guidelines, and action plans.
- Regulations are binding legal acts that apply directly to all EU member states. Unlike directives, they do not need to be translated into national laws since they are automatically enforceable and have a direct legal effect.
- Frameworks provide a general structure or outline for approaching a specific issue or policy area. They establish the context and principles within which further policies and measures will be developed.
- Strategies are long-term plans that outline a vision and a set of goals to be achieved in a specific area. They often provide a framework for policy development and guide decision-making processes.
- Action plans are detailed documents that lay out specific actions, measures, and timelines for implementing policies or achieving specific goals. They provide a roadmap for translating policy objectives into concrete steps and monitoring progress.

In 2019, there was a renewed momentum for climate action, thanks to movements such as Friday for Future and Green-leaning political parties gaining ground in the European Parliament election (Financial Times, 2019). The positive feedback that started in 2015 gained momentum around 2019, generating even more political momentum for higher renewable energy targets. The 2020 targets set in the first renewable energy directive were met, with the Union achieving the 20 % renewable

energy uptake target (EEA, 2021). Renewables have become more affordable and profitable due to technological advancements, government subsidies, and high gas prices. This clear momentum for sustainability and renewables since 2015 could be the beginning of a new "S curve" of positive feedback.

The political momentum and the increased focus on sustainability led to changes in the EU renewable energy policy subsystem. Firstly, a group of Commissioners, led by Frans Timmermans, is responsible for the Green Deal, and the Commission's directorate generals are now more focused on sustainability issues. This has led to a more united and focused Commission, compared to the previous REDII policy. The European Parliament, elected in 2019, also shows greater awareness and support for higher renewable energy targets than proposed by the Commission, with some political groups even proposing targets as high as 45 % or 51 % (Simon, Tylor, 2022). However, there are still some divisions over the type of energy to be supported, with some political groups advocating for low-carbon gases. In the Council, REDII rapporteur Claude Turmès is a policy entrepreneur who enjoys support from Scandinavian and southern European countries, while central and eastern European countries show less ambition on renewable energy targets. Unlike REDII, there has been limited intervention from Heads of State and Government, with the debate focused within the subsystem. Energy utilities have shifted their support towards renewable energy sources and are now strong advocates for them. This is a noticeable change from their previous position of mainly promoting fossil fuels. Eurelectric, which previously represented fossil electricity, now prioritises renewables. NGOs have also become more active in promoting renewable energy and have even been successful in influencing the content of the REDIII proposal. In May 2021, when the Commission released an initial outline of the proposal, it included low-carbon energy sources in the RED certification scheme. However, a group consisting of NGOs, MEPs, and renewable energy stakeholders, including Climate Action Network (CAN), wrote a letter that persuaded the Commission to remove this solution. Thus, not only has the EU renewable energy policy image changed with the Green Deal, but also the actors within the renewable energy subsystem, particularly those involved with the REDIII proposal, are different from those who worked on earlier versions of the directive.

Looking at the Commission's July 2021 REDIII proposal, there is a significant difference in the conditions for a punctuation to occur. The Commission has proposed a 40 % target for 2030, which is an 8-point percentage increase from REDII. The Parliament supported a 45 % target, representing a 13-point percentage increase, which is greater than the increase between RED and REDII (EC, 2021). This increase in target means that REDIII would move EU energy policy into a new paradigm where renewables dominate the Union's energy mix. However, it should be noted that this ambition only came gradually, with REDII increasing the renewable energy uptake target from 20 % in 2020 to 32 % in 2030, and REDIII proposing to increase the target by 8 %. The proposal also introduces nationally binding sub-targets in economic sectors where decarbonisation has been deemed insufficient. On bioenergy and biomass, the changes are incremental, with biomass

support schemes set to be phased out starting in 2026, while criteria for recognition and counting in the renewable energy target become more stringent. The Commission is pushing for the implementation of the "cascading principle" for woody biomass (EC, 2021). In terms of support schemes, REDIII does not change anything, as they are still dealt with under state aid rules, and there is no radical change that could support the idea of a punctuation in the EU energy policy.

This article presents several novel elements in its examination of the European Green Deal and its impact on the EU energy policy. Firstly, it provides a comprehensive analysis of the institutional framework of the EU, shedding light on the roles of different entities in the legislative process and clarifying legal terms specific to the EU context.

Furthermore, the paper offers fresh insights into the momentum for climate action and the increased focus on sustainability since 2015. It highlights the positive feedback loop and political momentum that emerged in 2019, leading to significant changes in the EU renewable energy policy subsystem. The roles of diverse actors, including the European Commission, Parliament, Council, energy utilities, and NGOs, are thoroughly examined, revealing their contributions to shaping the renewable energy policy landscape.

Moreover, the paper delves into the proposed Renewable Energy Directive III (REDIII) and unveils its notable differences compared to previous directives. It analyses target increases, nationally binding sub-targets, changes in bioenergy and biomass support, and the introduction of the cascading principle for woody biomass. By highlighting the incremental nature of these changes, the paper offers a nuanced understanding of the proposed revisions in EU energy policy.

To summarise, the article's hypotheses were confirmed. The Green Deal brought decarbonisation and climate neutrality to the forefront of EU policies, which changed the image of EU energy policy and led to the revision of the Renewable Energy Directive. The subsystem in charge of the Union's energy policy changed, with the Commission and Parliament promoting renewables and low-carbon energy sources, and energy companies and NGOs supporting ambitious targets. However, there has only been an incremental change, and a clear shift from REDII is unlikely. Member States' reluctance to commit to higher targets with binding characters has slowed down change, despite the efforts of policy entrepreneurs like Turmès and stakeholders. As a result, the EU's institutional framework and its veto players have once again slowed down the change, despite the positive feedback loop on renewable energy policy. The first renewable energy directive made a significant change to EU energy policy, but its recasting only brought about small changes. However, with the European Green Deal, which prioritises sustainability in climate policy, there may be an opportunity for a significant change with the proposed revision of the directive in 2021.

6. Conclusions

This article compares the three renewable energy directives from 2009, 2018, and the July 2021 Commission proposal. The review discusses the changes in policy image that occurred during this period, starting with a focus on sustainability and climate issues in 2007-2009. This was followed by a period of economic crisis and international tensions, leading to a greater emphasis on affordable energy and security of supply. However, sustainability came back into the spotlight after COP21 and led to the European Green Deal.

The article also notes the presence of policy entrepreneurs in each version of the directive, including heads of state, environmental NGOs, the European Parliament and its rapporteur, and stakeholders such as NGOs and renewable energy companies.

The article also discusses the progressive change in the EU renewable energy policy subsystem. Initially, this was dealt with at the national level, while the EU focused on topics such as competition in the energy sector. However, after REDI and the adoption of the Lisbon Treaty, the subsystem gained competence in the development of renewables. It became fully geared toward the green transition as part of the Green Deal after being divided for several years.

In this article, we examined the renewable energy directives from 2009, 2018 and the Commission's proposal from July 2021 to compare the different political situations and content of each. We found that several changes occurred over the period, with a strong focus on climate issues and sustainability in the field of energy in 2007-2009. This was followed by a period of economic crisis and international tensions, leading to other concerns such as affordable energy and security of supply. However, the COP21 in Paris brought sustainability back under the spotlight, creating a dynamic that resulted in the European Green Deal.

We also observed the presence of policy entrepreneurs appearing in the legislative process of each version of the directive. Heads of state, environmental NGOs, the European Parliament, and renewable energy companies were all pushing for the development of renewables. We also found a progressive change in the EU renewable energy policy subsystem, with the EU gradually becoming fully geared toward the green transition as part of the Green Deal.

However, despite the conditions for a punctuation to happen in the EU, it did not occur due to the presence of veto players, namely Member States. Some Member States were very ambitious about decarbonising their energy sector, while others were not, leading to opposition to high, binding targets in both REDII and III. This reluctance to change the directive's framework or the broader governance regulation led most institutional actors to drop support for nationally binding targets.

This study has some limitations, such as being based on only one directive and the third Renewable Energy Directive has not yet been adopted by the EU. Additionally, the final REDIII might be significantly different from the one currently being discussed, and the context of the Ukrainian War and the weaponisation of energy by Russia against the EU might lead to changes in the EU energy policymaking in the future.

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A Study of the Relationship Between the Gold Price, the Exchange Rate and the Stock Market Index Returns during the Current Crisis Period using DCC-GARCH and VAR DCC-GARCH Models. Comparative Analysis of Romania and Poland

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Abstract

The events of recent years had a significant impact on financial markets and the economy in general, causing increased volatility in many business sectors. The purpose of this study is to carry out a comparative analysis that aims to highlight the evolution trends of the volatility of the stock market indices from Romania and Poland, as well as two key variables, namely the exchange rate and the price of gold. The originality of this work lies in the case study carried out on the price of gold, the exchange rate, and the main stock market indices from Romania and Poland, which are two emerging countries from Eastern Europe. The results show an increased volatility between variables, as well as the existence of an inverse relationship, on the one hand, between gold index prices and exchange rates and, on the other hand, between gold prices and stock index returns. It was found that there is a direct relationship, synchronised in certain periods, between exchange rates and stock indices. The one-way relationship between the Romanian stock market indices and the price of gold, as well as between exchange rates (USD_RON and USD_PLN) and the price of gold, shows that the price of gold responds to the changes coming from these and not the other way around, which denotes a reluctance of investors who consider that there are more advantageous investments than those in gold.

Keywords: crisis period, multivariate GARCH, stock index return, gold price, exchange rate.

JEL Classification: C01, C12, C51, C52, C53, C55, C58, C61, C63, F47.

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1. Introduction

Gold is traditionally considered a safe investment during periods when negative economic events occur, when there are exchange rate fluctuations, as well as economic instability, which can lead to increased demand for gold. The paper aims to highlight the relationships and influences between the behaviour gold index and the main stock market indices from Romania (the BET index of the Bucharest Stock Exchange) and Poland (the WIG index of the Warsaw Stock Exchange), as well as the exchange rate of the two countries related to USD. The used datasets with daily observations are based on the closing prices of stock indices, gold and the exchange rate from 29.03.2010 to 27.03.2023, on which multivariate GARCH models have been applied, namely DCC-GARCH and VAR-DCC, which allowed us to generate graphs based on the wavelet technique. The objective of the paper is to analyse the gold index compared to changes in the main stock market indices and the exchange rate in the two countries, a fact useful in the decision-making process of investors in diversifying their portfolios. Although there are various studies in the economic literature on the relationship between gold prices and stock indices (Kumaraswamy, Abdulla, Panigrahi, 2023; Nafisi-Moghadam, Fattahi, 2022), which, through various GARCH models, show the persistence of gold prices volatility in India and other emerging countries as a result of using this asset as a safe haven. By investigating the relationship between gold and stock indices with multivariate and bivariate tests, it could be seen that gold is not a safe haven during a period of economic decline (Choudhry, Hassan, Shabi, 2015). There are studies showing that the price of gold can influence the exchange rate of the dollar, which can be an advantage or a disadvantage, depending on the investment strategy and objectives of the lead investor (Moussa, Mgadmi, Regaieg, Bejaoui, 2020), and there are also other studies showing that the price of gold plays a substantial role in creating pressure on the exchange rate of the dollar as well as the fact that there is a negative relationship between the exchange rate and the price of gold, the increase in the price of gold leading to the depreciation of the US dollar (Tsen, 2015). The importance of the paper, even if this topic has been addressed in the vast literature related to this field (Baur, Lucey, 2010), is given by the perspective that it can provide to investors through the analysis of the influence of gold, the exchange rate, and the stock markets in Romania and Poland, under the conditions the current global economic uncertainty, with armed conflicts at the border.

The main objective of this paper is to show that, by using multivariate GARCH econometric models, it is possible to capture the change over time in the variation of the volatility of the variables used, especially during the current unforeseen events in which gold is considered as a safe haven asset.

Moving onwards, the paper is structured as follows: the second section, in which some of the specialised works in the field are mentioned, the third section, in which the research methodology used is presented, and the fourth and fifth sections, which show the contribution of the work to the literature in the field, and the last section where the conclusions are presented.

2. Literature Review

In the economic literature, there are numerous papers on the relationship between gold and the stock markets of India, Pakistan, Malaysia, and other emerging countries. The main reason why these countries are chosen to conduct an economic analysis is that they have a strong tradition of holding gold as a form of investment and protection against inflation and currency volatility. Another reason could be that emerging countries are often more vulnerable to economic and financial crisis and their stock markets are less developed and more volatile than those in developed economies, making the relationship between gold and stock markets more visible.

By using various robust data analysis methods that generate useful insights into complex economic relationships, it could be seen that gold and oil prices have a major impact on stock markets (Shabbir, Kousar, Azra, Batool, 2020). The asymmetric impact between the volatilities of gold and oil prices on stock markets shows the existence of strong positive spillover effects in the case of developed countries and negative spillovers in the case of emerging economies, both on the long term, as well as on the short term (Raza et al., 2016). There are also contradictions in the specialised literature (Marwanti, Robiyanto, 2021), which, through studies conducted on the impact of gold and oil price volatility on stock markets, concluded that, in troubled times, gold represents a hedging asset in emerging countries. There are several studies suggesting that the price of gold can influence the exchange rate of the dollar and the conclusion was that the gold price could be a good way to observe the future performance of the exchange rate (Erb, Harvey, 2012).

Analysing in various papers the impact that the volatility of gold has on the exchange rate, it was found that, on the long term, gold can only represent a partial hedge against currency depreciation. In the short term, the price of gold can fluctuate significantly and unexpectedly, which can cause losses for investors seeking to hedge against currency depreciation (Wang, Thi, Lee, 2021). On the other hand, it has been demonstrated that when there is an increase in volatility in the economy during periods of crisis, metals such as gold can be considered useful for diversifying the portfolio. Referring to the 2008 crisis period, the negative values of the correlations between gold and stock indices showed that gold can serve as a refuge (Siemaszkiewicz, 2020).

3. Research Methods

This study, by using the VAR-DCC-GARCH method, which is an extension of the DCC-GARCH method, focused on modelling the interdependencies between the used variables, namely the price returns of the BET and WIG stock indices, the gold price returns, as well as the USD exchange rate against the currencies from Romania and Poland, as we wanted to showcase how the volatility of gold affects the volatility of emerging stock markets and the USD exchange rate in those countries.

In their paper, Engle and Sheppard (2001) introduced the concept of DCC-GARCH, which allowed the modelling of time-varying conditional correlation.

Cappiello et al. (2006) added to the model proposed by Engle by introducing an asymmetric DCC-GARCH model. In this study we have approached the VAR-DCC-GARCH version. Engle (2002) defined the covariance matrix in DCC-GARCH as follows:

$$H_t = D_t R_t D_t \quad (1)$$

The model proposed by Engle (2002) differs from that of Bollerslev (1990) in that R can vary, and the correlation of the DCC-GARCH model is characterised by the formula:

$$Q_t = (1 - \sum_{m=1}^{M} a_m - \sum_{n=1}^{N} b_n)\overline{Q_t} + \sum_{m=1}^{M} a_m a_{t-1} a_{t-1}^T + \sum_{n=1}^{N} b_n Q_{t-1} \quad (2)$$

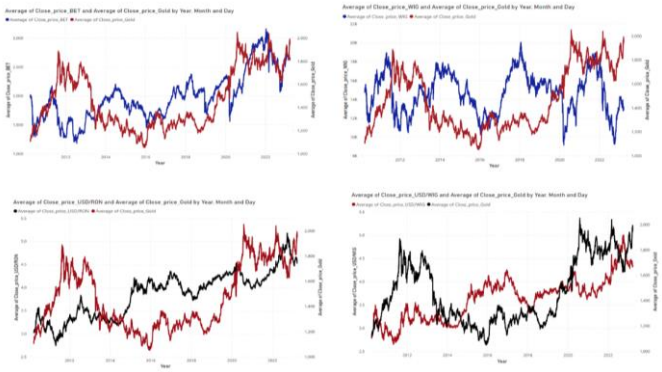
We have studied the degree of interdependence between gold, stock indices, and exchange rates by applying the wavelet technique for graphs, which provides a broader vision of the periods in which there is influence and persistence of the interdependence between the variables. This often-used method has a graphical interpretation that is based on the colours and the meaning of the arrows, as the warmer the colours of the graph are (red or orange), the greater the interdependence between the variables will be. To realise the wavelet technique, first we had to apply the wavelet transformation, which is characterised by the formula:

$$X(a,b) = \frac{1}{\sqrt{a}} \int_{-\infty}^{\infty} \overline{\left(\frac{\Psi(t-b)}{a}\right)}\, x(t)\, dt \quad (3)$$

4. Description of the Data

To determine the relationship between the gold price, exchange rates, and stock indices in Romania and Poland, we used data sets with daily frequency for the period 29.03.2010-27.03.2023. The analysis was performed on the closing prices of the gold index, the BET and WIG stock indices, and the exchange rates, based on which the classical return calculation formula was applied (the logarithmic ratio version). The data series was collected from the Reuters platform, the BNR and the Investing.com websites.

Figure 1. The evolution of the data series from March 2010 to March 2023



Source: Author's own calculations, based on data available on the websites.

Table 1. Correlation between variables

	Gold	BET	USD_RON	WIG	USD_PLN
Gold	1.0000				
BET	0.1154	1.0000			
USD_RON	-0.1542	-0.3491	1.0000		
WIG	0.1606	0.5788	-0.3207	1.0000	
USD_PLN	-0.2156	-0.5254	0.3458	-0.7216	1.0000

Source: Author's own calculations.

In Figure 1, we have graphically illustrated the time evolution of the analysed data series between March 2010 and March 2023. An increased volatility between variables is observed, as well as an inverse relationship between gold stock index prices and exchange rates. In terms of the degree of correlation, we can say that there is a degree of correlation between BET and WIG, as well as between the two exchange rates. There is also a small degree of positive correlation between the returns of the gold price and the returns of the two stock indices.

5. Results and Discussion

The descriptive statistics carried out, the results of which are illustrated in Table 2, showed that during the analysed period there was an average increase in the returns of the gold price, the BET index, as well as the exchange rates, apart from the WIG stock index. The data series has negative skewness except for the two exchange rates, which have positive skewness. The value of the kurtosis coefficient shows that the data comes from a leptokurtic distribution, and, according to the ADF (Augmented Dickey Fuller) test, at a significance level of 95%, the series of data that were used are stationary.

Table 2. Summary statistics

	Gold	BET	USD_RON	WIG	USD_PLN
Mean	0.0181	0.0094	0.0134	-0.0039	0.0131
Median	0.0313	0.0596	0.0030	0.0319	-0.0130
Min	-9.8205	-12.9450	-3.3455	-15.5473	-4.1598
Max	5.7775	11.4576	3.1997	7.9914	5.1454
Std	1.0437	1.3577	0.6121	1.6191	0.8169
Jb	4739.1	18191	907.32	6983.3	1402.9
Skewness	-0.5659	-0.8908	0.2110	-0.7922	0.3963
Kurtosis	5.9337	11.7020	2.6081	7.1600	3.1887
ADF	-14.632***	-13.057***	-14.006***	-14.51***	-14.776***

*** significant at 1% level, ** significant level at 5% level, * significant level at 10% level

Source: Author's own calculations.

To determine the relationships between the analysed variables and predict their values in the future, we have performed an estimation of the conditional average of the VAR DCC-GARCH model, the propagation coefficients of the own average being very important

both in understanding the interdependence between financial variables and in the risk assessment of the propagating shocks between them. From the results obtained in Table 4, it can be seen how the propagation coefficients of the own average for BET registered a positive and significant value (0.0730), for the USD_RON exchange rate it showed a negative and significant value (-0.1398) and for gold a negative but insignificant value (-0.0237). The propagation coefficient of the mean for WIG was positive (0.0361), but statistically insignificant. For the USD_PLN exchange rate, the propagation coefficient was negative (-0.0623), but significant, and for gold it was negative (-0.0298) and statistically insignificant.

Table 3. Estimates of conditional mean VAR model

	Coefficients			
Romania				
	c_1	φ_{11}	φ_{12}	φ_{13}
BET	0.0068	0.0730***	0.0838***	0.0463***
	c_2	φ_{21}	φ_{22}	φ_{23}
USD_RON	0.0181	-0.1433***	-0.1398***	-0.0786***
	c_3	φ_{31}	φ_{32}	φ_{33}
Gold	0.0182	0.0125	0.0233	-0.0237
Poland				
	c_1	φ_{11}	φ_{12}	φ_{13}
WIG	-0.0036	0.0361	-0.0525	0.0311
	c_2	φ_{21}	φ_{22}	φ_{23}
USD_PLN	0.0145	-0.0281***	-0.0623***	-0.0325***
	c_3	φ_{31}	φ_{32}	φ_{33}
Gold	0.0187	0.0283	0.0066	-0.0298

*** significant at 1% level, ** significant level at 5% level, * significant level at 10% level

Source: Author's own calculations.

The results showed, in the case of the BET index, that there is a significant positive one-way relationship between the BET index and the price of gold, which means that there is a significant correlation between these two variables, but this correlation is only valid in one direction. In other words, an increase in the performance of the stock market in Romania may lead to an increase in the price of gold, but a decrease in the price of gold will not have a significant effect on the performance of the stock market. On the other hand, in the case of the WIG index, we can say that there is no relationship or significant correlation between the gold index and the stock market index. A unidirectional, but negative, relationship is also found in the case of the USD_RON and USD_PLN exchange rates on the price of gold, which signifies a trend, namely: an increase in the exchange rate could lead to a decrease in the price of gold. To observe the relationships between the studied variables, we have used two models that are part of the multivariate GARCH family, namely the DCC-GARCH model and the VAR-DCC-GARCH model. These models are often used in such studies due to their ability to model the volatility of the dynamic relationships between the studied time series.

Table 4. Results of DCC-GARCH and VAR DCC-GARCH models

Model	**DCC-GARCH**				
	Coefficients				
Variables	**Ω**	α_1	β_1	**DCC α**	**DCC β**
	Romania				
BET	0.0545***	0.1085***	0.8631***		
USD_RON	0.0017***	0.0383***	0.9573***	0.0184***	0.0266***
Gold	0.0160	0.0361***	0.9492***		
Log-likelihood	-11701.97				
	Poland				
WIG	0.0387***	0.0743***	0.9117***		
USD_PLN	0.0051***	0.0616***	0.9313***	0.0280***	0.9588***
Gold	0.0160	0.0361***	0.9492***		
Log-likelihood	-12152.53				
	VAR DCC-GARCH				
	Romania				
BET	0.0253***	0.1125***	0.8849***		
USD_RON	0.0012***	0.0442***	0.9532***	0.0184***	0.9525***
Gold	0.0048	0.0319***	0.9657***		
Log-likelihood	-11524.1				
	Poland				
WIG	0.0032	0.0621***	0.9300***		
USD_PLN	0.0040***	0.0618***	0.9339***	0.0266***	0.9621***
Gold	0.0068***	0.0321***	0.9632***		
Log-likelihood	-12207.15				

*** significant at 1% level, ** significant level at 5% level, * significant level at 10% level

Source: Author's own calculations.

The results obtained above, following the application of the two multivariate GARCH models, can be concluded by the fact that the DCC-GARCH model shows, for both countries, how the coefficient of the var-covar matrix parameter Ω is positive and statistically significant, except for gold yields. In the case of the VAR-DCC-GARCH model, for Romania, we have observed a significant positive value of the parameter Ω for the BET and USD_RON indices, but a positive and insignificant value for gold. In Poland's case, a positive and significant value is found only in the case of gold. Looking at the coefficients of the GARCH model ($\alpha_1$and β_1) we've noticed that their sum, both in the case of the DCC-GARCH model and in the case of the VAR-DCC-GARCH model, is a subunit value, so a pronounced GARCH effect is present. From the point of view of the $dcc\alpha$ and $dcc\beta$ parameters, we can see that they are statistically significant for both models, so what can be concluded is that a strong and long-lasting effect of the volatility of the time series covariance is present, a conclusion drawn based on the very high values

of the $dccβ$ coefficient. To see which model better illustrates the correlation between the variables and better models the volatility between the variables, we have used some measures to determine which model fits the data series better based on the principle of choosing the model with the lowest values of the MSE, RMSE and MAE parameters.

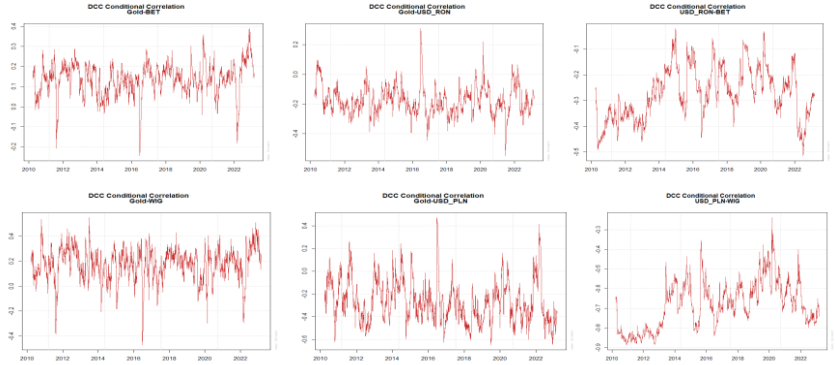
Table 5. The performance of the models

	DCC-GARCH Model		VAR-DCC-GARCH Model	
	Romania	**Poland**	**Romania**	**Poland**
MSE	0.9491	2.4196	0.9298	2.4163
MAE	0.6463	1.0586	0.6338	1.0562
RMSE	0.9742	1.5555	0.9642	1.5544

Source: Author's own calculations.

The results obtained above show that the VAR -DCC-GARCH model is a better model than the DCC-GARCH model.

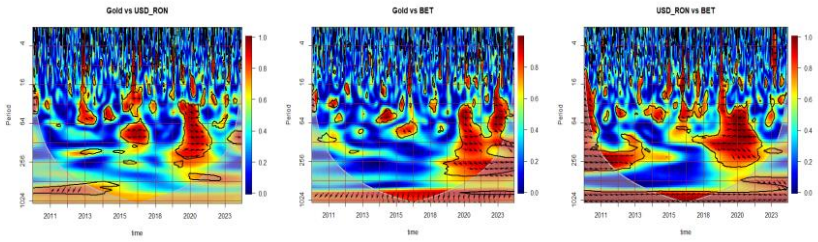
Figure 2. VAR DCC-GARCH - Conditional Correlation for Romania and Poland



Source: Author's own calculations.

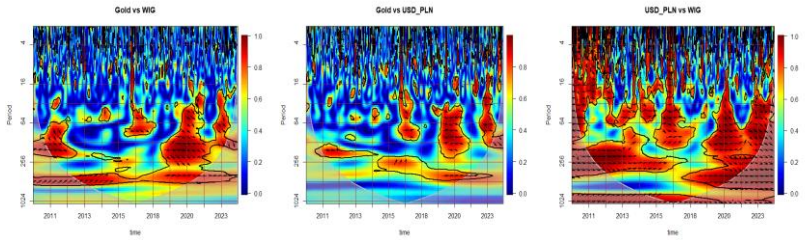
The graphs illustrated by the Wavelet technique, which allows the observation in detail of the influences between the analysed data series, show the results obtained with the VAR-DCC-GARCH model, namely that there is a high, persistent volatility of the covariance of the time series over time.

Figure 3. Wavelet technique – Romania



Source: Author's own calculations.

Figure 4. Wavelet technique – Poland



Source: Author's own calculations.

Figure 3 presents the case of Romania, namely the correlation between the variables BET, USD_RON, and gold for the analysed period. In the case of the correlation between gold and the stock market index, it can be observed that the blue colour spectrum is predominant, which means that on the short term there is no significant correlation between the two variables, instead, on the medium term, in the period 2020-2023, with the events that have affected the entire global economy, the relationship between them has changed. Thanks to the arrows pointing down and to the right, it can be observed that there is an inverse relationship between the two data series. The same can be said about the relationship between the RON_USD exchange rate and gold, namely that, starting with the 2019-2020 period, more prominent correlations can be observed between the two variables, but, on the medium term, the relationships are inverse (showing arrows pointing to the lower right). We cannot say the same thing about the relationship between the exchange rate and the BET stock index, where there is a positive relationship in which the two variables are synchronised.

In the case of Poland (Figure 4), we can observe a strong correlation between the stock index and gold in the period 2019-2023, being an inverse relationship, preceded by a short period in which the relationship between the two variables was synchronised. The relationship between the USD_PLN exchange rate and gold shows, in the medium term, a synchronised relationship between the two variables that is visible in the period 2020-2021. Regarding the relationship between the USD_PLN exchange rate and the WIG stock index, it can be seen that there is a strong relationship (the warm colour spectrum dominates the graph) on the short term, as well as on the medium and long term, in the period 2010-2013 and in the period 2015- 2023, a relationship marred by moments in which the series were strongly synchronised, but in the 2020-2023 interval there were also periods in which the series had an inverse relationship.

6. Conclusions

The current paper uses two known econometric models, due to their efficiency in terms of modelling volatility and capturing the relationships between variables, and proposes a comparative analysis between two emerging countries, namely Romania and Poland, through which the correlation between the volatility of the prices of the BET and WIG stock market indices, the exchange rates related to the two economies

and gold is evident. The results show that there is an increased volatility between the variables, as well as an inverse relationship, on the one hand, between the prices of the gold index and the related exchange rates of the two countries and, on the other hand, between the prices of gold and the returns of the stock indices. It was found that there is a direct relationship, synchronised in certain periods, between exchange rates and stock indices. The inverse relationship between gold stock index prices and the exchange rate shows that an increase in gold prices can lead to a depreciation of the local currency, which can reflect fluctuations in the international foreign exchange market. Conversely, an increase in the value of the national currency can make that country's products and services more expensive than those of other countries, which can reduce exports and have a negative impact on the country's economy, economic changes that can influence the price of gold in a negative way.

The existence of the correlation between BET and WIG, as well as between the two exchange rates, and the existence of a small degree of positive correlation between the gold price returns and the returns of the two stock market indices, as well as the fact that, following the estimation of the conditioned average between the stock market index BET and the price of gold and between exchange rates and the price of gold, it was found that there is a unidirectional relationship showing that the price of gold responds to the changes coming from those variables and not vice versa, thus signifying a reluctance of investors who consider that gold does not represent an advantageous investment in times of crisis and are in favour of other investments considered advantageous. From the perspective of Poland's WIG index, it is observed that there is no relationship between it and the gold index, but only a one-way relationship between the exchange rate and the price of gold. By performing the DCC-GARCH and VAR-DCC-GARCH models, we have found that the best model that captures volatility and the relationships between variables is the VAR-DCC-GARCH model. From the results obtained, we have found a strong and long-lasting effect of the volatility of the time series covariance, as well as a strong GARCH effect. Conditional correlation plots provide useful insight into the nature of these relationships and how they vary over time, while wavelet analysis provides a more detailed perspective that helps identify relationships that are more difficult to see in other types of graphs. The persistent medium-term inverse relationship between the price of gold and stock indices over the period 2020-2023 can be used by investors and portfolio managers, as it suggests that gold can be an effective hedge against financial market volatility, but there are other factors that can influence the price of gold, such as monetary policy, interest rates, and geopolitical events.

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The Energy Crisis and The Measures Taken by the European Union to Overcome It

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Abstract

The energy crisis that broke out in the fall of 2021 quickly became global, affecting several powerful economies around the world. The European Union, a major importer of energy resources, has become the epicentre of this crisis, facing shortages of natural gas and an exorbitant increase in fossil fuel prices. The escalation of the military conflict in Ukraine, in February 2022, highlighted the vulnerability of the European Union in the field of energy security, especially emphasising the dependence of the EU bloc on energy resources imported from Russia.

The EU adopted several measures to minimise the negative effects of the crisis. In this context, the article aims to critically evaluate the effects of the measures taken by the authorities of the European Union and the member states, using the qualitative research method.

This paper is the result of the study of specialised literature on the topic addressed: official documents of the European Parliament and the European Commission, academic articles, and, last but not least, studies published by various prestigious think tanks. Additionally, the research is based on the analysis of data published by Eurostat.

Following the analysis, it was determined that the current energy crisis highlights the need for a review of how the security of the EU's energy supply is guaranteed. The reality of our days is an impulse to accelerate the transition from conventional to renewable energy resources, but also a challenge in terms of the power to supply various sectors of the economy with alternative energy resources.

Keywords: energy crisis, European Union, Russian Federation, energy security.

JEL Classification: F51, Q34.

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1. Introduction

The energy crisis that broke out in the fall of 2021 quickly became global, affecting several powerful economies around the world.

The paper addresses a current and important topic considering that the European Union, a major energy resource importer, has become the epicentre of this crisis. The EU bloc has faced a sudden and exorbitant increase in fossil fuel prices and shortages of natural gas. The unexpected increase in the price of natural gas had a ripple effect in all sectors of the economy, and the suspension of gas deliveries to several EU member states in the summer of 2022 has extended the uncertainty of energy supply. The conflict in Ukraine generated concerns about the energy security of the European Union, prompting EU leaders to seek solutions to ensure the energy supply of all member countries.

In this context, the purpose of this paper is to analyse how EU authorities have responded to the energy crisis, while also taking into account climate-related objectives. The research is a distinctive analysis of the topic addressed. In the first part of the article, the specialised literature on the concept of energy security was reviewed, and also the importance of energy security for the EU, especially in the context of an energy crisis, was presented. In the second part, the causes of the current energy crisis were presented, and in the third part, the measures taken by the European Union to minimise the negative effects of the current crisis were listed and analysed.

The authors are aware of the limitations of this research. Although the latest available information has been studied at the time of writing the article, this subject needs to be updated regularly, given that the addressed topic is current and new circumstances occur every day. The paper complements current research in this field and can be the starting point for new research on the decisions adopted by EU Member States at the national level in the field of energy policy to mitigate the current energy crisis.

2. Problem Statement

Natural resources, especially energy resources, have always had a major impact on the evolution of human society and economic development. In the content of the action plan, adopted by the United Nations during the Earth Summit, held in Rio de Janeiro (Brazil) in 1992, it was stated that "energy is essential for economic and social development and improving the quality of life" (United Nations, 1992).

Energy security is a multidimensional concept that has evolved over time. Initially, this notion referred only to oil. M. Collon argued that if you want to rule the world, you must control oil [...] wherever it is (Collon, 2000). Gradually, the concept of energy security also extended to natural gas and electricity. Currently, the concept mentioned above includes all phases related to the energy chain, represents a fusion of the notions of national security, sustainability, individual security, human rights, and has a major impact on the economic development of a country and the quality of life and social well-being of its citizens (Sovacool, 2016).

In the view of several specialists in the field, energy security means being ensured from the point of view of resources, control of routes, distribution, and alternatives. In general, the concept is defined as "secure resources at a reasonable price" (Proninska, 2007; Yergin, 2006), covering a much wider issue than the security of supply - sustainability - competitiveness triangle. Energy security is often perceived as an "umbrella" covering many concerns related to energy, economic growth, and political power.

Energy security mainly aims at the following dimensions: ensuring alternative sources of supply, identifying alternative energy sources for transport, securing existing sources and routes, and increasing the share of alternative energies in domestic consumption.

The vision of energy security depends largely on the regional and global context and the position occupied in the economic circuit. Therefore, consumers and energy-consuming industries want reasonable prices and try to avoid supply interruptions. The major oil-producing countries consider the security of demand and the security of income essential parts of any discussion of energy security.

According to the World Bank, energy security includes three major pillars: "energy efficiency, diversification of energy supply, and managing volatility" (World Bank, 2006). The experts of the German Center for Applied Political Research have identified the following dimensions of energy security, namely: the domestic political dimension, the economic, geopolitical, and security policy dimensions (Baumann, 2018). The International Energy Agency (IEA) presents energy security as available and uninterrupted energy sources for an affordable amount of money (IEA, 2023).

The EU's energy policy has been constantly adapted to the new geopolitical realities to supply energy at affordable prices, promote energy efficiency, and protect the environment. In the content of the European Energy Security Strategy, presented in 2014, it was pointed out that "EU prosperity and security hinges on a stable and abundant supply of energy" (European Commission, 2014). Currently, the energy policy of the European Union focuses on the security of energy supply, sustainability, and integration of the energy markets of member states (Ciucci, 2022). Thus, the energy policy of the European Union is dominated by two interrelated themes: the problem of energy supply and the aspiration to become the *world's* first “climate-neutral bloc” by 2050. EU climate and energy policies are no longer seen as separate domains in EU policymaking (Siddi, 2023). In the current European energy policy, the definition of energy security corresponds to that given by the IEA, namely "uninterrupted availability of energy at an affordable price". Given the fact that the EU is a large importer of energy resources, its current policy in this area focuses on ensuring a stable flow of energy at affordable prices in the context of energy crises (Pilloni, 2022). In response to the energy crisis, the EU has fundamentally reframed its energy policy, in addition to climate concerns, expanding its attention to global industrial competitiveness, but also to energy poverty (Maaskant, Bogaert, 2023).

3. Research Questions / Aims of the Research

The article aims to critically evaluate the effects of the measures taken by the authorities of the European Union to combat the energy crisis. To achieve the proposed goal, the following objectives were formulated: defining the concept of energy security and presenting its importance to a country; explaining the concept of energy security from the perspective of the European Union; establishing the premises and causes of the energy crisis that began in 2021; analysis of the measures taken by the EU to minimise the negative effects of the energy crisis while still pursuing the goal of becoming climate-neutral by 2050.

4. Research Methods

The paper is an analysis of the measures taken by the authorities of the European Union and member states to mitigate the energy crisis, using the qualitative research method. The article is the result of the study of specialised literature on the topic addressed: official documents of the European Parliament and the European Commission, academic articles and, last but not least, studies published by various prestigious think tanks (Center for Applied Policy Research, Center for Strategic and International Studies, Israel Public Policy Institute (IPPI)). To outline a complete image of the researched topic, statistical data was collected. As a result of accessing Eurostat and IEA Statistics, data on global energy production, consumption, and EU energy imports from the Russian Federation and from outside Russia for the period 2016-2022 were analysed.

5. Findings

5.1 Causes of the Energy Crisis

Among the main causes of the crisis in the EU are the following:

Accelerated post-pandemic economic recovery, business recovery resulting in a "demand shock" for energy, especially natural gas. In Q2 and Q3 of 2021, EU GDP began to grow (growth of over 2 % per quarter) and is even more pronounced compared to the corresponding quarters of 2020 (Eurostat, 2023). Natural gas demand growth was even stronger, at 6 % for 2021 (IEA, 2021). Additional demand for it was also due to the implementation of the plan of Germany, the largest consumer of energy resources in the EU, to phase out nuclear energy by 2022.

Weather conditions, in particular, the cold winter of 2020-2021, during which energy consumption in the EU increased significantly; during several cold periods in April-May 2021, some EU Member States also had to switch from filling underground gas storages (UGS) to extracting gas from them. Low wind conditions also reduced the amount of offshore wind generation.

Liquefied natural gas (LNG) market transformations: In 2021, LNG supplies to the EU grew by 5 % in comparison with 10 % annually in 2016-2019. The most important factor was the reorientation of suppliers to other parts of the world due to higher demand and, accordingly, more attractive offers at purchase prices in non-

European markets. As a result, 80 % of all added LNG production in the world in 2021 went to China; LNG supplies to Asia increased by 11 %, to America – by 59 %, while to Europe they were carried out on a residual basis (Tsafos, 2021).

Limited LNG supplies from the US, were driven not only by weather conditions and the economic impact of the pandemic but also by new climate priorities, which led to a decrease in investment in shale gas production.

Limited pipeline gas supplies: imports from Norway in Q2 2021 fell below 20 %, the lowest since 2015; shipments from Libya also decreased.

5.2 EU-Coordinated Measures to Counter the Energy Crisis

5.2.1 REPowerEU

The escalation of the military conflict between the Russian Federation and Ukraine has highlighted the EU bloc's excessive dependence on fossil fuel imports from Russia, thus heightening concerns about energy security in the European Union. The new geopolitical and economic reality has prompted the European Union to diversify energy supply sources and accelerate the transition to clean energy. In response to the difficulties and disruptions in the global energy market, the European Commission presented the communication "REPowerEU: joint European actions for more affordable, secure, and sustainable energy" on 8 March 2022, and on 23 March 2022 communication "Security of supply and affordable electricity prices: options for immediate measures and preparing for the coming winter". During the meeting held on March 24-25, 2022, EU leaders discussed issues related to ensuring the security of energy supply at the European level. As there is full agreement between the conclusions adopted during this meeting and the Declaration of Versailles, presented at the informal meeting of heads of state and government on 10-11 March 2022, the European Council agreed to gradually and as soon as possible eliminate the dependence of the Community bloc of gas, oil, and coal imports from the Russian Federation (European Council, 2022). In May 2022, the Commission presented the REPowerEU plan, setting out a series of measures to help rapidly reduce the European Union's dependence on fossil fuels from the Russian Federation by accelerating the transition to clean energy (electricity produced from renewable sources and hydrogen) and combining efforts to build a more resilient energy system and a true energy union. The "REPowerEU" plan contains measures to reduce the European Union's energy dependence on fossil fuels imported from Russia, and at the same time accelerates with new actions the implementation of the European Green Deal, taking into account the legislative package "Fit for 55" (European Council, 2023b).

The "REPowerEU" plan is based on saving energy, diversifying supply sources, and producing clean energy. In the short term, saving energy is the easiest and cheapest way to reduce dependence on fossil fuel imports from Russia. Regarding the diversification of energy imports, the plan supports the intensification of the collaboration of the community bloc with international partners to diversify sources of supply and mitigate the increase in energy prices. Currently, the diversification of

sources refers to the alternative supply of gas, oil, and coal, but in the future hydrogen produced from renewable energy sources will also be added. About the rapid replacement of fossil fuels by accelerating the transition to clean energy, the plan targets the electricity production, industry, transport, and construction sectors. The main pillars in this direction are the green transition and the stimulation of investments in energy from renewable sources.

To diversify the supply, the European Union began to collaborate with various international partners, managing to register a record of imports of liquefied natural gas. In the first half of 2022, LNG imports from outside the Russian Federation (USA, Canada, Norway) increased by 19 billion cubic meters compared to the same period last year. The EU bloc has also increased its cooperation with Azerbaijan, especially regarding the southern gas corridor. The European Union signed the Trilateral Memorandum of Understanding with Egypt and Israel for the export of natural gas, relaunched the energy dialogue with Algeria, and continued to cooperate with the major producers in the Persian Gulf, as well as with Australia. Pipeline imports from outside Russia (Norway, Azerbaijan, the United Kingdom, and North Africa) increased by 14 billion cubic meters in the first half of 2022 compared to the same period last year.

At the same time, to guarantee the security of the energy supply, in June 2022 the Council adopted the Regulation on gas storage. The new rules required that in the underground gas storage facilities on the territory of the member states stocks should be established at a minimum level of 80 % for the winter of 2022-2023 and 90 % of the capacity before the beginning of the following winter periods.

To ensure the EU's energy supply at affordable prices, the Commission and Member States have set up a platform for the joint purchase of gas, LNG, and hydrogen, thus seeking to make the most of the EU's collective purchasing power. Among the purposes of establishing this voluntary coordination mechanism are to obtain more favorable prices than when each country negotiates separately, to improve transparency in this area and to support smaller member states that are in a less favourable situation as buyers.

With investments made in the infrastructure, namely the construction of LNG terminals and the creation of natural gas interconnections, each EU member state can receive gas from at least two sources, with reversed flows between neighbouring countries also possible. On May 1, 2022, the Poland-Lithuania gas interconnector began its commercial activity, which strengthens the optionality and resilience of the entire Baltic gas market, and on October 1 of the same year, the Greece-Bulgaria gas interconnector was inaugurated.

5.2.2 EU Sanctions against Russia

Since March 2014, the European Union has progressively imposed restrictive measures against Russia in response to the crisis in Ukraine. In 2022, the EU massively expanded sanctions against the Russian Federation in response to the outbreak of military conflict on 24 February 2022 and Russia's decision to recognise the independence of Donetsk, Luhansk, Zaporizhia, and Kherson regions. Since February 2022, the EU has adopted ten sanctions packages against Russia. Thus, the

Russian Federation became the most sanctioned country in the world for the first time, surpassing Iran, Syria, North Korea, and Venezuela in this regard.

The toughest measures ever taken by the EU bloc against a foreign country include individual and economic sanctions, media restrictions, diplomatic measures, visa measures, restrictions on economic relations in specific areas, and economic cooperation measures. The economic sanctions adopted against Russia by the EU target the financial, trade and energy sectors, as well as the transport, technology, and defense sectors.

The restrictive measures imposed by the European Union in the energy field refer to the price capping regarding the maritime transport of crude oil and petroleum products. Also, the sanctions in this field provide for the prohibition of coal imports and oil imports (with some exceptions) from the Russian Federation, exports to Russia of products and technologies from the oil refining sector, making new investments in the Russian energy and mining sector, and providing of gas storage capacity (except for the corresponding part of LNG facilities) to Russian nationals (European Council, 2023a).

The sixth package of sanctions, adopted by the EU Council, prohibits the purchase, import, or transfer of crude oil and certain petroleum products by sea from the Russian Federation to the European Union. The embargo on crude oil entered into force on December 5, 2022, and the restrictions on other refined petroleum products apply from February 5, 2023. At the same time, a temporary exception was provided for crude oil imports via pipelines in the member states of the community block, which, due to the geographical situation, are specifically dependent on Russian energy resources and there are no viable alternative supply options. However, Member States benefiting from this exemption are not allowed to resell crude oil and petroleum products to other Member States or third countries. The Council also determined that Bulgaria and Croatia would benefit, specifically, from temporary exemptions on the import of Russian seaborne crude oil and vacuum diesel, respectively. Bulgaria was granted a special temporary derogation until the end of 2024, and Croatia was allowed imports necessary to operate its refinery until the end of 2023.

The EU bloc has banned ships from the European Union from transporting Russian crude oil and petroleum products to third countries, but this ban does not apply if the crude oil or petroleum products are purchased at or below the oil price ceiling. The price ceiling applies to seaborne crude oil, petroleum oils, and oils obtained from bituminous minerals originating in or exported from the Russian Federation. In December 2022, the EU Council, together with the Price Capping Coalition, set the ceiling level for crude oil at USD 60/barrel (Council of the EU, 2022), followed by two more price ceilings for the same product category in February 2023. Thus, the first price ceiling for oil products traded below the nominal value of crude oil was set at USD 45/barrel, and the second price ceiling for oil products traded above the nominal value of crude oil was set at USD100/barrel (Council of the EU, 2023). Taking into account market developments and technical

changes, the current value of these ceilings is to be reviewed and adjusted periodically.

As the majority of Russian oil is delivered to the EU by sea, the European Union imposed these restrictive measures to limit the steep increases in fossil fuel prices and significantly reduce the Russian Federation's oil export revenues.

6. Conclusions

Following the analysis, it was determined that the current energy crisis highlights the need for a review of how the security of the EU's energy supply is guaranteed. The REPowerEU plan and the sanctions packages imposed by the EU against Russia, which also include restrictive measures in the energy field, are the most important measures adopted at the level of the entire EU bloc regarding combating the current energy crisis. Reducing the EU's dependence on fossil fuels from the Russian Federation is essential for strengthening the EU's energy resilience and autonomy, especially in the event of an energy shortage. Given that the ambitions of the European Union are not limited to independence from the supply of fossil fuels from Russia, but to achieve independence from fossil fuels as a whole, the authors of the article believe that this energy crisis represents the right opportunity to accelerate the transition to renewable sources of energy. Saving energy, diversifying supply sources, developing LNG stations, developing the internal transport network, and developing internal renewable energy production are the main ways in which the European Union can gradually eliminate its dependence on Russian energy resources. Even if some results have already been recorded due to the adopted measures, the authors of the article believe that it is premature to pronounce on their success, as time is needed to achieve the objectives proposed by the European Union. The reality of our days is an impetus to accelerate the transition from conventional to renewable energy resources, but also a challenge in terms of the power to supply various sectors of the economy with alternative energy resources. Given the different energy mixes, conditions, and circumstances of the EU Member States, only the unity between the EU countries and how the decision-makers will implement the proposed measures to the end will determine whether the EU Member States will succeed in meeting the objectives of the European Green Deal.

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Business Internationalisation and the Need to Resilience in the Stream of Globalisation: Risks and Unpredictable Trends for Companies and Business

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Abstract

This paper presents and investigates the volatility of business internationalisation in the stream of globalisation in times of risks and unpredictable trends, Globalisation and digitalisation have made the world a global market where companies can take advantage of to prove their competitiveness, due to the high level of competition in domestic markets, the international economic flow has undergone dynamic changes and challenges in the geographical structure of internationalisation. The research questions are "Does the stream of Globalisation with its risks and trends make business internationalisation volatile?" and what are the main risks that economies and business could face?". The research methodology focused on literature review and data analysis in a qualitative and quantitative way. The results showed that the uncertainties regarding negotiations and international economic relations have an impact on business and companies at the international level. The main focus to balance business resilience in companies according to this analysis should be between rating the impact of disruption or loss and describing risks and they could be mitigated In conclusion, Globalisation has a global importance and impact on business and companies that move to the internationalisation process, if something happens in any part of the global economic area, it transmits straight away between economies, in times of risks and unpredictable trends companies in general and business in particular need to focus on the way of resilience to survive. Before entering international or foreign markets, companies should fully understand their products and the sector in which they intend to expand and operate as well, by carefully drawing a resilience plan to possible risks that may hit their business from time to time.

Keywords: Globalisation, Business, Business internationalisation, volatility, trends.

JEL Classification: F20, F23, F44, F60, D74.

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1. Introduction

Globalisation and digitalisation have made the world a global market where companies can take advantage of to prove their competitiveness, due to the high level of competition in domestic markets, internationalising a company has become almost very necessary and mandatory, not just for large companies, but for Small and Medium Sized Enterprises (SMEs) as well. The international economic flow has undergone dynamic changes and challenges in the geographical structure of internationalisation. The pandemic in 2020 showed that there were major risks that caused a global economic slowdown due to the decrease in demand and the increase in restrictions and lockdown measures. However, as powers compete for dominance in a new era of geopolitical upheaval, the year 2022 was very significant in terms of some major events defining the cost of the future, events such as armed conflict in Europe since World War 2 and the demonstration of friction between the US and China, etc. All this has led to disturbing geopolitical situations, businesses that have become familiar with unrestricted international trade, now face growing challenges like export limits. As major powers are still vying for control of the future, the risk has become something that needs fast resilience and significant measures. Geo-economic risks and conflicts are considered a major threat to companies and business at the international level; companies that move towards internationalisation could face problems to resist and survive in times of risks and precisely in periods of geo-economic risks. Some other top three risks that could be a danger to economies, markets, companies, and business are cyber-attacks and natural disasters as main near-term risk.

2. Problem Statement

The phenomenon of "globalisation" is primarily to blame for the unprecedented trend of social, economic, cultural, and political interconnections that the global society is currently experiencing in daily life (Jackson, 2008). The extent and speed with which this phenomenon affects global society, are quite difficult to describe, in part because of researchers who have put forth conflicting conceptualisations and understandings of the consequences, making it one of the most discussed and contested topics in the modern era. Studies (Grossman, Helpman, 1991) have found that globalisation plays a significant role in the expansion of the economy because of the employment opportunities it creates and the ease with which technology can be accessed. But there are studies (Gaston, Nelson, 2004) that demonstrate the adverse effects of globalisation, particularly on developing states, such as the rise in employment inequalities, but also some adverse effects on the environment (Kirikkaleli, Oyebanji, 2022) or even geopolitical conflicts (Beck, 2014). As this study looks at globalisation from an economic angle, the definition of globalisation used in this paper is taken from Jenkins (2004), who defined it as "a process of greater integration into the world economy, through movements of goods and services, capital, technology and labour, leading increasingly to economic decisions being influenced by global conditions." This definition effectively captures the

economic goals and outcomes of globalisation, emphasising the changes occurring in international trade and investment. Jenkins' definition also includes the role that economic factors play in shaping the globalisation process. The recent conflict in Ukraine is a prime example of how western sanctions against Russia have had a direct impact on the world economy, with poorer nations suffering the most. When trade between the West and Russia began to decline, it was observed that inflation began to rise globally, the cost of labour around the world began to fall, and food prices began to rise, while wages remained constant. Therefore, we can say that globalisation is a "transformative" phenomenon, influencing employment, wages, and all businesses and institutions involved in the labour market (Gaston, Nelson, 2004). One of the most complex aspects that SMEs have to face in order to reap the benefits of globalization and be able to be competitive is the definition of an adequate business model. (Benabed et al., 2022) Internationalisation involves the expansion of companies across national borders with the goal and objective of producing and selling products and services (Hitt et al., 1997). Others mainly consider internationalisation as a growth and business development strategy for organisations (Luostarinen, 1979). Likewise, it is observed that one of the components that is repeated in various definitions is that the internationalisation process is a dynamic process, understood as a phenomenon of an evolutionary and gradual nature (Albaum et al., 1994). On the contrary, there are research papers that highlight that through internationalisation companies are exposed to greater learning in social and environmental issues and consider that internationalisation can allow them to acquire valuable knowledge from different markets that results in a substantial improvement in their social performance (Strike et al., 2006). Technology and digitalisation have been reshaping global business.

Resilience is built over time and can be lost. Everyone can name at least one powerful company that no longer exists where the shuttered company's once strong resilience crumbled. When attending to multiple capitals, the focus is often on preserving and enhancing capitals in the current situation and into the future (Berger-Schmitt, Noll, 2000).

3. Research Questions / Aims of the Research

This paper presents and investigates the risks that business internationalisation could face in the stream of globalisation. The research questions are: "Does the stream of Globalisation with its risks and trends make business internationalisation volatile?" and what are the main risks that economies and business could face?".

4. Research Methods

The methodology of research focused on literature review and data analysis in a qualitative and quantitative way by analysis and describing data and statistics.

5. Findings

The uncertainties regarding negotiations and international economic relations have an impact on business and companies at the international level. The unpredictable trends and geopolitical risks such as the pandemic and the recent global geopolitical escalations and conflicts have provoked more inflation, a global economic recession, and an economic slowdown in both advanced and developing economies. In companies, there should be a real-time feedback strategy to consider the customer's requirements and to what they want, so that companies may deal with those risks and threats. Digital risks such as cyber-attacks and imitation after the incorporation of digitalisation have been so important to be tackled by putting efforts to boost digital security and control (See Figure 1).

Figure 1. Global risks for companies and business

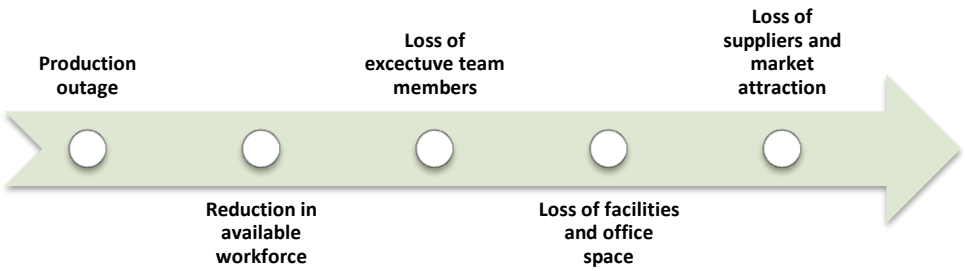
Source: Author's design and research, 2023.

Strategic risks include the pressure of competition, changes in demand, legislations and laws by governments, political conflicts and instability, social norms and restrictions, the pressure from creditors and shareholders. Financial risks include the mismanagement of cash flow, the risk of financial growth, and decrease in profit that could happen during inflation, recession, the decrease in investments, and fluctuations in the market. Operational risks are more about where the companies

may operate and possible conditions to start and go further with business in the new market by adapting its rules and products with the type of customers and opportunities that could be created there (See Figure 1).

Business resilience and continuity planning are the creation of processes and systems to ensure that a company or business can continue operations after a crisis scenario. Creating a business resilience plan may help examine a range of disaster scenarios for potential failure points, focusing on details recovery plans, potential mitigations, and alternatives with an interest to look at for opportunities for precautions and preventive steps. Among the possible intern risks that a business has to consider are production outage, reduction of available workforce, a possible loss or decrease in the executive team, a possible loss of space or facilities, and deterioration and loss in market attraction and suppliers (See Figure 2).

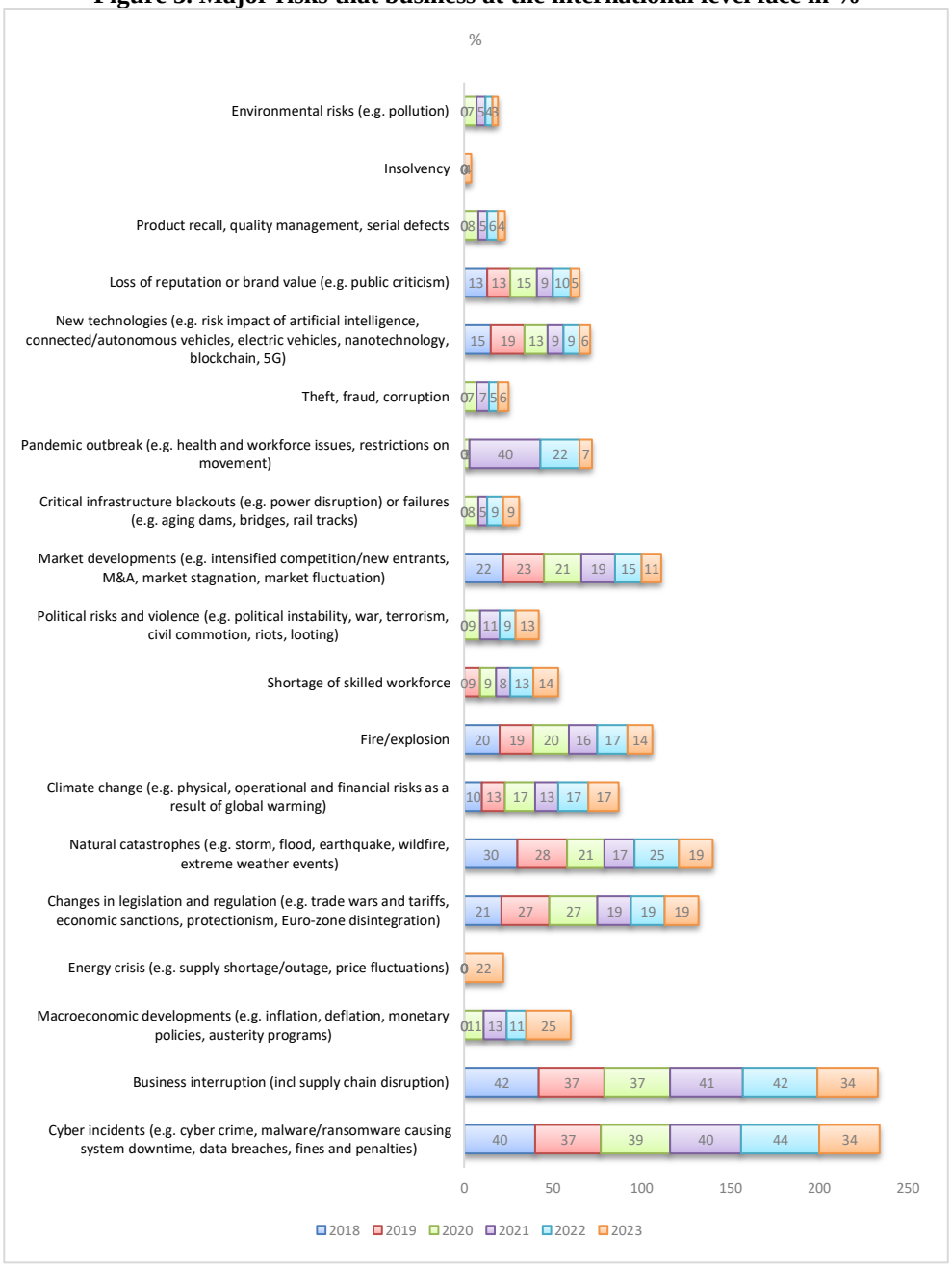
Figure 2. Possible intern risks to business that require attention and resilience



Source: Author's design and research, 2023.

The main global risks to business are different from time to time and from a region to another. By taking the period 2018-2023 (Q1), we may observe that Business interruption and supply chain disruption could be considered as one of the top risk at the global level for business, its level of risk varied from 42% in 2018 to 34% in 2023 (Q1), but it remained high in 2022 with 42%. This is due to factors such as the global economic recession, the increase in inflation rate and the decrease in demand, and the possibility of low investments. The major risk to business at the global level in 2022 was the risk of cyber incidents that was high with 44% and with a slight fluctuation from 40% in 2018. In 2021, the pandemic outbreak of 2020 was considered as a 40% high risk to business. The level of natural disaster risks including extreme weather conditions, decreased from 30% in 2018 to 19% in 2023(Q1) and 25% in 2022. Furthermore, the risk of economic sanctions, wars, changes in regulations, legislations fluctuated with a slight decrease from 21% in 2018 to 19% in 2021 and 2023(Q1). Political risks and instability have increased slightly since 2018 from 9% to reach 13 in 2023(Q1). Furthermore, the risk of inflation, monetary policies, and various macroeconomic developments has increased to reach 25% in 2023(Q1). (See Figure2).

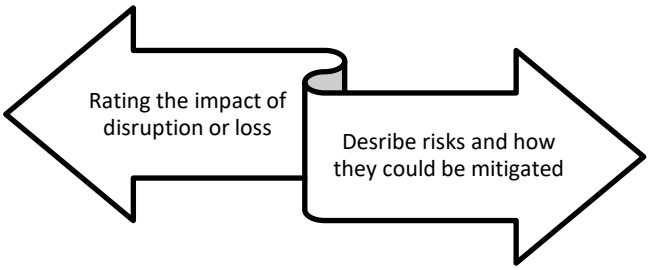
Figure 3. Major risks that business at the international level face in %



Source: Author's contribution, Statista data, 2023.

The main focus to balance business resilience in companies according to this analysis should be between rating the impact of disruption or loss and describing risks, and they could be mitigated (See Figure 3).

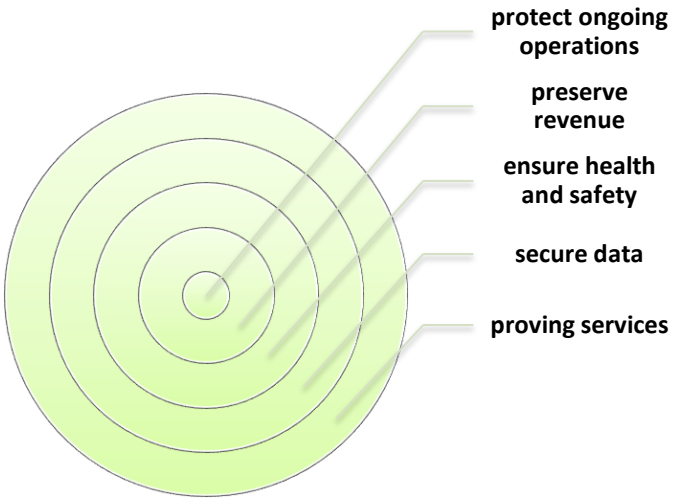
Figure 4. Main focus to balance business resilience in companies



Source: Author's design and research, 2023.

Business resilience and continuity planning are the creation of processes and systems to ensure that a company or business can continue operations after a crisis scenario by creating a business resilience plan may help examine a range of disaster scenarios for potential failure points, focusing on details recovery plans, potential mitigations and alternatives with an interest to look at for opportunities for precautions and preventive steps (See Figure 4).

Figure 5. Some priority goals for business resilience for companies



Source: Author's design and research, 2023.

Some priority goal should be clearing considered by companies for business resilience, a plan to face and get prepared for risks should secure data, prove services, ensure health and safety of products, services and employees, preserve revenues, and protect ongoing operations (See Figure4).

Back in history, many years ago, the process of internationalisation was hard and expensive, but today thanks to digitalisation technological advances and globalisation it has become easier. However, it is important to consider the risks that may occur or face business internationalisation in particular and business in general. Internationalisation increases companies' competitiveness, especially in exporting products and services, by obtaining higher productivity rates and levels that can help increase their turnover. Business internationalisation helps generate more skilled and qualified employers and better paid jobs. As internationalised companies are more competitive and with more business volume, hiring is based on various possibilities and opportunities. In addition, internationalised companies may resist and they are better prepared to economic trends since they manage to their markets, and they may be well prepared to face the volatility and fluctuation of the business cycles. Going abroad and moving towards internationalising business means the possibility to find more opportunities in other markets with such a possible growth potential. Companies within the process of internationalisation transfer their products and productive activities to other markets and countries with the possibility of lower cost and high sales but that depends on the level of their operations, adaptation in the new market, and offers by negotiating even about resources, logistics costs and transportations, so they may produce in another foreign market of country. Besides business internationalisation is related to positive values and opportunities by building, for example, more trust and reinforcing the positions of brands through marketing and advertising of products and services to attract potential customers since that follow international products and well-known qualities as well.

The differences in business cultures may cause many operational difficulties. The way of working, thinking, and communicating can be different, so they should fit the interests and tastes of consumers. In terms of freight transport or communication with distributors, consumers, and suppliers, indifferences could happen due the distance between the headquarters and the delegations.

Before entering international or foreign markets, companies should fully understand their products and the sector in which they intend to expand and operate as well, by carefully drawing a resilience plan to possible risks that may hit their business from time to time.

Indeed, serious escalations offer the chance to focus on business resilience and seek opportunities to boost it or save it in times of geopolitical tensions by concerning major trends experienced in international trade, such as:

- The growing influence of geopolitics on international business.
- The acceleration of challenges and changes that motivate volatility in quotations and prices.
- The impact on quality standards and the rising appearance of inflation, which concerns both supply and demand.
- New production parameters and companies' leaderships.
- The consolidation of the global economy and technological advances.
- The speed to sustainability and renewables that still are still not enough to satisfy to be considered as alternatives internationally.

6. Conclusions

In conclusion, Globalisation has a global importance and impact on business and companies that move towards the internationalisation process, if something happens in any part of the global economic area, it transmits straight away between economies. Furthermore, in times of risks and unpredictable trends, companies in general and business in particular need to focus on the way of resilience to survive. The differences in business cultures may cause many operational difficulties. The way of working, thinking, and communicating can be different, so they should fit the interests and tastes of consumers. In terms of freight transport or communication with distributors, consumers, and suppliers, indifferences could happen due the distance between the headquarters and the delegations. Before entering international or foreign markets, companies should fully understand their products and the sector in which they intend to expand and operate as well, by carefully drawing a resilience plan to possible risks that may hit their business from time to time.

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Four Models of Digital Authoritarian Practices

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Abstract

To consolidate control within and beyond their borders, authoritarian regimes develop novel practices that allow them to apply digital communication technologies, surveillance techniques, Big Data analysis, and digital means of manufacturing public consent and spreading disinformation. When the practices are expanded and replicated beyond the regimes' borders, they are often labelled "exporting digital authoritarianism". In the last decade, China and Russia, with their palpable record of human rights violations, have been repeatedly accused of exporting digital authoritarianism, especially to other hybrid and authoritarian regimes. However, data-based surveillance practices and the export of surveillance software by Western democracies have often been off the radar. Based on secondary resources, this article proposes four models of digital authoritarian practices: Chinese, Russian, Western, and Imported. Despite some overlaps, these four models contain distinctive policies and practices. With its "Sharp Eyes" and "Golden Shield" initiatives that allow monitoring, recording, and analysing its citizens' real-time offline and online movements, the Chinese model is arguably the most institutionalised, digitally sovereign, and comprehensive. The Russian model, on the other hand, is dependent on tight information control, a strong and flexible legal regime, and low-cost, low-tech practices. In the West, government agencies and tech giants are using legal loopholes to carry out arbitrary data surveillance and extract huge amounts of personal data. Such practice is continuously undermining notions of human rights and legal and institutional capability and, in a way, albeit not to the degree of China and Russia, promoting authoritarianism. The last model, the Imported model, is followed by the smaller authoritarian and hybrid regimes, and naturally, their digital authoritarian practices are diverse. These regimes lack digital sovereignty and therefore depend on other states and companies for surveillance or disinformation campaigns.

Keywords: digital authoritarianism, surveillance, democratisation, China, Russia.

JEL Classification: F5, F52, F59.

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1. Introduction

In the 2000s, during the heydays of internet freedom, cyberspace was a libertarian dream come true, when state involvement was comparatively lower and individual liberty was higher than today. The freedom of cyberspace played a crucial role during numerous protests and social movements in the 2010s, from Occupy movements and the umbrella movement in Hong Kong to the so-called Arab Spring (Fuchs, 2014; Adorjan, Yau, 2015; Feldstein, 2021). However, one person's cyberactivist proved to be another person's cyberterrorist. States, irrespective of their nature, quickly acquired internet control and sophisticated digital tools to keep the public in check and maintain order (Pytlak, 2020). The state apparatus has to quickly cope with the fast-paced cyberspace, and in doing so, it sometimes undermines the basic notions of human rights, privacy, and dignity of individuals. Often, the legal provisions are not updated enough compared to the complexity of cyberspace. All these practices ultimately question the utility and primary objective of the state system: is the state for the people, or are the people merely subjects?

Therefore, this paper examines digital authoritarian practices and identifies the types of digital repressive mechanisms. Depending on the frequency of usage, this paper identifies four distinct models of digital authoritarian practice: Chinese, Russian, Western, and imported. It does not mean that a state belonging to one particular model exclusively follows the designated practices of the model. Rather, it means that the state predominantly follows the practices, along with the other practices followed by different models to a minor extent.

2. Digital Authoritarianism Goes Global

In the last few years, anglophone think tanks and media outlets have become increasingly concerned about the Chinese "export of authoritarianism' (Edel, Shullman 2023; The Washington Post, 2020; Polyakova, Meserole, 2019; Shahbaz, 2018). Such practice is sometimes labelled "tech-augmented" or "tech-enhanced" authoritarianism (Hoffman, 2022). Russia's export of surveillance software has also gained considerable attention (Polyakova, Meserole, 2019; Yayboke, Brannen, 2020). However, data-based surveillance practices and the export of surveillance software by Western democracies have often been off the radar. In addition, the states with limited technological capacity rely on these three sources, i.e., China, Russia, and Western states, and their implementation of digital repressive mechanisms is significantly different.

Digital technology advancements now provide governments with instruments to easily follow and monitor their people en masse, suppress opposition or protests, and manipulate public opinion. Such governments now have access to a larger range of repressive tactics thanks to technological advancements, which also lower the cost of repression (Dragu, Lupu, 2021). Naturally, these tactics should be the forte of authoritarian, repressive regimes, and in reality, they are. Researchers found that they are equally applied by liberal regimes, although the target is often not to suppress opposition but to protect people (Yayboke, Brannen, 2020). In this

article, it has been argued that digital authoritarianism is not practiced exclusively by authoritarian and illiberal democratic regimes, but also by liberal electoral democracies.

Moreover, since digital practices are ubiquitous, little work has been done to categorise them. Feldstein (2021) enlisted the practices and divided them into five broad categories: surveillance, online censorship, social manipulation and disinformation, internet shutdowns, and targeted persecution of online users. This paper adds another category to the above five: shaping international norms (Table 1). Digital authoritarian practices usually do not confine themselves within their own boundaries. Exporting digital authoritarianism is much easier than exporting authoritarianism. Powerful states are continuously trying to establish their dominant narrative of Internet governance in the international arena by supporting international conferences and establishing multilateral institutions. They also facilitate other authoritarian regimes by providing surveillance mechanisms and other repressive technologies. In a way, digital authoritarian practices tend not to confine themselves within territorial limitations; they are global.

3. Four Models of Digital Authoritarian Practices

3.1 The Chinese Model: Comprehensive, Overtly Institutionalised and Shaping International Digital Norms

In China, where the party state holds the ultimate regulatory authority, dissenting voices are muzzled and intimidated, and a pervasive state of surveillance has been established. Some scholars have identified China as the epitome of a "surveillance state" (Qiang, 2019; Chin, Lin, 2022). With the help of corporations heavily controlled by the Chinese Communist Party (CCP), Beijing is maintaining overarching state surveillance, censorship, and campaigns of misinformation (Wang, 2021).

Perhaps the nature of the Chinese model of digital authoritarianism is best understood in the province of Xinjiang, where targeted repression is preemptively carried out against , potential dissents using big-data analytics (Oztig, 2023). The Great Firewall of China, a network filtering tool used to screen Internet content, was built by the Chinese government in the 1980s, at the earliest days of the Internet (Chin, Lin, 2022). With the help of the Great Firewall, websites like Google, Facebook, YouTube, and Wikipedia are blocked, as are URLs, DNS, IP ranges, and VPNs (Qiang, 2019; Taylor, 2022). China blocked 700 websites and more than 9000 mobile applications in the first three weeks of 2019 (Polyakova, Meserole, 2019). The "Smart City" projects, with their extensive use of facial recognition, biometrics, and surveillance technology, monitor every move of a citizen in real-time (Hoffman, 2022). The Social Credit System is a national credit rating that measures the state-imposed "trustworthiness" of an individual or a business entity. Depending on their credit ratings, individuals and business entities are blacklisted and whitelisted, and their eligibility to receive certain services is determined (Cheung, Chen, 2021).

The Chinese model is perhaps the most comprehensive and institutionalised of all. In 2005, the Ministry of Public Security (MPS) and the Ministry of Industry and Information Technology (MIIT) launched the Skynet program to cover all the public spaces in China under the coverage of CCTV cameras (Polyakova, Meserole, 2019). The new Sherp Eye initiative, to ensure "no blind spot," is heading towards 100 % coverage of the Chinese public space (Thompson, 2021).

The CCP is already promoting its version of values and norms within its territory, primarily but not exclusively, with the help of the Social Credit System.

Table 1. Taxonomy of digital authoritarian practices

Surveillance	Online Censorship	Social Manipulation and Disinformation	Internet Shutdowns	Targeted Persecution of Online Users	Shaping International Norms*
Technologies, systems, or legal directives that enable control through identification, tracking, monitoring, or analysis of individual data or systems. Passive surveillance: Internet monitoring, mobile phone tapping, SIM registration, location monitoring, deep packet inspection, network interception, cable tapping, telecom surveillance. Targeted surveillance: intrusion operations which manipulate software, data, computer systems, or networks in order to gain unauthorised access to user information & devices (spyware/ malware). AI & big data surveillance: facial recognition, intelligent video, smart policing, smart cities/safe cities, social media monitoring. Surveillance laws: supports digital surveillance actions through the provision of intelligence & national security laws, data disclosure, data retention, and data localisation directives.	Laws, regulations, or actions undertaken by state authorities to restrict content & limit access to information. Content blocking and filtering Social media/ICT apps blocked. Takedown requests; content removal. Distributed Denial of Service (DDOS) attacks Infrastructure restrictions (Internet firewalls; closed ICT infrastructure – e.g., Great Firewall, Halal Net) Censorship laws & directives: religion/blasphemy, cybercrime, false news/fake news, political/hate speech, *lèse-majesté*, security/terrorism, copyright infringement, defamation/libel/sedition, indecency/anti-LGBT, financial targeting of groups	Strategies deployed by state or state-sponsored actors to shape narratives & beliefs and to mislead & manipulate users Disinformation Trolling, doxing, harassment Flooding Automated methods – bots, algorithms Vandalism and defacement	Intentional restrictions or disruptions of ICT networks or electronic communications rendering them effectively unusable for a specific period of time Total Internet shutdowns Partial shutdowns (restricted websites, blocked social media access) Throttling, blackouts, slowdowns	Online users persecuted by state authorities as a reprisal for posted political or social activity Online users charged, arrested, imprisoned, or in prolonged detention Online users physically attacked or killed	Support international conferences and organisations to facilitate their own version of Internet governance. Facilitate other authoritarian regimes by supplying surveillance and other technologies

Source: Feldstein, 2021, p. 26; *Added by the authors.

At the international level, China is promoting its own version of digital sovereignty by establishing the Shanghai Cooperation Organisation, providing training facilities to tech giants and the research community, and annually organising

the World Internet Conference. In this way, China is shaping the global norms of digital governance (McKune, Ahmed, 2018; Shahbaz, 2018). Moreover, China is one of the leading global suppliers of AI-powered surveillance technology and other repressive digital tools and software (Feldstein, 2021).

3.2 The Russian Model: Tight Information Control, Strong Legal Regime, Offensive, and Low-cost Alternative

Unlike the Chinese model, the Russian model is less strict and less comprehensive. This model uses surveillance mechanisms, but not to the degree of China; rather, Russia is more focused on censorship and information control. The Federal Security Service (FSB) analyses and conducts investigations when deemed necessary into all Internet traffic, telecommunications, and telephone networks throughout the country that is intercepted and stored via the SORM network (System for Operative Investigative Activities) (Akimenko, Giles, 2020). Moreover, Russia is developing the Runet, the Russian version of the Great Firewall, to block external internet traffic (Knake, 2020). Several government agencies are assigned to perform particular tasks. Department K under the Ministry of Interior is responsible for dealing with all sorts of general cybercrimes, and GosSOPKA is responsible for providing early warning and detecting cyberattacks (Akimenko, Giles, 2020).

The Russian model depends on a stronger and more flexible legal regime compared to the Chinese one. The latter is by no means without any legal provisions when digital repression is concerned, but it depends more on state agencies and arbitrary party directives than laws. The Russian regime enacted separate laws to ensure data localisation (On Personnel Data Law and amendments, 2015), VPN restriction (Information, Information Technology, and Protection of Information Law, 2017), criminalising reposting targeted content (Ant-Extremism Law, 2002), restriction on encryption (Amendments to Anti-Terrorism Law, 2016), and strategic censorship of contents threatening the regime (Internet Restriction Bill, 2012) (McKune, Ahmed, 2018).

Even though both countries possess pure cyber offensive capability, in practice, Russian activities are much more aggressive than China's. Russia regularly launches offensive disinformation campaigns and cyber-attacks on critical infrastructural systems and maintains strong cyber espionage capability (Brandt, Taussig, 2019; Akimenko, Giles, 2020).

Compared to China, Russia is still less digitally sovereign. Even a few years ago, Russia was dependent on China and western suppliers such as Cisco, Dell, and Microsoft (Kirilova, 2021). Gradually, Moscow is on the verge of gaining absolute digital sovereignty, and after the 2022 Ukraine invasion, it has gained momentum. Russian digital repressive tools are regularly imported by the former Soviet states, largely due to linguistic similarities, political ideology, and historical ties (Akimenko, Giles, 2020). However, Russian technology is a low-cost and easy-to-install alternative to most Chinese and Western systems. Therefore, African, Latin American, and Middle Eastern countries are the primary importers of these technologies (Codreanu, 2022).

3.3 The Western Model: State-industry Collaboration, Alienated from Accountability Mechanisms, and Shaping International Digital Norms

Digital authoritarian practices have always been considered the forte of authoritarian regimes like China and Russia, but evidence shows otherwise. Western liberal democracies are not lagging behind when surveillance and personal data monitoring are in question. Corporations such as Google, Amazon, and Facebook adopted a surveillance-based business model that monitors, collects, and sells our personal data, which is conceptualised as 'surveillance capitalism' by Shoshana Zuboff (2019). This model has come under severe fire from activist groups, journalists, and academics because it directly undermines a person's right to privacy, the right to equality and the non-discrimination, and right to free speech.

The ability of states and corporations to regulate, censor, and conduct cyberpolicing has considerably increased (Nye, 2011). These restrictions have included the virtual demarcation of virtual national borders, by separating national networks from the global Internet, which does not have any practical difference with China's Great Firewall (Deibert et. al., 2011).

Three dominant forces are still fighting over establishing their own version of internet governance: the Chinese model that advocates absolute government control, the US model that advocates an unrestricted free market and allows corporate dominance, and the EU model that advocates protecting individual privacy and personal data (Freedom House, 2021; Codreanu, 2022). Despite their own differences, the latter two models comprise of the Western model of Internet norms, that is detering Chinese attempt to shape international digital norms.

3.4 The Imported Model: Depends on Social Manipulation, Internet Shutdowns, Targeted Persecution, and Less Digitally Sovereign

Developing digital authoritarian mechanisms requires sophisticated technological know-how and huge funds. Therefore, most countries have to rely on the big powers to exercise authoritarian practices. Understandably, the countries that fall under this model are less digitally sovereign. This means they possess limited innovative capacity.

They import digital repressive tools from a variety of sources, and their practices are not uniform as well. Interestingly enough, not only the smaller authoritarian and illiberal regimes, but also electoral democracies buy and use these mechanisms.

These countries rely predominantly on the ‚older' practices of digital repressive mechanisms, which include social media manipulation, internet shutdowns, and targeted persecution. This does not mean that they refrain from surveillance and censorship in any way. Feldstein (2021) identifies five key components of social manipulation. They are disinformation, trolling and harassment, flooding (the use of bots and algorithms), and vandalism. Likewise, there are different varieties of Internet shutdowns and targeted persecution. For the time being, they are not adopting sophisticated surveillance techniques like AI-powered targeted surveillance, but that does not mean that they will not apply them in the future.

4. Why Model Digital Authoritarian Practices?

The decline of democracies after 2006, which Larry Diamond (2020) called „democratic regression," naturally gave way to autocratic regimes. Lührmann and Lindberg (2019) claim that this „third wave of autocratisation" is unique in two ways: first, democracies are gradually declining under legal disguise; and second, autocratisation is no longer a sudden event, unlike older transformations (like a military coup). Therefore, it is really difficult to precisely identify the transformation of a democracy into an autocracy. Contemporary research on autocratisation and the ubiquitous multiparty elections around the world suggests that the current wave of autocratisation is more covert and slow than previous waves. Lührmann and Lindberg further argue that "we lack the appropriate conceptual and empirical tools to diagnose and compare such elusive processes" (2019, 1095).

Unfortunately, in conventional literature, the typology of authoritarianism has not changed much from the military-monarchical-one party-multiparty quad. This typology might be applicable in the old Cold War settings, but today's political reality has changed a lot. Of course, there are some seminal works that reframe the typologies (Wahman, Teorell, Hadenius) and develop comprehensive data sets (Geddes, Wright, Frantz, 2014; Magaloni, Chu, Min 2013), but these data sets could not incorporate the changing and fluid nature of authoritarianism. These four models help to identify an authoritarian regime disguised as an electoral democracy.

Democracy, following the ideals of the Enlightenment, endorses human dignity and freedom as its key components. However, the question of individual freedom and human dignity is often overlooked by both the agent and the structure, due to the proliferation of digital space in our lives. In the name of public security, digital autocrats easily enter and control our private lives. This proliferation is so fast that even if the political elites attempt to curtail it, the legal provisions cannot keep pace with the ever-changing digital practices. Identifying the particular model of digital authoritarian practice might help policymakers intervene before it is too late.

5. Conclusion

Digital authoritarianism will only become more potent and more widely disseminated if left uncontrolled as new technologies continue to be developed. More and more people, businesses entities, and governmental institutions become dependent on digital tools and the Internet. Similar practices are becoming more prevalent in democracies, despite the fact that democracies are more transparent in their actions and citizens can hold leadership accountable for abuses, even though China and Russia are the main users of digital technologies for oppressive purposes and the main exporters of digital authoritarian tools. However, the bar for what constitutes misuse of digital tools will be dramatically lowered for digital authoritarians if liberal democracies continue to accept local or imported forms of digital authoritarianism. Democracies should work to monitor the conduct of digital authoritarians as well as their own online behaviour, even while promoting examples of democratic internet governance.

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Globalisation and the Fluctuation of the Stock Exchange in the Global Economy: Case and Tendencies

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Abstract

This paper investigates the impact of globalisation on the fluctuation of the stock exchange in the global economy. Globalisation has interconnected and turned different markets and economies into a global economy. Economic globalisation is about the global mobility of goods and services, people, technology and capital; it is about the fact that trading blocks and economies, countries and regions become interdependent. The research questions are "Does globalisation impact the stock exchange?" and "Is there a fluctuation in the global economy and stock exchange at the global level?" As research method, we focused on literature review and data analysis in qualitative quantitative way by focusing on data and correlation of some indexes by studying the interconnection between markets, we chose some representative indexes. For this purpose, we made the assumption that the stock exchanges are representatives of the global economy. The results showed that the Stock Exchange indexes for different countries are strongly correlated, and the occurring fluctuations in the advanced economies can be seen in all the indexes at the same time. One main aspect modifying the world economic shape, inducing fluctuations, is the change due to intelligent economy, to the implementation of new technologies and substituting human contribution in industry. The most important game changer is the spread of machine learning, deep learning and AI techniques, in many businesses. In conclusion, due to globalisation, markets and economies are highly connected especially with the incorporation of digitalisation processes that help show the transmission of economic trends from between economies faster, the stock exchange is linked to the market system that is impacted by globalisation.

Keywords: Globalisation, stock exchange, fluctuation, economy, business, trend.

JEL Classification: F01, F60, F62.

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1. Introduction

Globalisation has interconnected and turned different markets and economies into a global economy. Economic globalisation is about the global mobility of goods and services, people, technology and capital, it is about the fact of trading blocks and economies, countries and regions become interdependent. The ideological and regulatory playing field was now set for an unprecedented expansion in global economic activity, after the fall of the Berlin wall an era started which is nowadays called hyper-globalisation, countries around the world began in earnest to industrialise their economies bringing in countries workers into urban centres to work in the low-skilled manufacturing of goods that now could be exported to global supply chains, global trade agreements removed the limitations of the national economy as the world economy could observe a much greater amount of production. With the incorporation of digitalisation, more products and information started to move between more nodes faster. The deregulation of financial institutions in the late 1980s enabled the formation of a global financial structure to move investments around the world; foreign direct investment started to flow to emerging economies as money became relatively freely available with capital markets, and this was the pinnacle of neoliberal economic globalisation that took place during the 1990s and 2000s with development of global supply chains and hyper growth in driving commodity and economic cycles.

Globalisation has driven dramatic changes around the world. Globalisation has interconnected and turned different markets and economies into a global economy. Economic globalisation is about the global mobility of goods and services, people, technology and capital, it is about the fact of trading blocks and economies, countries and regions become interdependent. As economies depend on each other for commodities, food, services, etc. The market value of a company should reflect how much cash investors believe the firm will make in the future. If changes in the broader economy are likely to affect company performance, then this should lead to changes in share prices. But it is important to emphasise that investors will consider not only what is happening now, but also what is likely to occur in the future (Economics Observatory, 2021).

2. Problem Statement

The phenomenon of "globalisation" is primarily to blame for the unprecedented trend of social, economic, cultural, and political interconnections that the global society is currently experiencing in daily life (Jackson, 2008). The extent and speed with which this phenomenon affects global society, are quite difficult to describe, in part because of researchers who have put forth conflicting conceptualisations and understandings of the consequences, making it one of the most discussed and contested topics in the modern era. Studies (Grossman, Helpman, 1991) have found that globalisation plays a significant role in the expansion of the economy because of the employment opportunities it creates and the ease with which technology can be accessed. But there are studies (Gaston, Nelson, 2004) that

demonstrate the adverse effects of globalisation, particularly on developing states. According to Investopedia, a stock exchange does not own shares. Instead, it acts as a market where stock buyers connect with stock sellers. Stocks can be traded on several exchanges such as the New York Stock Exchange NYSE or the NASDAQ (Harper, 2022). Although most stocks are traded through a broker, it is important to understand the relationship between exchanges and the companies that trade. Additionally, there are various requirements for different exchanges designed to protect investors. (Harper, 2022). A stock exchange is a centralised location that brings corporations and governments together so that investors can buy and sell equities. Furthermore, auction-based exchanges such as the "New York Stock Exchange" provide the traders and brokers the possibility to physically and verbally communicate, buy and sell orders. Electronic exchanges take place on electronic platforms, so they don't need a centralised physical location for trades. (Harper, 2022).

Some previous research showed that exchange demutualisation enhances a stock exchange's operating performance (Otchere, Abou-Zied, 2008) but remains silent on its impact on an exchange's market participants. In fact, this important event, similar to other economic and regulatory changes, is likely to affect the behaviour of investors, firms, and financial intermediaries. Stock exchanges play a crucial role in financial markets by providing liquidity and disseminating stock price information. (Hanselaar et al., 2019). The efficiency of the secondary market in providing liquidity and accurate price discovery facilitates firms' access to capital. In a liquid stock market, firms can easily sell their stocks (i.e., more equity issuance) to service debt without greatly affecting the stock price. In contrast, in a less liquid market, equity issuance becomes costlier because an increase in the supply of stock has a greater price impact (Hanselaar et al., 2019). According to Harper 2022, the stock prices are determined in the marketplace, where the seller/supply meets buyer/demand. However, unfortunately, there is no clean equation that mentions exactly how the price of a stock will behave. (Harper, 2022). Stock market fluctuations often seem far removed from what is happening in the wider economy, especially in a crisis (Economics Observatory, 2021). Fluctuations in the prices of financial assets in the stock market can sometimes seem to be inconsistent with what is happening in the rest of the economy (Economics Observatory, 2021).

3. Research Questions / Aims of the Research

The aim of this paper is to investigate, present, and describe the tendencies of globalisation and the economic fluctuation of the stock exchange in the global economy and markets. The research questions are "Does globalisation impact the stock exchange?" and "Is there a fluctuation in the global economy?"

4. Research Methods

As research method we focused on literature review and data analysis in qualitative quantitative way.

5. Findings

With the process of globalisation, the rise of a new organisational paradigm in the form of the market system, a new logic of commercial exchange has been extended to ever more spheres of human activity after the fact that people and governments are making choices within a political context. Today economies around the world are less governed by the choices of their political institutions and by the rules of economics, markets, and flows of financial capital. This truly radical transfer of power and decision-making has taken a place within a few short decades with far- reaching implications. In other words, more and more societies around the world and more aspects of those societies become open to being organised through the logic of the market system. So, things have become increasingly organised with global networks of economic exchange. Until the middle half of the twentieth century hierarchies were almost unanimously seen as the only effective method for organising production with large mass societies; then, a new ideology of free market as a distributed coordination mechanism in its own right arose, Then with the work of Friedrich Hayek who recognised that price produced by supply and demand alone could be an accurate and sufficient signal of information to allow decentralised coordination to achieve the optimal allocation of resources with society. Although the state was seen to be needed to provide basic support. Hayek saw the market as an optimal self-sustaining system, and enabling it required converting as much as possible into private property and contracts that would allow for those signals to order the economy spontaneously; the latter half of the twentieth century saw the realisation of Hayek's in the United States and other developed economies with acceleration of a process of transferring socio-economic organisations from hierarchical social organisations to market structures as promoted by a new ideology of neoliberalism in the 1970s, 1980s and 1990s. Public previsions started to retreat and private production via the market started to expand into almost all areas.

The neoliberal paradigm is the logic of the market system. Although originally it may have been an economic theory, neoliberalism became much more than that, it came to encompass a set of ideas or paradigm about human nature, economic and social organisation. Neoliberalism is the free market ideology based on individual liberty and limited government, it is about the connected human freedom to the action of the rational self-interested actor in the competitive marketplace, the neoliberalism formed created a conceptual rationale for shifting economic organisation from people and hierarchies toward an impersonal logic of the market. In order to achieve this, it had removed power and capabilities from the nation state, it moved economic organisations to the market through privatisation and deregulations of national economies. Moreover, by shifting the power of national democracies and their parliaments or organisation into executive and international bodies that were not controlled by democratic procedures such as the IMF or WTO.

The deregulation of financial institutions in the late 80s enabled the formation of a global financial structure to move investments around the world, foreign direct investment started to flow to emerging economies as money became relatively freely available with capital markets, this was the pinnacle of neoliberal economic

globalisation that took place during the 1990s and 2000s with development of global supply chains and hyper growth in driving commodity and economic cycles. Globalisation has driven dramatic changes around the world.

Globalisation has interconnected and turned different markets and economies into a global economy. Economic globalisation is about the global mobility of goods and services, people, technology and capital, it is about the fact of trading blocks and economies, countries and regions become interdependent. As economies depend on each other for commodities, food, services, and various products.

5.1 Fluctuation of the Stock Exchange (Example of Four Large Economies)

Another point of demonstration would be that the major markets of the world are all evolving synchronously, they are linked and correlated, and their fluctuations are transmitted to lower-volume markets. In order to study this interconnection between the markets, we chose some representative indexes. For this purpose, we made the assumption that the stock exchanges are representatives of the global economy. The bigger and more important stock exchange, there is a better correlated with the economy status. For this study we evaluated four stock exchanges, which we considered to be the most representative of the world, due to their volume, tradition, and influenced region. The three major stock exchanges, situated on three continents, are New York Stock Exchange (NYSE), Tokyo Stock Exchange and London Stock Exchange. To the three major stock markets, we added the representative index for Shanghai Stock Exchange.

The following four indexes were considered to be representative for each of the three Stock Exchange institutions:

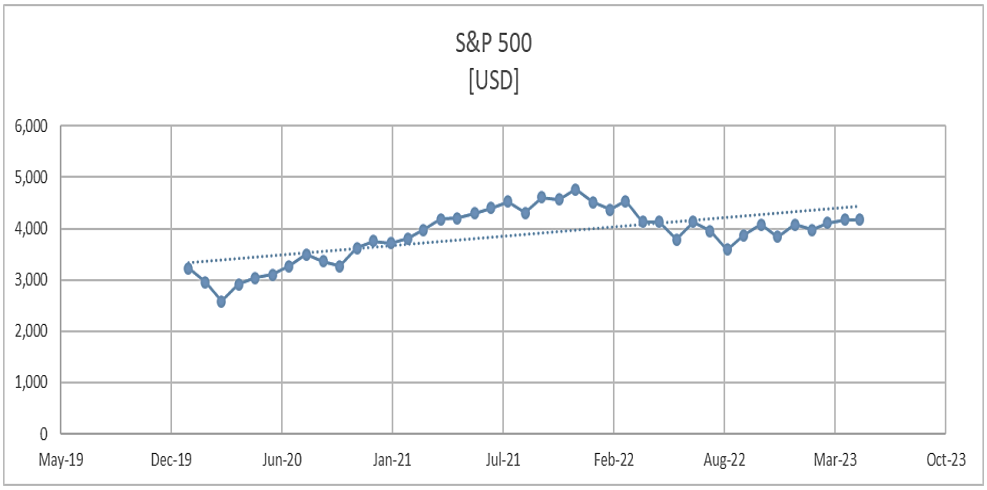
Table 1. Representative indexes for the most important stock exchange economies

Index	Description	Value April 1st 2023 [USD]
S&P 500 (GSPC)	Standard & Poor's 500 Index, is a market-capitalisation-weighted index of 500 leading publicly traded companies in the U.S.	4,169.48
Nikkei 225 (N225)	Nikkei 225 is a price weighted composed index by the most important 225 blue chip companies in Japan.	215.67
FTSE 100 (FTSE)	FTSE is an index tracking the price action of the shares traded on the London Stock Exchange; it has currently 94 components.	9,890.95
SSE Composite	The Shanghai Stock Exchange Composite Index is a composite index based on all A and B shares traded on the Shanghai Stock Exchange	479.81

Source: Author's contribution and research 2023, Yahoo Finance data 2023.

Below are represented the variations for these stock exchange indexes, in USD, over a time interval from January 1st 2020 to April 1st 2023. The S&P 500, representative for the NYSE (New York Stock Exchange), shows a variation almost sinusoidal around a trend line. The trend of this index is increasing, showing that the NYSE is in a bullish trend (see Table 1 and Figure 1).

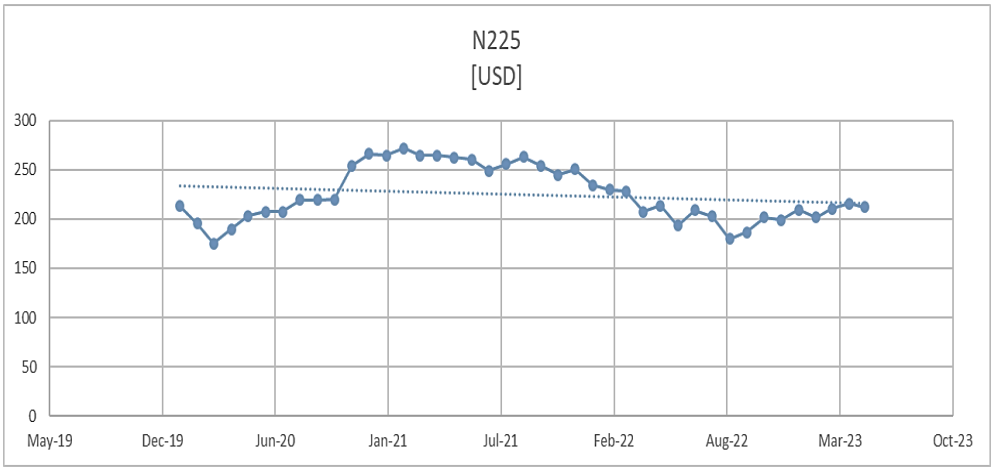
Figure 1. Monthly values for S&P 500 index (New York Stock Exchange)



Source: Author's contribution and research 2023, Yahoo Finance data 2023.

The Nikkei 225 index has a relatively similar curve, but with a slightly decreasing trend, showing some impact in the Japanese economy (see Figure 2).

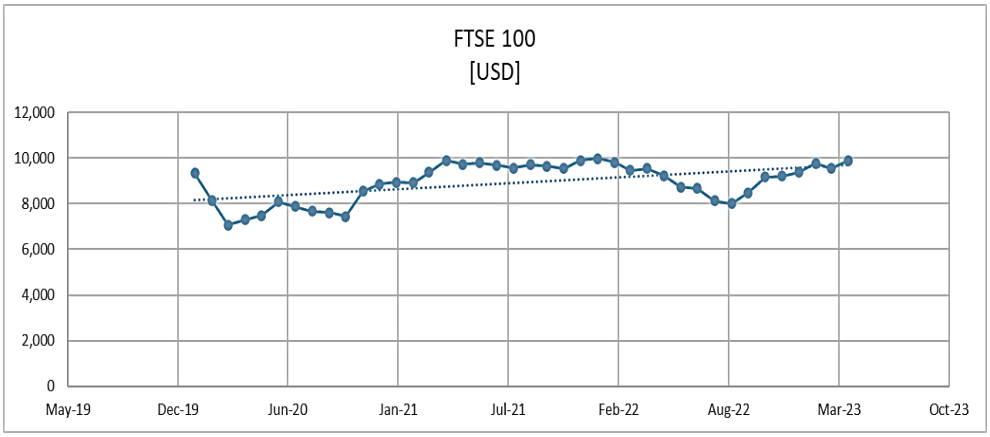
Figure 2. Monthly values for N225 index (Japan)



Source: Author's contribution and research 2023, Yahoo Finance data 2023.

The FTSE 100, representative for the London Stock Exchange, is more correlated with the S&P Index, showing also a slightly increasing trend (see Figure 3).

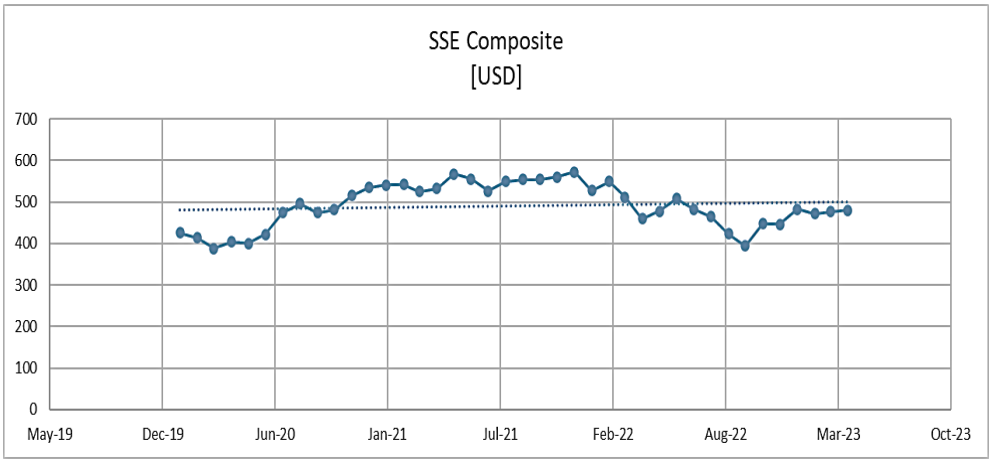
Figure 3. Monthly values for FTSE 100 index (UK)



Source: Author's contribution and research 2023, Investing.com data 2023.

Finally, the Chinese SSE Composite index is more correlated with the S&P 500 and FTSE 100, and has a slightly lower correlation with N225. The trend for SSE is also slightly increasing (see Figure 4).

Figure 4. Monthly values for SSE Composite index (China)



Source: Author's contribution and research 2023, Yahoo Finance data 2023.

The variations of the indexes, which are correlated with the stock exchanges representative for the main world markets, show a strong correlation with each other, a fact that suggests that they are correlated with the global economy. We have tested the correlation between these indexes, and the Pearson correlation coefficients show a strong link between these indexes, with a slightly lower correlation for the N225 index (see Table 2).

Table 2. Correlation between the indexes

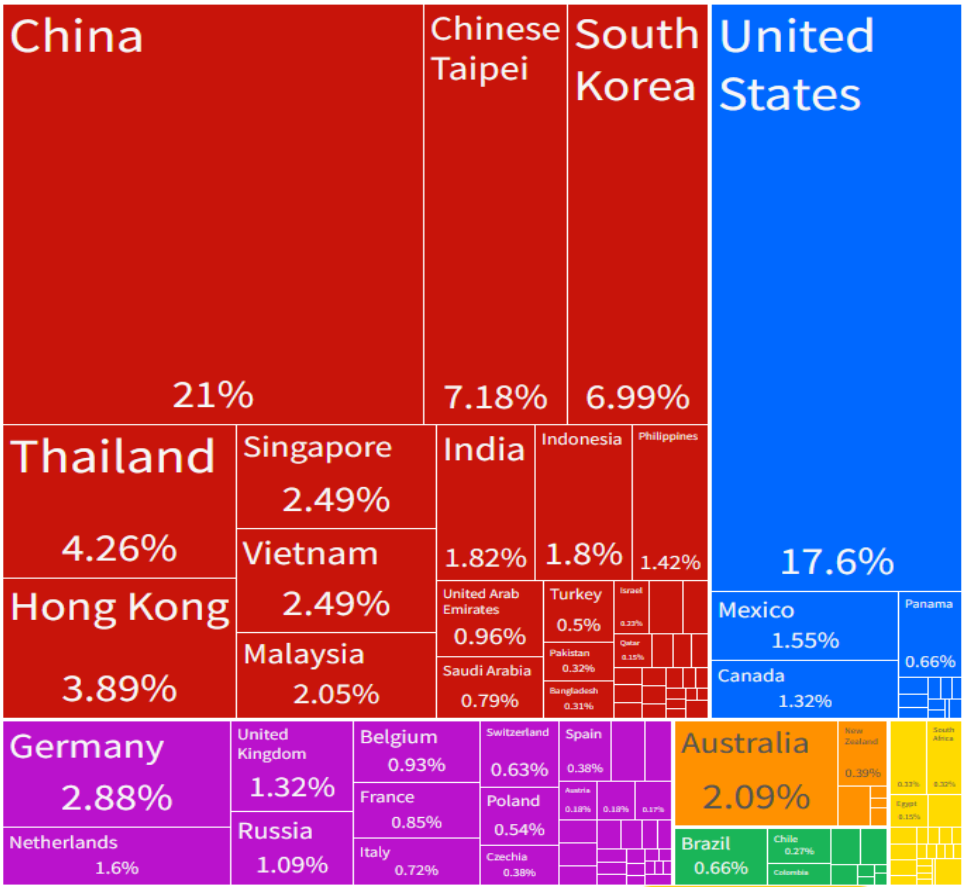
	S&P 500	*N225*	*FTSE 100*	*SSE Composite*
S&P 500	1			
N225	0.5269	1		
FTSE 100	0.8596	0.5388	1	
SSE Composite	0.7420	0.8729	0.6516	1

Source: Author's contribution and research 2023, Yahoo Finance data 2023.

From the study of the correlations between the Stock Exchange indexes, we found the following:

- **S&P 500 with N225 (0.5296)** – the two indexes have the lowest correlation of all the considered indexes. This shows a disconnection between the US and Japan economies; even if the curves are similar, the main difference is in the trend, which is slightly increasing for the S&P 500 and slightly decreasing for N225.
- **S&P 500 with FTSE 100 (0.8596)** the two indexes are strongly correlated. This is in line with the idea that the British economy is strongly linked to the US economy.
- **S&P 500 with SSE Composite (0.7420)** American and Chinese economies are strongly correlated, the explanation being that the US is the most important market for the Chinese companies.
- **FTSE 100 with SSE Composite (0.6516)** the medium correlation shows the degree of connection between the British and Chinese economies, which could be considered as medium as compared to the other indexes.
- **N225 with FTSE 100 (0.5388)** one of the lowest correlations for the considered indexes, this shows a reduced connection between Japanese and British economies.
- **N225 with SSE Composite (0.8729)** the strongest correlation from the selected indexes, it shows the leverage of the Japanese companies on China, in line with the technological profile of Japan and with the fact that Japan has scarce resources. Japan's most important export destination is China (2021), with 153B USD out of a total of 731B USD (See Figure 5).

Figure 5. Main Exports for Japan in 2021



Source: Observatory of Economic Complexity 2023.

6. Conclusions

We have found that the Stock Exchange indexes, for different countries, are strongly correlated, and the occurring fluctuations in the advanced economies can be seen in all the indexes in the same time. One main aspect modifying the world economic shape, inducing fluctuations, is the change due to intelligent economy, to the implementation of new technologies and substituting human contribution in industry. The most important game changer is the spread of machine learning, deep learning and AI techniques, in many businesses. In the last period, we have seen two contractions, one resulting from the Covid 19 pandemic (2021) and one starting in February 2022, hitting the bottom in August 2022 and since then recovery period. The Japanese SE index N225 has a bearish trend, and the Japanese economy is dependent on China, as over 20% of their exports are to this country. In the first part of 2023, China has become the most important oil importing country, as it gets the most part or the oil exported by Russia.

Globalisation has driven dramatic changes around the world. Globalisation has interconnected and turned different markets and economies into a global economy. Economic globalisation is about the global mobility of goods and services, people, technology and capital, it is about the fact of trading blocks and economies, countries and regions become interdependent. As economies depend on each other for commodities, food, services, and various products. There is an interconnection between markets and economies through globalisation and the fluctuation of the stock exchange.

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Trends in the Development of the Payment Services Market: A case of Slovakia

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Abstract

The current payment services markets face significant challenges reflecting changes in the global business environment. These changes also induced important modifications of the relevant legislation regulating the functioning of the payment services markets. One of its goals, besides strengthening the security of payment services, is to make especially electronic payments available to everyone. These efforts are accompanied by the application of innovative payment technologies as well as the expansion of the activities of non-bank payment service providers. The purpose of this paper is to identify the most prevalent trends in the recent development of the payment services market. In particular, we look at the aspects of digitization and structural aspects of the payments and payment services market. The qualitative analysis of these trends is supplemented by available data for the period 2017-2021 demonstrated by the example of Slovakia, which has been a member of the Eurozone since 2009. Thus, the overall look at the European payment services market with the implications for its future development is provided as well.

Keywords: payment services market, digitisation, electronic payments, Slovakia.

JEL Classification: D53, E42, G21.

1. Introduction

Significant changes in the global business environment including aspects of innovation and digitisation induced also modifications in the functioning of the payment services market and its regulation. One of the aims of financial policies is to attract more economic subjects and populations to use cashless payment methods. As indicated by Rustamov (2016), new participants in the payment services market,

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such as electronic money institutions or payment institutions, can bring new views and innovative services to develop cashless settlements.

This paper is focused on the analysis of these trends, especially structural changes in terms of the composition of payments and payment service providers, as well as digitisation aspects of the payment services market in the Slovak Republic. To the best knowledge of the authors, there is no study that would provide a complex overview of the development of relevant trends in the payment services market underpinned by relevant data, under the conditions of the Slovak Republic. Since this country has been a member of the Eurozone since 2009, we consider it as a good example of a country with implemented European regulations related to the payment services market. Besides a review of literature related to the outlined topic, we also provide a brief overview of the relevant legislation in this regard, as well as an overview of the development trends of the payment services market based on available data.

2. Problem Statement

When focusing on the current literature analysing the development trends in payment markets, we identified several studies that deal with specific issues in this regard. When looking at traditional payment tools such as payment cards, direct debits, and credit transfers, Zhang et al. (2019) identified that when initiated electronically, there are complementary effects across these electronic payment methods. However, there are substitution effects between electronic and paper-based payment methods. At the same time, a higher penetration ratio of electronic payment methods in 27 European Union member countries, is generally associated with higher GDP, consumption as well as tax revenue. A more detailed look at card payments conducted by Fusaro (2013) in the case of the United States showed that debit cards are the faster-growing consumer payment method when compared to more popular credit cards, especially at the turn of the millennium. At the same time, he concluded that debit cards can be used as a way to limit spending. Similarly, a recent study by Feruś (2022) conducted under the conditions of Poland showed that the number of payment cards, especially the number of credit cards, is decreasing, but this trend is accompanied by an increase in the average debt on particular cards.

However, traditional payment instruments operated by banks have faced increasing competition from non-financial institutions in recent years, especially in the field of providing payment services through new financial technologies (FinTech). As indicated by Romānova and Kudinska (2016), traditional banks can view the boom in FinTech as a threat; however, it can also be turned into an opportunity, because it can provide better functionality, more flexibility, and aggregation of provided services. From a structural perspective, Elsaid (2021), based on an extensive literature review, suggested that while FinTech companies could take some market share away from banks, they are not expected to replace banks. He instead proposes to build strategic partnerships and cooperation between banks and FinTech companies in a mutually beneficial way.

Thus, the rise of FinTech brought not only growing competition in the payment services market, but also the rise of innovative payment solutions, which implementation is not always without challenges. Khan et al. (2017) evaluated the status and growth of online payment services and pointed out that there is a change in the behaviour of consumers showing a shift from the traditional to an advanced online mode of payment with nearly all available mobile devices. However, better integration of online payment systems with the current telecommunication and financial infrastructure is necessary for the favourable future of this payment regime.

A study by Kang (2018) analysed the mobile payment market by comparing traditional payment services with recent mobile FinTech payments, including their security challenges. The study has a qualitative nature, and the author calls for further development of especially simple and convenient mobile FinTech services. Another study focused on digital payments was conducted by Sahi et al. (2022). It systematically reviewed digital payment literature, covering papers published over 22 years. The countries that contributed the most to this body of literature are China, India, and the United States. The authors also highlighted the fact that the primary research interest lies in the technological aspects of digital payments, without considering the cultural aspects of its users.

Despite the existence of the literature focusing on specific aspects of payment services market development, there is a lack of studies that would provide a more complex look at this market from users' point of view, underpinned by relevant data.

3. Aim of the Research

It is in our interest to take a closer look at the single-country payment market and its more broadly defined trends, supported by relevant legislation and data. Hence, the present paper aims to identify the most prevalent trends in the recent development of the payment services market in the Slovak Republic. This country has been a member of the Eurozone since 2009, and therefore the legislation and measures of the European Central Bank apply to its payment services market. It can be thus considered as a good example of a country indicating also trends within the whole European payment market.

4. Research Methods

For the purpose of the analysis conducted in this paper, we first come out of the relevant legislation that formed the payment services market in recent years. Then, we consider structural aspects of the payment services market in Slovakia, namely the structure of payments distinguishing credit transfers, direct debits, and card payments, in terms of the number of transactions as well as their value. Regarding card payments, we take a detailed look at the comparison of the use of debit cards as well as credit cards. The above analyses are based on the data available in the European Central Bank Payments Statistics database (ECB, 2022), which contains data covering the 2017-2021 period. We consider also structural aspects of the payment services market in Slovakia, in terms of the number of current payment

services providers including banks and non-bank providers, distinguishing also domestic and foreign subjects. For this purpose, we use a Financial Entities Register maintained by the National Bank of Slovakia (NBS, 2023).

Subsequently, it is in our interest to analyse the digitisation aspects of the payment services market. Based on the data from the European Central Bank Payments Statistics database (ECB, 2022), we compare credit transfers and card payments initiated traditionally and electronically. To gain a more complex picture of the level of digitisation of payment services, we are looking for the coverage of these aspects within existing complex indicators of digitisation, such as the Digital Economy and Society Index, Network Readiness Index, and Digital Payments Index.

5. Findings

The results of our analyses are presented in the structure indicated above. We first provide an overview of the structural aspects of payment services, containing the structure of payments and the structure of subjects providing payment services in Slovakia. Then we look at the digitisation aspects of the payment services market.

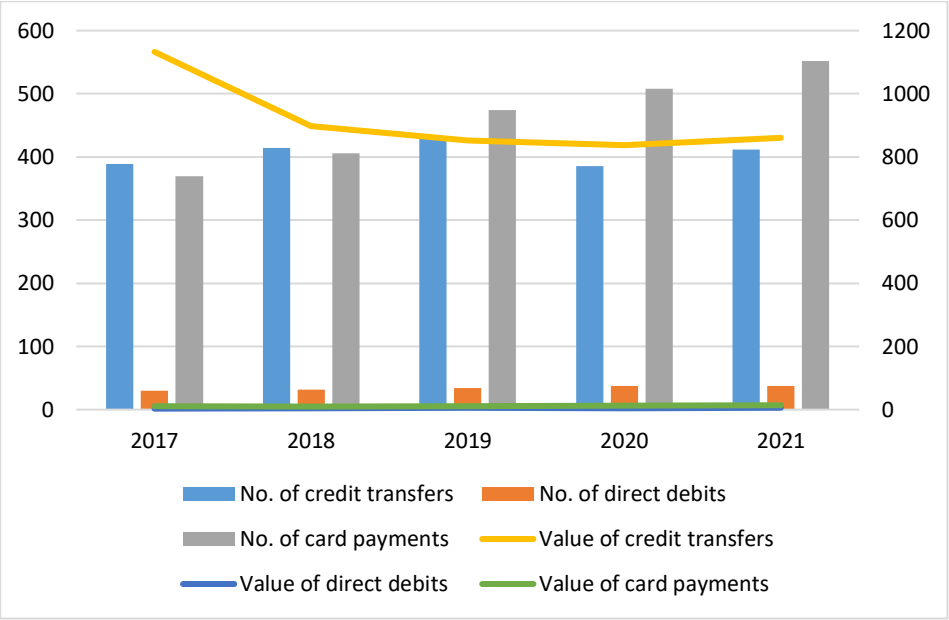
5.1 Structural Aspects of Payment Services

Within the European payment market, one of the most significant changes was the full implementation of the Single Euro Payments Area (SEPA) as of October, 2016, which allowed people and businesses to make cashless euro payments within one SEPA country or between different SEPA countries under the same conditions regardless of the SEPA country in which the payment account is held. The SEPA region, in which cashless euro payments are harmonised, consists of all European Union countries and several non-EU countries such as Iceland, Norway, or Switzerland. The legislative framework for SEPA was established by Regulation (EU) 260/2012, which regulates technical and commercial requirements for credit transfers and direct debits in euro and which amends Regulation (EC) 924/2009.

Figure 1 shows the development of the number of sent SEPA payments in the Slovak Republic (in millions) in the structure of credit transfers, direct debits, and card payments in the reported period of 2017-2021. The secondary axis shows the total values of these transactions (in € billions).

It is obvious that while at the beginning of the reported period, the credit transfers prevailed both in terms of number and value, their popularity was challenged by more frequent use of card payments, at the end of the reported period. However, the overall value of card payments remains relatively stable and low during the monitored period. The same can be concluded regarding direct debits, which are the least frequently used SEPA payments. Since there is a big difference in the overall value of payments in terms of their types, we look at their average value per payment. The highest average amount, namely € 2,263 was sent by credit transfer, followed by direct debit payment in the average amount of € 136 and card payment slightly exceeding € 25. However, the average sum paid by card slightly decreased in the monitored period, from € 30 at the beginning to € 25 at its end.

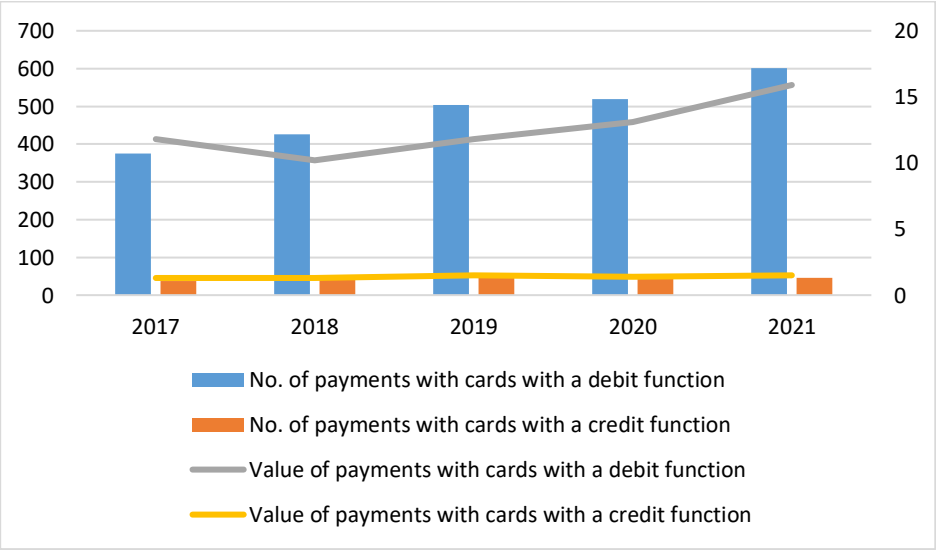
Figure 1. Structure of SEPA payments in terms of number and value



Source: Own processing based on data from ECB Payments Statistics (ECB, 2022).

Further, we looked at the structure of payments made by cards. Figure 2 shows the development of the number of card payments (in millions) in terms of their debit or credit function in the reported period of 2017-2021. The secondary axis shows the total values of these transactions (in € billions).

Figure 2. Structure of card payments in terms of their function



Source: Own processing based on data from ECB Payments Statistics (ECB, 2022).

It is obvious that while the number, as well as the value paid by debit cards, increased in the monitored period, the number and value of transactions conducted by credit cards are stable and relatively low. So, it seems that Slovak payers are cautious and rather reluctant to use cards with a credit function. However, the average amount paid in one transaction by credit card is slightly higher, namely € 32 compared to € 26 paid on average by debit card.

Further innovations concerning SEPA credit transfers were defined by the European Payments Council as the SEPA Instant Credit Transfer scheme, which became effective in November 2017. These payments are processed in real time, 24 hours a day, every day of the year, with money in the recipient's account within ten seconds, and are available to all types of payers, from consumers to large companies. The amount of each transaction is limited to € 100,000. In accordance with the National plan for the implementation of instant payments in the Slovak Republic (NBS, 2019), the starting date of instant payments in Slovakia was scheduled for February 1, 2022. Participation in the instant payment scheme is optional for the payment service providers. However, more institutions can be expected to join the scheme in the future, which will speed up e-Commerce processes and make them more efficient. At the same time, instant payments are believed to accelerate the payment of taxes, social insurance, and other administrative fees (NBS, 2019).

Another significant change that affected the functioning of the European payment services market was the implementation of the Directive (EU) 2015/2366 of the European Parliament and of the Council of November 25, 2015 on payment services in the internal market, known as PSD2, which content was implemented into the legal order of the Slovak Republic effective from January, 2018. This regulation brought an increase in the security of online payments by introducing the obligation to apply strong authentication of the payer and payment authorisation. It also led to the expansion of the range of payment services by new types, due to the constantly increasing level of digitisation. It has created space for new entities in the payment services market that can provide services through interfaces and applications. Banks have also caught up to new trends, developing their own FinTech solutions.

Currently, payment services in the Slovak Republic and the European Economic Area can be provided by authorised providers, which are not only banks but also payment institutions. The same applies also to the issuance of electronic money, which is reserved not only for banks but also for institutions of electronic money. Information from a payment account can be in consolidated form accessed by an account information service provider and a bank. Such entities can perform activities in the Slovak Republic based on their authorisation or registration issued by the National Bank of Slovakia (NBS). At the same time, there are also entities that can freely provide these services cross-border, based on authorisation from a domestic supervisory authority without having to apply for another authorisation in the host Member States. The current structure of the Slovak market of payment services in terms of their providers is reported in the following Table 1.

The numbers show that the most frequent provision of banking services in Slovakia is done on a free cross-border basis. Most of the banks located in Slovakia

perform activities as branches of foreign banks. The reason may be the fact that Slovakia is a very small country with a limited market for the establishment of other banking institutions. Rather, there is a tendency to carry out acquisitions, as a result of which there is a change in the ownership structures within the longer-term incorporated banks in the Slovak Republic.

Table 1. Structure of providers of payment services in Slovakia

Type of institution	Number
Banks based in Slovakia	11
Branches of foreign banks	14
Free provision of services on the cross-border basis of foreign banks and other credit institutions in Slovakia	395
Payment institutions located in Slovakia	9
Branches of foreign payment institutions in Slovakia	2
Foreign payment institutions providing services in Slovakia via payment services agents	6
Free provision of services on the cross-border basis of foreign payment institutions in Slovakia	262
Account information service provider established in Slovakia	1
Free provision of services on cross border basis of foreign account information service providers in Slovakia	22
E-money institutions based in Slovakia	1
Free provision of services on the cross-border basis of foreign e-money institutions in Slovakia	208

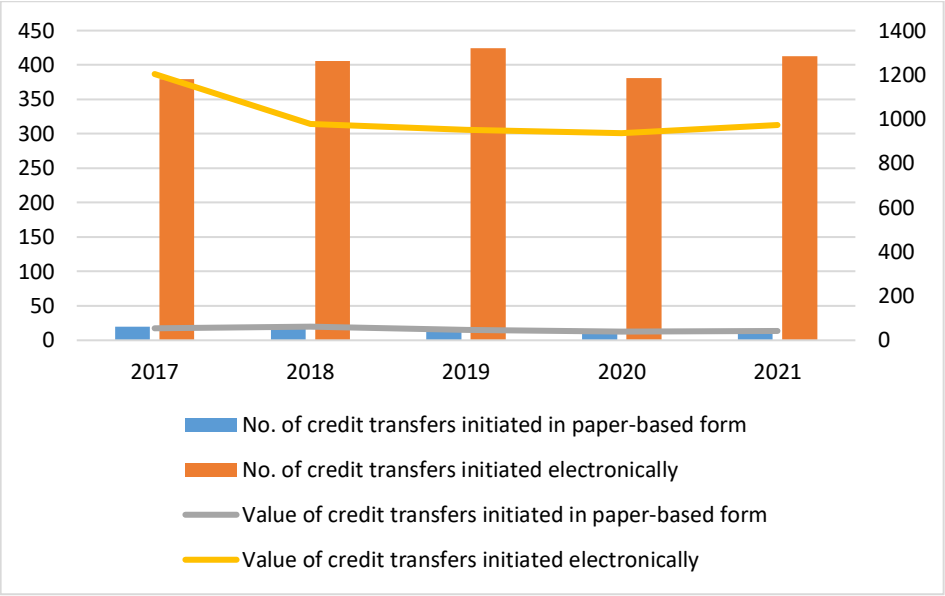
Source: Own processing based on data from Financial Entities Register (NBS, 2023).

Among non-bank payment service providers, the most numerous group is formed by payment institutions providing their services in Slovakia freely on a cross-border basis followed by foreign e-money institutions performing activities on the same free cross-border basis. There are only a few payment service providers incorporated in Slovakia, which reflects the size of the internal market and/ or the limited attractiveness of the provision of these types of payment services for Slovak entrepreneurs.

5.2 Digitisation Aspects of Payment Services

The previous analysis showed that the most important forms of payments are performed via credit transfers and card payments. Hence, we looked in more detail at the aspects of digitisation within these types of payments. The following two figures capture the development of the number (in millions) and the value (in € billions) of credit transfers initiated in paper-based form and electronically, as well as card payments initiated at physical EFTPOS (Electronic Funds Transfer at Point Of Sale) and remotely in the Slovak Republic in the reported period of 2017-2021.

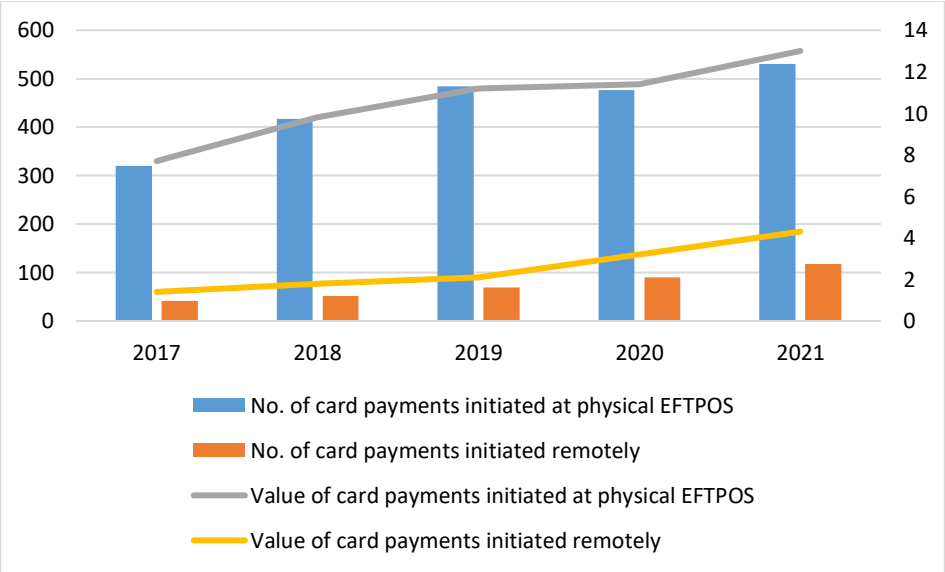
Figure 3. Structure of credit transfers



Source: Own processing based on data from ECB Payments Statistics (ECB, 2022).

The number and value of credit transfers initiated electronically are much higher compared to the paper-based form, the use of which is gradually decreasing. The slight decrease in the number and value of electronic credit transfers can be attributed to the rise of use of card payments, which is shown in the Figure 4.

Figure 4. Structure of card payments



Source: Own processing based on data from ECB Payments Statistics (ECB, 2022).

The increasing popularity of card payments is obvious, both initiated at physical EFTPOS as well as remotely. However, while the average value of payment paid at physical EFTPOS reached in the reported period almost € 24, the average amount paid remotely is higher by € 10. Hence, it is reasonable to assume that, especially higher amounts, are more frequently paid remotely.

It is in our interest to look in more detail at the overall level of digitisation of the payment market using some composite indicator. For this purpose, we analysed the composition of some well-known digitisation indicators to identify partial indicators that would specifically reflect the level of digitisation of the payment sector. When looking at the Digital Economy and Society Index (DESI, 2022) and its dimensions, we found none to be focused on the payment market. There is a dimension "e-commerce" that is dealing with selling online which is related also to online payments, however, still not reflecting the complexity of digitisation in payment markets. Similarly, in the case of Network Readiness Index (Portulans Institute, 2022), there are several of its sub-indices that deal with digital payments, such as the "socioeconomic gap in use of digital payments" or "rural gap in uses of digital payments". However, these partial indices mainly reflect socioeconomic aspects, so the complexity of digitisation in the payment markets is still not being adequately covered. There is also another indicator, namely the Digital Payments Index, which was created by The Reserve Bank of India for the purpose of measuring the penetration of digital payments throughout the country during different periods. It consists of five partial dimensions, which reflect the digitisation of the payment services market to a large extent (Ravikumar et al., 2022). However, this index is applicable only in India.

6. Conclusions

The present paper focused on the identification of the most prevalent trends in the recent development of the payment services market in the Slovak Republic, both in terms of its structural and digitisation aspects.

From the SEPA payments structure point of view in the period of 2017-2021, payment cards represented on average 51 %, credit transfers 45 % and direct debits 4 %. Specifically, the risen frequency of card payments use is obviously accompanied by a decreasing average amount paid by card. Almost 92 % of card payments were performed by debit cards. It seems that the Slovak payer is quite cautious, relying on its own funds while paying. However, the project of implementation of instant payments has the ambition to substitute not only cash payments, but also standard credit transfers and to some extent also card payments. Therefore, further structural changes in the payment market can be expected in the near future.

The second part of the paper analysed aspects of digitisation of the payment service market. A detailed look at the credit transfers showed that the majority of them (96 % in terms of number) are initiated electronically. At the same time, the increasing use of card payments initiated remotely and their relatively higher value compared to payments at physical EFTPOS confirms the overall tendency to the

digitisation of the payment services market in Slovakia. However, there is a lack of relevant composite indicators that would reflect the development of overall digitisation of the payment services market within the EU. This also forms an interesting challenge for financial policy authorities to initiate activities in this regard.

As part of our future research, we want to extend the analysis to more countries and also explore new payment methods, especially online payments, which are not covered by the database used for the purposes of this paper.

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The Impact of Digitalisation and Cyber Risks on the Banking Sector

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Abstract

The banking sector has been permanently changed by digitalisation, which transformed banks into more efficient, cost saving, and customer friendly organisations. But this process of transformation and evolution has brought a new threat to the attention of the risk officers, namely the cyber risks, which materialise through data breaches, phishing attacks, or malware. In order to mitigate the consequences, which can be severe, ranging from financial losses to reputational damage and loss of customer trust, it is essential that the banking sector has in place effective cyber risk management. This paper analyses the relationship between digitalisation and cyber threats in the banking industry, presents the challenges of managing these risks, and provides recommendations for banks to improve their risk management practices. The results suggest that banks should have in place integrated cyber risk management policies, with strategic pillars such as regular risk assessments, employee training, and the implementation of the latest security technologies.

Keywords: risk management, cyber risks, digitalisation, banks.

JEL Classification: G21, G32.

1. Introduction

The use of digital technologies has brought significant changes to the banking sector, leading to increased efficiency, cost savings, and improved customer experiences. However, these benefits have come with new risks, particularly in the form of cyber threats that can result in significant financial and reputational losses for banks. Cyber threats in the banking sector can come in different forms, including data breaches, phishing attacks, malware, and insider threats. These threats have

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become increasingly sophisticated, making it more challenging for banks to protect their systems and customer data.

2. Problem Statement

An area of research that has received considerable attention is the identification of cyber risks in the banking sector. Researchers have identified various forms of cyber threats that banks face, such as those mentioned above. Moreover, the frequency and severity of cyber threats have been increasing, leading to greater concerns about the ability of banks to protect their systems and customer data. For example, Adrian and Ferreira (2023) found that the number of cyber-attacks on banks has increased significantly in recent years, highlighting the need for banks to be more vigilant and proactive in managing cyber risks.

Another area of research that has received considerable attention is the impact of cyber risks on the banking sector. Cyber risks can have a significant impact on the financial performance and reputation of banks. For example, Nadeau (2021) found that data breaches can lead to a decline in the financial performance of banks, while Bouveret (2018) found that cyber-attacks can result in reputational damage and a loss of customer trust. These findings suggest that cyber risks can have significant consequences for banks, which makes it important for them to have a comprehensive risk management framework in place to manage these risks effectively.

In response to these risks, researchers have studied the best practices for managing cyber risks in the banking sector. These best practices include the development of a robust cybersecurity framework that includes regular risk assessments, employee training, incident response planning, and the implementation of the latest security technologies. For example, Etoom (2023) found that a proactive approach to cybersecurity, including regular risk assessments and employee training, can significantly reduce the impact of cyber risks on banks. Moreover, researchers have emphasised the importance of collaboration between banks, regulators, and other stakeholders to combat cyber threats effectively. For example, Fell et al. (2022) found that regulatory frameworks play a critical role in promoting cybersecurity practices in the banking sector.

Overall, the literature review highlights the importance of digitalisation and cyber risks in the banking sector and the need for banks to adopt a proactive approach to managing these risks. Cyber threats are a growing concern for banks, and their impact can be significant, leading to financial losses, reputational damage, and loss of customer trust. Therefore, banks must have a comprehensive risk management framework in place that includes regular risk assessments, employee training, and the latest security technologies. In addition, collaboration between banks, regulators, and other stakeholders is essential to effectively combat cyber threats.

The literature review also highlights the role of regulatory frameworks in managing cyber risks in the banking sector. Researchers have emphasised the need for regulators to develop clear guidelines and standards for banks to follow in managing cyber risks. These guidelines should be based on best practices and should

be regularly updated to keep up with the evolving threat landscape. Moreover, regulators should conduct regular assessments of banks' cybersecurity frameworks to ensure that they meet these standards.

For example, Crisanto and Prenio (2017) found that regulatory frameworks play a critical role in promoting cybersecurity practices in the banking sector. They argue that regulators should take a proactive approach to cybersecurity, including the development of clear guidelines, regular assessments, and the promotion of information sharing between banks. Similarly, Wilson et al. (2019) found that regulatory frameworks can incentivise banks to invest in cybersecurity by imposing penalties for non-compliance with cybersecurity standards.

In addition to regulatory frameworks, researchers have also emphasised the importance of information sharing between banks and other stakeholders in managing cyber risks. Information sharing can help banks identify potential threats and vulnerabilities more quickly and can facilitate a more coordinated response to cyber incidents. For example, Chamberlain (2018) found that information sharing between banks can help reduce the impact of cyber threats on the banking sector.

The literature review also highlights the role of emerging technologies in managing cyber risks in the banking sector. Researchers have identified various technologies that can help banks improve their cybersecurity frameworks, such as artificial intelligence, blockchain, and cloud computing. For example, Thisarani and Fernando (2021) found that artificial intelligence can help banks detect and respond to cyber threats more quickly and accurately.

Overall, the literature review highlights the multifaceted nature of managing cyber risks in the banking sector. It is not just about implementing the latest security technologies, but also about developing a comprehensive risk management framework that includes regulatory frameworks, information sharing, and collaboration between stakeholders. Moreover, the literature highlights the need for banks to keep up with emerging technologies that can help them improve their cybersecurity frameworks.

Finally, the literature review highlights the potential impact of cyber risks on financial stability. Researchers have noted that a large-scale cyber incident in the banking sector could have significant systemic implications, potentially leading to widespread financial disruption and instability (Kopp et al., 2017). Therefore, managing cyber risks in the banking sector is not just important for individual banks, but also for the stability of the financial system as a whole.

Moving forward, it is essential for banks to develop a comprehensive cybersecurity framework that addresses the unique challenges posed by digitalisation and cyber risks. This framework should include a range of measures, such as employee training and awareness programs, cyber insurance, and collaboration with regulators and other stakeholders.

In conclusion, digitalisation has brought about significant changes in the banking sector, presenting new opportunities for growth and innovation, but also new risks and challenges. Cybersecurity has emerged as a critical issue for banks, as they face an ever-evolving threat landscape that requires constant vigilance and adaptation. By

developing a comprehensive cybersecurity framework that incorporates the latest technological advances and regulatory best practices, banks can better manage their cyber risks and ensure the stability of the financial system as a whole.

3. Research Questions / Aims of the Research

The objective of the research is to explore the challenges faced by banks as they increasingly rely on digital technologies to provide services, and to identify ways to manage the risks associated with cyber threats. This research could provide valuable insights for policymakers, regulators, and practitioners in the banking sector, as well as for academic researchers who are interested in this field.

4. Research Methods

We conducted our research using the qualitative research method, and we started from relevant case studies with banks that faced cyber failures in recent years, trying to gain an in-depth understanding of the challenges they had to overcome and the best practices for managing cyber risks. We selected a sample of 4 internationally active banks that have experienced cyber threats, with effective cyber risk management practices implemented, and explored their experiences and perspectives.

5. Findings

5.1 Cyber Risks in Banking

Cyber risks have become a growing concern for the banking sector in recent years. With the increasing digitisation of banking services, the amount of sensitive information stored and transmitted digitally has also increased, making banks a prime target for cybercriminals.

One of the challenges in managing cyber risks in the banking sector is the constantly evolving nature of cyber threats. Cybercriminals are constantly developing new and more sophisticated methods to circumvent security measures, making it challenging for banks to keep up.

Banks may also consider partnering with cybersecurity firms or other technology experts to enhance their cybersecurity capabilities and stay up-to-date with the latest threats and countermeasures.

Cyber risks in banking refer to the potential threats and vulnerabilities faced by financial institutions in the digital age. These risks can range from cyber-attacks on bank infrastructure and networks to data breaches and theft of sensitive customer information. Cyber risks can have severe consequences for banks, including financial losses, reputational damage, and legal liabilities.

A study by Accenture found that the average cost of a cyber-attack for financial institutions is $18.5 million, being the highest of all industries (Accenture, 2019). These costs can include expenses related to recovery, investigation, legal fees, and fines imposed by regulatory authorities.

Moreover, the banking sector is particularly vulnerable to cyber risks due to the large amounts of valuable data and assets they manage. According to Al-Alawi and Al-Bassam (2020), in 2020, 26 % of financial institutions faced online attacks which materialised through losses of money.

To address these risks, banks are increasingly investing in cybersecurity measures, such as firewalls, intrusion detection systems, and encryption technologies. However, the effectiveness of these measures depends on the bank's ability to detect and respond to potential threats in real-time.

Another challenge in managing cyber risks in the banking sector is the rapid pace of technological change. Banks must continually adapt their cybersecurity measures to keep up with evolving threats and the introduction of new technologies. This requires ongoing investments in research and development, as well as partnerships with technology companies and cybersecurity experts.

In conclusion, cyber risks in the banking sector are a growing concern, and banks must remain vigilant in their efforts to manage these risks. Effective cybersecurity measures, comprehensive frameworks, and ongoing investments in technology and training are crucial to mitigating cyber risks and protecting the integrity and stability of the financial system.

5.2 Risk Management Framework for Cyber Risks

Effective risk management is crucial to managing cyber risks in the banking sector. A robust risk management framework can help banks identify, assess, and manage cyber risks, thus reducing the likelihood and impact of cyber incidents. The following sections provide an overview of the key components of a risk management framework for cyber risks in the banking sector.

5.3 Risk Identification

The first step in managing cyber risks is to identify and assess the risks. Banks need to understand the potential sources of cyber risks, including internal and external threats. Internal threats can include employee errors, system failures, and data breaches, while external threats can include cyber-attacks by hackers, malware, and social engineering. Banks should also consider the potential impact of cyber risks on their operations, reputation, and financial position.

5.4 Risk Assessment

Once the risks have been identified, banks need to assess the likelihood and potential impact of each risk. This assessment should take into account the bank's overall risk appetite and the potential consequences of a cyber-incident. Banks should also consider the effectiveness of their current cybersecurity measures and identify any gaps or vulnerabilities.

5.5 Risk Mitigation

Based on the risk assessment, banks should develop a risk mitigation plan that outlines the actions needed to reduce the likelihood and impact of cyber incidents. This plan should include a range of measures, such as technical controls, security policies and procedures, staff training and awareness, and incident response plans. Banks should also consider the need for cybersecurity insurance to mitigate the financial impact of cyber incidents.

5.6 Risk Monitoring

Effective risk management requires ongoing monitoring and assessment of cyber risks. Banks should establish a process to monitor cyber risks and the effectiveness of their risk mitigation measures. This process should include regular assessments of the bank's cybersecurity posture, vulnerability scanning and testing, and incident reporting and analysis.

5.7 Risk Reporting

Risk reporting is an important component of a risk management framework for cyber risks. Banks should establish a process for reporting cyber risks to senior management and the board of directors. This process should include regular reports on the bank's cybersecurity posture, incident reports and analysis, and recommendations for improving the bank's cybersecurity measures.

The banking sector faces significant cyber risks, and effective risk management is crucial to managing these risks. A robust risk management framework can help banks identify, assess, and manage cyber risks, thus reducing the likelihood and impact of cyber incidents. The components of a risk management framework for cyber risks in the banking sector include risk identification, risk assessment, risk mitigation, risk monitoring, and risk reporting. Banks that implement an effective risk management framework for cyber risks can better protect their operations, reputation, and financial position.

5.8 Regulatory Landscape

The increasing frequency and severity of cyber-attacks in the banking sector have prompted regulatory authorities to introduce new regulations and guidelines to manage cyber risks. The regulatory landscape for cyber risks in the banking sector is complex and rapidly evolving, with multiple regulatory bodies and guidelines across different jurisdictions.

In the United States, the Federal Financial Institutions Examination Council (FFIEC) provides guidelines for financial institutions to manage cyber risks. The FFIEC's Cybersecurity Assessment Tool (CAT) provides a framework for financial institutions to assess their cybersecurity risks and develop a comprehensive cybersecurity risk management program. Additionally, the New York State Department of Financial Services (NYDFS) introduced the first cybersecurity

regulation in the U.S. financial services industry in 2017, requiring financial institutions to establish and maintain a cybersecurity program.

In the European Union, the General Data Protection Regulation (GDPR) introduced in 2018 provides a framework for data protection and cybersecurity. Moreover, in 2019, the European Banking Authority (EBA) has issued guidelines on cyber risk management, stressing the need for a risk-based approach and regular testing and evaluation of cyber risk management processes,

In Asia, the Monetary Authority of Singapore (MAS) introduced the Technology Risk Management Guidelines in 2013, which provide a framework for financial institutions to manage technology risks, including cyber risks. The guidelines require financial institutions to establish a robust governance framework for technology risk management and to conduct regular risk assessments.

Overall, regulatory authorities have recognised the importance of managing cyber risks in the banking sector and have introduced guidelines and regulations to promote cybersecurity risk management. Financial institutions need to comply with these regulations and guidelines and implement robust cybersecurity risk management programs to mitigate the risks of cyber-attacks. Moreover, financial institutions need to ensure that their risk management frameworks are flexible and adaptable to address the rapidly evolving cyber threat landscape.

5.9 Case Studies

In recent years, there have been several high-profile cyber incidents in the banking sector, highlighting the need for effective cyber risk management in the industry.

1. JPMorgan Chase Data Breach (2014)

In 2014, JPMorgan Chase suffered a data breach that affected approximately 76 million households and 7 million small businesses. The breach compromised customer names, addresses, phone numbers, and email addresses, as well as internal data such as employee names and email addresses. The attackers were able to exploit vulnerabilities in JPMorgan Chase's network and gain access to sensitive data.

The cause of the breach was attributed to JPMorgan Chase's failure to patch known vulnerabilities in its systems. In response to the incident, the bank hired additional cybersecurity personnel and invested heavily in improving its cybersecurity defences, including implementing multi-factor authentication and increasing its use of encryption.

2. Bangladesh Bank Heist (2016)

In 2016, hackers stole $81 million from the Bangladesh Bank's account at the Federal Reserve Bank of New York. The attackers were able to gain access to the Bangladesh Bank's systems by stealing employee credentials and then using those credentials to initiate fraudulent transactions.

The cause of the breach was attributed to the Bangladesh Bank's lack of cybersecurity controls, including weak password policies and insufficient network segmentation. In response to the incident, the bank implemented new cybersecurity measures, including two-factor authentication and improved network segmentation.

3. Capital One Data Breach (2019)

In 2019, Capital One suffered a data breach that affected approximately 100 million customers and applicants in the United States and Canada. The breach compromised customer names, addresses, phone numbers, email addresses, dates of birth, and Social Security numbers. The attacker was able to exploit a misconfigured firewall in Capital One's cloud environment to gain access to sensitive data. The cause of the breach was attributed to a misconfiguration in Capital One's cloud environment, which allowed the attacker to gain access to sensitive data. In response to the incident, the bank increased its focus on cloud security, including implementing automated monitoring of misconfigurations and improving its access management processes.

4. Equifax (2017)

In 2017, Equifax, one of the largest credit reporting agencies in the United States, experienced a data breach that affected approximately 143 million customers. The attackers were able to gain access to sensitive customer information, including Social Security numbers, birth dates, and addresses. The breach was attributed to several factors, including unpatched software vulnerabilities, weak passwords, and a lack of employee training. In response, Equifax implemented a number of measures, including upgrading its security systems, enhancing its employee training programs, and increasing its cybersecurity budget.

These case studies illustrate the significant impact of cyber incidents in the banking sector and the importance of effective cybersecurity measures. In each case, the cause of the breach was attributed to specific vulnerabilities or failures in cybersecurity controls, highlighting the need for ongoing risk management and continuous improvement of cybersecurity defences. Additionally, the response measures implemented by each bank demonstrate the importance of investing in cybersecurity measures and taking proactive steps to address vulnerabilities and improve defences.

6. Conclusions

Based on the above analysis, there are several clear recommendations that banks should consider when dealing with cyber risks. These recommendations are summarised in the following matrix:

Table 1. Recommendations for the effective management of cyber risks

Recommendation	Description
Conduct a Risk Assessment	Banks should conduct a comprehensive risk assessment to identify and prioritise their cyber risks. This assessment should include a review of the bank's IT infrastructure, systems, and data, as well as an analysis of potential threats and vulnerabilities.
Develop a Cybersecurity Strategy	Based on the risk assessment, banks should develop a comprehensive cybersecurity strategy that includes policies, procedures, and controls to mitigate identified risks. The strategy should also include measures to monitor and respond to cyber incidents.

Recommendation	Description
Implement Security Controls	Banks should implement security controls to protect their IT infrastructure and data. These controls should include measures such as firewalls, intrusion detection systems, and access controls.
Conduct Employee Training	Banks should provide regular training to employees to raise awareness of cyber risks and provide guidance on how to identify and respond to potential threats. Training should include measures such as phishing simulations and scenario-based training.
Consider Cyber Insurance	Banks should consider purchasing cyber insurance to mitigate the financial impact of cyber incidents. Cyber insurance can provide coverage for losses resulting from cyber events and can be an essential component of a comprehensive cybersecurity framework.
Stay Up-to-Date on Regulations	Banks should stay up-to-date on the regulatory landscape related to cybersecurity. This includes monitoring changes in regulations and guidelines, as well as collaborating with regulators to ensure compliance.
Engage in Information Sharing	Banks should engage in information sharing with other banks, government agencies, and industry groups to stay informed about emerging threats and best practices. This information sharing can help banks to proactively identify and mitigate potential risks.

Source: Authors` contribution.

Overall, banks should take a proactive and comprehensive approach to managing cyber risks. By conducting risk assessments, developing cybersecurity strategies, implementing security controls, providing employee training, considering cyber insurance, staying up-to-date on regulations, and engaging in information sharing, banks can effectively mitigate cyber risks and protect their customers' data and financial assets.

The impact of digitalisation and cyber risks on the banking sector is significant, with the potential for financial losses, operational disruption, and reputational damage. However, banks can mitigate these risks by adopting a proactive approach to cybersecurity, including regular risk assessments, employee training, and the implementation of the latest security technologies. It is also critical for banks to work closely with regulators and other stakeholders to stay informed about the latest threats and to share information to combat cybercrime. By taking a proactive approach, banks can better protect themselves and their customers from cyber risks in the digital age.

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What do Capital Markets Prefer: Left or Right?

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Abstract

The aim of this paper is to examine the impact of government political orientation on capital market performance on the European Union stock markets. We investigate whether capital markets have a preference for the left-wing parties over the right-wing or vice versa. Within the study, two data panel models with fixed and random effects have been implemented (one multivariate and one single variate) with an additional dynamic panel model using the Arellano-Bover estimator on an annual dataset. We used three different data panels, in order to highlight any significance or correlation that might have otherwise been lost in case the model would have been run only on one group of countries. The data spanned from 1995 to 2020 and the panels are: the European Union, the Central and Eastern Europe countries, and the Advanced Economies in Europe. Several regressions have been employed using political, financial, and economic variables to test the main hypothesis, namely, if the financial markets react to the orientation of the government in place. We found an overall significant influence of government's political partisanship on market returns in the case of the European Union and in the case of countries included in the CEE classification, for most of the performed models. The markets in these countries do have a preference for left-wing regimes with a difference in the market performance which varies in between 4.6 % and 8.4 %, depending on the econometric model of reference. However, for Advanced Economies there was no robust evidence to sustain the hypothesis. Furthermore, other variables such as GDP per capita, Market Capitalisation, and Financial Crisis turned out to be statistically relevant. The contribution of this paper to the academic literature consists of a longer, scrutinised time period as well as new divisions of countries that had not been analysed, in tandem before.

Keywords: Stock Market Returns, Political Partisanship, Multivariate and Dynamic Econometric models, European Union.

JEL Classification: E44, G1, G4, C23.

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1. Introduction

The influence of politics on financial markets is multi-faceted (Brooks, Mosley, 2008). Politics affects financial institutions, legislation, tax rates, corruption, and monetary policy. Political risk, which refers to unfavourable changes in public policy impacting investments, is a crucial factor linking investor behaviour and politics. Elections provide an opportunity to examine the relationship between politics and finance as political news intensifies during this period. The academic literature explores various aspects of this link, including election periods, political cycles, and government composition.

Investors closely monitor political developments, and the effects of elections on stock markets have been extensively studied (Frot and Santiso, 2010). Research suggests that left-wing political victories often lead to decreases in stock valuation, while right-wing regimes tend to increase stock values. This pattern has been observed in historical events. Stock prices reflect market participants' expectations about a company's future performance, which is influenced by government policies such as taxation and labour regulations. The public's perception and expectations of political parties play a role in shaping market reactions. Right-wing parties are associated with consistency and limited policy variation, appealing to the business community seeking steady and predictable economic policies (Bechtel, 2009). In contrast, left-wing governments can reverse market-friendly policies for political gain. However, studies have also found no statistically significant difference in market performance between left-wing and right-wing executives across various global markets Bialkowski, Gottschalk and Wisniewski (2006).

Another dimension of the politico-economic link is the concept of political cycles. Studies have shown that stock returns in the United States follow a four-year cycle, with values declining during the first half of a presidency and rising during the second half (Gärtner, Wellershoff, 1995). These patterns have persisted regardless of the political affiliation of the administration. The composition of the governance body itself can also impact financial markets (Bawn and Rosenbluth, 2006). The policy pursued by a coalition government can vary based on whether a legislative majority is formed before or after elections. Multi-coalition governments may be perceived as less efficient in policy-making, potentially leading to negative market reactions.

Overall, there is a clear need for further academic research to fully understand the complex relationship between politics and financial markets. The paper aims to contribute to this understanding by employing econometric models and analysing datasets from European Union countries, specifically focusing on the Central and Eastern European (CEE) countries and Advanced European Economies. The study's objectives include developing a comprehensive framework, incorporating multiple independent variables that have shown statistical significance in previous studies, and examining the correlation between governments' political orientation and market returns within the specified data framework.

2. Literature Review

The effects of government partisanship on capital market returns have been extensively studied by various researchers such as Bialkowski, Gottschalk and Wisniewski (2006); Gärtner and Wellershoff (1995), Riley and Luksetich (1980), Watson and Blinder (2015), etc. However, there is still no consensus on the impact of political orientation on stock market performance. Several studies suggest that stock returns are higher under Republican regimes, supporting the traditional belief on Wall Street that right-wing governments tend to increase market returns (Riley and Luksetich, 1980). This view is based on the idea that Republicans pursue policies aimed at achieving long-term economic objectives, as highlighted by MacRae (1977). However, other studies indicate that stock market returns are higher during Democratic mandates, suggesting that left-wing parties have a better capacity to stimulate the economy in ways that benefit stock returns and income growth. These conflicting findings reflect the complexity of the issue and the different perspectives from which it can be analysed.

Studies such as Leblang and Mukherjee (2005) find partisan patterns in the US and the UK economies, with dividend yields and personal income from stock returns growing during election years when the market anticipates right-wing parties winning elections. This implies that right-wing parties have a better ability to prime the economy in ways that benefit stock returns and income growth. However, the same studies also suggest that stock market participants are concerned that left-wing parties might prioritise redistribution and welfare programs, which could negatively affect stock values.

Contrary to these findings, other studies, such as Santa-Clara and Valkanov (2003), Cahan and Potrafke (2021), found that financial market returns are higher during Democratic mandates. They observed that real market returns are higher under Democrats by more than 5 %, indicating a significant performance gap between Democratic and Republican administrations.

There are also studies that do not find statistically significant differences in stock market performance between Democratic and Republican presidential regimes. Johnson, Chittenden, and Jensen (1999) found mixed evidence, with large-capitalisation stock indexes performing better under Democratic governments and small capitalisation equities outperforming during Democratic governments but with insignificant differences. They also found that the debt market performs better during Republican governments. Similar findings have been reported for European markets, with Stoian and Tatu-Cornea (2015) finding that financial markets' performance is higher under right-wing administrations in advanced EU countries but not in Central and Eastern European countries.

Moreover, studies examining the correlation between stock market returns and the political orientation of the administration in place have yielded inconsistent results. Some studies, such as those by Bialkowski, Gottschalk, and Wisniewski (2006), found no statistically significant variations in stock market performance between left-wing and right-wing governments in OECD countries. Similarly, Pardo

and Furió (2010) found no systematic differences in excess returns during right-wing or non-right-wing governments in the Spanish stock market.

The lack of consensus in these studies can be attributed to various factors, including the complexity of the relationship between government policies and stock market performance, the specific context of each country and market, the different methodologies employed, and potential endogeneity issues.

While many studies have attempted to establish a clear relationship between government partisanship and stock market returns, it is evident that there is no uniform agreement across markets and countries. However, it is worth noting that several studies (Beyer, Jensen, Johnson, 2008; Johnson, Chittenden, Jensen, 1999; etc.) indicate that right-wing administrations are generally perceived better by investors and businesses, and they are correlated with superior market performance. This preference for right-wing governments may stem from their perceived encouragement of policies favouring investors and financial markets.

Different perspectives and approaches have been taken in studying this topic. For instance, Pastor and Veronesi (2017) found a direct relationship between voter preferences and risk aversion, showing that less risk-averse individuals tend to vote for Republicans, while more risk-averse individuals lean towards Democrats. Kaustia and Torstila (2010) explored the idea that investors' preferences for assets align with their preferences for consumption goods, which could explain various phenomena related to the relationship between government partisanship and stock market returns. Their study suggested that investors with preferences for luxury consumption goods tend to favor Republican administrations, which could contribute to the observed market performance during Republican regimes.

It is important to note that the relationship between government partisanship and stock market returns is complex and multifaceted (Brooks, Mosley, 2008). Stock market performance is influenced by a wide range of factors, including macroeconomic conditions, monetary policies, corporate earnings, geopolitical events, and investor sentiment. Although government policies can have an impact on these factors, they are not the sole determinant of stock market performance.

Furthermore, the stock market is a forward-looking mechanism that incorporates a multitude of information and expectations about future economic conditions. It reacts to a variety of factors beyond political orientations, such as technological advancements, industry trends, global economic developments, and market dynamics.

Therefore, it is challenging to establish a definitive causal relationship between government partisanship and stock market returns. The available studies provide insights into potential correlations and patterns, but do not offer conclusive evidence. Investors and analysts should consider a broader range of economic and market indicators when assessing stock market performance and making investment decisions.

In summary, while some studies suggest that stock market returns may exhibit variations based on the political orientation of the government in power, the relationship is not consistent across all studies and markets. The impact of

government partisanship on stock market performance is influenced by numerous factors, and the stock market is driven by a multitude of complex forces. It is important for investors to consider a comprehensive range of factors when evaluating market trends and making investment choices.

3. Methodology and Dataset

As a starting point, the ground for this research has been established based on the aforementioned existing research. Specifically, after reviewing the work of previous authors, we have composed a methodological setup that includes different types of variables that had already been used in experiments and that turned out to be statistically significant. Furthermore, two econometric models will be run on the collected data, the first one consisting of a linear regression model with fixed and random effects (controlling for pseudoreplication) and the second one being a dynamic panel regression with one lag. Further down below follows a descriptive section in relation with the data and data sources, time interval, and number of observations, categories and subdivisions that make up the 3 analysed panels, variables included in the model, as well as details about how the final observations were obtained (or computed, if it is the case). Then, an in-depth explanatory part will ensue as background for the developed econometric models and for the accuracy and robustness tests that have been performed.

The data was collected from a number of trustworthy sources such as World Bank Database, Bloomberg, etc. For each specific variable comprising the model, the origins of the data will be mentioned within the variable's description (further below in this chapter). All observations have an annual frequency. The studied time interval spans from the start of 1995 until the end of 2020 for a total number of years of 26.

As for the grouping process of countries, there will be 3 subdivisions on which the experiment will be conducted. The first of them consists of 24 countries from the European Union. The second category comprises the countries of the Central and Eastern Europe (CEE) group, as defined by the OECD and the scholarly literature. *"Central and Eastern European Countries (CEECs) is an OECD term for the group of countries that includes Albania, Bulgaria, Croatia, the Czech Republic, Hungary, Poland, Romania, the Slovak Republic, Slovenia, and the three Baltic States: Estonia, Latvia, and Lithuania,"* according to the Directorate of the Organisation for Economic Cooperation and Development. However, because Albania is not a part of the European Union, it will be excluded from the dataset. In addition, Estonia, Latvia, and Lithuania have also been excluded from the dataset due to lack of reporting on the required variables (no data reported for multiple variables from 2010-2012 until 2020). The last subdivision of countries only includes the Advanced European Economies. This sub-panel is formed by subtracting the second category from the first, the final composition being the following 16 countries: Germany, France, Italy, Spain, Portugal, The Netherlands, Malta, Greece, Denmark, Finland, Luxembourg, Sweden, Ireland, Austria, Belgium, Cyprus. Summing up, after the aforementioned exceptions, the first category will include 24 countries, the second will contain 8 and the third will comprise 16 countries.

The variables (along with the method of computation and other relevant details) that have been used in the econometric models are described below:

1. The Market Return, denoted in the dataset with *"return"* is the dependent variable of this study and is measured annually as the percentage change of the end-year price. Main market indices of the analysed countries were used as a proxy for this variable. Data was collected from Bloomberg.
2. Political Orientation, denoted in the dataset with *"party"* is the explanatory variable of interest and is a dummy variable representing the political orientation of the government in place. To establish the political orientation, the government of each country within the analysed dataset, throughout the entirety of the 26-year period, was carefully assigned a value as follows: 1 means a centre-right to far right government, whereas 0 signifies a centre-left to far left administration, representing the political affiliation of the government in office. The data was collected from Wikipedia. Moving from election to election, for every country within the analysed period, each year was assigned the political orientation of the winning administration with the binary method described above. It is important to notice is the fact that, when the elections were organised in the middle of a year, the orientation of the government that has spent the most time in office was assigned for that entire year.
3. Logarithm of the Gross Domestic Product per capita, denoted in the dataset with *"lngdp"* is an independent control variable with the purpose of giving context to the overall model and it represents the gross domestic product per inhabitant for each year within the time interval and of each country. Specifically, it captures the average standard of living in one's country. Furthermore, for data consistency reasons, the logarithm function was applied to the raw GDP data, as it was the only variable which was not expressed in percentage points, but rather in US dollars per capita. Data was collected from Bloomberg. Raw data was collected from the World Bank data library.
4. Market Capitalisation as percentage of GDP, denoted in the dataset with "cap" is an independent control variable with the purpose of giving context to the overall model that measures the total value of the capital market within one's country, signifying the level of development of these markets. For listed domestic corporations, market capitalisation (also known as market value) represents the share price multiplied by the number of outstanding shares (including their various classes). Investment funds, unit trusts, and businesses whose sole purpose is to hold shares of other publicly traded firms are not included. End-of-year values have been converted to US dollars using year-end foreign exchange rates, and the overall sum was then reported to the yearly GDP. Data was collected from The Global Economy.
5. Interest-Rate Spread, denoted in the dataset with *"irspread"* is an independent control variable which measures the business cycle within the economy. It is computed by subtracting the short term interest rate from the long term one. According to authors such as Estrella and Mishkin (1996) and Rudebusch and Williams (2008), this indicator can accurately predict recessions, as well as other

macroeconomic periods. According to their findings, the term spread is clearly lower in the years leading up to an economic crisis, both in the general sample and in the case of the United States. Thus, this variable should provide validity to the overall model. Raw data was collected from AMECO.

6. Financial Crisis, denoted in the dataset with *"fincrisis"* is an independent dummy control variable whose only purpose is to give context to the econometric model. It signifies the presence of a major financial crisis. Being a binary variable, each year within the time interval was assigned a value as follows: 1 for the existence of a major financial crisis and 0 for the absence of a major financial crisis. Excluding the European Sovereign Debt Crisis because it had limited effects and only affected some of the analysed states (and thus it could create outliers), during the interval period of interest, the only 2 major recessions that are captured by this variable are the 2007-2008 global financial crisis and the start of the pandemic in 2020,

Moving further, we will now start the experiment itself with 2 univariate regression models with the purpose of analysing the direct effect of the government's political orientation onto the market return. The dependent variable is the market return, denoted in the data set by "return" while the independent variable is the political orientation, under the notation "party". Eq. 1 describes this model:

$$return = \alpha + \beta \times party + c \text{ (equation 1)}$$

After the first univariate equations were run on all 3 panels and the results were obtained, we continued with another set of regressions. This time, 4 additional control variables were included in the model with the purpose of giving context and relevance to it. The extra variables (that had already been defined in this section) are: Gross Domestic Product per capita, Market Capitalisation, Interest-Rate Spread, and Financial Crisis. The model is described by eq. 2:

$$return = \alpha + \beta \times party + \chi \times lngdp + \delta \times cap + \varepsilon \times irspread + \varphi \times fincrisis + c \text{ (equation 2)}$$

Much like in the case of the univariate models, the multivariate ones will also be estimated using both fixed and random effects. The reasoning for using both type of estimators throughout the entirety of the study is based on the work of Clarke, Crawford, Steele and Vignoles (2010). In their paper, not only do they prove the importance of using at least one of these indicators while running econometric models, but they also highlight the gravity of choosing the right method for the right situation. The authors of the 2010 study concluded their paper with the following guiding affirmation: *"if rich data are available, then random effects models have qualities very close to those of fixed effects models, and allow researchers to address a wider range of research questions".* However, because "rich data" is a vague term and not wanting to compromise a thing or let anything to chance, the final judgment

when it comes to the methodology regarding those effects was to run all econometric models with both random and fixed indicators and present the results in parallel.

Lastly, a dynamic model will be employed, based on Equation 2. This will help the experiment by incorporating into the model the econometric consideration of time and the variable "return" with 1 lag. The scope of this is to find out whether or not past returns influence future price performance.

These 5 final econometric models (2 single variate, 2 multivariate and a dynamic one) have been run for each panel of countries mentioned above (EU, CEE and AE). Testing the same models on multiple subdivisions, as highlighted by researchers such as Jeffrey M. Wooldridge (2001) in his very comprehensive econometrics book, has various advantages: First, within the whole population (the entire dataset), for the variable of interest – the market return or "return" – there can be outliers or abnormalities (which are especially hard to exclude from the dataset, in this case, because one can hardly define what an outlier looks like). Specifically, in this case there are countries that during the entirety of the analysed time interval have only been governed by a single party or by parties belonging to only one political side (see Belgium, Luxembourg, Finland, etc.). Thus, a problem arises: there can be no comparison as one of the 2 sides are not well represented in the dataset, rendering the variable "party" (and thus, the whole experiment) useless. Using multiple subdivisions of the global category could reduce the unwanted impact of these abnormalities. Secondly, in the case of the parties that follow a big tent ideology or in the case of a large coalition struck by making big compromises (a minority left party obtaining majority by offering in exchange some important cabinet seats to a right party), how should one categorise these governments? Either way, even if most of the cabinets are led by the right or the left, there is no unanimity, thus market return (or prosperity, in more general terms) cannot be 100 % attributed to neither left-wing nor right-wing political making. The detrimental effects of this problem can also be diminished by running the same equations on multiple subsets and seeing if there are any differences in results.

4. Results and Discussion

For the European Union Category, in both univariate models, the explanatory variable ("party") is holding statistical significance to the 10 % significance level. An economic interpretation is that, if the government has a right-wing orientation, the market return will be approx. 4.45 % lower (as there is an inverse proportion relationship) in the case of the random effects model and -4.71 % lower for the fixed effects model. These results are robust. Moreover, the constant is also statistically relevant at the 1 % significance level. A possible economic interpretation, in this particular case, might be: when all other variables are 0, the market yields 9.78 % (and 9.94 %, respectively). This value seems plausible as the 10 % per annum (not adjusted for inflation) is a generally accepted comparison benchmark within the literature, according to the article published by Dana Anspach (2022), which analyses the average historical market returns from 1980 to 2021. However, as The Analysis Factor (2020) broadly explained, unless all factors from a regressions can

be equal to 0, there can be no economic interpretation of the constant. "lngdp" and "cap" cannot be equal to 0, otherwise there would be no point in performing the experiment anymore. Tables containing the results, as well as the database, can be viewed upon request.

In the case of multivariate models, the explanatory variable fails to keep its significance, resulting in no correlation between government's orientation and market returns. However, other independent variables became relevant. "lngdp", in the case of the multivariate model with random effects, is statistically accurate – resulting in the following interpretation: for each 1 % increase in GDP per capita, the market return drops by 5.45 %. Counterintuitive as it might appear at first glance, it is not always the case. As MSCI Barra (2010) very well highlighted, this assumption does not always hold in practice and does vary greatly depending on the starting and ending point of the analysed period (even if the difference is only 1 year). The study finds a negative correlation between GDP and equity returns on data from 1958 to 2008 for eight developed markets, much like in my case. The authors also pointed out that in the literature, this assumption has been debunked over and over again. Moreover, these findings have also been replicated independently, this time on the European markets, by Stoian and Tatu-Cornea (2015). Similarly to findings within this study, the authors found a strong inverse relationship (statistically relevant to the 1 % significance level) between GDP per capita and market returns in the case of global samples (20 European countries) as well as in the case of CEE countries.

Moving onto the variables "cap" and "fincrisis", both hold significance in the multivariate models at the significance level of 1 %. In the case of market capitalisation, for every 1 % increase in total valuation, the market return will also increase by 0.13 %, in the case of the model including random effects (and 0.25 % for the one with fixed effects). "fincrisis" which represents a dummy variable signifying the occurrence of a crisis, the interpretation is the following: during the financial crisis, the annual market return will be 23 % lower (23.15 % respectively) than how it would normally be, if a crisis does not exist. The constant also kept its relevance at 1 % significance level. "irspread" is the only variable which did not hold any statistical significance for any of the models performed.

The results for the dynamic Arellano-Bover model with 1 lag were obtained. All variables turned out to be statistically relevant, except for the "irspread", which measures the business cycles. The explanatory variable of interest "party" became relevant at 5 % significance level (compared to only 10 % for the first 2 single variate models and to no relevance for the multivariate ones). It seems that, in this particular case, constructing a dynamic model might be better fit for the study's purposes. The direction of the relationship (negative) stayed the same but the coefficient doubled. Now, if the government is of right-win, the annual market return will lower by approx. 8.47 % (compared to a situation where the government is left-wing). GDP per capita ("lngdp") is again relevant at the 5 % significance level but now for a 1 % increase in GDP per capita, the market decreases by 8.2 %. Market capitalisation ("cap") and the dummy variable representing financial crisis ("fincrisis") also stay

statistically significant at 1 % level and have a slight increase in numerical values (0.33 % from 0.25 % and from -23 % to -22 % respectively) when compared to the multivariate regression models. The variable with 1 lag ("return L1") also holds statistical relevance to the 1 % significance level, meaning that, if in the past year, the market return has been up (down) with 1 %, then the predicted return for the current year will also increase (decrease) by 0.28 %. These results stay consistent throughtout the the analysis of the CEE countries data panel. However, for the Advanced Economies data panel, only one out of 5 econometric models keeps it statistical significance (univariate model with fixed effects).

Finally, as all regressions have been performed for every dataset, we aggregate the results into a brief chapter-ending summary:

1. Throughout the whole experiment, the explanatory variable of interest "party" has fluctuated in significance – its influence is more pronounced in the sample data for the EU panel (remaining significant at 10 % for the single variate models and at 5 % for the dynamic model). Moreover, the direction of the relationship is the same for all examined samples: negative. We will conclude that there is sufficient evidence to support the existence of the capital market's preferences for left-wing regimes across the European Union as well as for the CEE countries.
2. GDP per capita has had a negative relationship with the dependent variable (market return) in all data panels. However unusual this might be, there is a rich body of literature that has had the same results. MSCI Barra (2010), Stoian and Tatu-Cornea (2015), Pastor and Veronesi (2017) are just some of the authors who obtained the similar results.
3. For all analysed datasets, the constant stayed statistically significant at 1 % confidence level (with minor exceptions), although no economic interpretation can be attributed to it with 100 % certainty, as the model is not properly defined so as the constant can convey proper economic justification, according to the guidelines put in place by The Analysis Factor (2020).
4. The independent variables with the highest relevance – at 1 % confidence interval over the entirety of the experiment across all datasets – are the "cap" and "fincrisis". Conclusively, these 2 variables influence the market return the most. As rough estimates, in case of a major crisis, one should expect the market to take a hit of 20-30 % in the years while the crisis lasts, whereas, in the case of market capitalisation, if it rises by 1%, one should expect the market return to also rise with 0.1 % - 1 %.
5. The number of observations were 624 for the European Union category, 208 in the case of CEE countries and 416 for the Advanced Countries. According to Hun Myoung Park (2011) and to The Analysis Factor (2020), a benchmark for a reliable number regarding the observation within one dataset is around 200. This criterion is well accomplished in this study, thus the data experimented upon should have been reliable and sufficient to capture any correlation.
6. "lrspread" – the variable measuring the business cycle had no statistical relevance whatsoever. Although studies such as Stoian and Tatu-Cornea (2015) have found it to be relevant, differentiation of raw data sources can be the reason for this.

7. "return L1" – measuring the influence of past returns on current performance stays statistically relevance throughout the whole experiment at 1% significance level. We can conclude that, in this case, past performance was a reliable indicator of future returns, on average.

5. Concluding Remarks and Recommendations

The purpose of this study was to find out whether or not there is a statistically significant correlation between the orientation of the government in charge and the equity market returns. The results for the EU and CEE panels are indicating a strong to mild correlation between the dependent and the independent variables, whereas the results for the AE panel are inconclusive. Capital markets have a preference for left-wing regimes, with a difference of returns of around 4-5 % for the single variate models to around 8-9 % for the dynamic one, in the case of the first panel (the EU). This implies that if there is a ruling left-wing government in power, markets will perform better by about 4-5 % annualised return (~8-9 % respectively) when compared to a right-oriented government. In the case of the CEE countries, the differences are even bigger: ~6 % for the multivariate model with random effects and approx. 12 % in the case of the dynamic panel model. These conclusions reinforce the work of Camyar and Ulupinar (2013), Mark Watson and Alan Blinder (2015), Santa-Clara and Valkanov (2003), and others, which arrived at similar findings across samples from Europe and US.

A possible justification of such results might consist of the fact that, unlike in the USA or other countries/regions of the globe), especially in the case of the European Union, there are different layers of agreements within the EU. To name a few, there is the monetary union (the euro-zone) - formed by countries only using the Euro, then there is the Schengen Area which facilitates free individual movement, etc. Taking on a more nationalist/conservative approach (which is what right-wing governments usually do) could impeach the free movement of capital or scare away the inflow of capital from the union, having a detrimental effect on the overall economy and resulting in lower market returns. It is commonly known that European integration and Far-Right parties do not work well together, and although there is no specific study that studied this hypothesis (none that we could find), the issue is still up in the air. For example: the recent cases of Poland and especially Hungary, which led them to lose European funding, as reported by the BBC (16 February, 2022). Further research is needed on this topic to discover whether or not European cointegration has indeed an impact on financial markets and GDP of one's country.

Our experiment also uncovered a strong negative correlation between GDP per capita and market returns across all samples, which translates into economic terms as follows: if GDP per capita (often represented as the living conditions) rises by 1 %, one can expect a drop in market returns by about 4 to 12 %, depending on the dataset and model used as reference. Although unusual, there is a rich body of literature which has had the same results. MSCI Barra (2010) using data from global samples (across multiple markets and continents), Stoian and Tatu-Cornea (2015)

with data from European markets, Pastor and Veronesi (2017) with data from the US markets, are just some of the authors whom I've reviewed and that got indistinguishable results. Further research is required to draw a definitive conclusion on this issue.

Lastly, independent variables of great statistical relevance turned out to be the market capitalisation and the financial crisis. As a reasonable estimate, in the event of a significant crisis, one should anticipate the market to lose 20-30 % of its value during the years the crisis lasts. Moreover, if market capitalisation grows by 1 %, one should expect the market return to climb by 0.1 % to 1 %. These results were consistent across all datasets and for all practiced models, at the 1 % significance threshold.

Recommendations for future researchers: first of all, when collecting data using a binary method (as it was executed within this paper), the complexity of politics (consisting of coalition governments, governments of compromise or any other special situation that may occur, which in politics is actually very common, especially when the study is executed on a large data set as time interval and number of observations) is drastically reduced to only 2 variables which cannot fully encompass the reality as it is. As further research will be done on the topic, our recommendations are, regarding the methodology, that the authors will use a 4-point metric system, instead of a binary one. From 1 to 4: 1 signifying far-left, 2 for centre-left, 3 for centre-right and 4 for far-right, thus managing to gather more of the subtle tones that politics often imply. However, even with a more enveloping system as the one that we mentioned, our educated belief is that there will still be a lot of relevancy left out of the study as there are some situations that are very hard to fit into preset categories. What if there exist political parties which are very hard to categorise as left or right. One good example to illustrate this point is Luxembourg's Christian Social People's Party, which possesses left-leaning views on topics such as ethics, welfare, culture, traditions, etc., but seldom acts as a left party when talking about economic issues, acting in such cases more as a right-wing party.

Secondly, a larger time interval should be used by researchers that approach this topic in order for the experiment to have both sides of the political spectrum well represented. As mentioned earlier, should either left or right govern throughout the entirety of the analysed period, the experiment will become less relevant. To avoid these, opting for the enlargement of the studied time interval, if data is available for all variables, could be a solution.

Finally, future studies should take into account the existence of political cycles in order to design an experiment with one variable that accounts for such a hypothesis. The academic literature also points towards a strong correlation between market returns and political cycles: Using the Bartels' Test on 624 monthly stock prices observations (from January 1926 to December 1977), divided into cycles of 24 and 48 months, Herbst and Slinkman (1984) found *"strong support for a four-year political-economic cycle, but no support for a two-year stock market cycle that is politically induced"*.

Regarding recommendations for the methodology of this study, we strongly advise future researchers to consider using dynamic models with one or two lags, as the results within this study confirm that that type of model is better suited for this kind of topic, as the nature of returns imply computation based on past results, and this significance might be lost or not well captured by a stationary model.

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What Role Does Sustainable Finance Play in Achieving Sustainable Development Goals?

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Abstract

Moving to a circular economy with low carbon emissions is the main recommendation for saving our planet. The most influential call to action for ending poverty and saving the planet had been adopted by United Nations in 2015, known as Sustainable Development Goals (SDGs). Sustainable finance represents one of the most notable trends in recent years, shifting from caring about achieving short-term profit to creating long-term value. It needs more effort to manage all resources toward achieving sustainable outcomes by taking into account environmental, social, and governance aspects when making investment decisions. The main purpose of the study is to analyse the role of sustainable finance in achieving the Sustainable Development Goals by providing an overview of the diverse acceptations, in broader or narrower scope, as retrieved by the scientific literature, financial intermediaries, and international bodies in the field of sustainable finance. The paper comprehensively synthesises the taxonomy of sustainable finance activities by outlining their dynamic, continuously evolving nature. It is examined, through in-depth desk research, the potential role sustainable finance may play in achieving Sustainable Development Goals and climate neutrality, in order to answer the main research question. Using finance as a tool to achieve social, economic, or environmental sustainability is an attractive issue for many researchers, but most of the studies focused only on studying the effect of sustainable finance on one of the Sustainable Development Goals. Consequently, the added value of this paper is of a theoretical and conceptual nature. The results suggest that the main role of sustainable finance is to support the move to a sustainable economy, which further contributes to the achievement of SDGs by acting as an effective tool in this transition to a green economy and promoting development in renewable and clean energy, while at the same time catalysing social and economic sustainability.

Keywords: sustainable finance; climate finance; impact finance; green finance; sustainable development goals.

JEL Classification: F65, Q56.

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1. Introduction

Historically, sustainability as a concept appeared in the financial and economic literature relying on the environmental interpretation launched during the United Nations Conferences in the 1970s and 1980s (Soppe, 2004).

The first article on sustainable finance was published by Ferris and Rykaczewski in 1986 and concerned the benefits of social investment in portfolio management (Kumar et al., 2022). Since then, sustainable finance has represented a challenging and continually evolving concept in the financial literature (Rambaud, Richard, 2016).

The way of thinking about sustainable finance has evolved over the years, passing through different stages, its main benefits ranging from focusing on achieving short-term profit to long-term value creation (Schoenmaker, 2019).

Previously, there were no environmental concerns embedded in the economic models because the natural resources were abundant, and the emissions of carbon were limited, therefore, the economic models and even the financial theory were concerned only with work and capital, without taking into consideration that these resources should be better managed, to overcome the environmental risks.

There is a need to transfer to an economy with low carbon emissions and more circular. Concerns about the impact of economic investments on the environment and social structure have been discussed for years through research like the relationship between finance and sustainability, which further gives rise to the Environmental, Social, and Corporate Governance (ESG) criteria in investment decision-making (Friede et al., 2015), and regarding the impact of investments on climate change and human rights.

To achieve sustainable outcomes, according to (Fatemi, Fooladi, 2013), we need to incorporate sustainable value into all practices and outcomes, by considering government and social problems and accounting for all benefits and costs. Furthermore, the finance market has recently shifted toward creating social and environmental impact, as well as financial return, despite the long history of supporting "social-economic" goals (Nicholls, 2021).

The shifting or transition represented terms used to describe the evolution from our traditional financial system to a financial system based on environmental and social responsibility (Ryszawska, 2016). According to the European Commission, transitional activities refer to a specific set of activities that aim to make significant contributions and support efforts to mitigate climate change. The main idea in transitional activities is not the nature of the activity or the sector, but how the activity is performed, in order for the activity or project to be qualified as low carbon or contribute to sustainability in climate change mitigation, and supporting the transition to a climate neutral economy in a direct way (Platform on Sustainable Finance, 2021).

International initiatives like the United Nations Sustainable Development Goals and the Paris Agreement on climate actions can provide decision makers, practitioners, and businesses with clear guidance on their projected investments (Sommer, 2020). The Sustainable Development Goals represented an international

call to save the planet and mankind, through joint action that protects people, ends poverty, protects our planet, and improves the quality of lives; In 2015, all UN members adopted 17 goals as part of the 2030 Agenda for Sustainable Development (United Nations, 2022).

The paper is structured as follows: Section two provides an overview of the various acceptations, in broader or narrower scope, as retrieved by the scientific literature, financial intermediaries, and international bodies in the field of sustainable finance. Section three synthesises the taxonomy of sustainable finance activities by describing their dynamic, continuously evolving nature. Section four examines, through an in-depth desk research, the potential role sustainable finance can play in achieving the Sustainable Development Goals (SDG) and climate neutrality. The last section concludes.

2. Sustainable Finance – Review of the Various Acceptances

Sustainable finance, according to the European Commission, considers ESG issues as the principal step when investment decisions have been taken in the financial sector, which will lead to more long-term investments in sustainable economic activities and projects, therefore supporting economic growth and reducing pressures on the environment, by additionally considering social and governance considerations.

Sustainable finance can play the main role in allocating financial resources and seek them in more sustainable fields, by looking at the interactions between finance and environmental, social, and governance issues, which will make the transition to a low carbon economy more rapid (Schoenmaker, Schramade, 2020). Complementary, Mahesh et al. (2022) defined it as a financial instrument that contributes to financial development through better financing for supporting economic growth, which leads to protecting the ecological system by fighting climate change and its effects (reducing and regulating carbon emissions, promoting finance for investments in renewable energy, etc.). Thus, it will lead to more achievements in terms of sustainable development towards saving our planet and its three basic elements: environment, society, and economy (Mahesh, Aithal, Sharma, et al., 2022).

Generally, traditional finance was looking for optimal financial returns with less risk to maximise shareholder value (Schoenmaker, 2019). In this acceptance, the financial sector is separated from society and the environment and is concerned only with generating high returns. On the contrary, sustainable finance cares about social and environmental factors in addition to financial returns (Schoenmaker, 2017).

According to Migliorelli (2021), sustainable finance represents a 'self-standing factor' in efforts to achieve a sustainable society, particularly in line with the Sustainable Development Goals and the Paris Agreement. Thus, to develop a workable definition of sustainable finance, we should make references to two main issues: 1) the identification of the effective and possible dimensions of sustainability and trying to include sustainability in the investment decisions, and 2) include the evaluation of contributions or the impact of each economic activity in the

achievement or progressing toward at least one of the sustainability dimensions. Therefore, sustainable finance is defined as a type of finance that supports activities and sectors that trigger effects or exert a contribution to the achievement or progress in at least one of the sustainability dimensions, such as the preservation of the environment and the fight against climate change (Migliorelli, 2021).

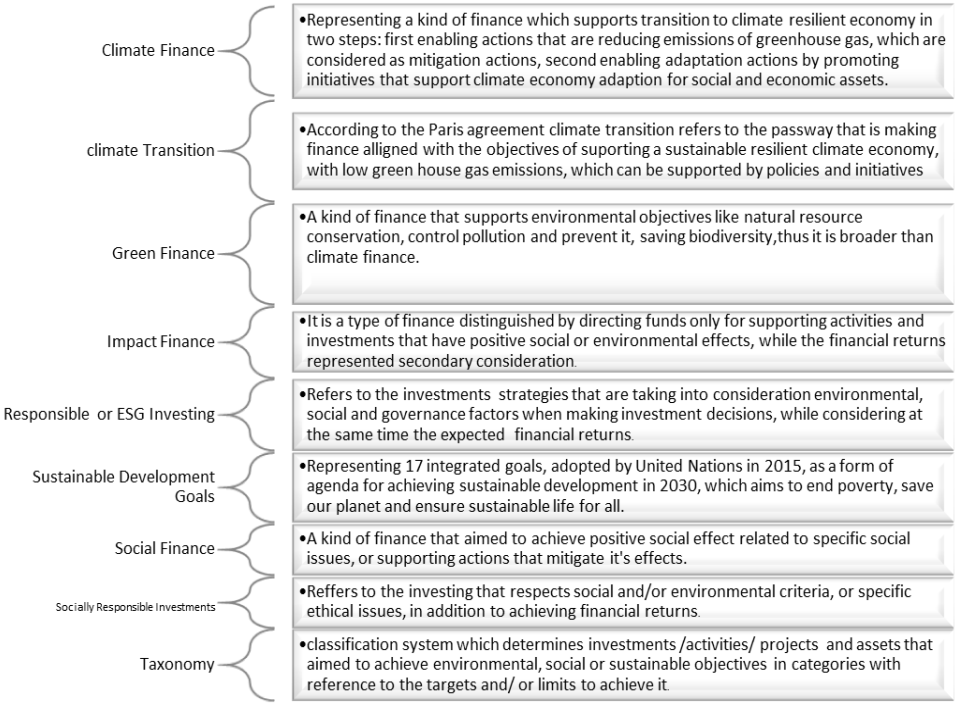
Today, sustainable finance represents a booming field in the development of the financial market, but is dominated by financial institutions that seek to achieve mainly profit (Urban, Wójcik, 2019), which represents an obstacle to the achievement of sustainable financial behaviour. Therefore, the sustainable finance market can be divided into negative sustainable finance and positive sustainable finance according to its impact on the three dominances of ESG; the investments can be scanned according to the material risk profile of it; if there is no harm, it is considered negative sustainable finance, but if there is a potentially significant positive effect on the environment or social dominations, often aligned with the Sustainable Development Goals; it can be classified as positive sustainable finance (Nicholls, 2021).

The World Economic Forum defined sustainable finance as a set of activities, starting from investors who invest their money only in green projects related to institutions that take into consideration social values or good governance, so each investment is dominated by ESG considerations, and investors will not have choices between profit or saving the planet, which represented priority; therefore, they will take into account ethical business standards and inclusion when they invest their money, thus leading to make our world better (World Economic Forum, 2022).

Increasing sustainable economic growth by supporting interactions between financial services and ESG criteria represents the main objectives of sustainable finance, which had been established by the European Banking Authority. In addition to increasing the awareness of financial participants about the need to mitigate ESG risks by implementing good management practices of these risks, taking into consideration the particular nature of these risks, the uncertainty about their valuation and pricing (EBA, 2022). In this sense, sustainable finance from the point of view of BBVA bank represents the ability of the financial institution to be a creative choice for investment, not only for its financial indicators, but also for ESG criteria, thus increasing its financial resources (BBVA, 2022).

The market of sustainable finance, which aimed to merge financial returns with creating environmental and social impacts, is distinguishable because it still employs confusing and poor inconsistent terminology (Nicholls, 2021). In the following (see Figure 1), a series of terms related to sustainable finance, defined by ICMA are synthesised, which may give us an overview about the coverage and depth of sustainable finance terminology used in practice.

Figure 1. Sustainable Finance Terminology



Source: Prepared by the author according to ICMA (2020b).

3. Typology of Sustainable Finance Activities

The sustainable financial system caused non-stability in the traditional financial system and opened the way to creating suitable innovations (Ryszawska, 2016). Today, the current international discourse on sustainability is focused on the environment, especially climate change. However, the concept of sustainable finance is wider, including Green Finance, as well as social and governance-related aspects (Sommer, 2020). Some strands of literature attempt to provide evidence on the causal relationship between green finance, clean energy, environmental responsibility, and green technology as different types of sustainable finance (Madaleno et al., 2022). Clean energy, green financing, development of green economy and green bonds represent *sustainable practices* that can be measured by the ESG pillars (Yang et al., 2022).

Although there are different kinds of sustainable financial products, services, and securities in the financial market, the guidelines that have been issued by international institutions (ICMA and European Commission, for instance) have shown just the main categories of it, and have merged the rest, such as *green bonds* and *social bonds* (Migliorelli, 2021).

To achieve the EU's objectives related to climate and energy, and reach the goals related to the European green deal in 2030; the European Commission issued an

EU taxonomy for sustainable finance that was published in the journal of the European Union in 2020, It is a cornerstone of the EU's sustainable finance framework (European Commission, 2022). It represents a valuable tool for achieving a green financial system, with the aim of translating the ambitious EU climate and environmental goals into clear criteria for economically green investments / projects or environmentally sustainable. According to the EU taxonomy, the *green economic activities criteria also* include a series of EU environmental *objectives*:

- generating a positive effect on climate change mitigation and adaptation;
- protection of the resources of water and making efforts for its sustainable use;
- control and prevention of pollution;
- protection and restoration of biodiversity and ecosystems.

The conditions that have to be achieved to classify an activity as an environmental one include:

- exerting a sustainable effect for at least one environmental objective;
- do not do any significant harm to any environmental objectives;
- complying with the social safeguards and technical criteria (European Commission, 2021).

In complementing the EU's initiative for a generally accepted taxonomy for sustainable finance, the International Capital Market Association (ICMA) has provided capital market participants with specific guidelines for issuing bonds (The Social Bond Principles – The Green Bond Principles). In the acceptance of ICMA, impact bonds may be classified into three main categories:

1. **green bonds**, representing any kind of bond instrument that provides finance or re-finance in part or full, related only to new or existing *green projects* (ICMA, 2022). These low-carbon investments and projects have impacts on climate change mitigation or adaptation, of natural resources, by saving biodiversity and reducing pollution (Madaleno et al., 2022). The main idea of green finance is to use the proceeds of green bonds exclusively for the further financing of green projects, which are evaluated according to the Principles of Green Bonds, which enumerate some of the green project categories (for instance, renewable energy, energy efficiency, pollution prevention and control, environmentally sustainable management of living natural resources, and land use, clean transportation, sustainable water, and wastewater management, climate change adaptation, circular economy adapted products, production technologies, and green building) (ICMA, 2022).

2. **social bonds,** which represent a type of security whose proceeds may be further used for providing financing toward new or existing social projects or investments like providing or/and promoting access to basic services, affordable basic infrastructure, programs designed to support the unemployed from social or economic crises, sustainable food system and food security, empowerment and social improvement (ICMA, 2020a).

3. **sustainable bonds,** which are a type of bond that mixes social and green projects (ICMA, 2020a).

The World Bank also works through its institutions for uncovering sustainable solutions; it has initiatives to support sustainable finance, such as the World Bank Long-Term Finance Group initiative represented by *The Global Program on Sustainability.* The main idea of the program is to encourage the use of high-quality data in making decisions by governments, financial institutions, and investors, which will promote analyses related to natural capital resources and environmental systems.

The second initiative from the World Bank is *The Sovereign ESG Data Portal*. The main outcome of this initiative is to provide investors and policymakers with the tools and information necessary to achieve the best understanding of sustainable criteria. This initiative is supported by the first one (The Global Program on Sustainability).

Under a Green Recovery initiative, which aims to support countries in building recovery plans from Covid-19 with a low-carbon and climate-resilient focus, in 2020 the World Bank launched the initiative *Climate Support Facility*, a new trust fund supporting governments with technical and advisory services.

Although the *IFC Edge of the World Bank* represents innovation, it is a response to the call for measurable solutions to ensure the business case for the green economy and building, especially. In addition, the World Bank programs are aimed to support green bond issuance and green regulatory frameworks, such as the *J-Cab* program, which focuses on six countries with priority, and supports them technically to achieve the objectives of the program (The World Bank, 2022).

To support the transition to more sustainable and inclusive economies across the financial system, the United Nations has created a network meant to gather investors, insurers, and banks to support efforts to accelerate sustainable development within the United Nations initiative (*United Nations Environment Programme Finance Initiative*). Under this initiative, the UN has designed in 2019 a framework for responsible banks called *The Principle for Responsible Banking,* which represents a unique framework. It consists of six principles designed to ensure alignment between the practice and strategies of the signatory banks with the vision of the Sustainable Development Goals and the Paris Agreement. All signatory banks should incorporate all principles into their business strategies and all business areas.

As part of United Nations initiatives, in 2021, the United Nations convened the Net-Zero Banking alliance, which aims to provide an international framework and principles to support the implementation of carbon neutrality strategies. The alliance aims to gather a representative group of banks that are committed to achieving the goal of net zero emissions in 2050 in all their portfolios.

Based on the importance of supporting the global response to the major requirements of the Paris Agreement and enabling the role of the financial system in the transition to a low-carbon and green economy, in 2017 a group of central banks and supervisors has established the *Network of Central Banks and Supervisors for Greening the Financial System (NGFS*).

The NGFS network defined the best and most effective practices that each member has to implement, in addition to analysing the progress on green finance (NGFS, 2022).

Many efforts have been made by the European Commission to support the transition to a sustainable European economy, such as issuing a strategy and framework to support all efforts to achieve sustainable finance and transition to a sustainable economy. In particular, the EU Sustainable Finance framework depends on three main pillars.

- EU taxonomy: adopted in 2020, it is a common classification of sustainable economic activities, depending on clear criteria;
- disclosure, to help investors choose sustainable investments; there is a need to encourage both financial and nonfinancial institutions to disclose all necessary information. The Sustainable Finance Disclosure Regulation applies since 2021;
- tools designed for each participant (companies, market participants, and financial intermediaries) to develop sustainable investment solutions and prevent greenwashing, such as the EU Climate Benchmarks Regulation, which applies since 2020 (European Commission, 2022).

4. The Role of Sustainable Finance in Achieving the Sustainable Development Goals (SDG) and Climate Neutrality

Moving to a circular economy with low carbon emissions is the main objective of saving our planet and our lives. The basic task of sustainable finance is to seek and channel funding for more productive and sustainable sectors (Schoenmaker, Schramade, 2020). Currently, according to Sun et al. (2015), the incorporation of financial factors with nonfinancial factors (ESG factors) is responsible for shifting to a sustainable financial system (Zioło et al., 2021).

More efforts from European regulations are concerned with shifting to a low-carbon, more efficient resource use, and sustainable economy (Ahlström, Monciardini, 2022). To achieve the objectives related to the green deal and support the transition to the green economy, it is necessary to increase private investments in sustainable projects; therefore, sustainable finance acts as a tool to achieve the green transition (European Commission, 2022). The basic role of sustainable finance in supporting the sustainability transition process consists of moving to a financial system with environmental and social responsibility (Ryszawska, 2016).

Sustainable finance plays an important role in achieving the Sustainable Development Goals, as documented by the study by Ziolo et al. (2021), which reports a series of findings:

i. a strong link between *sustainable finance and social sustainability* (1-3-5-10-16 SDGs: ending poverty in all its forms everywhere; ensuring healthy lives and promoting well-being for all ages, reducing inequality within and among countries, promoting peaceful and inclusive societies for sustainable development and providing access to justice for all, building effective, accountable, and inclusive institutions at all levels);

ii. strong relationship between *sustainable finance and environmental sustainability* (11-12-13-15 SDGs. The goals represented: make cities and human settlements inclusive, safe, resilient, and sustainable; ensure sustainable consumption and production patterns; take urgent actions to combat climate change

and its impacts; protect, restore, and promote sustainable use of terrestrial ecosystems, sustainable management of forests, combat desertification, and deserve land degradation and halt biodiversity loss);

iii. a strong link between *sustainable finance and economic sustainability* (8-9-17 SDGs: promote sustained inclusive and sustainable economic growth; full and productive employment and decent work for all; resilient infrastructure; promote inclusive and sustainable industrialisation).

From the viewpoint of Lange and Schmitt (2019), sustainable banks can significantly contribute to achieving financial inclusion and make a social turnaround by adopting a sustainable culture that takes into account human rights and good governance standards.

Another study examined the causal relationship between green finance and sustainable finance; the results show that green finance produces positive impacts on sustainable finance in multi-subperiods (Wang et al., 2022).

There is also evidence of a strand of literature that focuses on the role that sustainable finance plays in the environment.

According to Madaleno et al. (2022), the role of Green Finance and Green Technologies has been observed in dealing with carbon neutrality in the long and short run by promoting carbon neutrality. Furthermore, to achieve successful energy transition and sustainable development goals, it is necessary to design a policy that strengthens green finance and environmental responsibility by funding green technology (Madaleno et al., 2022).

By promoting developments in renewable energy and regulating carbon emissions, sustainable finance fights against climate change (Mahesh, Aithal, Sharma, et al., 2022) and its adverse impacts on macroeconomic indicators, such as inflation, growth, and employment, on financial stability, on the value and risk profile of financial assets, leading to greater climate-related financial risk (Elderson et al., 2022).

The development of sustainable finance and renewable energy plays a fundamental role in achieving carbon neutrality goals (it can facilitate its achieving), according to the study by (Qin et al., 2022) that examines the effect of sustainable finance and renewable energy in the United States. The findings indicate that in the short term, there is a negative effect of renewable energy on CO_2 emissions, so increasing renewable energy seems to generate a greater effect on CO_2 emissions than reduce it. In addition, the direct impact of sustainable finance on carbon neutrality is more significant than the impact of renewable energy.

Green technology funding is important to strengthen and improve sustainable responsibility and green finance, leading to a successful shift to clean energy and achieving sustainable development goals (Madaleno et al., 2022). The use of green finance and renewable energy sources has a positive effect on sustainable development and a negative effect on carbon emissions according to a case study conducted at the country level by Zhou and Li (2022).

The importance of sustainable finance has also been studied in conjunction with the health care system, arguing that sustainable finance that emerges from

ESG factors implemented in the decision-making process must be the main concern according to hospital policy makers (Sepetis, 2020).

5. Conclusions and Future Research Directions

Each effort to achieve the Sustainable Development Goals has to start from the belief that our economic, environmental, and even social resources are not sufficient. We need more effort to save them by taking into consideration these aspects in our designs and try to better manage these resources through considering ESG issues as the principal step when investment decisions have been taken in the financial sector.

The need to transfer to an economy with low carbon emissions and more circular features is increasing day by day; this shifting also being noticeable in terms of moving from a traditional financial system to a financial system based on environmental and social responsibility. Sustainable finance plays a leading role in the responsible allocation of financial resources toward more sustainable fields, which will make the transition to a low carbon economy more rapid. It may start from investors, when they invest their money only in green projects, without any choices between profits or saving the planet. This change of priorities should take into account ethical business standards and inclusion when they invest their money, thus leading to making our world better, by reconciling financial returns with creating environmental and social impacts.

There are many types of sustainable finance products and activities, and we can distinguish them from non-sustainable ones through some criteria or even through the purpose of each activity. Many efforts have been made by international organisations to support the transition to a sustainable economy, such as issuing strategies, principles, and frameworks to support all efforts in order to achieve a sustainable financial path and transition to a sustainable economy and support global response to the major requirements of a sustainable economy.

Finance acts as a leader of sustainable efforts; therefore, sustainable finance plays the main role in channeling funding for more productive and sustainable sectors, which will lead to a more sustainable economy that subscribes to achieving the Sustainable Development Goals.

A strong link is present between sustainable finance and social sustainability, through manifold indicators representing several social goals like ending poverty, promoting healthy lives and better health care systems, and accountable in addition to an inclusive society. Also, there is a strong link between sustainable finance and a sustainable environment; through green technology and renewable energy, and other types of sustainable products and activities, one can promote a sustainable environment and while leading to a successful shift to clean energy and achieving carbon neutrality goals. In the same vein, sustainable finance promotes sustainable economic goals through promoting inclusive, smart, and sustainable economic growth, productive employment and decent work for all, resilient infrastructure, inclusive, and sustainable industrialisation.

The added value of this paper can be considered as a theoretical approach, the article providing an overview of the diverse acceptations, in broader or narrower

scope, as retrieved by the scientific literature, financial intermediaries, and international bodies in the field of sustainable finance. In addition, it synthesises the taxonomy of sustainable finance activities by describing their dynamic, continuously evolving nature, and examines, through an in-depth desk research, the potential role sustainable finance can play in achieving the Sustainable Development Goals (SDG) and climate neutrality. In this approach, the study has original theoretical and methodological scientific value.

In light of the increasing importance of achieving Sustainable Development Goals and the significant role of sustainable finance, the economic and business models at all levels are supposed to cover economic, social, and environmental aspects as fundamental indicators. Therefore, more advanced research should be developed to determine the value of each ESG criteria related to investment projects aiming at achieving SDGs, the literature review that performed in the paper could be used for developing further research in achieving SDGs goals.

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Customer Selection Criteria Using Existing Car Sales Databases

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Abstract

The main objective of the paper is to identify a general framework for the promotion of smart car products, the customer's requirements, and the market trend when the way of promotion changes. In this environment, it is necessary to use artificial intelligence to consult platforms / databases, from which the profile of each customer can be extracted, and the market requirement can be generalised. The specialised literature provides, in this sense, a series of market innovations, but the technological innovations required by customers, by age groups, and more, the adaptation of promotion to gamification or even metaverses are not specified. As a result of the new market requirements, in a continuous modification, the research will be an empirical one, from which the consumer behaviour, globalisation, and technological innovations required by the client will result. Thus, the analysis of platforms / databases was carried out in order to identify the requirements formulated by the client, as well as the SWOT analysis of product promotion. The limitations of the research are due to the fact that the data collected from the specialised literature are minimal. For this reason, research is also necessary in the environment of profile companies, from which it can be concluded whether they have implemented modern tools to promote intelligent auto products and, moreover, whether they use simulating environments based on artificial intelligence for the presentation of the products. Promotion in the online environment leads to the use of electronic resources and the need to implement artificial intelligence. The practical implications resulting from the use of platforms/databases lead to the accelerated purchase of a car presented with specifications towards the new green technologies, with a content marketing and with a permanent communication between the customer and the seller, thanks to artificial intelligence.

Keywords: the customer, the market, marketing innovation tools, online promotion, databases.

JEL Classification: M31, M41, M21.

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1. Introduction

Traditional marketing has so far represented an important element in selling products (Savych, Shkoda, 2020), using communication channels with which an immediate profit is obtained (Wang, Moriarty, 2017). Today, in full transition process from Industrial Revolution 4.0.(I4.0.) to Industrial Revolution 5.0.(I5.0.) (Xun et al., 2021; Madsen, Berg, 2021), marketing is carried out online (Lopes, Oliveira, 2022; Wang et al., 2023), with the help of electronic tools and artificial intelligence (Cui et al., 2022; Ozdemir, Hekim, 2018) that make a consumer to be assisted and guided in choosing a brand (Engelmann et al., 2022; Dunska et al., 2018). Moreover, from this environment, artificial intelligence can populate a database (Engelmann et al., 2022) with various customer selection criteria, depending on their behaviours (Ma et al., 2022), for future promotion of the products.

The customer wants a market as close to his needs as possible, a market where the product, in this case a car, can be presented in a physical form (Dorčák et al., 2017). However, the lack of time for detailed research of the car before the purchase makes a customer ask for new methods of promotion, on secure platforms (Purcarea et al., 2017; Li et al., 2019).

Like the above ideas, the purpose of this paper is to identify the elements necessary for a transition from traditional marketing to that of I5.0 are observed (Ruan, Mezei, 2022; Wongleedee, 2015; Hein-Pensel et al., 2023). Several studies have brought to the limelight innovations in product promotion and how a car is reported in the green economy (Loiseau et al., 2016; Tang et al., 2017; Mansour, 2023; Goikoetxea-Gonzalez et al., 2022). The use of the environmentally friendly car, and the design of the car so that it consumes and pollutes as minimum as possible (Lo Franco et al., 2022) are advantages in the customer's choice of the finished product.

2. Problem Statement

The digitisation of business with the help of artificial intelligence (Xie et al., 2022), of electronic tools that took shape in I5.0. (Lachvajderová, Kádárová, 2022; Mansour, 2023) lead to the emergence of opportunities to test how sale (Lo Franco et al., 2022) of a car. Although there are still companies that have not implemented the processes from I4.0. (McLellan et al., 2021), have developed processes for market change and adapt to customer demands (Liu et al., 2019), substantially changing their business model (Cui et al., 2022).

In specialized literature, in the searches carried out in Web of Science articles, we did not identify whether a customer looking for products online. This is regarding to customer that can configure his car, according to his requirements (Ma et al., 2019), can check the performance of the car (Tang et al., 2017), can make a simulation in the environment in which he will drive his car (Dwivedi et al., 2023), is satisfied with the search result, and places an order.

In turn, the company should acquire these configurations with the help of artificial intelligence (Periyasami, Periyasami, 2022), populate databases with customer requests (Li, Yu, 2022; Li et al., 2019), and create groups according to their requirements. Moreover, in a future promotion of a product, either a component, or a car with a new brand, or a new market, artificial intelligence should help the company to target the customer profile of a certain group (Cheah, Shimul, 2023).

It is also important to research the situations in which a company finds itself, when implementing the components of I5.0. through a SWOT analysis from the specialised literature. This analysis will be based on empirical studies, which prove whether a customer with a certain profile prefers online instead of physical car presentation.

Of course, at some point, every driver will want to try the car in traffic (Wang, Moriarty, 2017). But time spent choosing a car, signing up for a test drive, and waiting time can be limited to simulating a virtual metaverse environment (Cheah, Shimul, 2023; Hwang, Lee, 2022; Periyasami, Periyasami, 2022; Chinie, Oancea, 2022), through situations where the car is valued, in gamification (Lucassen, Slinger, 2014; Conaway, Garay, 2014; Huotari, Hamari, 2017).

The purpose of this research is to verify the state in which companies are, with the help of specialised literature, if a customer looking for products online is satisfied with the results obtained (Savych, Shkoda, 2020), if these searches are personalised and reported to I5. 0. (Madsen, Berg, 2021). Moreover, the novelty brought by this work consists of the preparations made by the companies that present their products in metaverses, through gamification.

3. Research Questions / Aims of the Research

Digitisation is a key factor in the promotion of cars, and the use of smart product-service systems (PSS) ensures a safe environment for the promotion of smart car products (Tsunetomo et al., 2022; Xie et al., 2022; Li, Yu, 2022; Liu et al., 2019; Liua et al., 2019; Cheng et al., 2019), which will lead to the research question:

Q1: What are the new market requirements for car sales in I5.0?

This is how the demand arose, through the online promotion of cars, in a form of simulation of the gamification type (Lucassen, Jansen, 2014; Li et al., 2022; Hofacker et al., 2016; Hsu, Chen, 2018), in which the car is highlighted in different situations. The simulation environment is one of the metaverse type (Cheah, Shimul, 2013; Periyasami, Periyasamy, 2022; Hwang, Koo, 2023), where all configurations of a car are obtained virtually. For this reason, the question is formulated:

Q2: What are the requirements of the client, in the simulation during the car promoting?

The market for presenting a car will be online (Lachvajderová, Kádárová, 2022), and by using simulations, it will be possible to customise, depending on the customer's requirements, product sales (Aboltinsa, Rivza, 2014). The idea of

having a car configured in this way will lead to the creation of categories of customers, depending on their requirements (Wongleedee, 2015), on specialised platforms, for which the question will be answered:

Q3: How do we promote a smart car product in an online environment?

4. Research Methods

The research methodology consisted of analysing situations compatible with new market requirements for car sales, requirements of the customer in the simulation; promote a smart car in an online environment to identify the current state of companies in I5.0.

To achieve the objectives of this research, we searched for articles in the Web of Science, from which we extracted the following data collection template: identification of a general framework for the promotion of intelligent car products through the market innovations brought by I5.0., customer requirements in the field innovative technologies through the use of artificial intelligence, as well as the market trend, when changing the way of promotion by adopting a product usage simulation environment.

4.1 A Series of Market Innovations

When searching for market innovation, in Web of Science articles, we found 1183 (as of March 24, 2023) results that contain the identification of elements of exchange of goods, in our case of a car, exchange that can bring benefits to both the buyer and the seller. The car was delivered to the buyer through limited search time, and the seller made an immediate profit. Until now, the question of a safe market, in which the products reach the buyer, has been raised. Innovation in I5.0. leads to the appearance of trade platforms and with a minimisation of the search, carried out by artificial intelligence, according to the requirements given by the customer, to be able to obtain the product with the details requested by him, to satisfy his desire, and complete the transaction.

But the most important elements identified were technology innovation and market innovation, which leads to the fact that the two values of the business are intertwined.

4.2 Technological Innovations Required by Customers

A customer looking for cars online is satisfied with the results obtained only if this search is carried out in a short time. This is where the platforms come in, the artificial intelligence that helps the customer get the desired product.

Moreover, it is obvious that when creating groups on car sales platforms, these groups must be made by age groups, interests, customer income, and even driving style. In this sense, we found over 100 articles resulting from the description of customer profiles, written with the help of technological innovations.

4.3 The Adaptation of Promotion to Gamification

Web of Science searches were reported on client customisations and associated with innovations in I5.0. 189 articles were returned stating that gamification has been used since 2011 and that it is used in all fields, not only marketing, where a simulation of actions is desired. The maximum number of gamification use was in 2021, when a number of 1432 works with activity simulation were registered. And in the case of product promotion, 81 works resulted in 2021.

4.4 Metaverses for Simulation

92 papers confirmed that this type of simulation is used and takes shape in 2022 and 2023, most papers being in the field of marketing, which concludes that in the future the market, product promotions, exchange of views, and even negotiation will perform in the metaverse, with as little time as possible to complete the sale. Of course, delivery remains an issue for further study.

However, an important problem is the preparations made by the companies that present their products in the metaverse, through gamification. They will invest in hardware components that will support the online applications/platforms where gamification will take place. The costs incurred by the companies are covered only when the company starts selling with a minimum of online promotion effort.

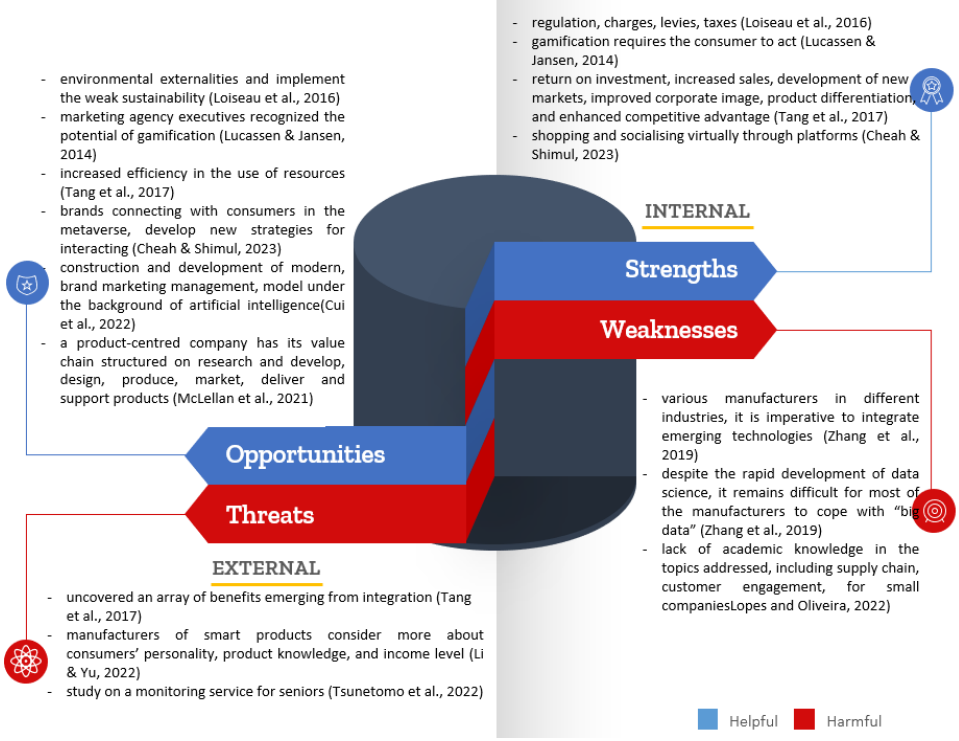
It is the artificial intelligence that will produce profitable results, in the sense that the customer profile is also used for another customer, the requirements in the car market will be reported to the customer groups that the AI has made that can lead to customer satisfaction and after the sale through various bonuses.

5. Findings

An important result is the customer profile on the platform. A customer who has a family, who travels a long way with the family, will opt for a car with increased comfort, with interior improvements for every age, with low pollution. A customer who wants a car for its performance in traffic or speed will choose a car with higher engine power, agility in traffic, and less pollution. A customer who uses the car to commute to work every day will want a car that can weave through city traffic, find a parking spot quickly, and help with shopping. In this sense, the demand in the new market must be easy to identify. All these profiles should be found, processed, and returned by an artificial intelligence application.

It is also important to research the situations in which a company finds itself, when implementing the components of I5.0. through a SWOT analysis from specialised literature (Figure 1). This is proof that a customer with a certain profile prefers online instead of physical presentation.

Figure 1. Swot analysis of the virtual environment



Source: A car sales transaction is processed, according to the presented source at each element.

Consumer behaviour in the market (Loiseau et al., 2016) is an important factor in the transition from traditional marketing to online marketing.

Companies face different situations in presenting their products on platforms (Tang et al., 2017). Various formats and presentations are used across platforms to highlight products and the selling price (Ma et al., 2019). Platform providers understand user requirements (Engelmann et al., 2022).

The limitations of the research consist in the fact that the study was done only in the automotive industry and only based on articles published in Web of Science. In this sense, it is necessary to draw up some questionnaires or an interview, with respondents from companies with various fields of activity, to identify the requirements of a new market in I5.0. It is also necessary to identify companies that have implemented modern online product promotion tools or that use simulation environments based on artificial intelligence and adapt to consumer behaviour.

6. Conclusions

From the researched studies, we can extract the fact that expanding market access by setting up an electronic market, increasing sales, and reducing pollution (Loiseau et al., 2016), using platforms through metaverses with simulation from

gamification (Noorbehbahani et al., 2019; Nah, Tan, 2017), we responded to the requirements of selling a car in I5. 0. Marketing in the metaverse presents opportunities and strengths for a car (Vidal-Tomás, 2023; Zekree et al., 2021). The metaverse provides a new platform for digital marketing, allowing companies to interact with customers (Cheah, Shimul, 2023; Tsai, 2022; Ramadan, 2023).

Consumer preferences and demand for electric vehicles by collecting and recording online consumer behaviour is the answer to the following question (Ma et al., 2019). It is obvious that due to lack of time, customers want a platform, with customer profile groups that can provide them, with the help of artificial intelligence, very quickly, a type of car brand that suits them.

Companies develop smart cars according to the market and the marketing strategy is an important guarantee to achieve corporate value. Consumer groups use the same marketing tools and therefore will have limitations in searches and, furthermore, in promoting a car, relative to the customer group (Cui et al., 2022).

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EU Taxonomy as a Game-Changing in Sustainability

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Abstract

The focus of this paper is to understand how firms are responding to the EU taxonomy; find out what strategies they have in place; explore relationships between company responses to certain aspects of the market and with various stakeholders.

The importance of the EU taxonomy is given by its role in helping the implementation of the European Green Deal by creating a green classification system, establishing a list of environmentally sustainable economic activities. It is a transparency tool that introduces mandatory disclosure obligations in relation to three indicators: capital expenditures, operating expenditures, and turnover. This mandatory disclosure is applicable to financial institutions that offer financial products on the European market and to all large companies with more than 500 employees. According to the European Commission, this reporting obligation covers 11,700 large companies and groups across the EU.

The major added value of this material is given by the novelty of the topic and its implication in the medium and long term in relation to a sustainable marketing strategy of the companies. Another added value is understanding how businesses react to the EU taxonomy in terms of methodology for publicly disclosing the KPIs.

Keywords: sustainable marketing, EU taxonomy, stakeholder response, Green Deal.

JEL Classification: M 31, Q56.

1. Introduction

Pollution and environmental concerns have been discussed since the nineteenth century. Even back then, some entrepreneurs believed that pollution prevention, recycling, renewable energy, and supplying good food were their responsibilities (Rosen, 1995; Jones, 2017a; Berghoff, Rome, 2017; Bergquist, Lindmark, 2016).

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As an initial reaction to industrialisation, early attempts toward pollution control and the establishment of green firms were done, but a much broader and more effective social movement did not develop until the 1960s. The late 1960s environmental awakening mobilised a mass movement and the formation of new institutions, including a complex of laws and organisational structures to safeguard the environment (Brenton, 1994; Jones, 2017a). This environmental awakening was accompanied by harsh criticism of the business community (Carroll et al., 2012; Rome, 2017). Environmental regulation has become an important issue for polluting companies with operations in western countries (Bergquist, 2017).

The new Green Deal comes with a common driver: the necessity of an economy-wide Net Zero transition for Europe, with a share of the same principles in setting sustainability disclosure policies and implementing standards: transparency, uniformisation, cohesion, and comparability (European Commission, 2021).

The aim of this paper is to understand how large companies are responding to the EU Taxonomy due to the novelty of the topic. Taking into consideration that sustainability is the "21st century mantra" (Dyllick, Hockerts, 2022) and is facing now more concrete dimensions, the EU taxonomy is only one of these, a mandatory disclosure obligation in relation to three indicators: capital expenditures, operation expenditures, and turnover (Brito et al., 2008).

This paper is one of the few that investigated the how large companies are responding to the EU taxonomy in relation to the medium- and long- term climate targets, by using 10 Romanian BET companies and 10 regional oil and gas companies as case studies.

2. Literature Review

The twentieth century is inimitable in human history, due to the huge technological achievements and growth in living standards, and for the significant increase in the number of environmental challenges (McNeill, 2000; the United Nations, 2016). Industrial capitalism, international companies, and globalisation have played key roles in this evolution (Nyberg, Wright, 2015).

The climate topic, the link between the use of fossil fuels and the Earth's atmospheric temperature, was pointed out by the Club of Rome. Climate change had gained some traction by 1991 (Kirby et al., 2021). The Kyoto Protocol from 1997 codified consensus on problem acknowledgement, recognising the Anthropocene as an epoch in which human activity has damaged the planet's natural ecosystems and attempting to persuade member governments to stabilise greenhouse gas emissions. However, the Kyoto Protocol was stopped by the 2008 global financial crisis as nations resorted to budgetary restraint. The Paris Climate Change Agreement, signed at COP21 in 2015, served as a successor to the Kyoto Protocol. It has more than 190 signatories and was the first legally binding climate change effort. Its justification was based on agreement on the need to address the effects of global warming and restrict the increase in atmospheric temperature to 1.5 ^{o}C, a safe operating temperature that maintains the resilience of similar ecosystems.

The Sustainable Development Goals (SDGs) of the United Nations address broader contemporary sustainability challenges. Every country is called upon to provide solutions through its governments, corporations, and societies. The global character of human effects on the environment (Rockström et al., 2009), social inclusion and equity (e.g., Raworth, 2017), and good governance of business and civil society (SSDN, 2021) are all implied in the SDGs.

The six transformations identified by Sachs et al. (2019) provide guidance on how the SDGs might be implemented through investments, policy implementation, and regulation by governments, corporations, and societal organisations in order to dive the transformation. These changes reflect the sustainability principles developed by Gladwin et al. (1995), which include equity, prudence, comprehensiveness, connectivity, and security. It is implicit in these principles that we cannot understand sustainability in organisations without first taking into account the socio-ecological systems in which those organisations are embedded. Businesses are essential to these changes.

Researchers such as Weber (2007) have drawn attention to corporate responsibility for biodiversity loss, climate change, and social inclusion. The prevailing business mentality continues to be one of economic expansion despite mounting calls for change (Schoenmaker, Schramade, 2018). According to Jensen and Meckling (1976), firms are merely entrepreneurial by-products of market flaws.

The Triple Bottom Line (TBL) concept proposed by Elkington (1997) marked a major turning point in efforts to build harmony between the environment, society, and business. Striking a balance between profit, corporate social responsibility, and the environment is a central idea of TBL theory, and the Global Reporting Initiative (GRI) has put this idea into practice (Elkington, 1997). During that time, corporate growth was aided by the financial system, and now environmental (E), social (S), and governance (G) issues have become an advantage to the extent that voices for a degrowth approach to economic development have grown louder (Kirby et al., 2021).

The European Green Deal (EGD) has been projected as a mission for Europe to become the world's first Net Zero continent by 2050, and to strengthen European cohesion through this ambition (European Commission, 2020). This ambition can only be successful if it comes with concrete progress in improving living conditions for European citizens at large (Wolf et al., 2021).

To achieve the ambition by 2050, a significant acceleration of emission reductions is needed, which is by far the most ambitious international arrangement currently existing. There are some criticisms of this policy package that addresses climate change through a "just and inclusive" transition, that to make Net Zero Europe's production systems, this will require a broader range of 'green' industrial policies to address environmental sustainability, structural change, and the fairness of economic outcomes in Europe (Pianta, Lucchese, 2020).

As a result of the criticisms related to the absence of official political constraints that can push governments to implement a Green Deal agenda, difficulties were created in making Net Zero Europe's production systems (Pianta, Lucchese, 2020);

a broader range of 'green' industrial policies were created that should jointly address environmental sustainability, structural change, and fairness of economic outcomes in Europe. The next step was to provide companies, investors, and policymakers with appropriate definitions for which economic activities can be considered environmentally sustainable and a similar classification system for what are sustainable activities. The EU taxonomy has a major role in helping the implementation of the European Green Deal by creating a green classification system, establishing a list of environmentally sustainable economic activities. It is a transparency tool that introduces mandatory disclosure obligations in relation to three indicators: capital expenditures, operation expenditures, and turnover for sustainable activities/projects.

Previous research has revealed that the EU Taxonomy is a working method, based on cooperation among regulators, academics, and industry (Lucarelli et al., 2020). The most important is that the EU taxonomy is a general European regulation applicable to all EU countries, no translation into national legislation is needed. Now that EU Taxonomy-related topics have been incorporated into policy measures, further positive environmental effects are expected from here on out (Lucarelli et al., 2020).

3. Research Methodology

The present paper aims to explore whether companies in scope of the EU taxonomy have set out strategies, key performance indicators to comply with the new regulations. The research methodology is exploratory, based on secondary data. This paper is an important research tool, providing a valuable answer to the question: is the EU taxonomy a game changer in sustainability? To collect data to understand how companies in the scope of the taxonomy regulation complied with their requirements during the first 18 months of application, the analysis was performed on the nine most liquid and best performing listed companies in BVB and 10 major regional oil and gas players. The companies targeted are within the scope of the EU taxonomy, e.g., more than 500 employees, listed companies.

To gather information for the analysis of the 10 well-known BET Romanian companies, we performed desk research that involved analysis of their websites, the sustainability strategy, the corporate strategy, the non-financial report for 2021 and 2022, the annual report for 2021 and 2022, the last materiality matrix, disclosure related to the EU Taxonomy key performance indicators and major activities.

In the case of the first 10 Romanian BET companies (Cojoianu, 2023), sustainability reports for 2022 have not yet been published (www.banca transilvania.ro, www.romgaz.ro, www.brd.ro, www.transgaz.ro, www.electrica.ro, www.transelectrica.ro, www.bvb.ro, www.conpet.ro). According to Romanian legislation, the deadline to publish nonfinancial data is June 30. The only BET companies that published sustainability data are Nuclearelectrica and OMV Petrom (Petrom). In 2022, Nuclearelectrica claimed 100 % aligned turnover and CapEx. The main aligned activities are the production of electricity from nuclear energy in existing installations. The aligned CapEx is in line with its medium-term goals:

to supply 66 % of Romania's clean energy after 2031, to avoid 10 million tons of CO_2 every year with current operation.

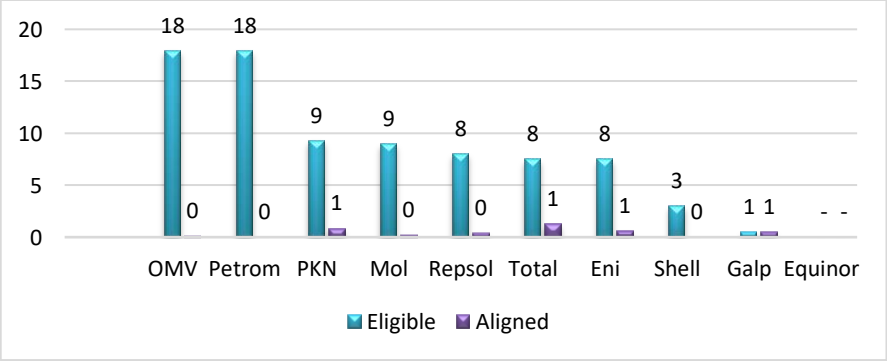
For the same timeframe, OMV Petrom claimed only 0.41 % aligned CapEX. According to the newly released non-financial report, the aligned CapEx is generated by the following three activities: electricity generation from solar photovoltaic technology, infrastructure for low carbon road transportation, and installation, maintenance, and repair of renewable energy technologies. These activities are correlated to the OMV Petrom 2030 Strategy and the new targets for increased capacity to operate more than 1GW of renewable power capacity, to create 500 charging points for alternative fuelled vehicles.

The rest of the eight well-known Romanian BET companies, 2022 sustainability, non-financial report has not been released yet, but only six of them have sustainability strategies, CSR focus areas, or targets published on their websites. Only 4 out of 10 companies are mentioning EU Taxonomy in their reports, annul or sustainability, and only two of them are publishing in 2021 and 2022 the mandatory KPIs.

In the case of the nine major regional oil and gas players, all of them have a sustainable strategy, short-, mid-, and long-term targets, and ambition to become Net Zero by 2050. The aligned CapEx allocation for sustainable activities ranges from 0.41 % to 34 %. In terms of eligible, more general conditions to be checked, the percent of CapEx ranking starts at 3 % and ends at 44 %.

The taxonomy KPIs presented by Shell (2022) are voluntary, but the company chose to take a 'prudent approach' to publish zero alignment for 2022 due to 'At present, there is a lack of consensus in the market about how to interpret various aspects of technical screening criteria'. However, the company assessed elements of some activities related to solar, wind, hydrogen, low carbon road transport, and renewable energy technology activities, not fully aligned, but the estimate "when fully aligned, this would result in a range of" 0.1-0.2 % for turnover, and 9-10 % for capex".

Figure 1. The Percentage of Turnover eligible/aligned out of total turnover/company



Source: Annual reports, Sustainability reports of the companies analysed (www.omv.com, www.omvpetrom.ro, www.molgrouo.info, www.repsol.com, www.totalenergies.com, www.eni.com, www.reports.shell.com, www.galp.com, www.equinor.com)

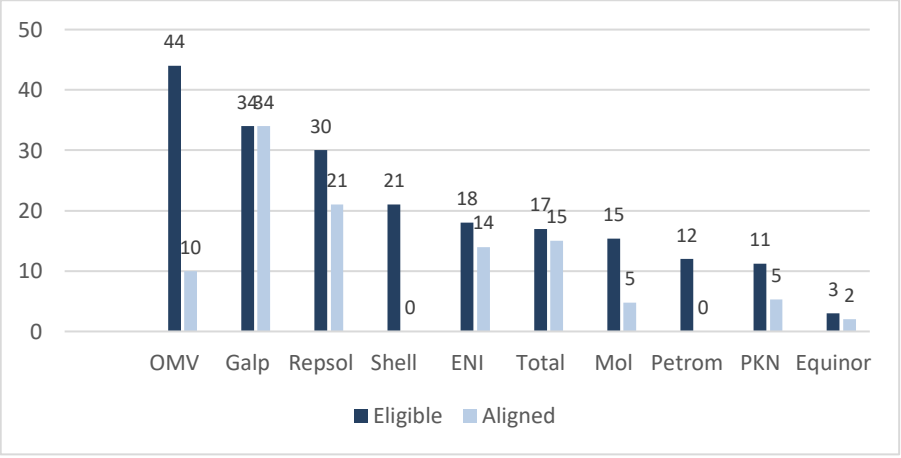
The above figure shows the eligible (the basic conditions for EU taxonomy) and aligned (the sustainable activities from the EU taxonomy perspective) turnover. It is important to mention that, according to public reports, for OMV and Petrom, the eligible turnover comes from the power plant activity. In 2022, neither company has aligned its activities.

The above table shows that 4 companies, PKN, Total, Eni, and Galp, have a low percentage of eligible turnover based on the EU taxonomy methodology. The eligible turnovers come mainly from the manufacture of organic basic chemicals, manufacture of plastics in primary form, energy generation from hydropower, bioenergy, manufacture of biogas and biofuels, and power plants.

The aligned turnover is generated by activities mainly from activities like electricity generation wind, manufacture of biogas and biofuels for use in transport, manufacture of plastics in primary form, and material recovery from non-hazardous waste.

The gas is a new entry in the EU Taxonomy, and it was included with very high criteria to meet for alignment. Simplifying the process of alignment means activities/ projects with very low GHG emissions that do not significant harm sustainable use and protection of marine resource, protecting the biodiversity, transition to circular economy, and pollution prevention.

Figure 2. the Percentage of CapEX eligible/aligned out of total CapEx/company



Source: Annual reports, Sustainability reports of the companies analysed (www.omv.com, www.omvpetrom.ro, www.molgrouo.info, www.repsol.com, www.totalenergies.com, www.eni.com, www.reports.shell.com, www.galp.com, www.equinor.com).

In the case of the ten major regional oil and gas players, we observed that the largest investment in sustainable activities defined according to EU taxonomy is 34 % of the total CapEx and the lowest is close to zero. The largest investments are for projects dedicated to photovoltaic technology for 9 of 10 companies analysed, the second ranked are the projects focused on wind power, and the third placed in this evaluation are the activities for the manufacturing of organic basic chemicals.

Table 1. Summary of EU Taxonomy-aligned activities for 10 major regional oil and gas players and % of CapEx

EU Taxonomy defined activity / Proportion of CAPEX aligned	OMV	Galp	Repsol	Shell	ENI	Total	Mol	Petrom	PKN	Equinor	Total
Manufacture of hydrogen and hydrogen-based synthetic fuels	0,1	0,2	0,1				0,5				**0,8**
Manufacture of organic basic chemicals	5,8						1,9		3,9		**11,6**
Manufacture of plastics in primary form			0,3				0,5				**0,8**
Transmission and distribution of electricity	0,3										**0,3**
Electricity generation using solar photovoltaic technology	0,2	31,0	12,0		4,9	13,3	0,5	0,1	0,1	0,7	**62,6**
Electricity generation from wind power	0,6	0,5	5,0		7,3					1,0	**14,4**
Electricity generation from bioenergy									0,0		**0,0**
Transmission and distribution of electricity									0,9		**0,9**
Storage of electricity			0,2								**0,2**
Manufacture of biogas and biofuels for use in transport and of bioliquids	0,3	0,8	3,0		0,8	0,6			0,4		**5,8**
Transmission and distribution networks for renewable and low-carbon gases							0,2				**0,2**
Production of heat/cool using waste heat	0,2										**0,2**
Underground permanent geological storage of CO_2			0,0		0,6						**0,6**
Infrastructure enabling low-carbon road transport and public transport	0,1		1,0		0,5		0,1	0,2	0,1		**1,9**
Transport by motorbikes, passenger cars and light commercial vehicles							0,1				**0,1**
Installation, maintenance and repair of energy efficiency equipment							1,0				**1,0**
Installation, maintenance and repair of charging stations for electric vehicles in buildings (and parking spaces attached to buildings)		0,8									**0,8**
Installation, maintenance, and repair of renewable energy technologies	0,2	0,3	0,2					0,2			**0,9**
Close to market research, development, and innovation	1,9										**1,9**
Research, development and innovation for direct air capture of CO_2			0,0								**0,0**
Other						0,6					**0,6**
Total	**9,5**	**33,6**	**21,5**	**0**	**14,1**	**14,5**	**4,8**	**0,4**	**5,3**	**1,7**	

Source: Annual reports, Sustainability reports of the companies analysed (www.omv.com, www.omvpetrom.ro, www.molgrouo.info, www.repsol.com, www.totalenergies.com, www.eni.com, www.reports.shell.com, www.galp.com, www.equinor.com).

4. Results and Discussion

The application of the EU taxonomy is still at the beginning, and the companies were not prepared for these legal obligations.

From the data analysed, it is relevant to emphasise that the 10 regional oil and gas players have sustainable goals, short-, medium- and long-term climate targets, and Net Zero ambition to Net Zero by 2050. They have also publicly disclosed their turnover, CapEX, and OpEx using the EU taxonomy methodology, even though the figures are small. The existence of a journey to meet intermediary and long-term targets and the EU taxonomy obligations will help those companies adjust their strategy to have more activities aligned with the EU taxonomy. This helps them in their transition plan to a low- and zero-carbon business.

In Romania, only 5 of the 10 BET companies analysed at this moment have publicly disclosed sustainable goals, climate targets, and all are expected to publish the non-financial report by June 30. Only a very few of them are publishing the EU taxonomy requested KPIs.

Hypothesis: Companies that disclose the indicators required by EU taxonomy are more willing to adapt the way they reach the targets in the sustainability strategy.

EU regulators also introduced another principle for the EU taxonomy disclosure to prevent myopic investment processes that would focus on a particular environmental or social objective. The principle of Do No Significant Harm (DNSH) is to prevent narrow-minded investment processes that focus on a particular environmental or social objective without sufficient consideration for other objectives. DNSH will ensure that companies doing well on one environmental aspect meet a minimum baseline standard across others (Bloomberg, 2023).

5. Conclusions

In the last decades, big companies, multinationals, analysis represented a major interest and dominated the literature on international marketing (Brandenburg et al. 2014) and their impact on sustainability and their Net Zero ambitions (Ahola et al., 2020; Cowan, Guzman, 2020).

At this embryonic stage in the taxonomy lifecycle, the academic community has the potential to contribute to understanding its implications and companies to adjust their business models and support Europe's ambition to become the first continent to reach Net Zero. The Green Deal is the most ambitious legislative package for Europe and will drive the low-zero journey while fostering cooperation throughout the continent (Wolf et al. 2021).

In conclusion, large companies need more effort to succeed in implementing climate targets and meeting their EU taxonomy obligations.

This research provided favourable support for the established hypothesis. Based on the significant attention paid to sustainability in terms of concrete examples and measurements, it seems not easy to pledge Net Zero without a clear path. In addition, it is not sufficient for a company to take only the objective into consideration in this journey, DNSH and the minimum safeguard criteria must be included in sustainable

activities. In order to address issues such as climate change, biodiversity loss, water scarcity, etc. While simultaneously dealing with major social and economic challenges, the EU taxonomy is a tool that may be used to adapt traditional economic models (Söderholm, 2020).

Future research should aim at providing yearly analyses of the companies to measure the progress in terms of alignment percentage and type of activities under the EU taxonomy. Although our research is not without limitations, it provides information for academics, researchers, and practitioners as they begin reporting on EU taxonomy.

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Organisational Model for Development after War and Crisis: Bank-Centered Business Group

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Abstract

Wars and crises are events with devastating effects that drain the countries' resources. Countries experiencing devastating wars and crises have sought remedies for development and established new organizational structures. After World War I and the subsequent War of Independence, the Turks established a unique organizational model, Bank-centred Business groups, against all negative theoretical assumptions. Bank-centred business groups, which were established in a short time, were transformed after the great depression of 1929 and new organizational structures were adopted. The establishment and transformation of bank-centred business groups can be explored by historical transformation methodology. Bank-centred business groups established because of a strategic awareness are the first examples of future conglomerates. This study provides an exemplary historical model that can be used for the development efforts of countries experiencing war and crisis.

Keywords: Bank cantered business group, war, crises, development.

JEL Classification: E58, G01, F63. H56.

1. Introduction

Wars and crises, which have wreaked havoc throughout human history, have cost nations their industries and economic resources. Following conflict and crisis, leaders created new organisational structures in order to address the unfavourable situations. In many of the less developed countries, a significant part of the domestic and privately owned industrial sector which use relatively modern and capital-

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intensive techniques is organised in a special institutional pattern (Leff, 1978). Developing economies, especially those engaged in development efforts after a crisis, have established business groups as a solution. Enterprise groups have a significant share of industrial and commercial assets in late industrialised countries at different levels of development and play an important role in these economies (Buğra, 2005).

The world has experienced devastating wars and crises in the first years of the last century. The period between 1918-1945, which is described as the "Age of Disaster" in the history of economics and politics, is the period in which economic, political and social balance formations and centre shifts (Bakırtaş, Tekinşen, 2004, 83) were experienced. Turkish leaders, who lived through the First World War, the War of Independence, and the Great Depression of 1929 in a period of nearly 20 years, transformed the negative social and economic conditions into success with a unique business model. Before the Second World War, Turkey is one of the few countries where the first comprehensive policies for economic development were prepared and implemented among the less developed countries (Tezel, 2002). When the Turkish Republic came into being in I923, the most urgent problem it had to face was of economic development (Sarc, 1948). The leaders of the period, whose financial system collapsed due to wars and crises, who did not have enough entrepreneurs and lost almost all their businesses, started the development process by establishing "Bank-Centered Business Groups" as a solution. "İş Bank" in 1924, and "Sanayii and Maadin Bank", founded in 1925, were established with a bank-based business group model. The Bank-Centered Business Group is an innovative organisational model. When evaluated from the perspective of the social conditions of the innovative enterprise (SCIE), the emergence of innovative enterprises depends on industrial, organisational, and institutional conditions (Lazonick, 2003). Established innovative businesses are transformed depending on the changes in the surrounding conditions. Bank-based business groups founded in the last century have also experienced organisational transformations according to environmental changes.

Can the bank-based business groups model be a solution for the countries aiming to develop in today's conditions where wars and crises are experienced? Our study seeks to answer questions such as, "What are the organisational structure and the transformations of the bank-centred enterprise group model?" and "How will the bank-centred business group model be effective in the future?"

2. Methodology and Research Design

Our research is based on the historical transformation methodology that aims to study and understand how historical contexts change over time. Through this methodology, we approached the following stages:

Identifying Change: Initially, we identify significant differences in economic and organisational structures before and after the war and crisis, with a particular focus on the role of banks and business groups.

Contextualisation: In this step, we considered the broader context in which the transformation took place. This includes the economic, political, social and cultural conditions of the period and, in particular, how they influenced the development and role of banks and business groups.

Causal Analysis: Once the change and its context were clearly defined, the next step involved understanding the reasons that contributed to the change. We identified the key factors that led to this change, such as economic policies, government interventions, or other structural conditions.

Impact Assessment: This stage involved examining the effects of transformation, focusing on how they affected the structure and functioning of banks and business groups, and how these in turn contributed to post-war and post-crisis development.

Establishing Connections: I made a series of connections between the various transformations and events to better understand how they influenced each other and how they led to the evolution of the studied organisational model.

Comparative Analysis: By comparing with other post-war and post-crisis development models from other regions or periods, we were able to gain a broader and deeper insight into the effectiveness and applicability of the bank-centric business group model.

Interpretation and Synthesis: Finally, we interpreted the findings and synthesised the results into a coherent framework that provides a clear perspective on how the bank-centred post-war and post-crisis organisational model of development evolved and influenced subsequent development. This stage included a critical evaluation of the success factors and limitations of this model.

By applying this methodology, the study aimed to provide a detailed and comprehensive understanding of the transformation of the organisational model of post-war and post-crisis development, centred on banks and business groups.

3. Business Groups and Development

Due to their organisational structures and their importance in national economies, the significance of business groups in scientific research is increasing. Although studies on business groups date back only a few decades, their organisational characteristics and effectiveness have gained a significant place in research. Business groups, which are gatherings of formally independent firms under common administrative and financial control, are prevalent worldwide (Ghemawat, Khanna, 1998). Business groups are particularly an organisational model applied in developing countries as part of their development efforts. We contend that the business groups that dominate the landscape of virtually all developing countries provide an organisational structure that is better suited to dealing with the poor availability of basic inputs and services (Fisman, Khanna, 2004).

Business groups operate in different regions of the world, and their names and organisational structures differ accordingly in different countries' economic life. Business groups are called holding in Turkey, holding or conglomerate in America, grupos economicos in Latin American countries, grupos in Spain, keiretsu in Japan, konzerne in Germany, chaebol in Korea, business houses in India, and jituangive in

Taiwan (Maman, 2002). These business groups emerged at different times and under different conditions. The structural characteristics of business groups reflect the economic conditions of the countries.

Business groups were established to overcome negative economic and managerial conditions. An outstanding feature of most developing economies is the significant role played by business groups (Khanna, Rivkin, 2001). According to Maman (2002), business groups emerged in response to certain economic problems, such as capital scarcity and underdeveloped capital markets in underdeveloped countries. Business groups control a significant portion of developing or emerging countries' productive assets and describe the country's largest and most visible businesses in all developing economies (Khanna, Palepu, 2000). Business groups are unique organisational structures established to overcome the conditions that arise after wars and major crises, especially in developing countries. The emergence of business groups in Japan, South Korea, and Israel takes place in periods following the wars they experience and subsequent independence (Aydemir, 2019c, 4).

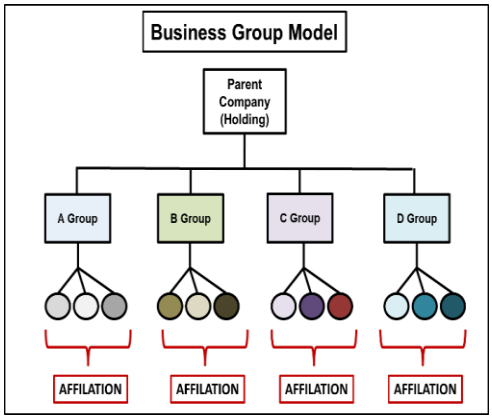
4. Bank-Centered Business Groups

The general organisational structure of the business group can be understood from its definitions. A business group with many definitions will be discussed in this study as an organisation made up of a combination of main and subsidiary businesses that act as a single economic entity under a common source of control (Ferris et al., 2003). Although the organisational structures of business groups differ from country to country, they have a common organisational model. As can be seen in Figure 1, there are group management and group affiliated companies/affiliations under the managerial and functional control of the parent company, which is called the holding company, and organisationally dependent on it.

In most business groups, there are finance groups and affiliated banks. In some countries, particularly Japan and Germany, banks play an important institutional role within business groups (Morck et al., 2000). Banks within business groups have special relationships within the group, in addition to performing traditional banking activities.

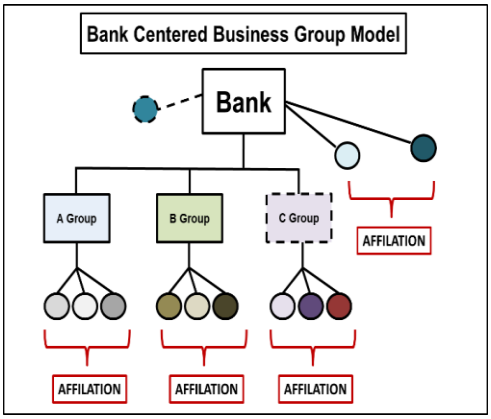
In a bank-centered business group model, a bank is present instead of a parent company/holding company. The bank operates like a holding company, establishing, acquiring, trading shares, and managing businesses, rather than engaging in traditional banking activities. Different countries have historically had bank-centred business models. Before and after World War II, in Germany, there were hierarchal business groups (Colpan, Hikino, 2010), while in Japan there were groups such as Fuyo, Dai-ichi Kangyo, Sanwa (Lincoln and Masahiro Shimotani, 2010, 140), and in Brazil, there were diversified conglomerates such as Bradesco and Itau´sa (Aldrighi, Postali). Samsung started out in the 1940s and 1950s under ISI (Schneider, 2010), bank-centred groups. In the 1950s, Israel pursued a policy of providing capital support to large businesses for development, leading to non-financial activities of Israeli banks and the emergence of bank-based groups (Maman, 2002).

Figure 1. Business Group Model



Source: Own contribution.

Figure 2. Bank Centered Business Group Model



Source: Own contribution.

When we look at the organisational structure and operations of bank-centred business groups, we see that there is diversity of businesses, similar to holding companies. There are also dominant businesses in different sectors that are affiliated with bank-centred business groups. Although the organisational structures of bank-centred business groups are generally similar, there can be differences among them.

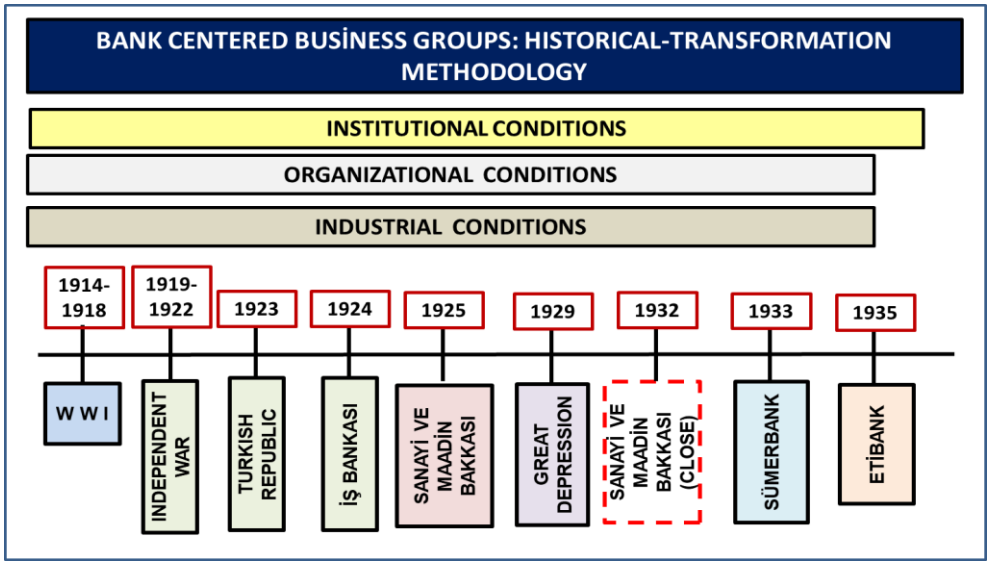
4.1 Bank Centered Business Groups in Turkey

The first predecessors of bank-based business groups were established in Turkey. There are two reasons for the establishment of bank-based business groups in Turkey. Firstly, the creator of this model is the functional background of the leaders, and secondly, it is a necessity created by the economic and institutional conditions of the period. The first reason can be explained by Hambrick and Mason's (1984) Top management team's approach. According to his approach, the reason for the decisions and practices made by the top managers is hidden in their cognitive structure and especially in their demographic values. The founding team of the Republic of Turkey, the creator of a bank-based business group model strategic organisation, consists of military people. The founding team are the commanders who received the best training of the period and spent most of their lives on the battlefields. Almost all of the decisions made by managers who have detailed planning, holistic thinking, long-term planning, and decision-making abilities in difficult conditions are tactical and strategic decisions. The establishment of bank-based business groups is the result of a strategic management approach that covers the long-term, covers the entire organisation, and can only be done by people with this awareness. The fact that business groups are dominant globally in addition to the national economies makes them strategic organisational structures. The establishment and management of these organisational models is also a reflection of strategic management. The establishment of a unique organisational structure that

will meet the need to stay in the conditions of the period and meet all needs is a successful example of strategic management.

Another reason for the establishment of bank-based business groups was the necessity of the economic and institutional conditions of the period. According to Lazonick's (2003) SCIE approach, the emergence of new businesses depends on industrial, organisational, and institutional conditions. To compare the business systems of businesses and countries, political, economic, social, and institutional conditions should be known (Amatori, Jones, 2007). The "Historical transformation methodology" will be used for this study. The theoretical analysis must be integrated with the historical study of the development process through an "historical-transformation methodology" (Lazonick, 2003). Figure 3 shows the historical transformations of the first established bank-based business groups.

Figure 3. Historical transformation of bank-centred business groups



Source: Own contribution.

The passage discusses the formation of business groups in Turkey in the first quarter of the last century, which were the predecessors of holding companies. Four bank-centred business groups were established, the first being İş Bankası on August 26, 1924, and the second being Sanayi ve Maadin Bankası on April 19, 1925. The latter closed its operations after the Great Depression in 1929 and became Sümerbank on June 3, 1933. Sümerbank was reorganised on June 14, 1935, and Etibank was separated from it.

After the War of Independence, the leadership of the newly established republic embarked on a rapid development effort. The primary goal of the Republican leadership was to accelerate Turkey's industrialisation (Tezel, 2002). However, the country's economic conditions were almost entirely unfavourable. Moreover,

the institutional conditions for new and powerful businesses to emerge were inadequate. Therefore, a single organisational structure was established that could eliminate all the negatives. Bank-centred business groups have made intense efforts to achieve the desired development.

The passage explains that the Ottoman Empire's economic conditions were the first institutional conditions that prepared the emergence of bank-centred business groups. The Ottoman economic system had different priorities than production, mainly based on agriculture and the army (Ulu, 1981). The economic institutional conditions worked against the Ottoman Empire for centuries. The Ottoman Empire's inability to correctly evaluate the world's changes led to its backwardness compared to Western countries. The reasons for the Ottoman Empire losing its competitive advantage against the industrial revolution-era Western European countries include inadequate transportation systems (Morel, 2000), the import of raw materials and minerals from abroad (Ökçün, 1971), Ottoman territories becoming a market for European industry, foreign capital investing in non-production commercial areas under state guarantees instead of the production sector (Eldem, 1970), the absence of a bourgeoisie to provide national capital accumulation, a centralised administrative structure in the management dimension, and production being done with simple technology (Altuğ, 1981). The Ottoman industry census conducted between 1913-1915 identified a total of 282 establishments operating in 8 sectors (Ökçün, 1971). Production was carried out in small workshops when all industrial facilities were examined. According to the industrial census conducted in 1921, the average number of employees per establishment was 2.3 people (Keyder, 1999). Beyond all these negativities, the devastating wars experienced worsened the current situation, and the existing backward facilities were also lost in the wars. The Republic of Turkey, which was founded on the ruins of a country that was invaded after losing an empire in the First World War, had an economy devoid of modern industrial facilities (Akçay, 2002).

Social conditions are as bad as economic conditions. The lack of entrepreneurs and workforce, which constitutes the managerial dimension of development, is one of the prominent negative conditions of the period. For centuries, the lack of capital accumulation and the concentration of economic power in the state administration has been an obstacle to industrialisation and development. According to Serin (1963), the lack of personnel with technical and administrative abilities, and the inadequacy of personnel with characteristics specific to businessmen was more severe and restrictive than the country's capital shortage. The lack of a qualified workforce is another obstacle to development. In the early 1920s, even 10 % of the population was illiterate (Tezel, 2002).

In order to gain a deeper understanding of the business groups of the foundation period of the Republic, one needs to examine the banking system that created them (Aydemir, 2019a). The biggest obstacle to development before and especially after the war was the financial structure of the country and the problems experienced in this regard. In 1924, although there were 12 foreign banks against 14 domestic banks, their share in deposits was 78% (Tezel, 2002). The Ottoman Empire adopted foreign

borrowing as the main method of financing its budget deficits and military expenditures (Broadberry et al., 2005: 126). The capital needed for industrialisation was also tried to be met from abroad (Akçay, 2002). Aware that the current capital situation and the financial system were not sustainable, the rulers initiated the national development initiative and searched for a new organisational model. The solution was bank-centred business groups. financial repression and credit rationing during a large part of the twentieth appearance of bank-centred groups (Çolpan 2010). Thus, large companies belonging to managerial networks had access to low-cost financing through their respective banks (Lefort, 2010).

With the devastating results of the war, the managers who started the development move started to establish bank-based business groups, which is a unique model with a strategic approach. In this context, first, two bank-based business groups were established. İşbank was established in 1924 and Industry and Maadin Bank was established in 1925. İşbank, which was first established, was established for purposes other than carrying out financial banking transactions and meeting the financial needs of the government and the market. It used its resources in the enterprises that it participated in or established for the development and the industrialisation of the country (Aydemir, 2019a). 3 of the 4 founding purposes in İşbank's founding agreement are related to entrepreneurship, establishment and management of businesses, and 1 is related to financial transactions. After İşbank was founded in 1924, it established and managed dozens of companies operating in different sectors, mainly insurance, mining, textile industry, sugar industry, glass industry, and trade.

Industry and Maadin Bank, established in 1925 with the Special Law No. 633, was established as a bank-based business group like İşbank. The second article of the establishing law states that "the bank itself or through its affiliates will make the industry activities and manage them" (Apak et al., 1952). After the establishment of the bank, 4 business entities inherited from the Ottoman Empire, namely Hereke Hali, Feshane, Bakirkoy Bez, Beykoz Deri, and Shoe factories, were handed over to the Industry and Maadin Bank (Aydemir et al., 2012). Apart from the ones transferred to it, the Bank has established new businesses, mainly textile and mining, and established businesses have participated. The bank during its lifetime had affiliated with 16 companies (Aydemir et al., 2012).

The third bank-based business group in the young republic is Sümerbank. Gerçete is a continuation of the Sümerbak Industry and Maadin Bank. Reflections of the conditions created by the Great Depression of 1929 in Turkey adversely affected a small number of businesses and the Industry and Maadin Bank was closed. The second major event that had devastating effects on the Turkish economy as well as on the world economy was the Great Depression of 1929. War and crisis are two negative events closely related to each other. Those who express their views on this issue agree that the devastating results of the First World War were the main factor that triggered the crisis (Duman, 2013). After the closure of the Industry and Maadin Bank, two banks, the State Industry Office and the State Industrial Office and Industry and Credit Bank of Turkey (State Industrial Office and Industry and Credit

Bank of Turkey), were established for a short time, but the desired success was achieved. Later, in place of the two organisations, the state-owned Sümerbank was established on 3 June 1933 pursuant to Law No. 2262, based on the precedent set by İş Bank (Aytemur, 2010). As in the previous examples, Sümerbank's establishment purposes are in the form of a bank-centred business group. The establishment law of the association has seven main sections and five of these seven sections are related to industrialisation and management, one relates to banking and the other to education and social issues (Aydemir, 2019b). Sümerbank founded and managed the cellulose industry, heavy industry, chemical industry, machinery industry, and ceramic industry, as well as the textile and leather industries that it took over from the Industry and Maadin Bank.

After the Great Depression, which caused great destruction after the war, new initiatives were needed. Despite the closure of the Industry and Maadin Bank, an example of a bank-based business group, and the establishment of Sümerbank, the targets set for national development could not be achieved sufficiently (Aydemir, 2019b). In order to realise the targeted development, enterprises that will operate in the energy and mining sectors were needed. A new bank-based business group was established as the corporate environmental conditions did not change significantly. Etibank has a structure similar to holding companies in western countries (Zarakolu, 1958). As a bank-based operating group, Etibank has established businesses operating in the mining, energy and banking sectors, and participated in established businesses.

4.2 Bank Centered Business Groups in Romania

Bank-centred business groups typically consist of a core bank and a range of affiliated businesses in various industries (Rădulescu et al., 2018). These affiliated businesses may include insurance companies, securities firms, asset management companies, and other financial and non-financial firms (Rădulescu et al., 2020).

While the organisational structure of bank-centred business groups tends to be similar, there can be differences among them depending on factors such as the size of the group, the nature of its businesses, the regulatory environment in which it operates, and the strategic goals of the group's management (Burlacu et al., 2021). For example, some bank-centred business groups may have a more decentralised structure, with a greater degree of autonomy given to their individual business units, while others may have a more centralised structure, with tighter control exercised by the core bank over its affiliated businesses.

Additionally, the dominant businesses within a bank-centred business group may vary depending on the group's focus and strategy (Androniceanu et al., 2017). For example, some bank-centred business groups may have a strong focus on the insurance sector, while others may place more emphasis on securities or asset management. These differences in focus can have implications for the group's overall performance and its ability to compete in different markets (Orzan et al., 2020).

In Romania, bank-centred business groups have played a significant role in the country's economy. These groups typically consist of a core bank, which serves as

the central hub, and a range of affiliated businesses in various sectors such as insurance, asset management, and real estate.

One notable bank-centred business group in Romania is Banca Transilvania Group, which is the largest banking group in the country. The group consists of several companies, including Banca Transilvania, BT Asset Management, BT Securities, and BT Leasing. Banca Transilvania Group has a diversified business model that allows it to offer a wide range of financial products and services to its customers.

Another bank-centred business group in Romania is the Raiffeisen Bank Group, which operates in several countries in Central and Eastern Europe. In Romania, the group operates through Raiffeisen Bank and a variety of affiliated companies, including Raiffeisen Asset Management, Raiffeisen Leasing, and Raiffeisen Insurance Broker.

Like in other countries, the organisational structures of bank-centred business groups in Romania can vary depending on the group's size, business focus, and regulatory environment. However, these groups continue to play an important role in the Romanian economy, contributing to the growth and development of various sectors through their diversified business models and expertise.

4.3 Comparative Analysis of Bank Centered Business Groups, Turkey-Romania and Lessons Learned

Bank-centred business groups have played a significant role in the economies of both Turkey and Romania. However, there are some differences in the way these groups are established and operate in each country.

In Turkey, bank-centred business groups have a long history, dating back to the establishment of the Republic of Turkey. These groups were created to address the lack of capital and high levels of inflation in the country, and they have continued to play an important role in the Turkish economy. The founding team of the Republic of Turkey consisted of military people who had detailed planning, holistic thinking, and long-term planning and decision-making abilities. These skills were valuable in establishing and managing bank-centred business groups, which require a strategic management approach that covers the long-term and the entire organisation.

In Romania, bank-centred business groups have also played a significant role in the country's economy, with the largest group being Banca Transylvania Group. These groups have a diversified business model, which allows them to offer a wide range of financial products and services to their customers. Unlike in Turkey, the establishment of bank-centred business groups in Romania is not directly linked to the country's historical context but rather to the need for diversified financial services in the market.

Another difference between the two countries is the regulatory environment in which bank-centred business groups operate. In Turkey, the regulatory environment for bank-centred business groups is highly developed, with strict rules and regulations that govern their operations. In contrast, the regulatory environment for

bank-centred business groups in Romania is less developed, and the rules and regulations are not as strict.

From the comparison of bank-centred business groups in Turkey and Romania, there are several lessons that can be learned:

Historical context can shape the development of bank-centred business groups. In Turkey, the founding team of the Republic of Turkey consisted of military people with detailed planning, holistic thinking, and long-term planning and decision-making abilities. These skills were valuable in establishing and managing bank-centred business groups, which require a strategic management approach that covers the long-term and the entire organisation. In contrast, the establishment of bank-centred business groups in Romania is not directly linked to the country's historical context, but rather to the need for diversified financial services in the market.

The regulatory environment plays a significant role in shaping the development of bank-centred business groups. In Turkey, the regulatory environment for bank-centred business groups is highly developed, with strict rules and regulations that govern their operations. In contrast, the regulatory environment for bank-centred business groups in Romania is less developed, and the rules and regulations are not as strict. A well-developed regulatory environment can ensure the stability and sustainability of bank-centred business groups, which are critical to the economies they operate in.

Diversified business models can improve the resilience of bank-centred business groups. Both Turkey and Romania have bank-centred business groups with diversified business models, which allow them to offer a wide range of financial products and services to their customers. This diversification can help these groups withstand economic shocks and fluctuations in the market.

Bank-centred business groups can contribute significantly to the growth and development of the economies they operate in. Both Turkey and Romania have bank-centred business groups that have played a significant role in their respective economies. These groups have provided access to capital for businesses, diversified financial services for customers, and created jobs and opportunities for economic growth and development.

5. Conclusions and Future Research Directions

Bank-based business groups are a unique organisational structure that meets the development need that can be established after events with devastating effects such as war and crisis. Especially finance, entrepreneur, etc. created by institutional conditions. Bank-based business groups, which are capable of meeting all the needs in a single organisational structure, are an exemplary historical model. Bank-based business groups are an organisational structure that many countries use for their development efforts. Bank-based business groups are the first organisational examples of holdings to be established in the future. In bank-based business groups, the main business is the bank. The bank not only carries out financial transactions, but also establishes and manages businesses like a holding, and the established businesses participate. Bank-based business groups are a unique organisational

model that can meet all of their needs, such as lack of finance, lack of human capital, and entrepreneurship, in a single organisational structure.

After İşbank, the first bank-based business group established by the Turks in 1924, new organisations were established and transformed into new organisations depending on the change in institutional conditions. After the Great Depression of 1929, new bank-based business groups established based on sectoral needs contributed to the development efforts. Bank-based business groups, which reflect the strategic management skills of the managers of the period, are a unique organisational model that can be applied to countries experiencing war and crisis and aiming for development.

In conclusion, bank-centred business groups have played a significant role in the economies of both Turkey and Romania. However, there are differences in the way these groups are established and operate in each country, with the historical context and regulatory environment playing a significant role in shaping their development. Bank-centred business groups are complex organisational structures that require a strategic management approach, a well-developed regulatory environment, and diversified business models to ensure their stability and sustainability. Bank-centred business groups can contribute significantly to the growth and development of the economies they operate in, and their lessons can be useful for policymakers and businesses looking to develop similar structures in other countries.

5.1 Future Research Directions

Extending the study to other countries and regions: Investigating other examples of organisational models used by countries affected by wars and crises can provide a broader understanding of how they develop and transform over time.

Analysis of the economic impact of bank-centric business groups: The study can be extended to assess the impact of these business groups on the economy, growth, and long-term development in the post-war and post-crisis context.

Studying internal mechanisms of adaptation and innovation: Investigating how bank-centric business groups adapt and innovate to meet the challenges and changes of the post-conflict and post-crisis environment can provide a deeper understanding of how these organisations develop in such contexts.

5.2 Implications of the Study

Improving decision-making: Knowing how bank-centric business groups have developed and transformed can provide countries affected by wars and crises with a frame of reference for improving decision-making related to organisational development and restructuring.

Supporting economic development: Using the organisational model presented in the study can contribute to post-conflict and post-crisis economic development by promoting economic growth and stability through bank-centric business groups.

5.3 Limitations of the Study

Generalisation of the results: It is important to consider the specific context of each country in evaluating the potential practical applications of the organisational model presented. What worked for bank-centric business groups in Turkey cannot automatically be transferred to other countries or situations.

Historical relevance: As the study is based on organisational models and historical events of the past, it is important to assess whether they remain relevant in the current socio-economic context and in the face of other contemporary challenges.

Cultural and socio-political impact: The way bank-centric business groups have developed and been adopted may be influenced by specific cultural and socio-political factors, which may limit their applicability in other contexts.

In conclusion, this study provides an exemplary historical organisational model, but there are multiple research directions, implications, and limitations that need to be considered to provide a clear roadmap for further investigation and potential application of the findings to practice. By exploring these aspects, one can advance the understanding of how organisations develop after wars and crises, and how this knowledge can be used to support development and reconstruction efforts.

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Digital Reliance within B2C and B2G Communication Systems in the post-COVID-19 Pandemic Era: A Systematic Literature Review

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Abstract

In the framework of this study, we carried out a systematic review of the literature on digital reliance within B2C and B2G communication systems in order to reveal the particularities of this phenomenon in the post-COVID-19 pandemic era. For the systematic literature review on this topic, articles published in representative databases were selected using the PRISMA 2020 flow diagram. As a result of the systematic literature review, a significant number of articles on the subject of digital reliance on B2C and B2G communication systems were identified, most of them indicating the increase in the use of these communication systems in the post-COVID-19 pandemic era. Both in the B2C and B2G fields, the COVID-19 pandemic has resulted in the proliferation of remote communication methods, digital signatures, digitally encrypted documents, secure online connections, e-portals, online meetings, virtual public spaces, and other forms of digital communication.

Keywords: digital reliance, B2C, B2G, communication, systems.

JEL Classification: O33; O39.

1. Introduction

Digitalisation of public and private entities has always been on the working agenda of nations world-wide, the trajectory towards unrolling B2C and B2G commercial operations and documents transfers within an unitary-tax environment being a continuous engaging purpose. The disruptive events like COVID-19 and the

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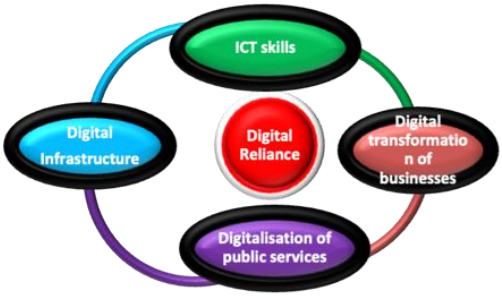
actual 2023 socio-economic environment have been demonstrating that the critical role of the digitalisation is to become more laser focused, as nowadays the digital systems functioning on programmed parameters stage up for a new era of B2C and B2G communication systems. If before the COVID-19 pandemic, the digitalisation was a nice-to-have future development plan, nowadays it has begun being a sine-qua-non requirement.

The fiscal-digital public-private partnership has faced a major boost turn toward transiting from paper-documents signed and stamped to digital-support documents, electronically signed and electronically encrypted, and electronically transferred and confirmed, in the post-COVID-19 pandemic era.

As the aforementioned digital landscape empowered remote communication B2C and B2B methods that rely on secure online connections and collaborative software. In this context, the informational asymmetries identification on-time and on-spot helps on reducing and eliminating: the vulnerabilities caused by hyper-connectivity and the security breaches in the B2C and B2G data interoperability. The current literature review that was conducted revealed a major interest in finding new ways of bringing at the same table both public and private entities, in order to conduct predictive detailed analysis. Staring from the premises that data sets are a non-rival resource and having a continuous B2C and B2G Big Data transfer, the switch towards a model based on evidence for socio-economic politics elaboration is becoming more tangible as the private sector is using the public infrastructures on a daily operational basis and is in need of measuring digital security incidents and data breaches for proper functioning. As predictability is hindered by the data set's limited interoperability and lack of comparable evidence, public-private partnerships sustained by European mechanisms, are enhancing to spur innovation in the B2C and B2G data and documents workflow. The primary steps are to be made at European level as already 80% of citizens are targeted to have a digital identity and subject to an online platform usage on a daily basis, 75% of private and public entities are to be using Cloud Storage, Artificial Intelligence, and Big Data, 10000 climate-neutral highly secure edge nodes are on the projected trajectories, and also adding valuable human resources to the table in form of 20 million+ ICT Specialists has been taken into consideration in empowering the 2030 digital reliance, as shown in Figure 1.

Figure 1. European Digital Decade objectives for 2030



Source: European Commission (2022).

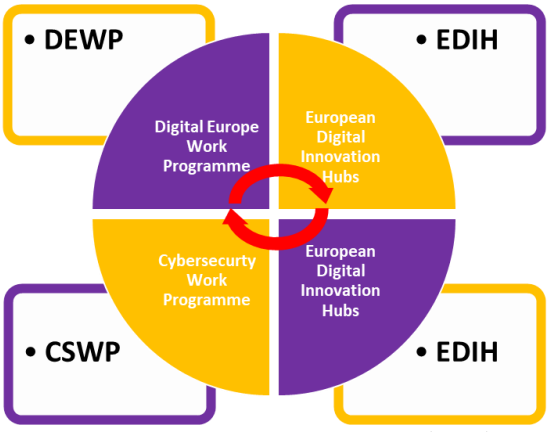
The systematic literature review emphasised that guidance is needed to secure B2C and B2G communication within a data-driven economy and the European Commission adopted in March 2023 the Digital Europe Programme for Europe's digital transition and cybersecurity, granting resources of 1.284 billion euro (digital-strategy.ec.europa.eu, 2023) in funding. Thus, cloud-to-edge federations and common data spaces have now both the resources and the purpose established in growing reliance on digital tools.

The primary goals of digitalisation were on the table all along, the COVID-19 pandemic, raised the leverage content and empowered a digital push, as the lack of resources kept in lagging digital transformation and dragged back B2C and B2G digital communication. Nowadays, the usage of e-platforms for virtual public spaces benefits citizens and both the public administrations and the businesses.

Consequently, the investments in digitalisation, B2C and B2G tailored, for a common data space is offering the incentives to further digital reliance expanding.

Hence the gaps in digital uptake due to lack of financial resources start to be filled in, the cornerstones of a B2C and B2G communication infrastructure, based on digital reliance of non-disclosure data to an unauthorised party, will grow in including: encryption, digital signatures with token, qualified electronic seal, DV (domain validation) and OV (organisation validation) digital certificates, QWAC and QSealC eIDAS certificates, strong authentication mechanisms for all the point-to-point and point-to-multipoint systems. Common space data requires availability, integrity and confidentiality, and this is also what EU Directive 2366/2015 legally states, that all data transfers, regardless of whether they are B2C or B2G, shall be managed through safe and secured channels and all the data within the transfer shall be protected in terms of authenticity. As both tangible and intangible damages can occur in the absence of secure communications, correlated with the slow rate of transposition of the bureaucratic segment towards technology, also European technical Standards like SR EN 1693-1 are to be implemented.

Figure 2. Current work programmes implementing DIGITAL, adopted by the European Commission



Source: European Commission (2023).

Digitalisation within B2C and B2G communication systems is expected to occur sooner as the disruptive events such as the COVID-19 pandemic raised the percentage of SME making more use of digital technologies by up to 70 %, and the Digital Europe Programme for Europe's digital transition and cybersecurity comes into shape, as shown in Figure 2. These contextual developments as well as the approach to the subject in specialised literature determined the interest in the research presented in this article.

2. Problem Statement

The issue of digital reliance within B2C and B2G communication systems in the specialised literature had different approaches both before the COVID-19 pandemic and during the pandemic, when the need to isolate individuals created new possibilities and needs for the fruition of digital opportunities by companies (Mitchell, Strubberg, 2022; Kysh, 2020; Vespe et al., 2021).

Digital reliance could be defined as the degree to which individuals, organisations, and societies depend on digital technologies for their daily functioning and well-being. Digital reliance can have positive and negative impacts on various aspects of human life, such as communication, education, health, economy, energy (Simion et al., 2023), security, and culture. In this regard, are significant the studies carried out by Pavelle and Wilkinson (2020), Al-Shareeda et al. (2022), Gössling (2021).

Digital reliance can also pose challenges and risks, such as digital divide (Litchfield et al., 2021), cybercrime (Tharshini et al., 2021), privacy breaches, misinformation, and digital addiction (Allcott et al., 2022). Therefore, digital reliance requires careful management and regulation to ensure that its benefits outweigh its costs.

Technology has become an integral part of our daily lives, from communication to entertainment, from education to health, from business to leisure. We rely on digital devices and platforms to connect, learn, create, share, and collaborate. This dynamic of the extent of technological changes and the effects on the management of organisations has long been revealed by the dynamics of managerial studies (Nicolescu, Nicolescu, 2014).

B2C stands for business-to-consumer, which refers to the type of transactions that occur between a business and its individual customers. B2C businesses typically focus on creating a positive customer experience and building brand loyalty. They use various marketing strategies, such as email campaigns, online reviews, influencer endorsements, or loyalty programs, to attract and retain customers. They also leverage data analytics and artificial intelligence to personalise their offerings and recommendations based on customer preferences and behaviour.

B2G stands for Business-to-Government, which is a type of e-commerce that involves transactions between businesses and public sector organisations. B2G can benefit both businesses and governments by: reducing costs and increasing efficiency through digitalisation and automation of processes, improving transparency and accountability through data sharing and reporting, enhancing innovation and competitiveness through collaboration and partnership.

Although there are numerous approaches in the specialised literature to the issue of digital reliance, B2C and B2G in the context of the COVID-19 pandemic, relatively few are focused on the evolution of digital reliance within B2C and B2G Communication Systems in the post-COVID-19 Pandemic Era. This research gap also appears because the peak period of the pandemic has just passed and there is still a relatively high degree of uncertainty about the developments in this field. In some areas, the post-pandemic developments seem to continue the trends from the period of the COVID-19 pandemic, and in others the period of post-pandemic seems to confirm a return to pre-pandemic trends and approaches.

3. Research Questions / Aims of the Research

The main purpose of the research presented in this article is to reveal the main mutations and implications that digital reliance within B2C and B2G communication systems in the post-COVID-19 pandemic era was based on a literature review that included articles published in three periods: the period from before the COVID-19 pandemic, during the COVID-19 pandemic, and in the post-pandemic period.

In accordance with the main purpose of the research, the following research objectives must be achieved:

- identification of relevant databases for the subject of the research carried out;
- the systematic research of specialised literature and the identification of studies and research carried out on the subject of digital reliance within B2C and B2G communication systems before the pandemic era, in the COVID-19 pandemic period and the post-COVID-19 pandemic era;
- highlighting the importance of digital reliance within B2C and B2G communication systems as a result of a systematic review of studies published in this field.

The research conducted on digital reliance within B2C and B2G communication systems in the post-COVID-19 pandemic era aims to answer the following questions:

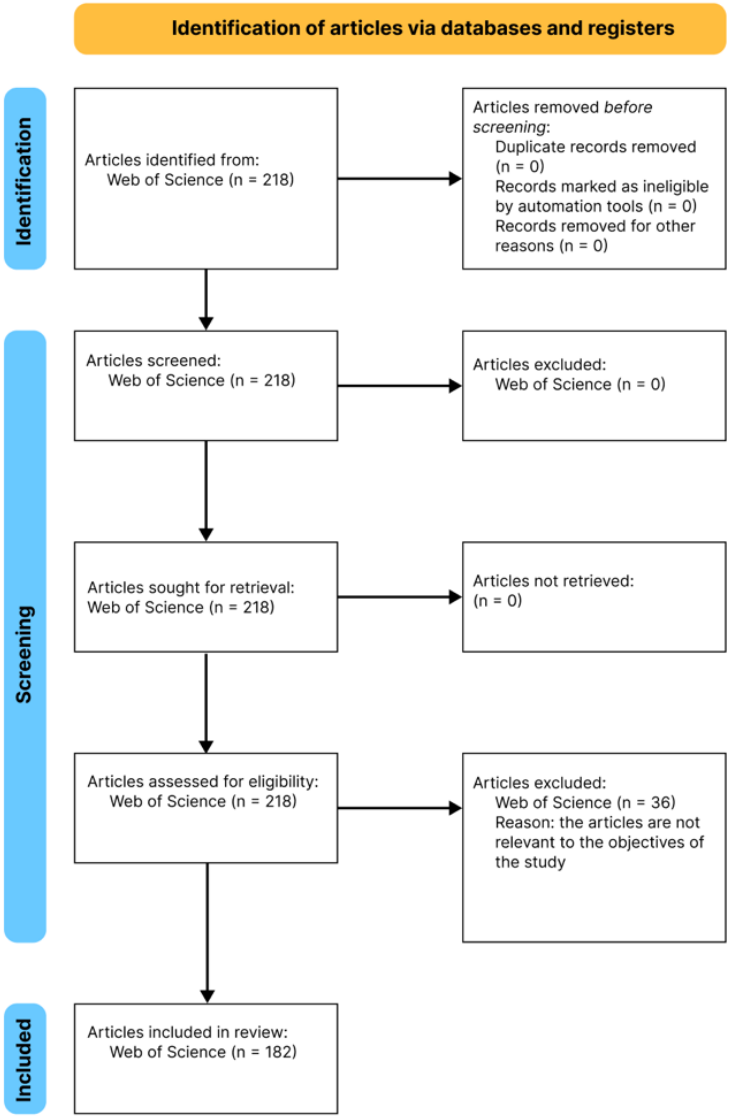
- What are the main approaches regarding digital reliance within B2C and B2G communication systems?
- How has scientific interest in these approaches evolved in the pre-pandemic period? But during the COVID-19 pandemic?
- What are the main communication systems used in the context of B2C and B2G?
- What are the effects (advantages and risks) of digital reliance within B2C and B2G communication systems?

Carrying out the literature review regarding digital reliance within B2C and B2G communication systems provides adequate answers to these questions, taking into account the breadth of topics covered in the specialised literature and the interest of publications/researchers in this topic to reveal essential trends and mutations in the post-COVID pandemic era.

4. Research Methods

The literature review was carried out using the PRISMA 2020 flow diagram to take into account all the studies and researches published in the Web of Science databases on the subject of digital reliance within B2C and B2G communication systems in the post-COVID-19 pandemic era. The main stages of the systematic review of the literature are presented in Figure 3.

Figure 3. The main stages of the systematic literature review



Source: Own data processing according to PRISMA 2020 flow diagram for new systematic reviews, including searches in databases.

From a methodological point of view, in the first stage, all important databases on the subject of the literature review were identified and analysed. The Web of Science database was selected because it indexes the most relevant articles on the subject of digital reliance within the B2C and B2G communication systems in the post-COVID-19 pandemic era. The Web of Science database search was conducted using the terms digital reliance (Topic) and communication (Topic) and initially generated 218 results. No double entries were identified at this stage, nor were articles flagged as ineligible by the automated search tools used. In the screening stage, 36 articles were excluded because the analysis showed that they are not relevant to the objectives of the study. Finally, 182 articles indexed in the Web of Science databases were included in the literature review.

5. Findings

The results of the research carried out mainly concerned the following elements, the fields and areas of research in which the articles were published, the communication systems used for B2C and B2G, and the effects of digital reliance within the B2C and B2G communication systems in the post-COVID-19 pandemic era.

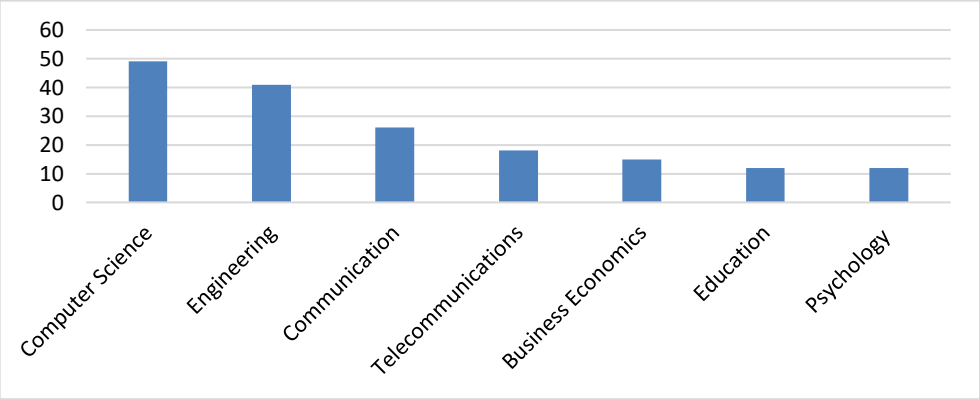
From the perspective of the Web of Science domains in which they were published, most studies on digital reliance within B2C and B2G communication systems were published in the fields of electrical electronic engineering, followed by communication, computer science, and telecommunications. Publications in fields such as Information Science, Education-Educational Research, or Health Care Sciences Services are represented in small proportions.

Figure 4. Frequency of studies published on Web of Science domains

Source: Web of Science.

Depending on the research area targeted by the content of the published studies and research, most articles were published in computer science, followed by engineering, communication, telecommunications, business economics, education, and psychology. The results are shown in the following graph.

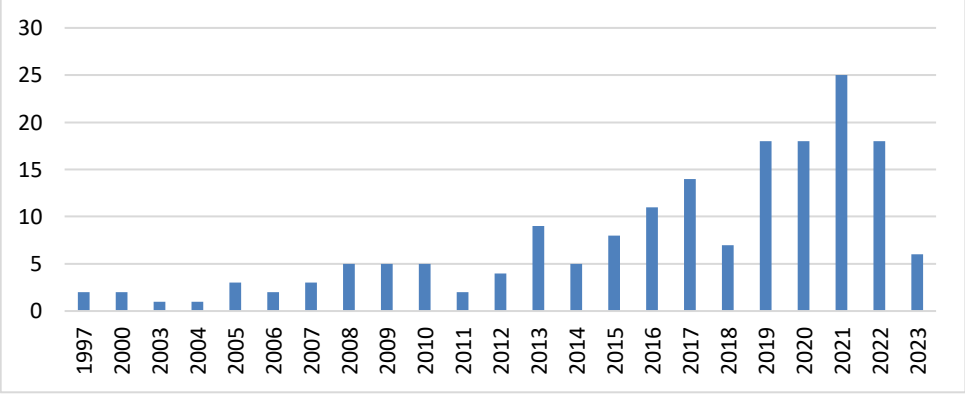
Figure 5. Frequency of studies published on research areas



Source: Own calculations using Web of Science data.

From the perspective of the dynamics over time of the studies carried out, it can be noted an increase in the interest of researchers for on the subject of digital reliance within B2C and B2G communication systems (Figure 6).

Figure 6. Evolution of studies published/year



Source: Own calculations using Web of Science data.

Figure 6 shows that the number of studies published during the COVID-19 pandemic is much higher than in the period before the pandemic. In the post-pandemic period (2022 and 2023) the number of studies began to decrease. However, the trend still cannot be considered relevant because there are only two years analysed, one of which is not yet completed.

Analysing the data in Table 1 regarding the frequency of publications regarding the communication systems used in the context of B2B and B2G, it can be seen that the interest of researchers is rather directed toward the study of remote communication methods, social media & social networks, secure online connections than towards digital signatures and E-portals.

Table 1. Number of studies focused on communications systems

Communication systems	Number of studies in Web of Science
Remote communication methods	30
Digital signatures	5
Digitally encrypted documents	10
Secure online connections	14
E-portals	2
Online meetings	9
Virtual public spaces	5
Social media & social networks	15
Other forms of digital communications	16

Source: Own calculations based on.

Many studies consider the advantages and risks/adverse effects of using specific B2C and B2G communication systems. Among the most important advantages identified are:improving access to information and knowledge; facilitating communication and collaboration; boosting creativity and innovation; increasing convenience and efficiency. Among the most important adverse effects are:affecting mental health and well-being; disturbing attention and focus; reducing social skills and empathy; creating ethical and social dilemmas (Allcott et al., 2022). Some of these problems, identified in studies published during the pandemic, appear to persist in the post-pandemic period.

6. Conclusions

The study presented in this article aimed to carry out a literature review on the subject of digital reliance within B2C and B2G communication systems in the post-COVID-19 pandemic era. To carry out the literature review, information was used regarding the studies published on this subject and indexed in Web of Science (both for the period before the pandemic and for the period during the COVID-19 pandemic and after it).

The analysis carried out revealed that this topic is addressed more frequently by the authors of studies focused on technical aspects than those of a socio-economic nature. The frequency of publications devoted to digital reliance and specific B2C and B2G communication systems was much higher during the pandemic than in the period prior to it. In the post-pandemic period, a reduction in interest in the subject of digitisation can be observed. The use of B2C and B2G has, according to the analysed publications, obvious positive effects, but also possible risks that are not specific to the pandemic, but rather seem to persist in the post-pandemic period.

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Assessing Romanian Meat Processing Companies' Readiness for Sustainable Marketing from a CSRD Perspective

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Abstract

In the recent difficult and turbulent context, the meat processing industry in Romania can change its course and consider its environmental, social, and governance impact (ESG). This article seeks to highlight how companies subject to the Corporate Sustainability Reporting Directive (CSRD) engage in sustainable marketing by analysing their sustainability reporting. The performance indicators studied in the 1,336 registered meat processing entities determined 10 companies that fit the CSRD criteria. For each of them, the corporate site was inspected, and a data base was created considering different variables related to sustainable marketing. Based on various research studies, a macro environment analysis using the PESTEL framework (Richardson, 2019) and a micro environment assessment based on Porter's 5 forces (Porter, 1979 cited in Richardson, 2019) were applied to the group of the 10 eligible companies. The results suggest that the top meat processing companies in the industry lag behind in articulating coherent sustainable marketing strategies and have little time for improvement, should they consider their ESG impact. However, this could be an opportunity to adopt more sustainable practices, especially in terms of their environmental footprint.

Keywords: Sustainability reporting, sustainable marketing strategies, meat industry, CSRD.

JEL Classification: M 31, Q56.

1. Introduction

The legal framework is an important trigger to advance the sustainability agenda in the EU. Since 2018, Romanian organisations with more than 500 employees have

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to submit their non-financial and non-audited disclosures, including sustainability-related commitments such as: environmental protection, social and HR engagement, anti-corruption and anti-bribery practices. Starting January 2022, these companies were due to report more specifically their actions against the climate change, and the resulting measurable outcomes. In November 2022, an important and long-awaited measure was enforced at the EU level: the Corporate Sustainability Reporting Directive (CSRD) was adopted by the European Parliament, which will 'make businesses more publicly accountable by obliging them to regularly disclose information on their societal and environmental impact'. CSRD will be applied to large or listed companies that simultaneously fulfil 2 out of 3 of the following criteria: turnover exceeding 40 million euros, profit more than 20 million euros, or a workforce above 250 employees. This directive includes a specific timeline for submitting audited sustainability reports, under the EU taxonomy, starting 2024 (audited reporting due in 2025) (Council of the EU, 2022).

Thus, sustainability will become equally important as the financial performance, for engaging investment and maintaining profitability, as companies will be scrutinised on their ability to fight climate change (environmental priorities), along with their social impact and governance practices, the so-called 'ESG' pillars. Furthermore, sustainable marketing can contribute to the development of a positive social image of the company, which can be beneficial in improving the reputation of the brand and increasing customer engagement (Gong et al., 2023).

The research aims to evaluate to what extent the top meat processing companies in Romania engage in sustainable marketing and are ready to adopt the CSRD reporting in the near future. Research results reveal that ESG reporting can trigger a management shift toward more sustainable practises, combating climate change.

The research was conducted in the context of sustainable marketing, a contemporary development of social responsibility in marketing, which focuses on delivering sustainable value to consumers and stakeholders through the balance of three sustainability dimensions (Lucic, 2020). Furthermore, 'the role of marketing in sustainable development is crucial, since the marketing department connects manufacturing and consumption', as stated by Stancu (2018). One can argue that the role of the marketing department is transformative, as it aims to achieve a triple performance, called the triple bottom line, in social, business and environmental dimensions, considering the “3 P” (People, Planet, Profit) (Turletti, 2019).

2. Problem Statement

If a given organisation considered a holistic approach to sustainability, beyond mere operational tasks, it would need to integrate sustainability into its values, beliefs, norms, goals, mission, structure, and operations, as highlighted by Rudawsa (2018).

To this end, sustainable marketing is a way to identify and meet customer needs while also considering the environmental impact of goods and services. In contrast, traditional marketing may prioritise profits over long-term environmental benefits. In short, sustainable marketing is defined as a process that aims to create,

communicate and deliver value to customers while preserving or enhancing natural and human capital throughout (Bernyte, 2021).

Companies adopting comprehensive sustainability strategies acknowledge the importance of social and environmental challenges and consider the potential risks to the respective business. To achieve this, organisations should adjust their operational strategies, with particular emphasis on their marketing strategies. Therefore, incorporating sustainable practices into marketing strategies is essential for companies to thrive and establish a competitive advantage in the long run (Rudawsa, 2019).

Furthermore, organisations should seek to understand better than their competitors the macro-environmental trends (and disruptions) that can transform sectors and create new opportunities' (Richardson, 2019). One of the frameworks documenting the analysis of future external trends impacting sustainability adoption, PESTEL, refers to a few dimensions: political, economic, social, technological, environmental, and legal.

When assessing the competitive microenvironment affecting sustainability, the five-forces model introduced in 1979 by Porter can provide an 'understanding of industry structures and the way they change' (Richardson, 2019).

Consumers generally tend to prefer companies that act as environmental stewards, as it allows them to identify with such brands (Orzan et al., 2018). According to Ajina et al. (2019), customer awareness of a company's actions is essential for their reactions toward the company. The more informed customers are, the better they can evaluate and differentiate the company.

As consumer values rapidly transition toward sustainable development, marketing must embrace suitable sustainable practises to accommodate this shift (Danciu, 2014). Businesses recognise that fulfilling their obligations involves acting responsibly, which in turn helps promote sustainable development (Zaharia et al., 2010). Ecological, social, and economic factors are the main components of sustainable consumption. According to Quoquab et al., Abdulrazak and Quoquab, Brach et al., and Bulunt et al., sustainable consumption is regarded as a force that propels sustainable development (Boca, 2021).

3. Research Questions

By investigating which are the meat processing companies where CSRD applies starting 2025, out of 1036 registered entities only 10 organisations meet the criteria. For each of those, where available, the corporate site was reviewed and a data base was created considering different variables, linked to sustainable marketing. The objective of this direct research has been to identify if meat processing companies are prepared to act more responsibly across the ESG criteria, being transparently accountable on their environmental, social, and governance impact.

Furthermore, based on various research studies, a macroenvironment analysis using the PESTEL framework (Richardson, 2019) and a microenvironment evaluation based on Porter's 5 Forces (Richardson, 2019) have been applied to the group of 10 organisations.

4. Research Methods

The review of the literature guides the role of sustainability in organisational marketing strategy and planning, while highlighting the barriers and triggers to advance their sustainability agenda. Special emphasis is placed on consumer behaviour in relation to sustainability principles.

Direct research has been used on the websites of meat processing companies where CSRD can already be applied. To properly document their readiness to integrate the CSRD framework, the main sections of these companies' websites have been analysed, their public reports, and communications (Stancu et al., 2013). In this way, the ability of the selected organisations to transparently communicate their sustainable marketing practices is documented, where they exist. The incumbent published sustainability reports or even nonfinancial disclosures have been considered for in-depth appraisal, as their reference to specific ESG objectives and outcomes.

Then macroenvironment research was performed using the PESTEL framework followed by a microenvironment assessment based on the Porter 5 Forces framework. Consequently, the mitigating factors and the challenges to advance the sustainability agenda within the meat processing industry have been determined. The informed resulting conclusions present an assessment of the readiness of the meat processing industry to apply sustainable marketing, under the CSRD lens.

5. Findings

5.1 Direct Research on the Websites of the Top Meat Processing Companies

The analysis applied on the 2021 available public data about the registered Romanian entities within certain fields of activity, coded as 1013- manufacturing meat products and 4632- trading meat products, revealed that out of 1,336 companies, there were only 10 meat processing organisations with annual sales exceeding 40 million euros and more than 250 employees.

Table 1. Top meat processing companies in Romania

Organisation	Employees 2021	Sales 2021 euros
CrisTim 2 Prodcom	1066	149,604,024
UNICARM	3087	145,281,076
MACROMEX	414	128,725,351
Caroli Foods Group	921	97,053,292
Fox Com Serv Distribution	444	73,371,101
Diana	507	56,545,793
Convenience Prod	440	49,039,089
Bertis	616	48,080,592
MEDA prod 98	732	48,007,184
ALDIS	808	46,514,218

Source: www.coduricaen.ro.

There were no companies with sales more than 40 million euros and a net profit exceeding 20 million euros or units with profits above 20 million euros and 250 employees. Consequently, the above evaluation led to identifying the only 10 organisations where the CSRD criteria could apply if the Directive has already been implemented.

Furthermore, the analysis revealed that of the 10 companies, 3 do not have working websites. Of the remaining 7 websites assessed, only 3 presented an articulated vision, mission, or values, which, however, were not related to sustainability or even to CSR. For example, among the identified visions, there were: "Family company" (CrisTim), "Wants to be part of their daily life" (Fox), "Brings food favourites to all communities.'

None of the considered organisations dedicated a separate section to their sustainability marketing initiatives or appeared prepared to transparently publish their ESG commitments in the form of a report. There is only one company that has made public, in a footnote, its nonfinancial disclosure.

Based on the above-mentioned findings, the leading meat processing companies in Romania seem to have enough room to improve their sustainability reporting abilities under the CSRD, while making publicly available their definite ESG objectives and outputs. Furthermore, since CSRD refers to its 2024 activity, these organisations have little time to set up a certain framework to implement sustainable marketing practices.

5.2 Macro Environment Research Using PESTEL

5.2.1 Political Factors

Given the impact generated by the war in Ukraine on Romania's ability to access energy sources, the Romanian government signed a green energy deal with three countries to provide energy through a 1,200 km submarine cable across the Black Sea (European Commission, 2022). This shows that Romania has taken serious steps to secure green energy locally and for the entire EU. Furthermore, local authorities have issued an emergency ordinance to encourage renewable energy consumption (Ministry of Energy, 2022), which may be an opportunity to engage in more sustainable energy use by the meat processing industry.

5.2.2 Economic Factors

In December 2022, Romania registered the highest inflation rate in the last 20 years: 17% (ING Snaps, 2022). Research conducted by a global intelligence agency revealed that 91% of panel consumers declared that they were extremely concerned with the impact of inflation on their household budgets (GlobalData, 2022). Furthermore, 4 out of 10 consumers in Europe find it harder 'to act sustainably due to economic problems', while 6 out of 10 consider environmentally friendly alternatives too expensive (GfK, 2022). Therefore, high prices should be considered an important barrier to sustainable purchasing, including the acquisition of processed meat products.

5.2.3 Social Factors

Romanians are mostly concerned about rising prices, the state of the war in Ukraine, and the costs of their healthcare (McKinsey, 2022). Sustainability becomes less of a priority, and consumers prefer to better control their purchasing budgets and even spend less.

To address the overwhelming downward trend, most meat processors decided to market and promote products packed in smaller quantities. These represent an opportunity to reduce food waste while generating more unrecyclable plastics on the market.

5.2.4 Technological Factors

Romania ranks the lowest on the European Innovation Scoreboard 2022 (European Commission, 2022), with reduced R&D funding reflected in the low number of patents registered by local firms. As the state does little to support innovation for the meat processing industry, academia and private companies must find alternative financing for creating more sustainable products replacing meat, such as plant-based.

5.2.5 Environmental Factors

Within the Farm-to-Fork EU strategy, sustainable agriculture is considered very important for fighting against climate change (European Commission, 2022). Local farmers can access different financing systems designed to protect the climate, while consumers are encouraged to taste national products and opt for a more 'local' approach, thus strengthening a sustainable supply chain.

In a study conducted to determine the growing concern of consumers for local origin products (Ipsos, 2022), their perceptions were translated into different dimensions of the perceived ‘local’ identity. The study revealed that the origin is already a decisive factor in the purchase decision and helps sustain small farms. Additionally, food of local origin reinforces sustainability, while local-origin products of local origin help reduce polluting emissions.

Therefore, it becomes increasingly important for the meat processing industry to identify local suppliers. This will increase the local footprint of the industry and make its supply chain more sustainable with reduced environmental impact.

5.2.6 Legal Factors

The impact placed by the CSRD reporting on the meat industry companies that qualify is time sensitive. Internal procedures for collecting data for the forthcoming sustainability reports should be established, dedicated internal and external resources to roll-out the sustainability reporting will be shortly needed. Equally important, these organisations will have to set clear and transparent ESG goals.

Furthermore, the revision of the European Packaging and Packaging Waste Directive (PPWD) would add packaging prevention and reduction goals to those of packaging waste management (European Commission, 2022).

5.3 Microenvironment Research Using Porter's 5 Forces

5.3.1 Bargaining Power of Buyers: High Force

A research study reveals that only 26 % of consumers still sought sustainability / environmentally friendly product characteristics when making a purchase (GlobalData Romania, 2022), being mainly interested in their functional characteristics (such as nutritional declaration).

5.3.2 Bargaining Power of Suppliers: High Force

The swine flu in Europe caused a severe shortage of pork meat. Romania is one of the countries where this animal disease was discovered and contained, but local supply is hardly available, while approximately 80 % of pork meat in the country is imported from outside Europe. This has led to a constant monthly price increase, while the scarce supply of pork meat already represents an overall challenge for the meat industry.

Consequently, the meat processing industry has the opportunity to look deeper for sustainable small local suppliers, who can provide clean and safe-to-eat pork meat.

5.3.3 Substitutes Products: Medium Force

In Romania, plant-based dry proteins (wheat, pea, soy) started to be used, especially for burgers, nuggets, and schnitzels. These substitutes cannot compete with the taste of the meat, but slowly win the preference of customers, and are a sustainable alternative to pork or chicken. Romanians rank first in Europe in terms of their preference to replace meat in their food: 46 % are flexitarian, pescetarian, vegetarian, or vegan (Kerry, 2022).

5.3.4 New Entrants: Medium Force

New entrants must put a lot of effort and investment into making processed meat products available nationally and position them correctly. The environmental certification necessary for any production unit takes long to obtain, and many EU environmental regulations must be met.

On the other hand, the big retailing networks became so powerful in Romania that often push for their own private brands on the shelves, focused on the lowest possible price and less on sustainability.

5.3.5 Rivalry: High Force

Cold cuts used to be developed by big companies, but smaller producers and private label brands have started to gain consumers' preferences in the last 3 years. These organisations can easily elude the CSRD reporting criteria, but the top companies have a real opportunity to focus on sustainability marketing and engage in transparent sustainability reporting.

The source of competitive advantage for the top meat processing companies will soon shift from price to sustainable marketing.

6. Conclusions

Given the identified challenges and opportunities resulting from the macro- and micro-external environments around the Romanian meat processing industry, time-sensitive changes will impact the top companies that meet the CSRD criteria.

Therefore, the 10 already qualifying companies for compulsory audited sustainability reporting will have to consider specific ESG objectives and outcomes and generate definite managerial changes to engage in sustainable marketing strategy and planning, in a very short timeframe.

Moreover, they will have to focus more on reducing their environmental emissions, by becoming more active in pushing for local legislation encouraging local supply. Additionally, the resulting good outcome will consist of a more active search for sustainable small local suppliers who can provide clean and safe-to-eat pork meat.

As the state does very little to encourage R&D, companies in the meat industry will have to find alternative financing for creating more sustainable products replacing meat, such as plant-based.

Although the current downward trend expressed by the meat products' consumers has little to do with sustainability and more with high prices, manufacturing companies should plan well in advance their own contribution to introducing more sustainable packing solutions. The necessary investment for new packing machinery and materials, to replace the existing non-recyclable plastic, can be considerable. This may be offset by accessing more sustainable energy sources, which are partially supported by the government, but an important investment plan is generally needed.

In addition, internal procedures for collecting data for the forthcoming sustainability reports should be established; dedicated internal and external resources to roll-out the sustainability reporting will soon be needed. Equally important, these organisations will have to set clear and transparent goals for the management of packaging waste.

In short, the source of competitive advantage for the top meat processing companies can soon shift from price to sustainable marketing if these organisations take advantage of the opportunity that comes from adopting ESG in their business models.

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Academic Admission Process: An IoT-based Indoor Location Case Study

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Abstract

Nowadays, individuals belonging to different demographic segments and social categories are surrounded by a large variety of devices, serving to facilitate comprehension of complex phenomena and enabling access to ideas that were previously perceived as intangible. Technology produces a positive impact in people's lives by inducing a sense of control, usually backed by solid fundamentals, that changes an individual's perception of the world and the tasks that can be accomplished with its aid, having implications in various spectra of life: personal, social, educational, and professional. Within the academic environment, digitalisation engenders heightened interest from students, prospective candidates, and stakeholders alike, with respect to the potential advantages that a university can provide, appreciating its openness to innovation, and projecting a mindset oriented towards performance and continuous progress, enabling the institution to provide outstanding education standards. The university's emphasis on student's integration within the academic environment outlines its underlying principles, highlighting the significance of setting up a smooth collaboration, starting from their initial interactions. In this context, the present paper proposes an indoor location ecosystem that integrates specific IoT technologies, built in a Big Data processing scenario, to assist applicants' desire of enrolling in a university, with the aim of facilitating the discovery of buildings and venues covered by the often-complex admission process, through the utilisation of the devices that they possess. The solution provides timely and up-to-date geospatial data regarding essential landmarks such as the admissions office, financial service, or academic departments. Furthermore, the application has the ability to furnish precise information concerning the availability of personnel accountable for counseling candidates, and simultaneously guide them through the campus. Last but not least, users can receive personalised recommendations regarding courses, labs, and extracurricular activities suited to the student's interests, giving applicants confidence and support throughout the admission process, helping them make informed decisions and paving the way for a future partnership between the university and the student.

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JEL Classification: L86.

1. Introduction

A person's education commences in early life and continues, if he has the desire to pursue it, throughout the lifespan. During childhood, fundamental abilities such as walking, writing and reading are acquired, along with social interactions within the community. Subsequently, one gains the ability to cultivate new proficiencies, explore various domains and develop critical thinking skills, useful to differentiate and comprehend methods that yield benefits to both themselves and others.

A part of an individual's life is under the umbrella of mandatory undertakings, which are administered by the government and allow each person to acquire a basic level of understanding, thereby enabling them to conduct themselves appropriately within the society norms to which they belong. However, a truly enlightened society cannot solely rely on the acquisition of the minimum necessary knowledge, as the presence of professionals proficient in various fields is essential to sustain continuity and promote innovation (Pelinescu, 2015). Therefore, the importance of higher education institutions in ensuring a complete education process is indisputable; they represent a necessary and recommended extension of the mandatory stages that a person goes through, starting from the first years of life. Higher education is what shapes pioneering professions, brings novelty, allows evolution and innovation, and supports people involved in a development process to continue research, encouraging them to raise questions and pursue for discovering answers (McMahon, 2009).

The manner in which recent high school graduates or individuals with an interest in academia engage with the relevant institutions frames the future, offering insight into those individuals who will take responsibility for undertaking actions across various sectors of the economy and their level of readiness to navigate the multifaceted nature of life. In this context, various duties are identified that both parties must assume and treat seriously. If the viewpoint of the student is considered, it becomes clear that there is a mandatory aspect in comprehending and mastering the requisites of the domain in which they seek to specialise. Conversely, from the perspective of the academic milieu, the significance of adapting to the demands of the students, to the unique characteristics and evolving trends of each generation is outlined.

The world is in constant motion, technology emphasising the speed with which it takes place and redefining the way certain routines are implemented. Young generations live in the technological sphere and this represents an extension of their lives. They learn through digital components, make their purchases online, chat with friends virtually and have redefined many activities, knowing that they can find answers to their questions through the Internet, mostly using their mobile phone to manage different circumstances. Consequently, for academia it is necessary to adapt

to the youth's preferences in order to facilitate the partnership between the university and the student, ensuring complete transparency in implementing an educational framework that is attuned to contemporary exigencies and demands.

In this context, the initial interaction between the student and the university occurs during the admission procedure, signifying a juncture where mutual expectations are established, and the probability of their realisation is evaluated. The student wants an easier interaction during the admission process, benefiting from the openness of the university to answer numerous questions and to guide him in solving all the bureaucratic aspects related to this step. However, the management of a large volume of registrations and all the documents necessary to complete this process can be problematic in the absence of automated solutions or elements that can replace human work, thus increasing the waiting time for handling each participant in the admission process and the possibility of generating frustrations or human errors caused by fatigue, the large volume of work, and the lack of necessary time.

The need for the implementation of an automated solution has been recognised. Such a solution would provide benefits to future students by aligning the university with their preferred ways of interaction. It emphasises the digitalised and interconnected aspects that they can rely on throughout their years of study. Additionally, it would also provide benefits to the staff involved in the admission process by facilitating a more efficient and expeditious management of the necessary documents required to complete all the steps involved in processing the data of individuals participating in the admission process.

The idea mentioned above outlines the central question that this paper aims to address, as identified in the chapter dedicated to the research purpose. Moreover, building upon the presented elements, the subsequent objectives are anticipated, with the intention of incorporating technological advancements to achieve desired outcomes such as reduced processing time and cost to complete the admission process.

Furthermore, it aims to guide students through all stages by assisting them in locating relevant points of interest, thus allowing them to effectively manage their time spent at the university during the registration process. The estimation of waiting times based on location would help identify areas where additional personnel are required more swiftly, while also determining areas where personnel allocation is unnecessary.

The significance of acclimatising to the working patterns of the younger generations is outlined by adopting and integrating technological elements to expedite a faster admission procedure, based on the utilisation of the most common devices, such as the mobile phone, to facilitate the fulfillment of specific steps, thereby minimising human intervention and enabling the handling of a sizable influx of applications concurrently. It also introduces the need for communication through the Internet and the transmission of information between various components that can manage this situation, thus outlining a framework often encountered in other spheres of activity, namely the Internet of Things, further referred as IoT.

2. Problem Statement

Currently, the admission processes automation degree in universities around the world varies, depending on the specifics of each one and the manners in which they manage to adapt to the students' expectations and their requirements regarding the interaction with the academic environment. Most of the time, the admission process is partially digitalised, consisting of the online submission of documents for registration, and a series of steps to be physically implemented, following the selection. However, the bureaucracy and the need to obtain documents, signatures or stamps to complete the admission and registration process presupposes the inability to move these activities to the online sphere, students being invited to interact physically in order to obtain the necessary documents, an interaction that must be facilitated by different people involved in the process, as instructions are needed to complete all the steps, in the absence of an automated option. These processes can be difficult to complete in certain contexts.

For example, in recent years, universities have faced novel challenges concerning the execution of their operations. These challenges were profoundly influenced by the global coronavirus pandemic and its profound implications. Consequently, certain processes were cancelled, while many others were reorganised to transition into the online sphere. During a period when physical interaction became impractical, education had to persist, compelling universities to identify alternative approaches that would ensure the uninterrupted progression of educational activities. Regarding the admission process, hybrid options were predominantly adopted. Initially, the necessary documents were uploaded online to a secure platform provided by the institutions. Subsequently, when limited physical interaction became permissible, sessions were arranged to facilitate the submission of the required documents. Institutions strived to manage these processes as efficiently as possible in the context of the pandemic. Situations such as the one described above further justify the need for automated solutions. Such solutions would streamline participant flow, enable the monitoring of student numbers within campus buildings, and gauge crowd density at various stages of the registration process. Consequently, they would enhance the staff and participants' sense of safety and trust, demonstrating a conscientious approach to the health context and the meticulousness with which the admission process is handled. These solutions would effectively manage the flow of individuals, restrict access as necessary, and foster an optimal environment.

An illustrative example is the University of Medicine and Pharmacy in Bucharest. Considering the specific requirements of the entrance examination, the university physically organised both the exam and documents submission during the July 2020 session, amidst the initial year of the pandemic. To ensure the exam's secure administration, a substantial number of students were allocated to different locations. Subsequently, during the documents submission period, the program spanned several days, from July 28 to August 3, 2020. Students were expected to adhere to a predetermined schedule based on alphabetical order, effectively managing the flow of individuals (UMFCD, 2020). In this context, the utilisation of a solution that facilitates tracking participants' location within the faculty and monitors the number

of attendees would have addressed the challenges associated with physically managing the admission processes.

Transitioning to a broader viewpoint to identify the most effective methods for enhancing the admission procedure, an initial step involves the domain analysis, its significance, and the impact that a slight alteration in the process could yield in heightening the visibility and academia's level of openness vis-a-vis the prospective candidates.

Subsequently, this study placed particular emphasis on the importance of education in diverse domains, aiming to justify the idea that the outcome of the initial interaction with the educational environment can engender far-reaching implications in the manner in which an individual engages with activities in the future and their level of preparedness to navigate them successfully. In the context where the student feels comprehended, drawn to the respective field, and assured of receiving all necessary resources to progress within the university, the effectiveness of the academic process can be evaluated by measuring the student's self-confidence and his desire to achieve professional success, being encouraged from the beginning and evolving within an environment that was conducive to growth (Hanushek, Woessmann, 2012). Otherwise, in the situation where discrepancies in the approach are identified and there are communication gaps from the first interactions with the academic milieu, a decrease in the student's engagement with the chosen field can be discerned, potentially exerting an impact on the future trajectory and the professional sphere in which he will operate.

2.1 The Education and the Society

The significance of education is obvious in every facet of society, be it the economic, personal, or social domain. A country that encourages study and has in its composition a large number of people interested in their development in various areas represents a country that opens the way to innovation, raising curious people, willing to experiment and test ideas, thus ensuring an increase in the economic growth by providing jobs and creating businesses that can solve different challenges (Aghion, Howitt, 2008).

In discussions concerning a society that strives towards prosperity, it can be linked to the concept of a community where individuals are well-educated, possess diverse interests and passions, comprehend their own needs and those of others, evince respect, exhibit inclusivity, and view the world through a collective lens. A society characterised by erudition is one where the rights of every individual, irrespective of their social status, ethnicity, religion, colour or any other distinguishing attribute, are accorded due reverence (Hanushek, Woessmann, 2008). In the context of such an environment, one can talk about social inclusion, about protecting the neighbour by understanding and respecting diversity, by reducing discrimination and firmly condemning inequality. Through integration and collective help, the usefulness of such behaviours and the generalised impact they induce are identified, emphasising the idea that in a society where education takes precedence, people have more knowledge about various fields of activity and present

a greater trust in specialists, with the aim of improving or maintaining a harmonious lifestyle. As such, any branch of the economy tends to develop through the involvement of competent people who want to produce a positive change, and, by investing in education, one invests in the future of the country, in the existence of more productive processes and a more prosperous life for the citizens (Teixeira, Queirós, 2016). Education is a fundamental component of society, which guarantees the transmission from generation to generation of the principles of co-existence and beneficial functioning of the community, providing people with the necessary tools to analyse and understand the needs, impediments, and methods by which their solutions can be ensured. By implementing functional education processes adapted to current generations, the future of a country is shaped by the way in which children, currently involved in training activities, will contribute to progress, develop skills, and be able to maintain and manage in a fair and efficient manner the challenges they will encounter along the way (Hanushek, Wößmann, 2007).

In this context, the implementation and constant updating of educational processes is justified, whether teaching methods, educational content, or interaction with the economic environment are discussed. The key to individual and collective success lies in the controlled and effective management of educational implementation, beginning with the initial interactions, such as the university admission process, as demonstrated in the current research.

2.2 Internet of Things in Academia

Currently, universities worldwide are undergoing a constant process of reinvention and adaptation to keep up with technological advancements. This facilitates the implementation of certain processes faster, safer and at a lower cost, while also benefiting from positive publicity through openness to innovation. Intending to translate some processes that are implemented manually and need human intervention to ones managed digitally, there are a multitude of technologies and components that can be used to reduce the complexity of the process.

A relatively new and widespread technology in a variety of fields is the Internet of Things, which allows the use of different physical elements, with the goal of retrieving data and interconnecting components via the Internet. In the academic context, the possibility of using sensors in different situations is illustrated by identifying a person's location in order to measure the level of congestion from a point of interest, monitoring climatic elements to provide the best environmental conditions, managing costs and consumption through intelligent components, or even performance analysis by retrieving data and processing them for intended purposes. IoT, unlike other technologies, presented a timid initial interest from the university area, but recently it is gaining momentum, by managing to solve problems of a logistical nature or by stimulating students' interest in how the university identifies innovative solutions to known impediments.

Considering the admission process, multiple universities which implement different activities with the aim of automating and streamlining the steps involved were identified. A concrete example is the City University of Science and

Information Technology, which uses multiple technologies in order to present the campus and the educational offer to candidates and interested persons (Habib et al., 2021). Other ways of using technology have been approached by universities in Europe such as Oxford University, which manages the admission process through an online portal, the University of Amsterdam, which supports admission interviews in an online video system, or the Saudi Arabian University, which offers an application for preparing the enrolment prerequisites and implements e-services for academic organisational processes (Brdesee, 2021). Last but not least, other universities in the USA use sensors through IoT technology to monitor the environment in the examination areas and to properly manage crowded spaces during the admission process. Hence, it is feasible to recognise several directions that can be enhanced as general perspectives of an admission process, regardless of the university in which it is implemented.

First, the possibility of using online platforms was identified in order to submit the necessary documents and monitor their status. It is also possible to identify here the possibility of online registration and schooling fees payment, for situations where this is a step in the admission process. Generally speaking, digitalisation played a key role in the last decades, and its influence is experienced more and more profoundly, even in academia (Bygstad et al., 2022; Díaz-García et al., 2022).

Second, the sensors can be used in multiple scenarios, such as monitoring temperature, air quality, humidity, or controlling resources, to provide a comfortable environment or in the desire to reduce costs through saving and responsible consumption (Becerik-Gerber et al., 2022).

Third, an important perspective is the integration of indoor location concepts in the use of IoT technology, in hope of gaining multiple benefits, a subject extensively analysed in the specialty literature (Asaad, Maghdid, 2022; Hayward et al., 2022; Khan et al., 2022; Tonggoed, Panjan, 2022). This last option will be explored further in this paper.

2.3 Indoor Location Perspectives in Universities

Implementing various approaches from the Internet of Things sphere in universities can yield numerous benefits. Although technical improvements may be required to accommodate this type of technology, the costs are outweighed by the benefits, and can be recouped within a relatively short period of time if the IoT implementation is focused on cost-saving measures.

Components that are commonly found in most universities, such as Wi-Fi networks or video monitoring systems, may be adequate to support the implementation of certain IoT concepts in specific relevant scenarios. In this context, all the information taken from these devices can be integrated by centralising them via the Internet, applying localisation algorithms and generating different reports regarding sites, degree of occupancy, flow of participants.

Some of the universities that use similar approaches in their operations are Stanford University or the University of Bologna (Prandi et al., 2021). The purpose of indoor location within a university campus is to improve the educational

experience by identifying buildings or halls, by quickly and efficiently decongesting crowded spaces in different situations, including evacuations for fire simulations or urgent matters through which the use of technology can contribute to the significant reduction of the action time.

Other components that can be used in the context of indoor location are motion sensors, which can be placed on campus in order to transmit information in real time and determine the position or direction of movement. A similar approach can be achieved through components that emit radio or Bluetooth signals, with the goal of target pin-pointing. Localisation can also be accomplished through visual recognition techniques, which analyse images to identify an individual, or by strategically placing QR codes in areas of interest and by utilising algorithms to retrieve information about their position after being scanned.

A concrete example in the admission process is implemented at the Technical University of Munich, where students can download a mobile application that allows them to locate inside the campus and guide them to different points, with the aim of reducing the waiting time (Nikoohemat, 2013). An improved approach to this scenario could involve the provision of access to the university's internal Wi-Fi network, thereby eliminating the requirement to use a specific application, an idea that defines the purpose of the current research.

3. Aim of the Research

The hereby study advocates for the implementation of an internal IT-based localisation system to streamline the university admission process. The use of this solution is done through a mobile device, accessing a dedicated web page, visible only within an internal network of the university. Accessing the web page by connecting to this dedicated network and accessing it directly from the phone's browser, without requiring the installation of additional applications, is desired. Thus, the university has a modern and effective support system, while applicants go through the stages of the application process faster, informed, and with a greater degree of independence.

The research question this paper is trying to answer is: How can a university admission process be optimised in terms of costs and resources using an IoT-based indoor location application?

The assumptions underlying the development of this article can be grouped into two distinct categories. The first category corresponds to the quantitative factors that tend to characterise the admission process. Specifically, in a relatively short time horizon, typically 8 to 12-hour intervals, spread over one or more days, very large volumes of applicants follow a repetitive process. Each person has to go through the same sequence of steps in order to successfully enroll in the university. From the previously described idea, the following problem's coordinates stand out: limited time horizon, large volumes of requests, parallel processing, and repetitiveness. Hence, the proposed solution aims to optimise two characteristics, namely providing optimal and efficient information to the large number of applicants about the

admission process they are required to undergo and providing guidance to them during the process in case of any ambiguities.

A second category is associated with the human factors involved in the admission process. To ensure that the admission process runs smoothly, universities often resort to co-opting volunteers or senior students to coordinate applicants, answer their questions and guide them along the way. In addition to the support staff, the admission process requires the presence of university employees from various departments. By analogy, the human factors highlight the following coordinates of the problem: costs and availability problems in the acquisition of auxiliary staff, overload in conditions of overcrowding, uneven character of the information transmitted to the applicants. As a consequence, two other features eligible for optimisation are the standardisation of the information available to applicants during the admission process, respectively, the instant access to an information and assistance vector.

In this context, the proposed solution highlights the following objectives:

- Objective 1: The facilitation of an indoor location platform based on the Internet of Things, with the purpose of enabling the precise localisation of individuals within the premises of the university;
- Objective 2: The development of an indoor navigation module within the platform, aiming to enable efficient movement inside the university premises, allowing the user to autonomously complete the registration process;
- Objective 3: The mean of average duration required to finalise an enrolment;
- Objective 4: The decrease of total costs involved in the admission process.

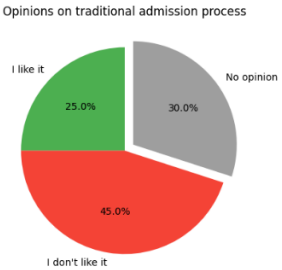
4. Research Methods

To attain the stated objectives, the present paper utilises a case study approach as the research methodology. The case study is based on the findings of a survey conducted on a sample of students from various universities, identified through online means of crowd observation around campus groups. The survey results were interpreted to develop the argumentation, explanations and implementation of the proposed solution.

In order to define and analyse in a correct manner the basic idea of this research, the answers given by the students to the applied survey were processed, with the purpose of observing the ways in which they perceived the first interactions with the university environment. 45 responses were collected from students enrolled in different study programs and universities, intending to obtain a realistic picture of the current admission process in Romania's academic environment. In the survey, 10 questions were asked about the steps of the admission process, the advantages and disadvantages of digitalisation, and the need to use indoor location solutions to facilitate faster movement within the campus. The first question was addressed with the aim of isolating a representative time horizon, considering the pandemic context of the last years which led to the forced digitalisation of certain processes in most fields of activity.

60% of the respondents stated that they were involved in the admission process in the last 2 years. Part of them, 25 %, considered that the traditional admission process, which involves recurring movements to the campus to complete the defined steps, is well structured, 45 % mentioned that it can be described as a tiring process, and 30 % did not express their opinion regarding this question, as can be seen in Figure 1. Moreover, 80 % of the respondents considered that the admission process can be digitised, mentioning the following among the expected benefits: 40 % believed that there would be a higher accessibility, 30 % believed that it would result in a reduction in costs and time allocated, 20 % appreciated the possibility of carrying out certain steps online and 10 % mentioned other benefits.

Figure 1. Survey results - traditional admission process opinions

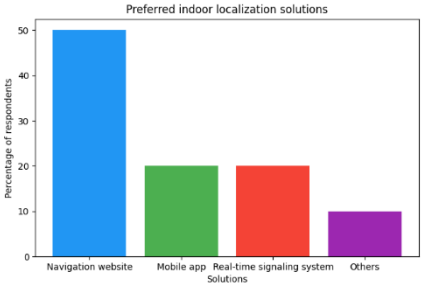


Source: Author's own contribution.

But, from the perspective of the disadvantages, 40 % mentioned their concern regarding the increased risk of fraud, 30 % presented doubts regarding the protection of data confidentiality and the remaining 30 % considered that a possible discrimination of people who have no technology access or knowledge may occur.

Regarding the way they interacted physically during the admission process, 70 % of the respondents mentioned that they had difficulties in identifying the rooms and 90 % mentioned that an interior localisation solution would be useful in solving this problem. Thus, from the list of proposed solutions, 50 % agreed to the use of a website for location identification and route suggestion, 20 % preferred the use of a mobile application, 20 % mentioned the signaling systems deployed in the building, and 10 % preferred other solutions, as can be seen in Figure 2.

Figure 2. Survey results – indoor location solutions preferences



Source: Author's own contribution.

Therefore, the study identified students' willingness to adopt a new approach in navigating the university premises and their preference for independent functioning during the enrollment process, with the aim of reducing time, serving as additional motivation for the implementation of this case study.

As such, the following section presents an overview of the necessary steps for conducting the case study, which will be further discussed in detail. But, in order to mark the transition to this, some theoretical perspectives can be presented now. So, the process of conducting a case study involves several steps. Firstly, it is necessary to identify a case or situation that is relevant to the research question and provides enough information for a detailed analysis. Next, it is recommended to collect data on the case, using various methods such as interviews, surveys, and document analysis. After collecting the data, it should be organised and interpreted to identify patterns and underlying causes and effects. Using the analysis, some conclusions may be drawn about the case and may identify best practices and recommendations. Finally, it is suggested to clearly and concisely communicate the findings and recommendations to stakeholders (Feagin et al., 2016; Heale, Twycross, 2018).

5. Findings

Starting from the prerequisites of a case study mentioned earlier, the stages of identifying a situation to be analysed and collecting data tend to portray the unfolding of an admission process within a university. In general, this process involves the physical presence of a candidate on the university premises, at a specific date and time. The candidate has prepared in advance a file containing a series of necessary documents, among the most common ones being an admission form where the options are specified, the legalised copy of the birth certificate, the legalised copy of the identity document, the diploma of Baccalaureate or an equivalent certificate issued by the graduated pre-university education institution, the medical letter, as well as other documents, which may vary from one institution of higher education to another, depending on the specifics of each one. The registration fee payment proof is typically included in these documents. The payment process, and the manner in which payment is made, depends on various factors, including the university's level of digitalisation, the ease of payment, and the candidate's willingness. The payment may either be made in advance, with the payment proof being attached to the documentation, or it may be paid in person, at the institution's cash desk.

Once the application file is completed, it is evaluated by a university representative, and the candidate is usually registered in an electronic platform, optionally in order to take the entrance exam at a later date, but most often to collect a series of identification data, such as name, birth date, personal numerical code, a bulletin-type photo taken on the spot, data that will later be found on the student ID, in the event of admission. After collecting the identification data, the candidate physically submits the registration file to the secretariat. In the context of an impeccably managed admission process, the educational institution makes available to applicants, in addition to the departments and necessary staff for the previously presented stages, a counseling office, where undecided applicants or those with

incomplete files can benefit from consultation, can be referred to the appropriate departments and get help to complete the registration process. Also, considering the large volume of applicants, the university can set up a temporary medical office, where people who need medical assistance can be examined and receive immediate care, as well as sanitary facilities, vending machines of various types, or chargeable printing services. Traditionally, the candidate can talk throughout the application process to the university staff, who are previously trained to be able to answer any uncertainties associated with the admission process. Given the large volume of applicants that a university faces in a relatively short time frame, the number of the involved staff tends to be large most of the time.

From a graphic point of view, the distribution of these elements of interest is illustrated in Figure 3, based on different colour schemes: the offices actually involved in the admission process are highlighted in orange, the medical office and sanitary facilities in blue, the vending machines area in red, in dark purple the printing services, and in green an office for the preparation and evaluation of files, where candidates can benefit from the advice of academic staff. For ease of interpretation, the access and evacuation points from the building were also shown in Figure 3.

Figure 3. University floor plan

Source: Author's own contribution.

By chronologically analysing the development of an admission process, it is identified as a repetitive pattern, characterised by a linear increase, directly proportional to the number of applicants, the completion of at least 3, often 4, mandatory stages in the admission process: fee payment at the cash desk, as an optional step, file evaluation, electronic registration, file submission. In atypical situations, the registration process may involve attending the other points of interest marked on the map. Since the previously highlighted pattern has a linear complexity, meaning that the more applicants there are, the longer the admission process and the

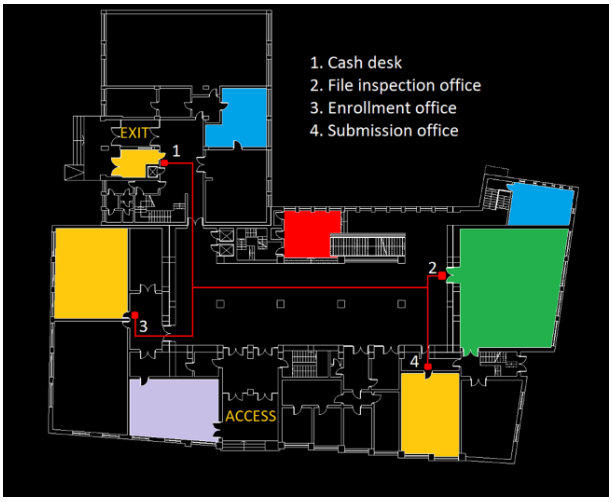
higher the associated costs, a relatively small optimisation in this pattern will cause a substantial impact on the bottom line, due to the high degree of multiplication.

An IT solution developed in this sense could be represented by a web application accessible from the university's intranet. When candidates present themselves for registration, they connect using their mobile phone to the Wi-Fi network and access a dedicated web page. It contains details regarding all the necessary steps in the registration process, which are the documents that a file must contain, where they are issued and where the registration fee can be paid. The application also displays a map of the main points of interest in the application process and a section with the most frequently asked questions. The indoor localisation module also allows the identification of a candidate's coordinates relative to a reference system, represented by the architectural plan of the university, and the calculation of optimal routes.

The candidates can scan a nearby QR code using their mobile phone to determine their starting position and choose from a predefined list of options a destination. The application determines, based on previously stored metadata about the location and distribution of QR codes and main points of interest in the premises, using algorithms specialised in calculating the distances between two nodes in a graph, an optimal route between the user's position and a point of interest, between two points, as well as complex routes oriented more towards objectives. Objective-oriented routes are those routes which, followed, lead to the achievement of an objective.

The application has a series of predefined routes, but it also allows the creation of customised ones, in which the user defines the places he wants to visit and the sequence in which he intends to do it. Figure 4 illustrates an example of a predefined route where potential candidates can outline the distribution of departments they need to visit in order to complete the application process.

Figure 4. University floor plan – predefined route



Source: Author's own contribution.

6. Conclusions

The proposed architecture in this paper is distinct from the existing solutions discussed in the literature review, as it does not require the installation of additional applications on the candidates' devices. The architecture is developed through a comprehensive case study to address a specific problem. The implementation of this IT solution enables a significant number of applicants to operate autonomously, without the need to wait in queues to interact with dedicated staff. Consequently, this autonomy significantly reduces the workload of support staff, allowing them to focus on critical tasks, rather than spending time repeating informative yet routine matters. As a consequence, it can be inferred that the proposed solution offers benefits such as cost reduction and increased efficiency in the admission process by reducing the involvement of unnecessary personnel and enabling higher parallelisation through a staged plan available on the web page.

Regarding the financial aspects associated with the admission process, costs are notably high during this period due to the necessity of employing additional staff to ensure the successful execution of all required activities. Consequently, costs such as recruitment expenses may arise, involving consultations with specialised companies that provide temporary assistance. Moreover, a common practice observed in Romanian universities is the recruitment of students during the admission period to assist new colleagues in navigating buildings, halls, providing document templates and addressing inquiries. These recruited individuals receive a predetermined compensation for each day they contribute to the admission process. However, with the implementation of this automated solution, the costs can be significantly reduced or even eliminated altogether, as all the information students require can be readily accessed through their mobile phones. Hypothetical, for 20 students that get paid 20 euros per day, for a week, such an application would bring 2000 euros in savings. Furthermore, the integration of a live chat module, managed by a small team of employees, enables online responses to inquiries, eliminating the need for on-campus presence and allowing for a temporary staff addition only when necessary.

Another cost-saving aspect facilitated by the proposed solution is the empowerment of students through automation, guiding them seamlessly through the necessary steps, and minimising the time spent physically present at the faculty. The implementation of such tools in the admission process justifies the analysis of the time required to complete the predefined steps, which can be reduced by simplifying the activities. Therefore, the capabilities of using the proposed solution would fulfil the mentioned objectives. Consequently, an estimate of the time required for the admission process integrated with an automated solution suggests a reduction in the number of days needed, leading to decreased expenses. This concept offers potential avenues for future research.

With regard to the risks associated with implementing the proposed solution, the most significant ones are related to the IT infrastructure. This type of solution requires a secure and stable internal network capable of accommodating a large number of parallel connections. Additionally, the server hosting the application must

possess sufficient computational resources to enable parallel processing of a considerable number of requests. Finally, reliance on an IT solution requires consideration of potential risks such as power outages and cyber-attacks and these risks should not be overlooked.

In terms of opportunities for further development, the rudimentary architecture described above can be extended over several horisons. To begin with, the application can adopt a gamification character, instead of recommending from the very beginning a predetermined route for applicants to follow, candidates can embark on a kind of treasure hunt, in an interactive exploratory experience. When accessing the university premises, they scan a QR code, and the application directs them to the cash desk or to the file evaluation office. Once the application fee is paid or the file is assessed, they scan a separate QR code, which marks the completion of a stage. The application records the progress and continues with the next stage in the registration process. In this way, in addition to the actual usefulness of the application, the entire registration process also acquires social values, it induces some relaxation, which relieves the sometimes-tense atmosphere specific to an admission process. In addition, such an approach allows recording the times when the QR codes were scanned, which gives the university enough data to calculate waiting times, occupancy rates in certain departments, average times to complete the application process, and based on these metrics it can later make informed decisions.

However, the translation of processes into a gamification experience requires a thorough analysis of their advantages and disadvantages. While the dynamic nature of such an approach is evident, capturing the student's curiosity and engagement by involving them in an interactive journey to explore and discover the university while completing necessary tasks, it is essential to consider the potential limitations and methods to mitigate them.

The proposal of such an interactive experience may be more suitable for scenarios with a limited number of participants or when registration locations are numerous and dispersed across a wide area, potentially spanning different buildings. In such contexts, integrating this solution is justified as it maintains interest and enthusiasm through interactive activities, even if they require participants to navigate between various locations.

It is crucial to recognise that implementing a treasure hunt-style approach within a large-scale event and a constrained framework can result in disorder and confusion. Therefore, in scenarios involving a significant number of participants and a restricted developmental context, a limitation of the current proposal is identified and additional automated solutions are necessary to ensure the smooth execution of processes, as part of a future research.

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Minimising Supply Chain Risks. Mitigation Strategies for Sustainable Private Organisations Development

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Abstract

This article provides an overview of academic papers that discuss strategies for minimising risks in supply chains. The sources cover a range of topics, including risk identification and management, classification of different types of risks, and practical guidance on risk assessment and mitigation strategies, thus providing to both supply chain leaders and researchers a detailed analysis of the various risks that impact supply chains, and the strategies that can be employed to minimise those risks.

The research methodology used to study and analyse the risks associated with supply chains and develop strategies to minimise those risks is simulation modeling, used to create a virtual model of a supply chain and simulate different scenarios to identify potential risks and test the effectiveness of different risk mitigation strategies, identifying potential challenges that could be implemented in real supply chains. The study focused on the risk of product shortages due to unexpected demand or supply disruptions, testing several parameters to measure the effectiveness of three risk mitigation strategies: Stockpiling - building up inventory to ensure enough product on hand to meet demand during a disruption; Diversification - creating alternative suppliers options minimise the impact of potential disruptions; and Collaborative planning - considering suppliers and customers to share information and coordinate production and delivery schedules.

The simulation results showed that each risk mitigation strategies were effective in reducing the risk of product shortages. However, the most effective strategy was a combination of all three strategies. The study also highlights how having information on a supplier's operations and inventory levels allowed supply chain leaders to make better reasoning and respond more quickly to disruptions. Overall, this study demonstrates how simulation modeling is showing through test results each parameter contribution to different risk mitigation strategies in supply chain management.

Keywords: supply chain, risk management, risk mitigation strategies, supply base management, collaborative planning.

JEL Classification: D81, F69, L52, N70, O19.

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1. Introduction

Supply chains involve the movement of goods and services from one party to another, often across different geographic locations. Participants in these supply chains have complex relationships established, especially in global or international supply chains where the parties are dealing with additional diversity and risk. The number of companies and processes involved in the supply chain can also increase its complexity. However, even in a two-party commercial relationship based on the offer-demand paradigm, there can be a wide range of risks that can impact the relationship, such as: Delivery risk- the risk that the delivery of goods or services will be delayed or fail to meet the required specifications; Overstock risk- the risk of carrying excess inventory or goods that cannot be sold, leading to a loss of revenue; Payment risk- the risk that one party will not receive payment for goods or services delivered; Insolvency risk- the risk of one party becoming insolvent or bankrupt, leading to a disruption in the supply chain; Single supplier or supplier dependency risk- the risk of relying too heavily on a single supplier or having limited options for suppliers; Quality risk- the risk that goods or services delivered will not meet the required quality standards; Warranty risk: the risk that goods delivered will not perform as expected and will require costly repairs or replacements; Liability risk- the risk of one party being held responsible for damages or losses resulting from the supply chain relationship.

International supply chains are aggravated by the multicultural factor of the participants involved. Each party may carry its own cultural mindset and values that can impact their actions during interactions. This can lead to misunderstandings, miscommunications, and even conflicts that can disrupt the supply chain, which is why these factors must be monitored and addressed when managing supply chain risks in global or international supply chains.

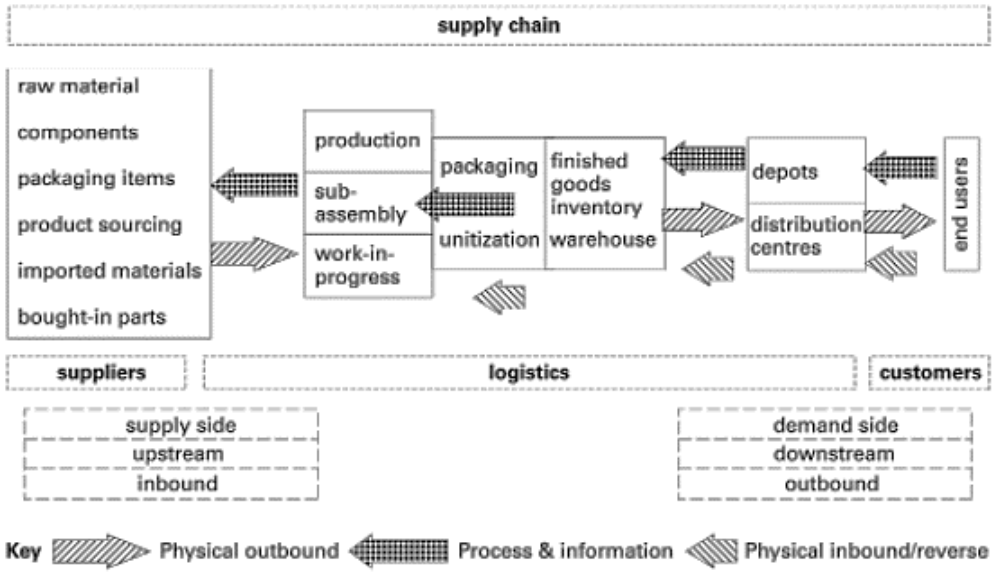
2. Problem Statement

Reading carefully the specialised literature dedicated to this thematic area allowed us to observe the multitude of studies that have focused on strategies to address supply chain risks, there is a lack of available information on risk management strategies used by decision-making managers in their day-to-day activities. We consider these strategies can be differentiated into rational and irrational selections. Rational selections are based on previous experiences and their consequences. For example, a manager who has dealt with a similar risk in the past may choose a similar strategy to mitigate the risk. Irrational selections, on the other hand, are based on strategic decisions made in unique situations that cannot be easily replicated as a model for future risk management decision-making. For example, a manager may choose to take a risk-minimising strategy based on the specific factors present in each situation, such as time constraint, financial constraint, or resource availability.

A definition of supply chain as viewed by Croucher et al. (2017) is represented by the sum of suppliers, logistics and customers, while the logistics can be defined

as materials management and distribution, below figure as built by the authors clearly represents interactions and complex flows found typically in supply chains, that bear both opportunities and risk on each component.

Figure 1. Logistics components and flows – fast moving consumer goods



Source: Croucher, P., Baker, P., Rushton, A. (2017). The Handbook of Logistics and Distribution Management: Understanding the Supply Chain, p. 5.

Ghoshal (1987) classified risks into the following categories: macroeconomic, policy, competitive, and resource-related risks. Furthermore, he details from the above-mentioned categories the events that bring the most relevance to Supply Chain Risk Management (SCRM), such as: foreign exchange rate, energy rate, lead time for transportation, provisioning demand, inventory management, quality catalogue, potential hardship leading to stop of economic activities, supplier dependency, safety, survival, or cultural associated risks. These risk events are interconnected and can lead to complex patterns of risks in global supply chains; for example, managers compare domestic versus China sourcing to illustrate how each of the specific risks are linked to each other: cycle time to produce a part, the transit time spent on sea, and the issues encountered with forecasting. Forecast errors in supply chain management are exacerbated by longer lead times and can contribute to companies overreacting by stockpiling inventory to avoid shortages, which can lead to excessive inventory and production shutdowns. This cycle of overreaction can cause a pendulum swing between shortages and excessive inventory, also known as the bullwhip effect. The comparison is made to forecasting the weather, where shorter-term forecasts are more accurate than longer-term ones.

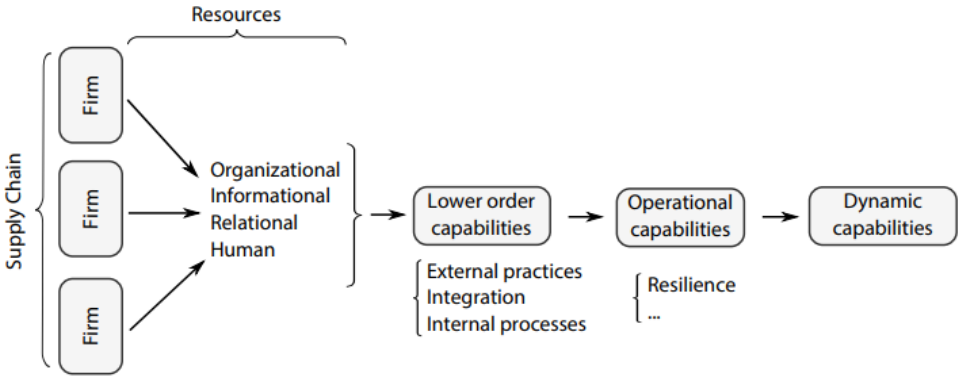
Ila Manuj and John T. Mentzer (2008) describe global supply chains as a tool of competitive advantage that companies have by providing access to a wide range

of resources and markets. These resources include labour, raw materials, financing, and government incentives, among others, that can be tailored to meet the specific needs of each participant. However, this international collaboration comes with various risks and uncertainties that may arise before, during, or even after the collaboration is finalised.

Strategies proposed by Tang in 2006 aim to manage fluctuations efficiently and make supply chains more resilient, but these strategies have not been assessed for their effectiveness. Demand risk mitigation involves various methodologies such as automatic pipeline inventory, order-based production control systems, two-period financial models, buyer's risk adjustment models, and simulation models. Mathematical programming models, such as stochastic integer linear programming models, mixed-integer stochastic programming models, stochastic linear programming models, and mixed integer nonlinear programming models are also used to reduce the consequences of demand uncertainty on supply chains.

Brusset and Teller (2017) identify in scheme below the input to output of resources allocated within supply chains, that enable the ability of a supply chain to revert to previous condition after overcoming a disruption, either natural or operational.

Figure 2. Resource based view of supply chain



Source: Brusset, X., Teller, C. (2017). Supply chain capability, risks and resilience in: International Journal of Production Economics, p. 3.

Studies tried to link risk mitigation strategies in SCRM and the application of Artificial Intelligence (AI) techniques. SCRM is targeting to identify, measure and reduce risk, while monitoring unexpected events or conditions that can have an impact at any level of the supply chain. AI techniques, such as mathematical programming, machine learning, and big data analytics, are suitable for SCRM because of their ability to process large, multidimensional data sources and enable rapid and adaptive decision-making. There are various definitions and classifications of supply chain risk which can be addressed using AI methodology having the specific task to manage supply chain risk. The analysis identifies areas for future research at the intersection of SCRM and AI.

Also, the focus of many studies in SCRM has been on supply risk mitigation. Empirical studies have shown that strategies such as behaviour-based management techniques, creating a network of strategic suppliers, customer being involved in supplier development, awarding strategic business volumes to ensure capacity utilisation and business continuity, reducing within these partnerships the supply base complexity can help mitigate supply risk.

The supply chain structure must be fully known for SCRM to be effective. Ho et al. (2015) provide a risk definition that refers to the likelihood and impact of events that are unexpected, or adverse conditions which have an influence within any level of the supply chain, having as consequence failures at strategic or operational level.

Ho et al. (2015) identified five separate groups of supply chain risks. The first group is formed by generally applicable risks to the complete supply chain instead of a certain level or activity related to it; they are also known as scope, macro, or environmental supply chain risks. The second group of risks is concerning the level of supply in supply chain and can also be referred to as source risks, being focused on any unforeseen event and outcome incurred in this level of the supply chain. The third group of risks is related to demand issues, including forecasting issues and delivery risks, which add up to build the bullwhip effect or demand distortion and associated actions flowing from it. The fourth group of risks is named make risks or manufacturing risks and is related to supply chain processes, while the fifth group of risks is comprised of infrastructural risks and is having in view the control over supply chain activities.

Part of the studies reviewed focus mainly on creating and ranking mathematical models that analyse uncertainties and risks, while the focus is less on explaining and proving the applicability of the models in practical situations. Baryannisa et al. (2018) find in their study that approximatively 53% of the papers considered do not enable readers to gain additional capability for decision-making, 39% share feedback from managers, and remaining 8% can structure a decision-making support mechanism, especially in the categories of agent-based, reasoning, Machine Learning, and Big Data. Therefore, the studies consulted cannot be referred to as a basis information support to help improve decision making for practitioners in the search for solutions to address different supply chain risks.

The concept of risk in the context of supply chain management refers to the potential for losses or negative consequences that can occur if a risk event actually takes place. This includes considering the likelihood of such events occurring and the possible impact of these losses or negative consequences. In this context, risk events are considered uncertain events that can lead to the realisation of risk. The probability of occurrence of a risk event and its potential impact are commonly referred to as dimensions of risk. These dimensions are of particular importance in the context of global supply chains, where the speed and frequency of risks can greatly impact supply chain performance.

In addition to the dimensions of risk, the speed of risk is also an important factor to consider. Slow discovery of a risk event can exacerbate the consequences and increase additional risks.

Manuj, I. (2008) determines the impact and measures the speed of risk considering the following parameters: rate of occurring risk event that has as consequence quantifiable loss, rate of periodicity for the occurring risk event, rate of achieved losses materialised measuring how often the loss is applicable and the rate of risk prediction showing how fast the risk is visible in the organisation to enable decision makers to undertake strategies for its mitigation.

Risk is difficult to measure even when its effects are produced, as shown by K. Snyder (2014). Moreover, it becomes even more challenging to forecast the impact of a potential risk event, reason why companies which engage in risk mitigation strategies will need to invest in supply chain resilience proportional to the impact they foresee applicable to a particular risk they attempt to mitigate. For example delivery stop from a supplier can be measured as the cost of penalties paid to the customer in the given contractual conditions and mitigated with alternative source qualification. The cost assessment for this alternative supplier mitigation strategy needs to be justified as being more competitive than the event of risk materialisation.

Physical distance and production time, and transport duration differences can also contribute to the extent of high or low impact risks faced by global supply chains.

Risks encountered in supply chains can be differentiated also based on the source of risk initiation: supply risks covering all supplier and supply related incidents that may have unknown impact, demand risks covering volatility of demand and potential unbalances that could arise at each level of the supply chain, operational risks arise in connection with unwanted events that disable the company to produce goods or services for the market, and security risks associated to potential issues with health, safety, integrity of customers and information.

These risks can arise from a variety of sources within the supply chain, such as supplier performance issues, changes in customer demand, disruptions in production processes, and security threats.

In comparison to other types of risk mitigation, Zhang et al. (2011) identified the risk monitoring as potential strategy that would allow companies to foresee certain risks, understand their occurrence, and mitigate the risk impact by implementing adapted solutions as response to a particular unknown situation, in alignment with the company's processes and values. Risk monitoring was therefore studied using diagnosis model to raise pre-notifications for certain events, showing that this system can identify abnormal data and decide the issuance of a warning; however, the study used only quality data and was not verified using real data.

S.Y. Ponomarov and M.C. Holcomb (2009) show the correlation between logistic capabilities and supply chain resilience through organisational learning: an adverse incident or unexpected event can help to prepare for future similar events or disruptions, thus strengthening the supply chain by creating new logistics strategies, developing tactics, and operations to support further logistics capabilities.

In summary, although risk, uncertainty, vulnerability, and sources of risk are often used interchangeably in supply chain risk management, they each have distinct meanings. Furthermore, there is a need for more information on the risk

management strategies used by decision-making managers in their day-to-day activities, including differentiating between rational and irrational selections of risk management strategies.

While companies that take on high risks may be rewarded with high profits, it is important to note that even the most competitive supplier with the lowest price may bear the highest risk if their supply chain does not consider, quantify, and mitigate potential issues that may arise at each level of its supply chain. This can include risks associated with raw material suppliers, transportation, manufacturing processes, warehousing, distribution, and the final delivery to consumers. Therefore, companies need to carefully consider these risks and take appropriate measures to mitigate them to maintain their competitive advantage and ensure long-term success.

While risk management has been an important topic for multinational companies for many years, there is a multitude of studies addressing the risks associated with supply chains over the past two decades. This is due in part to the increasing complexity of supply chains and the need to manage risks across multiple levels and geographic locations. As a result, there has been a growing body of research focused on identifying, assessing, and mitigating risks in supply chains, with the aim of developing effective risk management strategies that can help companies maintain their competitive advantage and ensure long-term success.

Risk, uncertainty, vulnerability, and sources of risk are often used interchangeably when discussing SCRM. However, they each have distinct meanings. Risk refers to the potential for adverse outcomes to materialise. Uncertainty refers to the reality that the full extent of possible outcomes is not known. Vulnerability, on the other hand, refers to the susceptibility to harm or damage in the face of risk and uncertainty. Sources of risk are the specific events or conditions that can lead to adverse outcomes in a supply chain.

M. Wang et al. (2019) focus on logistics innovation capability, showing that a company's ability to incorporate logistics innovation can enable problem solving and improve resilience to the changing environment, while achieving logistics operational excellence and reducing the impact of supply chain risks through proactive risk management activities.

Considering status and approach of the studies reviewed, we can state that risk management is a thematic area that has vast amount of applicability within supply chains, as they are constantly exposed to multiple categories of risk. Checking both the theoretical approach and the pragmatic approach, supply chain experts can rely on the existing literature to understand and assess their situation, however, not having enough models in hand to enable them to develop a decision-making scheme which would ease their procurement process and therefore through simplification reduce the risk exposure in a given situation.

3. Research Questions / Aims of the Research

A first hypothesis from which this study started is that supply chains are facing greater risks correlated with their complexity and global footprint- while providing competitive advantages, a multicultural supply base with international logistic chain

may incur high associated risks that require diligent management approach and mitigation. *A second hypothesis* tested during the research carried out considered the fact that effective risk mitigation is the result of high-level purchasing strategies applied by supply chain professionals, in both rational and irrational selections. *A third hypothesis* tested started from the assumption that applying risk mitigation strategies is effective in reducing the supply chain associated risks; however, a unique mix of risk management strategies is needed to be implemented for each company specific activities, and even in the same company there are increased complexity topics which cannot be sorted with a strategy model and need new strategic approach to incorporate all potential risks, opportunities solutions for that particular case, thus making supply chain managers key decision makers in this international supply chain risk management process. Secondary hypothesis considered supply chain professionals identify and connect the risk with the implemented strategy; however, this did not guarantee the success of the strategy selected, due to misalignments with performance key performance indicators, flexibility within the supply chain, and the supply chain team membership. Nonetheless, the study suggests that supply chains that adopt strategies aligned with the risks they face should perform better than those that do not. The concept of harmonised strategy and environment is complementary to the fit in concept detailed in strategy literature, that explains how one resource's ability to mitigate loss or increase profits is correlated to the fit of the strategy and the external environment, being aligned with the idea of matching the supply chain type with the demand variations incurred in a particular supply chain.

Therefore, the aim of the research is to demonstrate that there is no unique mechanism any company could apply to ensure a minimum risk exposure in a certain date in time. Each industry, company and tier to tier relationship is to be managed separately together with its specificities. While some are relying on previous experiences decisions, others on pure cultural factors and others on critical inputs of a scenario, the interconnectivity of the supply chain will need in depth collaboration to ensure a risk is mitigated, a loss is overcome, and lessons learned implemented. In such a tight correlativity relationship between customer supplier in depth 3-4 layers there are no single failures or single winners but interconnected financial and performance results, reason why strongest partners in supply chain can become strongest market leaders.

4. Research Methods

This paper is presenting positivist research methodology combined with simulation modelling methodology, used to create a virtual model of a supply chain, and simulate different scenarios to identify potential risks and test the effectiveness of different risk mitigation strategies identifying potential challenges that could be implemented in real supply chains. The study focused on the risk of product shortages due to unexpected demand or supply disruptions, testing several parameters to measure the effectiveness of three risk mitigation strategies: Stockpiling - building up inventory to ensure that there was enough product on

hand to meet demand during a disruption; Diversification - creating alternative suppliers options to reduce the impact of supply disruptions; and Collaborative planning - considering suppliers and customers to share information and coordinate production and delivery schedules. Also, the article is focused on a combination of positivist-type research, prioritising the main risks associated to supply chain, and phenomenological-type research, during which the most robust of the correlations supporting the starting hypothesis were highlighted. Therefore, we believe that increasing attention to minimising supply chain risks within the organisations will lead to improved performance of the company and strengthen its supply chain.

Manufacturing companies were chosen as a representative example of global supply chains because they are often the most visible and easily identifiable aspect of a supply chain. They are responsible for producing the final product that is sold to the end customer. Therefore, manufacturing companies are often the main focus of supply chain risk management efforts.

It is important to note that there are several other levels of the supply chain that are not related to the manufacture of the final product, such as logistics providers, quality control providers, assurance providers, and engineering providers. These levels of the supply chain also play important roles in managing supply chain risks. However, for the purposes of this study, the focus is on manufacturing companies, as they are a representative example of global supply chains and often the primary focus of risk management efforts.

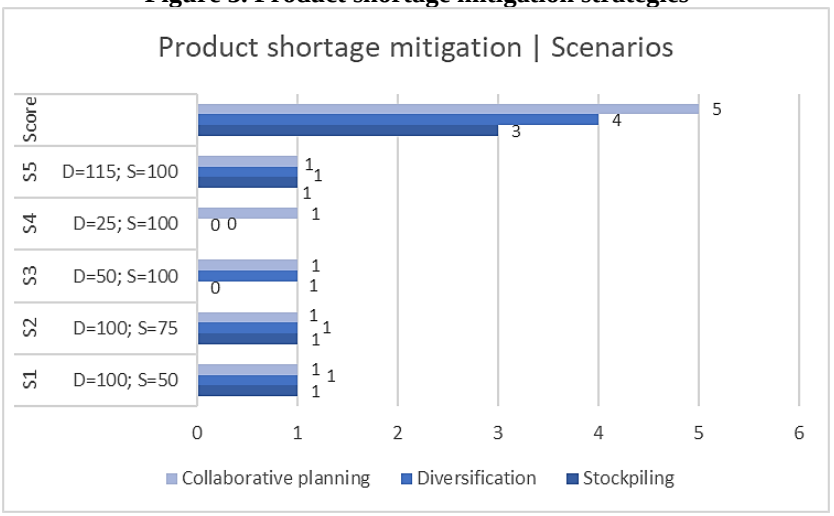
5. Findings

We identified four types of supply chain risks and their interaction in the global environment, while making descriptive analysis of the risks management strategies and the prior steps and reasonings for selecting a particular strategy to follow. Few of the parameters explored and evaluated to have a high influence are the composition of the team, the management of a certain degree of complexity found in the supply chain, and the ability to undertake and apply learning in the inter-organisational structure. To develop the risk management model presented in this study, the researchers also reviewed and summarised findings from similar studies. This helped to provide additional insights and context for the development of the model.

Supply chain disruption risk can occur as consequence of several factors such as political setup, natural hazards, economic instability, or supplier financial issues. This disruption can lead to both financial loss and reputational damage for the company and is materialised when an incident associated with inbound supply is stopping the supply chain advancement of regular activities, having as outcome the inability of the purchasing firm to follow its commercial commitments, to meet the customer demand, or causes threats to customer life and safety. Operational risk is referring to any risk regarding product flow, information and material incurred within the supply chain from the raw material supplier to the final customer of the finished good, which encompasses the risks associated with the day-to-day

operations of the supply chain. It includes risks such as production disruptions, quality issues, inventory management, transportation delays, etc. Performance risk is referring to a company not achieving its key performance indicators that are of high importance in its day-to-day activities, thus impacting both its customers and suppliers. An example of the risk of not achieving the desired level of performance or meeting performance goals is not achieving the targeted turnover to allow a certain percentage reinvestment in new product launches and research and development initiatives. It can arise due to various factors such as operational inefficiencies, supply chain disruptions, and market changes. Process risk refers to inconsistency in the outcomes available at each supply chain level participants, that will influence the variation of value added created per level and is the risk associated with the various processes involved in the supply chain. It includes risks such as production process failures, quality control issues, and delays in delivery. Supplier risk is referring to an action coming from the supply side of the supply chain that causes disruption of activities and products as an effect of a risk situation scenario, being the risk associated with the performance and stability of the suppliers in the supply chain. It includes risks such as supplier bankruptcy, supplier quality issues, and supplier delivery delays, which are captured and monitored at each company level with certain key indicators summarised in a centralised, quarterly or yearly refreshed supplier score rating file.

Figure 3. Product shortage mitigation strategies



Source: Created by author.

	S1	S2	S3	S4	S5	Score
Parameters	D=100; S=50	D=100; S=75	D=50; S=100	D=25; S=100	D=115; S=100	
Stockpiling	1	1	0	0	1	3
Diversification	1	1	1	0	1	4
Collaborative planning	1	1	1	1	1	**5**

Source: Created by author.

Risk assesed: product shortage due to demand/ supply disruption	
S1,..S5	Scenario 1, ..5
D	Demand
S	Supply
0	invalid respose| delivery supply failiure
1	valid response | risk mitigated

Source: Created by author.

There is a significant importance of selecting a research strategy that is appropriate for the research problem at hand. In this study, the research problem was related to understanding the phenomenon of risk management in global supply chains, with a specific focus on manufacturing companies. The Bills of Material reveal the aggregate cost of transferring a component from its source to the receiving area, known as landed costs. It is strategic to seek suppliers near the customer's location or with lower import charges. A balance must be found between the lower prices from far-off suppliers and the added transportation costs, including considerations about the potential risks associated with longer transit times. The design of a product has a direct bearing on the material cost. The product's attributes can stipulate the use of specific materials or precision requirements, influencing the choice between manufacturing in-house or outsourcing. Higher purchase volumes typically result in price reductions as suppliers can quickly recoup their equipment and startup costs. These volumes could also justify the use of more automated equipment and help reduce changeover times.

The company's decision to manufacture in-house or source from suppliers directly affects the skillset requirements and potential capital investment in the facility. Companies should carefully assess the benefits and drawbacks of dual sourcing, which can foster competition, improve quality, and potentially lower prices, but also introduce complexities in logistics and supply chain risk.

One of the findings of diversification parameter in depth analysis is the hedging strategy used to mitigate the supply side risk in global supply chains. Hedging means creating a footprint of global suppliers and facility locations for the same supplier to prevent a single event from affecting all entities at the same time and magnitude. Although it is associated with higher investment, hedging can help manage risks such as quality, quantity, disruption, price, variability in performance, and opportunism. Dual sourcing is an example of hedging, but it involves more capital expenditure than the single-sourcing strategy. Quality and process controls are crucial for hedging to be effective. Overall, hedging requires significant investment and is only valuable for cases where the risk is higher than the expense and the expense can be covered with the project financials or in cases of high-risk supply chains.

SCRM strategies are used in the global supply chain with the intent to minimise loss, speed, exposure, probability, and frequency of risk events and to better cope with their outcomes reflected on each level of the supply chain. Choosing the right risk management strategy fit to the purpose should enable improved performance of

the supply chain; however, in practice the complexity of the supply chain and the increased inter-organisational exchanges of lessons learned can contribute to moderate the correlation between risk management strategies selection and risk outcomes of a certain risk management event.

Each supply chain has its own complexity associated based on the type, structure, and amount of inter-connected actions, processes, and transactions happening within it, which has also a correlated impact with the risk levels associated to running operations, therefore, if the complexity factor could be adjusted and diminished we would potentially observe correlated risk reduction, reason why reducing supply chain complexity is one of the strongest correlations of risk mitigation strategies and is a strategic operations goal for companies looking to minimise and mitigate supply chain associated risk.

Global supply chain managers should consider the degree of complexity in their supply chains and aim to reduce it as much as possible. Additionally, they should focus on adopting inter-organisational learning processes to help mitigate the effects of complexity.

We identified various strategies for mitigating risks in different areas of the supply chain, as each level and action could potentially undertake risks, such as: transportation risks, avoiding last minute transport arrivals that may impact production planning or customer deliveries, financial risk mitigation by ensuring both the operating company and its business partners are in good financial health that would allow them to perform daily operations, ensure cash flow levels in line with performance targets and bankruptcy risk mitigated, information risk mitigation by putting in place processes and procedures to avoid information loss, misused or stolen through phishing campaigns. Also, the literature reviewed showed that supply chain risks can be addressed and mitigated also by putting in place behaviour-based management techniques, such as building strategic supplier relationships, adopting business continuity planning, reducing supply base complexity, and increasing flexibility. Other strategies include building collaborative relationships, sharing information, strategic supplier management, increasing capabilities, having corporate social responsibility programs in place to motivate and empower both employees and business partners together with showing an in-depth understanding of diverse and complex organisational cultures. However, there are limitations to these studies, and more research is needed to develop effective risk mitigation strategies.

6. Conclusions

Supply chain definition did not reach consensus, having in view the literature reviewed, each study undertook its own key factors parameters to have a quantifiable importance in supply chain understanding and breakdown. In the early stages of supply chain risk management development, it some registry terms were translated from fields such as finance and risk management specific to companies, while in time it developed its own complex registry populated with categories specific such as: supply base management, risk diversification, budget sourcing, contingency

plans, gap analysis, risk assessment. Even if risk is defined differently depending on the field where used, there is a general acceptance of the idea that risk is equivalent with the exposure to uncertain event which will occur with unknown probability and having a quantifiable outcome.

Authors approach risk as both subjective and objective phenomenon, involving both possible positive but most likely negative outputs. This has been studied in detail in the SCRM literature, while some studies argue that risk is defined by the stakeholders' positioning while other studies sustain the objective dimension based on risks that are commonly measured and ranked. While risk is risk is typically associated with severe negative consequences, some researchers also highlight some positive effects that may be experimented with in a situation bearing a high degree of risk. Risk is also linked to uncertainty, with some viewing it as the expected outcome from an uncertain event, while others see it as the uncertainty of possible outcomes. Some researchers have created models to enable decision-makers to assess their supply chains, based on different levels of uncertainty in the rage of complete certainty and radical uncertainty. In typical SCRM, participants are aware of the structure in which they act and about the probability that a future event will affect their objectives, based on experience and the status of market evolution. A late order placed in for Europe to a supplier located in India may incur delays based on known transit times, customs delays, quality issues coming from long term storage and other risks, while a period with expensive credit will have an impact on supplier own investment in a given project. In more uncertain situations, subjective beliefs are relied upon for SCRM. While further research is needed to fully understand the impact of these factors on performance outcomes, managers can start by implementing the risk management strategies approached by this study. The literature review demonstrates the increasing interest in SCRM, and the diverse approaches taken by researchers to identify and classify potential risks and risk factors in the supply chain. The reviews also highlight the gaps and challenges in the field, such as the missing unitary approach on SCRM definition and the need for more empirical methods to address risk incidents. As such, there is still much work to be done to fully understand and effectively manage supply chain risks.

In terms of logical events, SCRM can occur both in a proactive and reactive strategy. While most companies have in place risk management department to manage and mitigate risks, the reactive strategies tend to be more utilised as they are implemented after a risk materialises, ensuring the right resource allocation. The proactive strategies are meant to assess and foresee risks prior to their occurrence, allowing for suitable mitigation and contingency plans to be prepared. Research has placed more focus on proactive strategies due to the significant damage that delayed risk responses can cause, in contradiction with practice that is seeing a vast array of risks to manage and rarely finds the time for proactive planning and risk mitigation, reason why we find this subject is of high impact and importance as it can bring an additional insight and reference for supply chain leaders and experts active in supply chain risk mitigation.

Considering 2020-2023 events affecting drastically international supply chains, such as coronavirus and the war in Ukraine it is clear that risks needed to be foreseen, ranked, mitigated and each company needs to have in place a set of contingency actions in front of an uncertain event which can determine significant losses, putting an emphasis on proactive strategies that require accurate predictions and determinations of the probability of a risk occurrence and the easy calculation of its impact together with accepted mitigation strategy associated, to enable quick recovery in the event of risk materialisation.

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Digitalisation of the Fiscal System in Romania Qualitative Research

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Abstract

In recent years, the digitalisation of the fiscal system in Romania has been a priority and has increased significantly. In this regard, the fiscal authorities have been implementing a series of measures to increase efficiency, bring more transparency, and prevent tax evasion. Starting with January 2020, the electronic bill has become mandatory for all taxpayers, and in September 2020, has been launched e-Invoice, the national system for issuing and receiving electronic invoices through an online platform. In 2021, The National Authority for Fiscal Administration (ANAF) has launched an electronic system for accounting reporting (SAF-T – Standard Audit File for Taxation) that allows real time of the accounting reports of the companies through a public online platform. Moreover, ANAF provides to the taxpayers an online web interface for fiscal declarations and for payment of taxes and fees online – www.ghiseul.ro. Since 2019, the fiscal authorities in Romania have launched a lot of projects that use blockchain technology for preventing fiscal evasion. For example, they have launched a pilot project using blockchain technology to use and register transactions with excise duties on petroleum products.

The following paper aims to present the actual context in fiscal digitalisation in Romania based on the research carried out so far by reviewing the specialised literature as well as consulting the information on digital payments at the level of Romania and the European Union. This paper represents an initial part of a study to demonstrate that there is a direct correlation between the degrees of digitalisation in the fiscal system and the volume of tax collection. The study will propose measures to provide support in the digitalisation of services, the increase of tax collection and mitigations measures for the possible informational and logistical risks that may occur in technological implementation. This research will bring a significant contribution to the existing specialised literature regarding fiscal digitalisation in Romania and will offer a useful perspective for the development of the fiscal system.

Keywords: fiscal digitalisation, tax collection, reporting, digital payments, electronic system.

JEL Classification: O33, H87.

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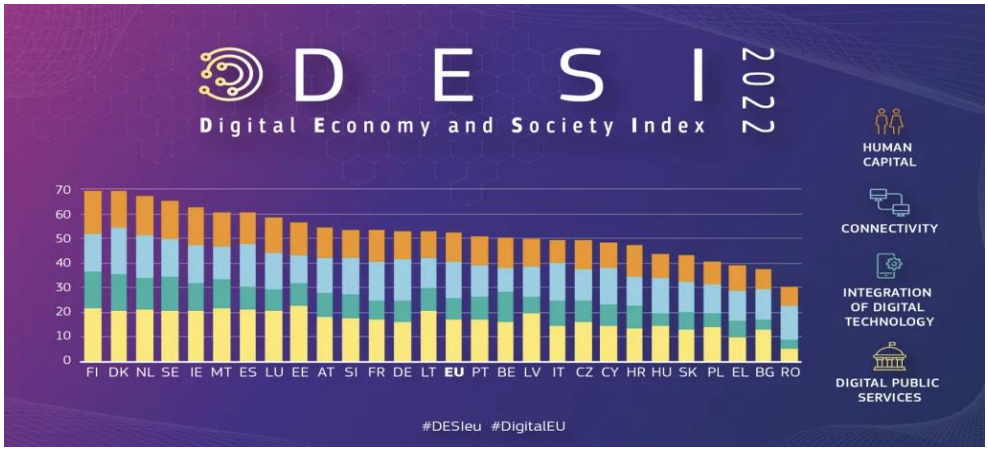
1. Introduction

Romania is one of the European countries with the most important IT industry in the region, having an important contribution to GDP (+12 % yearly increase in 2021 and 0.8 p.p contribution to GDP increase in 2021).

Nevertheless, the digitalisation of the services is still incipient in some industry sectors or regions of the country. Although in the private sector important progress has been made on digitalisation of the services, in the public sector, most of the services and processes are still executed manually, bureaucratic, risky, inefficient, and not sustainable (use of excessive paper, space, and utilities). This is translated into a supplementary activity executed by the taxpayers. Moreover, in the actual context of technological advance and the increasing tendency of the population to adopt digital services as a way of living, the necessity of this type of services is becoming mandatory in the public sector as well.

Romania is on the last place in Europe in the digital economy and society index classification, being one of the least digitised countries in terms of digital public services.

Figure 1. Digital Economy and Society Index



Source: https://digital-strategy.ec.europa.eu/en/policies/desi.

In the context of the COVID-19 pandemic, the lack of digitalised services in the public sector led to difficulties in delivering services to the taxpayers, in some cases creating real bottlenecks. At the same time, COVID-19 showed that the public sector could manage this type of crisis. The emergency period accelerated digitalisation of important services for collecting the fiscal information from the taxpayers and online taxes payments. Moreover, in the context of the Next Generation EU (PNRR), important funds were allocated for digitalisation of the public sector.

The final study aims to analyse the digitalisation in the fiscal system in Romania, measuring the impact of digitalisation through a synthetic index determined by a series of metrics, and the results will be validated through a quantitative study.

This study will bring a significant contribution to the existing specific literature regarding the digitalisation of the public sector and will offer a useful perspective for the economic decision-making and interested persons in the development of the fiscal system in Romania.

2. Problem Statement

In the context of technological advancement, the digitalisation in the public sector is becoming increasingly relevant. Therefore, not only do companies but also researchers show a great deal of concern in this regard and are interested in demonstrating the importance of digitalisation to ease the interaction between the taxpayers and fiscal authorities, increasing the level of tax collection.

Mammadli and Klivak (2020) conducted a qualitative analysis to determine a digitalisation index based on metrics. The article is also proposing a quantitative analysis for validating the index and measuring the impact of digitalisation on the dependent variable GDP.

McKinsey & Company (2020) are presenting the necessity of rethinking the fiscal activities in order to intensify working in the digital environment, mostly in regards with collecting the fiscal information.

The Organisation for Economic Cooperation and Development, OECD (2020) identifies several phases of tax administration, the first phase being based entirely on paper, characterised by many manual and isolated processes. As digitisation entered the government environment and several processes could be carried out remotely or electronically, the fiscal administration has moved into another, the one in which the data is used digitally, and analytical tools can be used. This phase was called e-administration, but in Romania we cannot say that there is complete integration. The third phase of the fiscal administration has the role of establishing the compliance of certain fiscal processes, for example, the establishment of VAT taxation or payments, and to integrate the reporting systems of taxpayers with the capture systems of fiscal administration reports. Greater emphasis is placed on data capture and processing to determine how taxpayers act and establish tax obligations more quickly.

Along with the digitalisation of business, companies like Google and Amazon had put under pressure the traditional tax rules and profit allocation as mentioned by Kim (2019). The author has identified that because of the digital economy, the profits can be easily generated in countries without physical presence. This is imposing a new tax, called digital service tax (DTS), applied to digital business models. The author challenges that DST can be a good solution for taxation of the digital economy.

The interest in digitalisation of the public sector is shown also by the World Economic Forum (2021), where it presents a short analysis of the way the fiscal authorities could improve the interactions with the taxpayers and increase the number of fiscal information through the digitalisation.

As Andrei and Petras (2021) mentioned, the fourth industrial revolution is centred around technology and the way we interact with it. The concept was introduced

by Klaus Schwab, the founder and Executive President of the World Economic Forum, and presented in his book "The fourth industrial revolution" published in 2016. The World Economic Forum organised in Davos in 2019 has dedicated the reunion to this subject. Modern technology means not only using the mobile phone for opening the personal car, it has a greater meaning, such as using the technology for collecting data about consumer behaviour and fiscal information. In this way, the fiscal authorities could have better transparency and accountability on tax collection. The authors are mentioning that SAF-T (Standard Audit File – Tax) project developed by OECD from 2010 and having as a main objective to setting a digitalised framework for reporting the accounting and fiscal data from the taxpayers. A digitalisation process means more than an electronic transfer of the information, it is important to efficiently the fiscal data collected, and the question is of the SAF-T project to contribute to the decrease of the tax evasion and increase of tax collection?

3. Research Questions

This paper is part of the final thesis "Digitalisation of the Fiscal System in Romania" and the aim of the thesis is to demonstrate the following hypotheses:

H0: There is no direct correlation between the digitalisation of the processes in the fiscal system and the tax collection to the state budget.

H1: There is a direct correlation between the digitalisation of the processes in the fiscal system and the tax collection to the state budget, and an increase of the services digitised will lead to an increase of the amount of taxes collected.

H2: There is a direct correlation between the digitalisation of the processes in the fiscal system and the tax collection to the state budget, and an increase of the services digitised will lead to a decrease of the tax evasion, therefore, to an increase of the taxes collected.

The aim of this paper research is to present the result of the online survey, part of the qualitative analysis of the final thesis research.

4. Research Methods

The research will be structured into a qualitative analysis and a quantitative analysis.

Qualitative analysis will consist in evaluation of the digitalisation degree of a component of the state budget of the respective service based on clearly defined criteria. The objective is to evaluate the digitisation degree in the fiscal system by determining a synthetic index based on a series of metrics.

The following metrics will be analysed:

- number of online fiscal declarations;
- number of electronic invoices;
- the degree of fiscal processes automation;
- VAT collection.

The index in digitalisation will be validated through a quantitative analysis, by panel data modelling where the dependent variable is the level of tax collection. The results of the study will confirm the influence of the digital process at the level of tax collection.

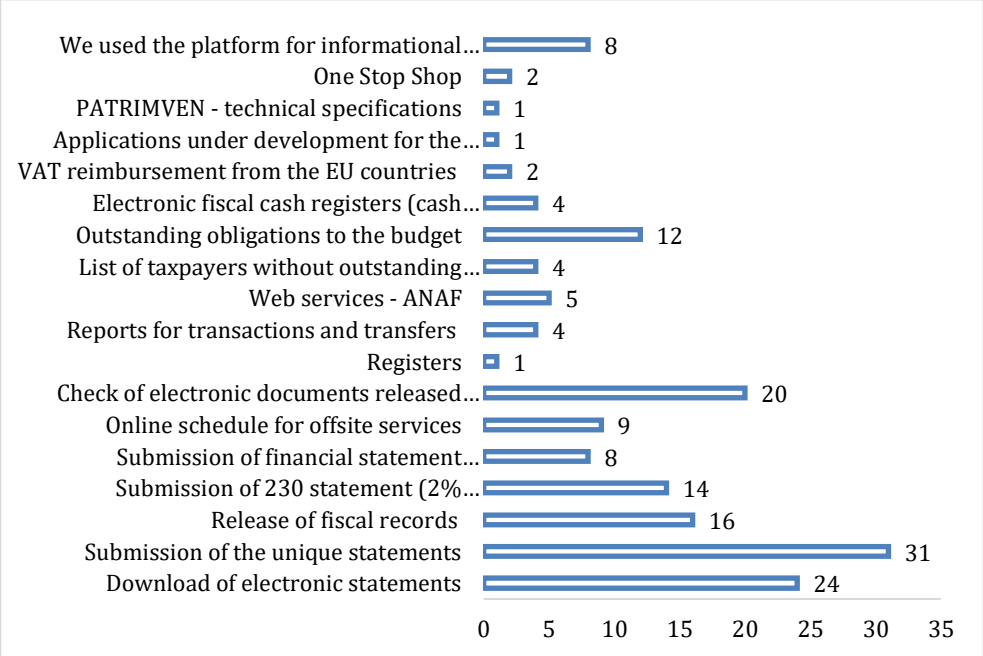
5. Findings

According to Johnston (2021), the pandemic accelerated the digitalisation and our lives became digitally transferring the way people made payments, increasing the number of online and contactless payments. This happened also in Romania, when along with the pandemic, the authorities faced an urge to digitalise the process in order to be able to sustain tax collection.

Part of the paper research was an online survey regarding the digitalisation services that the Romanian authorities implemented for the taxpayers until now: SPV (Virtual Private Space), ANAF, electronic invoices, and Ghiseu.ro.

Following the survey organised online in February 2023, with 57 respondents, 73.7 % of respondents mentioned that they used the SPV platform. 36 % of the respondents who used the SPV platform mentioned that they found the platform very useful, and 52.3 % of respondents found the process of online validation of the documentation acceptable. Almost 70 % of the respondents accessed the platform for reporting the financial statement online.

Figure 2. Responses regarding the operations done by taxpayers on SPV – ANAF



Source: Online survey, February 2023.

82.5 % of the respondents had accessed Ghiseul.ro for payments, and 7 % accessed the platform just for finding useful information. In terms of electronic invoices, 56.1 % of the respondents used electronic invoices in their activities.

68.4 % of the respondents have sent a fiscal document through an online platform and 84.2 % had received notifications regarding the fiscal information or and have received notifications in this regard.

Although there is an important degree of adoption of the digitalisation of the online fiscal services in Romania, and taxpayers are starting to use the platforms to interact with the authorities, there is still a lot of reticence regarding access to the assistance channels of the authorities like chat of phone, 75.4 % of the respondents said they did not access those channels for support. Moreover, 92.9 % of the respondents mentioned that they have never participated in training or information sharing sessions on how to learn to use the platform.

Pástor and Veronesi (2009) consider that when a new technology appears, there are three possible situations: 1) economic agents adopt the new technology, 2) adopt gradually the technology and learn about it and 3) don't adopt new technology.

According to the ANAF performance reports, in 2020, 4.4 million tax statements were filed online at ANAF and in 2021, 1.1 million invoices issued electronically, and 31 million payments made through the SPV platform.

The number of users is increasing, the authorities are making investments in digitalisation; in 2021 the degree of fiscal statements online was 98.3 % against 93.9 % in 2018, therefore, we can conclude that the Romanian population is gradually adopting this technology while learning about it.

Nevertheless, there is a huge potential for developing the manner of interaction between authorities and taxpayers and a lot of risks besides the adversity to change and rate of the technology adoption, such as data quality assurance and cybersecurity. Baur et al. (2020) fiscal accounting is part of the modern administration and according to Max Weber, this is representing an essential condition for economic development.

6. Conclusions

The fiscal authorities in Romania have made a lot of progress in the last years in improving the interaction with the taxpayers and invested in digitalisation. The first trigger was the COVID-19 pandemic that forced the authorities to change the process, otherwise all the collection of taxes would have been blocked. Along with the private sector, digitalisation of services become necessary also for the public sector.

The consumers of services from the private sector are the taxpayers of the public sector, they have similar behaviour and expectations when it comes to interacting with an institution. They prefer seamless services, easy access to services, and transparency in relation with the authorities. In this regard, the authorities must observe the taxpayer's behaviour and evolution and to help them to adopt the new technologies. By having the necessary information, easy access to the payment and collection platforms, and transparency, the taxpayers will be more willing to pay

their contributions. In this way, the amount of taxes collected will increase along with the transparency and the taxpayers trust in the fiscal authorities. Nevertheless, the digital transformation must consider data quality assurance and cybersecurity of the process of tax collection and fiscal reporting.

This paper is part of the final thesis "Digitalisation of the Fiscal System in Romania" and for demonstrating the economic impact of the digitalisation of the fiscal system, the next steps of the research will focus on the establishment of indicators and subsequent data collection, measurement for the construction of the digitisation index and application of panel data models.

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The Future of Sustainable Business: The Case for a "Green Economy" of Enterprises in Bulgaria

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Abstract

The world is in constant motion, and businesses are adapting in the midst of the fourth industrial revolution. Sustainable development is a complex multifaceted concept, but its idea is one; namely, it must be ensured that economic growth allows maintaining a model that creates fair results for all humanity. This means that it is necessary to modernise the economy in order to move towards sustainable consumption and production patterns, to correct the broken balance, and to lay a sustainable foundation through the way of production, consumption, energy, and conservation. The transition to low-carbon, climate-resilient operations and sustainable enterprise development requires significant funding and investment, as well as a significant shift in the way the private sector is invested. The future of enterprises lies solely in the creation of environmentally friendly products and services increasing their sustainable development. This allows the introduction of "green innovations" and the improvement of the country's ecological condition.

Recently, in the scientific literature, the consequences of the activities of the enterprises, as well as the ways of dealing with the problems and the opportunities for a "green economy", have been discussed more and more often. In the present report, several main tasks are set: to make a literature review of the topic, and to establish the development of enterprises towards the transition to a green economy. The main methods used in the development are content analysis, method of analysis and synthesis, statistical data, and reports. In the scientific development, several main results were achieved - an in-depth analysis of the literary sources on the subject, the current state of the enterprises switching to a "green economy" in Bulgaria, and a model for switching to a "green economy" was also proposed.

Keywords: green economy, enterprises, sustainable development, economy, growth.

JEL Classification: L32, O13, Q01.

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1. Introduction

Sustainable development has been an important concern for the international community for decades. Despite the efforts of many governments around the world to implement environmental protection and green economy strategies, as well as international cooperation to support national governments, concerns about global economic and environmental development persist in many countries. This concern has intensified after the ongoing global crises: health crisis related to COVID-19, war between Russia and Ukraine, energy crisis related to high prices of gas, electricity, fuels, food crisis related to high inflation, etc. Today, as governments seek effective ways out of these interconnected crises for their countries, given the limitations of our planet, the green economy (in its various forms) is often seen as a tool that can be used to catalyse the development of national policy and international cooperation and the promotion of sustainable development. The green economy is seen as one of the most important tools for achieving sustainable development for private sector enterprises, which is characterised by its inclusive nature and ability to promote economic growth, employment, and poverty eradication, while ensuring the normal functioning of the planet's ecosystems. The private sector plays a major role in improving the level of green economy in Bulgaria. Most of them carry out many ecological measures and innovations in the field of production and protection of nature.

2. Problem Statement

Nowadays, the literature related to the environmental status of enterprises is vast. The literary sources used in this article are mainly from various European statistical reports, studies, and analyses. The European commission points out the need for sustainable growth, of construction of low-carbon, resource-efficient economy, for which a number of strategies are drawn up.

3. Research Questions / Aims of the Research

The main goal of this report is to establish the level and role of Bulgarian companies in investing and creating a "green economy".

4. Research Methods

The article presents the main results of scientific research and data analysis among Bulgarian enterprises on the state of the "green economy" in the country and in the European Union. The main research methods used in the development are content analysis, method of analysis and synthesis, intuitive approach, systematisation, and other statistical data.

5. Sustainable Development and Green Economy – a Theoretical Analysis

The green economy is a model of economic development that assumes a responsible attitude of man toward the Earth's resources. It aims to find a reasonable compromise between the growth of prosperity and the conservation of natural resources.

Recent literature has argued that 'public opinion plays a key role in linking environmental initiatives from the private sector and government-led efforts, and in shaping political eco-initiatives." (Druckman, Valdes, 2019) The development of the green economy is driven by two main vectors: one driven by climate change policies and the other arising from growing competition from developing countries for access to increasingly scarce and expensive resources. An inclusive green economy must find a balance between economic prosperity, greater social cohesion, and better conservation and wise use of natural resources so as to preserve the well-being and that of future generations. It aims at the dematerialisation of enterprise production, i.e., to decouple economic growth from the use of natural resources and the generation of pollution and waste." (Agudo i Bataller, Narro, 2013). The green economy is part of the sustainable development of every enterprise or of the Bulgarian economy as a whole. The idea of sustainable development is elementary; it is necessary to ensure that economic growth allows maintaining a model that builds fair results for the whole world. Prerequisites are also being created for small- and medium-sized enterprises' modernisation of the production models and the gradual transition to sustainable consumption.

It is a well-known fact that European integration and policies contribute to sustainable development that meets the needs and requirements of the current generation without affecting future generations and their ability to meet their needs. Furthermore, there are several urgent and essential challenges that put the well-being and economic prosperity of any country at risk, including Bulgaria. All of these challenges are complex and highly interrelated, meaning that addressing one challenge can have positive consequences for others.

Sustainable development means improving people's living standards through real choices, creating an enabling environment, and spreading knowledge, as well as through better information. This should lead to a situation where we 'live well within the limits of our planet' (Bourguignon, Allaud, 2019) through a smarter use of resources and a modern economy that serves our health and well being.

It is important to point out that Europe has made significant progress in increasing resource efficiency, but much more needs to be done. Various European Union strategies and legislative acts, such as "Europe 2020/2030", the "Resource Efficiency Europe" initiative, and the Waste Framework Directive or the Seventh Environment Action Program are already being implemented in an attempt to create sustainability in key activities of the economy in a long-term transition perspective. Comprehensive implementation of these policies will provide numerous benefits to private sector enterprises. Less resources will be used per unit of output, and this will help protect and preserve the environment. At the same time, the

economy will benefit from fundamental innovations and higher competitiveness for European enterprises.

It is also necessary for the European Union to "provide knowledge" to small businesses, the economic opportunities of the transition to a low-carbon economy, efficient use of resources, and resilience to climate change. It is imperative in this transition to provide additional support, incentives and appropriate infrastructure to facilitate the creation of leading green enterprises. "A low-carbon economy will see the emergence of many new industry segments such as electric vehicles, energy efficiency solutions, water efficiency services, biomass generators, carbon capture and storage service providers." (EU, 2010)

Private sector initiatives are important drivers of the transformation of the green economy in many countries, including Bulgaria. It is necessary to build on the existing commercial and economic incentives for environmentally friendly business practices, including the development of standards and certification schemes, which help to increase the sustainable development of the country. The potential areas of interaction with the private sector and more specifically with SME's are extensive, for example:

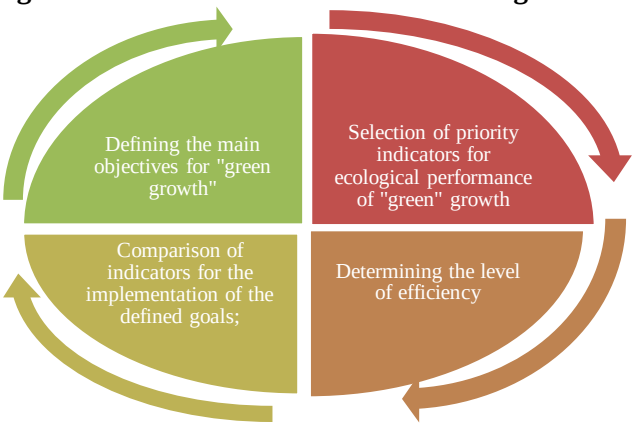
- Research and increasing information accessibility on sustainable practices and market opportunities;
- Capacity building of small businesses related to the green economy;
- Support for dialogue between producers and consumers committed to sustainable sources and eco-products;
- Actions to promote private sector investment in green sectors, including access to green finance by SME's;
- Encouraging the participation of the private sector in the development of policies to promote the transfer of green technologies;
- Development and alignment of green standards for certification, supply, and development of mechanisms to improve trade in "sustainable" goods;

In order to conduct an effective environmental policy of private sector enterprises and comprehensively assess the effectiveness of their "green" growth, a model for a gradual transition to a "green economy" is proposed. This model will make it possible to understand the level of current activities, the scale, and limits of their impact, and to process information on possible foreseeable risks in the most comprehensive way (pollution, waste, degradation of ecosystems, etc.). Important stages in building the model for the evaluation of effective environmental policy and the overall assessment of green growth can be (Figure 1):

1) selection of priority indicators for ecological performance of "green" growth;
2) determining the level of efficiency with their help, which will dynamically allow one to track what progress is being made towards achieving the goals of "green" growth;
3) comparison of indicators for the implementation of the defined goals;
4) defining the main objectives of "green growth" (target values of priority indicators).

When building a model for the development of the "green economy" in the long term, the main sectoral priorities can be proposed for analysis, as well as differentiated indicators in various strategies and programs that have not been synchronised over the years. The basic principle of modeling the situation in the development process of the "green economy" is defined as follows: the designed system must ensure a balanced interaction of the main priority "green" sectors that determine the essence of modernisation, such as ensuring technological progress for economic development and maintaining a favourable natural environment. The effectiveness of the implementation of the transition model to the "green economy" can be determined based on its goals, as well as the degree of results achieved, provided that the following sectors of the economy are introduced: energy (energy efficiency, partial transition to renewable sources of energy); waste disposal (reduction of anthropogenic impact); "green" technologies (BIO, Nano, ICT); production of ecologically clean food products (organic farming); "green" transport; "green" construction; clean water (rational use of water resources), forest and its protection.

Figure 1. A model for the transition to a "green economy"



Source: Systematisation of the author.

This model determines the effectiveness of the implementation of priority sectors of the economy in the transition to sustainable development based on the "green economy" in the long term. Based on this principle, the theoretical apparatus of design technology is used to analyse and calculate the environmental and economic indicators for the development of the "green economy" in the private sector. The effectiveness of the model is characterised by the socio-economic and environmental consequences of its implementation, taking into account the effectiveness of economic mechanisms to ensure the transition to a "green economy".

For the selection of priority indicators for ecological performance of green growth of enterprises, means to analyse all individual elements showing the state of ecological production. Through this, the level of efficiency of the achieved results is determined, and all the obtained indicators are applied for comparison. Target setting is the final element of the model and can include targets such as zero or minimal net

greenhouse gas emissions, reducing production emissions, and decoupling economic growth from resource use (this target actually means " decoupling "), households to be provided to the maximum, liberalisation of the market occupied by the enterprise, eco-friendly standards to be the basis of the creation of the organisation, etc.

According to Safonov (2020) , achieving greener economic growth requires both green innovation policies and supporting targeted industrial and environmental policies to create demand where traditional externalities are not fully reflected in market prices. The challenge is to bring innovation and environmental policy together in a well-balanced mix of administrative support for cutting-edge innovation, bridging the innovation gap, technology implementation and diffusion, and domestic technology implementation. Diffusion of green technologies can be accelerated by policies that increase their adaptability (e.g., promotion of science and engineering education) and trade and industrial policies (local arrangements and technology transfer).

The stimulation of innovative activity toward a green economy can be ensured through appropriate changes in tax, competition, and trade policies, financial incentives for "green" innovations, and control over the use of natural resources. It is necessary to achieve a situation in which productions associated with environmental pollution or excessive consumption of energy, water, and other resources become unprofitable. Then, private sector companies that invest heavily in green technology will be able to reap real dividends from it, due to the advantage over competitors in the cost of the final product.

6. Development of the "Green Economy" in Bulgaria

The Bulgarian economy is one of the most resource-intensive in the EU, lagging behind the member states of the community in terms of the application of the circular economy principle and in the implementation of eco-innovation activities related to the green economy. In the National Plan for Recovery and Sustainability of the Republic of Bulgaria until 2030, three main components are assigned: low-carbon economy, biodiversity and sustainable agriculture. The economy consumes on average 3.5 times more energy resources to produce a unit of GDP than the average energy consumption in the EU. In the last twelve years, a significant increase in the share of renewable energy sources in the gross final energy consumption has been recorded, and in 2019 the achieved share (21.6 %) is more than double compared to 2008 (10.3 %). According to this indicator, the country continues to perform better than the EU (the average value achieved for the EU in 2019 is 18.9 %), and the level of the indicator remains significantly above the national target under the "Europe 2020" strategy (16 % in 2020). The Green Deal's ambitious targets for gradual decarbonisation, as well as their projection in national strategy documents, imply significant additional efforts to increase the share of energy from renewable sources in gross final energy consumption. "At the same time, the ever-increasing development of renewable sources and the related inconsistency in the production of electrical energy require an increase in the adaptability of the operational

management of the electrical energy system to ensure the necessary flexibility, security, and quick action in its management." (Project Bulgaria, 2022)

In order to stimulate Bulgarian enterprises, it is important to implement the so-called energy taxation. It is a budget tool that can also be used as a tool to stimulate the choice of greener energy. Energy taxation policy is one of several instruments that can be used to achieve climate goals. Other instruments are legislation setting targets (for example, effort-sharing legislation on mandatory annual targets for greenhouse gas emissions), regulatory standards (for example, for vehicle emissions), and financing schemes (for example, for energy investment efficiency).

The role of small and medium-sized enterprises in the development of the "green economy" in Bulgaria is enormous. It is well known that they are the driving force of the market, they are the source of innovation and ideas. It is necessary to consider more carefully the models and tactics for environmentally friendly production and consumption. There are companies in the country that have the capacity to switch to ecological production and have done so. Also, a large percentage of SME's are gradually introducing eco-standards for production and consumption. The work to halt global warming and the loss of ecosystems and biodiversity that threaten the prosperity, prospects for sustainable growth, and life itself on this planet must be unceasing. Inequality and territorial disparities remain widespread despite progress. Dealing with these phenomena is important for building a just society, but also for preserving and strengthening social cohesion and for ensuring social and political stability within and between EU member states.

7. Conclusion

Finding ways to a green economy is a global and European opportunity to overcome international economic problems, accompanied by a gentler attitude toward the depleted environment. Frugal consumption of raw materials, sensible agriculture, and modern waste management can be highly profitable. A technological economy can be ecological if it analyses and invents. Based on what has been said so far, the following conclusions can be drawn:

First, the "green economy" is the future of business activity. The "green economy" is not simply a sectoral adjustment between emerging and other more traditional sectors (generated by the technological push towards a low-carbon economy). It includes the ecological modernisation of production and consumption patterns in order to integrate the objectives of increasing the added value of enterprises and their environmental sustainability in terms of material savings, energy efficiency, work organisation, and also worker-employer relations for improving the productivity of all factors.

Second, for the implementation of an effective environmental policy and a comprehensive assessment of the effectiveness of "green" progress in the private sector, a model for a consistent transition to a "green economy" has been developed, which establishes the level of current activities, the scale and boundaries, etc. transition to a "green economy".

Third, in order to comply with all the requirements and for the enterprises to have ecological production and consumption as quickly as possible, it is necessary to implement certain tax measures. Also, in our opinion, if the procedures are followed, there will be financial advantages for the results.

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The Impact of Risk Management on the Sustainability of The Insurance Business

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Abstract

In the light of the failure of Silicon Valley Bank (SVB), which was a leading financial institution that catered to the banking needs of tech start-ups and venture debt in the US, insurance companies with the dual role that they play of insuring institutions and companies' risks, in addition to their investments, are considered as one of the most important components of the economy. The bank's collapse was due to its exposure to risky start-ups and the panic created among investors and depositors following its announcement of a fundraising plan to plug gaps in its balance sheet. This crisis has highlighted the risks associated with investing in the fast-paced world of tech start-ups and the potential for tightening credit for the entire industry, which could stifle innovation and entrepreneurship. The purpose of this paper is to explore whether risk management has a significant positive impact on the sustainability of business. A combination of qualitative and quantitative approaches was adopted; secondary data were obtained by a theoretical presentation of previous literature, and primary data was collected by a specific questionnaire. This was done through a random sample of (forty) questionnaires distributed to employees and clients of insurance companies in Palestine. In order to answer the study question, the researcher followed the analytical descriptive approach using SPSS and tested three sub-questions which were clarified in the study. The results of this paper revealed that risk management has a significant positive impact on the sustainability of the insurance business.

Keywords: risk management, sustainability, insurance companies, Silicon Valley bank, crisis.

JEL Classification: Q01, G32, G22, D81.

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1. Introduction

Insurance companies are considered as one of the most important components of the economy important, as they always seek to carry out their activities in ways that help achieve their insurance or economic goals, especially in light of the current technological development.

The economy is interrelated; if any aspect of the economy is affected by bad things, it also has bad effects. For example, what happened to the Silicon Valley Bank affected all aspects of the economy badly, including the insurance side.

On the other hand, there are many obstacles and risks that insurance companies face that force them to manage according to the surrounding circumstances and the means available to them, whether at the level of current or future activities, the roles it plays in securing the risks to which all institutions and individuals are exposed.

This is called risk management, as it contributes to empowering management, increasing profits, and maintaining the sustainability of businesses.

Risk management is one of the most important current procedures that insurance companies are working on using, in order to achieve the general goal of striving for survival and continuity in growth and development, leading to sustainability and maximising the role of insurance companies in addressing the risks of collapse in economic institutions and sustainability.

Where the research problem appeared, based on what has been mentioned, we will try to address the issue by asking the following question: What is the extent of the impact of risk management on the sustainability of the insurance companies' businesses?

Based on what has been mentioned, the importance and objectives of the study lie in the fact that it addresses an issue of importance in the lives of economic institutions, especially insurance companies, in light of the economic situation that we live in after the COVID-19 crisis and the subsequent state of the economic recession after the current crisis by addressing the role that risks management plays in terms of business sustainability and adapting to various risks.

The objectives to be reached through this study can be summarised as follows:

Explain the impact of risk management on the sustainability of the insurance business and clarify how insurance deals with risk management in most insured institutions, which in turn affects the economy.

Explore the impact of risk management on the sustainability of businesses taking what has happened in the Silicon Valley bank (SVB) as a case study.

2. Problem Statement

There is no doubt that the recent banking problems in the United States are not at all like the ones that occurred in 2008-2009. The crisis in the banking system during the Great Recession was that hundreds of banks across the country, including many of the largest, were insolvent, and some banks are facing runs from uninsured depositors.

Silicon Valley Bank (SVB), the poster child of the current crisis, was very much an outlier for several reasons. First, uninsured deposits were an extraordinary share of its liabilities. These are deposits that exceed the $250,000 limit that is covered by the Federal Deposit Insurance Corporation (FDIC). These deposits accounted for well over 90% of the bank's liabilities. Second, the bank was closely tied to the tech sector, which is notorious for being a boom-bust industry. When the sector boomed during the pandemic (COVID-19), it meant that the bank's clients had lots of money to place with it, but in the last year, when the economy has largely returned to normal, the situation has reversed, and tech companies are laying off workers and making other cutbacks. The problem is that SVB has experienced extraordinary growth in recent years, with its assets quadrupling in size between 2018-2022. It clearly did not have a plan to deal with the flood of deposits received in those years. So, it chose to put them largely in longer-term US Treasury bonds. While this is a very safe asset from the standpoint of default risk, long-term bonds do have interest rate risk. Since the Federal Reserve Board advertised to increase the interest rates, it is surprising that SVB did not take steps to hedge itself against interest rate risk, which means that it has faced huge losses as interest rates rise. The focus of the bank's business in the tech sector meant that it was particularly vulnerable to a run. When some important people in this world withdrew their money, it led others to follow. Which forced the bank to sell some of its assets at a loss. When this information became known, it accelerated the run and forced the FDIC to take over the bank. While most banks are not similar to SVB in their business model, any bank can be susceptible to a run if there is enough fear in the environment (Baker, 2023).

Silicon Valley Bank (SVB) was a leading financial institution that specialised in the banking needs of tech start-ups and venture debt in the US. Also, SVB was known for its venture lending practice, which included around $74 billion worth of loans, including venture debt. Unfortunately, it was the largest US bank to fail since the 2008 financial crisis. The bank's collapse was due to its exposure to risky start-ups and the panic created among investors and depositors following its announcement of a fundraising plan to plug gaps in its balance sheet. This sudden collapse of SVB stranded billions of dollars owned by the companies, investors, and depositors, causing a bloodbath in the start-up industry and banking stocks. This crisis has highlighted the risks associated with investing in the fast-paced world of tech start-ups and the potential for tightening credit for the entire industry, which could stifle innovation and entrepreneurship (Yadav et al., 2023).

Vo and Le (2023) showed that the bank invested heavily in debt securities during the period of low interest rates, and the subsequent rise in interest rates in 2022 resulted in large unrealised losses, and the bank's deposits were also highly concentrated among a small group of venture capitalists, which increased the likelihood of a bank run. Moreover, the bank held less capital, which exacerbated the impact of risk. In general, mismanagement of assets and liabilities led to the failure of the bank.

Banks can fail due to a variety of reasons such as macroeconomic uncertainty and is positively associated with economic downturns (Aubuchon, Wheelock 2010), and

inadequate risk management (Beltratti, Stulz, 2012). While Acharya and Richardson (2009) point out that risk taking behaviour is a major reason for bank failure.

Hauf and Posth (2023) examine the main reasons for the collapse of the Silicon Valley Bank (SVB) from a regulatory and risk management perspective. It was shown that the economic value of equity pointed to excessive interest rate risks on SVB's balance sheet over one year before the actual collapse. The analysis reveals major weaknesses in SVB's risk management practice. Regarding the bank's risk management: It is in the interest of every bank to manage not only its risks to the minimum required by the regulator but in such a way that the bank's operational business can be managed sustainably - even during a crisis. For this, best practices in risk management must be implemented and circulated throughout the organisation.

Small and medium enterprises (SMEs) in Arab countries play an important role in economic development by creating sources of employment and encouraging innovation, especially in the tech sector. During the pandemic (COVID-19), the tech sector boomed, which was a basic pillar of the global economy. After the pandemic, the economy has largely returned to normal, the situation has reversed, and a large part of these services was dispensed with, so these companies have faced many risks that are the responsibility of the insurance companies that insure such companies. Therefore, the country's economic growth may be affected if SMEs do not have clear risk management that helps to achieve business sustainability (Dwikat et al., 2022).

There is a global interest in maintaining the economic situation in a more stable manner, and the continuous emergence of risks over time and the need for risk management to achieve sustainability in business, especially in the insurance sector, constitute an important scientific direction towards which most studies and research are directed, especially in developing countries (Al-Sabbagh, 2009).

Nugraha et al. (2022) studied the effect of applying risk management on the financial performance of companies, which has a positive impact on market performance. The aim of the study was to prove that risk management has positive effects on market performance. The study shows that companies that apply enterprise risk management have better market and financial performance compared to companies that do not.

In terms of risk management, Caraiman and Mates (2020) clarify that risk management is an integral part of the way any organisation works, being the basis of management approaches. It should not be separated from the daily activities of any organisation where risk management is necessary because there are always doubts about the nature of the threats facing companies. If uncertainty is an everyday reality, then the reaction to uncertainty must become a permanent concern.

Bromiley et al. (2015) clarify how Enterprise Risk Management (ERM) proposes the integrated management of all the risks an organisation faces, which inherently requires alignment of risk management with the company's strategy, and emphasise that organisations should manage all their risks comprehensively and coherently instead of managing them individually. A company's overall strategy and strategic

choices significantly influence its risk, and the uncertainty associated with high-level strategic choices poses challenges for ERM.

From previous studies, it's clear that risk management is important for all economic sectors in all their aspects, whether they are banks, insurance companies, or large, medium, and small technology companies, and they must be taken care of and work within a sustainable framework while adapting to continuous risks, whether they are economic crises or epidemics and their impact on all aspects of the economy. The recent collapse of the Silicon Valley bank teaches us a lesson that we should work on dealing with proper risk management to help sustain the business. It becomes clear that risk management is important in achieving sustainable development. From here, we clarify the main problem of the study, which is the impact of risk management on the sustainability of the insurance business, and how important it is to use risk management and insurance in all economic sectors?

3. Research Questions / Aims of the Research

This study comes in light of the crisis in the banking system during the Great Recession, where hundreds of banks across the country, including many of the largest, were insolvent and some banks are facing runs from uninsured depositors. In light of the collapse of the Silicon Valley Bank (SVB) as a result of weak in SVB's risk management practice and global interest in maintaining the economic situation in a more stable manner, and the continuous emergence of risks over time and the need for risk management to achieve sustainability in business, especially in the insurance sector, constitute an important scientific direction towards which most studies and research are directed, especially in developing countries, the aim of the research is to clarify a main question: "Is there a role of risk management in achieving sustainability especially in the insurance sector?"

The following sub-questions emerged from the main study question:

To what extent have the Palestinian insurance companies been affected by the recent crisis that occurred in the Silicon Valley Bank (SVB)?

To what extent is risk management applied in Palestinian insurance companies?

To what extent does risk management affect business sustainability and clarify its role in Palestinian insurance companies?

4. Research Methods

The study is exploratory and relies on primary and secondary data sources. To collect relevant data, a combination of quantitative and qualitative approaches was adopted. The qualitative approach was used by reviewing the previous literature and collecting data and secondary information from books, press articles, Internet research, and annual reports. The theoretical presentation in the problem statement of the previous literature focussed on risks that influence the economy, such as the collapse of Silicon Valley Bank, which caused the collapse of many economic institutions. This crisis has highlighted the risks associated with investing in the fast-paced world of tech start-ups and the potential for tightening credit for the entire

industry and the role of risk management in the sustainability of the insurance sector's business. A specific questionnaire has collected primary data. This was done through a random sample of forty questionnaires distributed to employees and clients of insurance companies in Palestine. In order to answer the study question and describe and investigate the impact of risk management on the sustainability of the insurance business, the researcher followed the quantitative analytical descriptive method using the SPSS and has tested three sub-questions which were clarified in the study.

Data was analysed and collected from articles that were in line with the objective of the study. Information helped to conduct a well-structured questionnaire on a random sample of 40 employees and clients of insurance companies in Palestine.

Primary data was collected from Palestinian insurance companies with a suitable sample of 40 respondents randomly distributed among the employees and clients of insurance companies in Palestine from April 2023 to May 2023 using an online survey (Google Form). four (4) incomplete questionnaires were excluded, and only 36 responses were used in the data analysis to answer the study questions.

The questionnaire consists of two parts:

Part 1: General information about the study sample and demographic details.

Part 2: Includes instructions on how to answer the questionnaire items. Participants were asked to indicate their level of agreement based on a five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree), as well as display the questionnaire items, which It consisted of three main domains; the first domain have asked questions regarding the recent crisis that occurred at the Silicon Valley Bank (SVB), the second domain included risk management in Palestinian insurance companies, and the third domain included the role of risk management on business sustainability. The questionnaire was developed by reviewing the references and previous studies related to the study.

5. Findings

In this part we discuss data analysis, study sample and confirmatory factor analysis (CFA) to reveal the validity and reliability of the structural model. As mentioned earlier, the random sample for the study consisted of 40 employees and clients of insurance companies in Palestine. It has been verified that the questionnaire measures the objective for which it was created, which is to determine the impact of risk management on business sustainability in insurance companies. The questionnaire was presented in its initial form to several arbitrators with specialisation and experience, and the necessary modifications were made to it.

The validity and reliability of the tool were tested, confirmation factor analysis (CFA) was tested to discover the validity and reliability of the structural model using Cronbach's alpha (α). Cronbach's alpha values were satisfactory, and the values for all latent variables were above 0.6 as shown in Table 1 and indicated higher values of internal consistency (Hair et al., 2013). The results were deemed to be valid and reliable to run the measurement model.

Table 1. Cronbach's Alpha (α) results for detect the validity and reliability

Section	No. of Items	Cronbach's Alpha
All question of questionnaire	23	0.654

Source: Authors' own research.

Table 2. One-sample statistics

Mean	Std. deviation	Std, error mean	T
2.5	0.642	0.081	-2.342

Source: SPSS program outputs.

In table 2 it is clear that the arithmetic means of the answers to the statements that show the impact of risk management in the sustainability of business in insurance companies has been linked to the value of (2.5) with a standard deviation (0.642) and the value of t (-2,342). Thus, we accept the null hypothesis that says insurance companies do not use risk management to sustain their business.

Table 3. Arithmetic means and standard deviations of the first part of the questionnaire according to respondents' responses

No.	Item	Standard Deviation	Arithmetic Mean
1	Do insurance companies take steps to deal with interest rate risk in insured institutions?	0.989	2.45
2	Does global tension increase tension in insurance activity?	0.721	2.51
3	Are there needs for effective tools to anticipate risks?	0.833	2.82
4	Does global tension increase tension in insurance activity?	0.976	2.30
5	Are insurance companies ready to deal with risks associated with investing in the fast-paced world of tech start-ups?	0.948	2.32

Source: Authors' own research.

Results show the value of each item. Table 3 indicates that the item:" "Are there effective tools to anticipate risks?" has the highest score among the items, with an arithmetic mean value of (2.82) out of five, with standard deviations of (0.833). By contrast, the item "Does global tension increase tension in insurance activity?" has the lowest score among the items, with an arithmetic mean value of (2.30) out of five, with standard deviations of (0.976).

The results pointed out that most of the respondents emphasised that after the collapse of Silicon Valley Bank there is a huge need for effective tools to anticipate risks to sustain business and manage not only risks to the minimum required by the regulator but in such a way that the business can be managed sustainably - even during a crisis.

Table 4. Arithmetic means and standard deviations of the second part of the questionnaire according to respondents' responses

No.	Item	Standard Deviation	Arithmetic Mean
6	Is there a lack of experience in risk management?	0.982	2.85
7	Are there expected scenarios for dealing with future risks for companies and customers?	0.964	2.56
8	Is there an application for risk management?	0.956	2.45
9	Are risk management steps used clearly within global ratings?	0.952	1.93
10	Are there obstacles to dealing with risks?	0.845	3.03
11	Are risk management steps used according to the (ISO 31000) standard?	0.809	2.12
12	Is technology used in the risk management system?	1.013	2.68
13	Is artificial intelligence used to warn of risks in a computerised system?	0.966	2.46
14	Is there cooperation between clients and insurance companies in dealing with risks?	0.883	2.77
15	Can customers be a risk factor?	0.823	2.90
16	Are the risks dealt with in a deliberate and pre-calculated manner?	0.011	1.94

Source: Authors' own research.

Table 4 Indicate that the item: "Are there obstacles to dealing with risks?" Has the highest score among the subjects, with an arithmetic mean of (3.03) out of five, with a standard deviation of (0.845). By contrast, the item " Are risk management steps used clearly within global ratings? The lowest score among the vocabulary with an arithmetic average of (1.93) out of five, with a standard deviation of (0.952)

The results pointed out that most of the respondents emphasised that there are obstacles to dealing with risks, as Palestine suffers from a complex political situation and there is no doubt that the occupation is a major obstacle in the way of sustainability and development. However, there is a tendency to apply risk management to achieve sustainability in business.

Table 5. Arithmetic means and standard deviations the third part of the questionnaire according to respondents' responses

No.	Item	Standard Deviation	Arithmetic Mean
17	Does sustainability increase profitability?	0.784	2.33
18	Does sustainability increase cooperation with all sectors	0.740	1.44
19	Does sustainability maximise the wealth of beneficiaries in a safe manner?	0.983	2.57
20	Does risk management create a sustainable economy?	0.993	2.55
21	Does proper risk management help to achieve sustainability?	0.893	2.96

No.	Item	Standard Deviation	Arithmetic Mean
22	Does the use of specialists in risk management help to reach sustainability?	0.942	2.57
23	Does sustainability increase efficiency?	0.769	2.70

Source: Authors' own research.

In Table 5 Results show that the item: "Does proper risk management help to achieve sustainability? " Has the highest score among the items, with an arithmetic mean value of (2.96) out of five, with standard deviations of (0.893). By contrast, the item "Does sustainability increases cooperation with all sectors?" has the lowest score among the items, with an arithmetic mean value of (1.44) out of five, with standard deviations of (0.740).

The results pointed out that most of the respondents emphasised that proper risk management increases work efficiency, continuity, and sustainability in work.

This paper's results revealed that achieving sustainability is one of the most important goals that help in the development of the Palestinian economy, and risk management has a significant positive influence on the sustainability of the insurance business in Palestine. This research study also supported and supports the previous studies conducted by various researchers about risk management's impact on the sustainability of the business.

6. Conclusions

The study aimed to study the impact of risk management on the sustainability of the insurance companies' business in light of the current economic situation, and the collapse of the Silicon Valley Bank (SVB) as a result of weak SVB's risk management practice and the global interest in maintaining the economic situation in a more stable manner, and the continuous emergence of risks over time and the need for risk management to achieve sustainability in business, especially in the insurance sector, constitute an important scientific direction towards which most studies and research are directed, especially in developing countries.

The paper found a significant positive relationship between risk management and sustainability in the insurance business. However, in Palestine, there are obstacles to managing risks as Palestine suffers from a complex political situation and there is no doubt that the occupation is a major obstacle in the way of sustainability and development, also after the collapse of Silicon Valley Bank. Attention was paid that there is a huge need for effective tools to anticipate risks to sustain business and manage not only risks to the minimum required by the regulator but in such a way that the business can be managed sustainably, even during crises. So, recently, there is a tendency to draw expected scenarios for dealing with future risks for companies and customers and apply risk management to achieve sustainability in business.

Attention should be paid to experience and scientific competence in risk management technology and an attempt to create a system based on artificial intelligence to help obtain a continuous computerised report of risks and warn of

dangers to help increase profits, maximise the wealth of the owners, in order to achieve sustainability in the work.

Finally, this paper has some limitations that future studies can address. First, spatial boundaries: Palestine (West Bank). The sample was taken from employees and clients of insurance companies in Palestine. Secondly, time limits: The study covers the period from April 2023 to May 2023. Therefore, further studies are recommended on the impact of risk management on the sustainability of the insurance business, and we hope that this study adds value to the scientific community.

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Investment in Research and Development in an Asian Emerging Economy: An Overview and Policy Implications

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Abstract

The Fourth Industrial Revolution is taking place strongly and affecting the production systems of countries worldwide. Investment in research and development (R&D) is seen as a pivotal strategy to promote economic growth and improve the competitiveness of the economies. This paper aims to analyse the investment in R&D in Vietnam, an emerging country that has successfully maintained robust economic growth in recent years. The study result shows that R&D investment in this economy has been still quite limited compared to the other countries in Asia. The low value of R&D investment would lead to a low level of technology in domestic production systems. Therefore, this evidence concludes that there is a great challenge in promoting high economic growth in the coming period. Finally, the paper provides some policy implications to promote investment in research and development in Vietnam in the coming period.

Keywords: R&D, innovation, technology development, knowledge-based economy.

JEL Classification: O14, O25, O40.

1. Introduction

In the context of science and technology being regarded as the cornerstone of a country's success (Nair et al., 2020; Anand et al., 2021). One of the keys to the success of science and technology development is research and development (R&D) (Inekwe, 2015; Zafar et al., 2019; Tung, Hoang, 2023). Therefore, the level of

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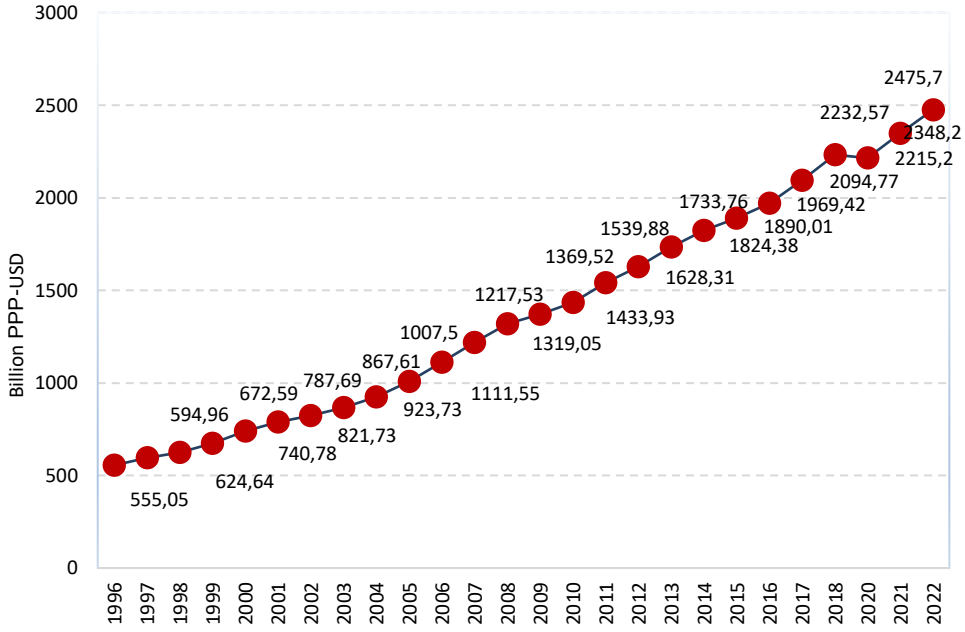
development is directly proportional to the amount of resources invested by countries in R&D. It is believed that significant investment in R&D over an extended period of time is the primary factor behind the achievements of a large number of multinational firms located all over the world (Tung, Binh, 2022). R&D at research units in the economy is responsible for the development of new products, new types of services, new technologies, and even new production methods (Vithessonthi, Racela, 2016).

According to the statistics provided by R&D World, governments throughout the world spent a total of 2,475.6 trillion USD on R&D in 2022 (R&D World, 2022). This is a 5.43 % increase compared to 2021. However, the level of investment in R&D varies greatly from country to country. In particular, a total of 1,939.7 billion USD, or 78.3 % of the total, was invested by the top 10 countries, namely the USA (679.4 billion USD), China (551.1 billion USD), Japan (182.2 billion USD), Germany (143.1 billion USD), South Korea (106.1 billion USD), France (68.5 billion USD), India (65.2 billion USD), UK (54.9 billion USD), Russia (52.2 billion USD) and Brazil (37 billion USD) (R&D World, 2022). As a result, developed countries are ahead of the curve when it comes to spending on R&D, and they will keep that momentum going into the foreseeable future.

Figure 1. Global investment on R&D, 1996-2022



Source: Statista (2022).

Many developing nations with rapid economic expansion and thriving commercial sectors have been classified as "emerging economies" over the years. Emerging economies are expected to play a significant role in driving global economic growth during the next decade. However, there are increasing challenges for these countries in maintaining high economic growth over the long run, which is necessary if they are to avoid falling into the middle-income trap. In order to assist developing countries in rapidly increasing their competitiveness, expanding the size of their economies, and reaching the per capita income level of the group of developed countries in the coming period, the development of science and technology as well as the promotion of R&D activities is considered to be the right direction.

The objective of this study is to investigate the current state of R&D investment in Vietnam, which is an emerging economy in Asia. On the basis of these findings, some policy implications are offered to encourage the continuation of this work in the near future. When it comes to fostering long-term, sustainable economic growth in the coming years, developing countries can benefit from the lessons that can be drawn from the experience of Vietnam.

2. Overview of the Impact of R&D on Development

In general, R&D is defined as "comprises creative and systematic work undertaken in order to increase the stock of knowledge, including knowledge of humankind, culture, and society, and to devise new applications of available knowledge" (OECD, 2015). Owing to its wide coverage in many fields of science and technology, R&D includes three main areas, namely (i) Basis research, (ii) Applied research, and (iii) Experimental development research. In particular, basis research is experimental or theoretical work undertaken primarily to acquire new knowledge of the underlying foundations of phenomena and observable facts, without any particular application or use in view. Applied research is the original investigation undertaken in order to acquire new knowledge. It is, however, directed primarily towards a specific, practical aim or objective. Experimental development is systematic work, drawing on knowledge gained from research and practical experience and producing additional knowledge, which is directed to producing new products or processes or to improving existing products or processes (OECD, 2015).

At the national level, R&D plays a significant part in promoting economic growth, which helps to increase national competitiveness and, as a result, helps to promote sustainable growth, according to the findings of various studies that were conducted (Tung, Hoang, 2023). Cooperation between countries in the field of R&D helps to tighten those countries' ties in the production technology arena, which in turn leads to the development of international production value chains (Inekwe, 2015). When viewed through the lens of the national production function, R&D contributes to economic growth by boosting both the total factor productivity as well as the marginal productivity of capital and labor. In the context of the ongoing fourth wave of the industrial revolution, the nations that invest the most in R&D are also the nations with the most prosperous economies (Nair et al., 2020). Investment

in R&D contributes not only to the enhancement of the national production model but also to the promotion of the green growth model, both of which are geared toward the elimination of emissions and the amelioration of environmental contamination. When viewed through the lens of agricultural production, the achievements of R&D help to improve crop productivity while simultaneously decreasing the negative effects of climate change (Zafar et al., 2019).

In terms of the micro perspective, studies conducted on the subject of R&D have revealed this field's favorable outcomes on the performance of corporations (Tung, Binh, 2022). In particular, R&D plays a key role in the process of bringing products of exceptional quality, distinctive, and appealing services to market. R&D is important to the process of developing new technologies, since it helps to improve technical autonomy and the capacity to assimilate new technologies (Vithessonthi, Racela, 2016). R&D also helps enhance the ability to adapt and update imported technologies, which in turn leads to an improvement in the export ability of businesses, the avoidance of the import of obsolete technologies, and the saving of resources for the procurement of technology. Businesses have the ability to develop new types of products, new services, or new features and new functionalities to improve already existing products and services through R&D as well as newly invented technologies. In addition, R&D efforts assist in the reduction of production and operating costs. This is accomplished by the development, fabrication, and improvement of new materials that have lower pricing, as well as by making the production process quicker, more productive, and less dependent on the consumption of energy. R&D not only serves to enhance the performance indicators of businesses, but it also helps to increase their market value, which is especially beneficial for businesses that are listed on a stock exchange. The driver for an increase in the capitalisation of corporations is the favourable impact that R&D has on the performance and growth of businesses.

In spite of this, investing in R&D involves not only triumphs but also failures. The reason for this is that both nations (at the macro level) and businesses (at the micro level) need to expend a significant amount of resources in order to support and advance R&D efforts. In the event that R&D projects are unsuccessful, businesses will be compelled to account for production costs, which will lead to an increase in the cost space. When expenses go up, prices go up; but, if that cost increase is not accompanied by an increase in the quality of the product or service being offered, there is a risk of losing the company's competitive position in the market. In other words, failure of R&D projects can negatively affect the competitive position of businesses.

3. Current Status of R&D Activities in Vietnam

Vietnam is now considered to be a member of the group of emerging economies after having achieved achievement in economic development (Barker, Üngör, 2019). This economy has received huge benefits from the successful implementation of the Doi Moi policy for more than four decades (World Bank, 2023). In addition, Vietnam has been successful in attracting a significant amount of foreign direct

investment (FDI), and it remains high on the list of potential destinations in Asia for international investment. Vietnam's domestic market has significant purchasing power and is a dynamic business environment for all types of businesses given the country's large and growing population and the influx of tourists (World Bank, 2023). In 2022, Vietnam's GDP grew by 8%, placing it among the top economies in the world (GSO, 2023). The Gross Domestic Product (GDP) of Vietnam is estimated at around 420 billion USD, with a GDP per capita of 4,200 USD. Vietnam is forecast to continue to grow rapidly in the next decades and be among the 20 largest economies by 2045.

Table 1. The main statistical indicators of the Vietnamese economy, 2022

No	The national indicator	Unit	Statistical number
1	Area	1000 km^2	331.2
2	Population	Million people	99.3
3	Labour force	Million people	51.7
4	GDP per capita	USD	4110
5	Average FDI per capita	USD	279
6	Economic growth	%	8.02
7	Inflation	CPI, %	3.15
8	Unemployment	%	2.32
9	International trade (Exports + Imports)	Billion USD	730.21

Source: The General Statistics Office (GSO, 2023).

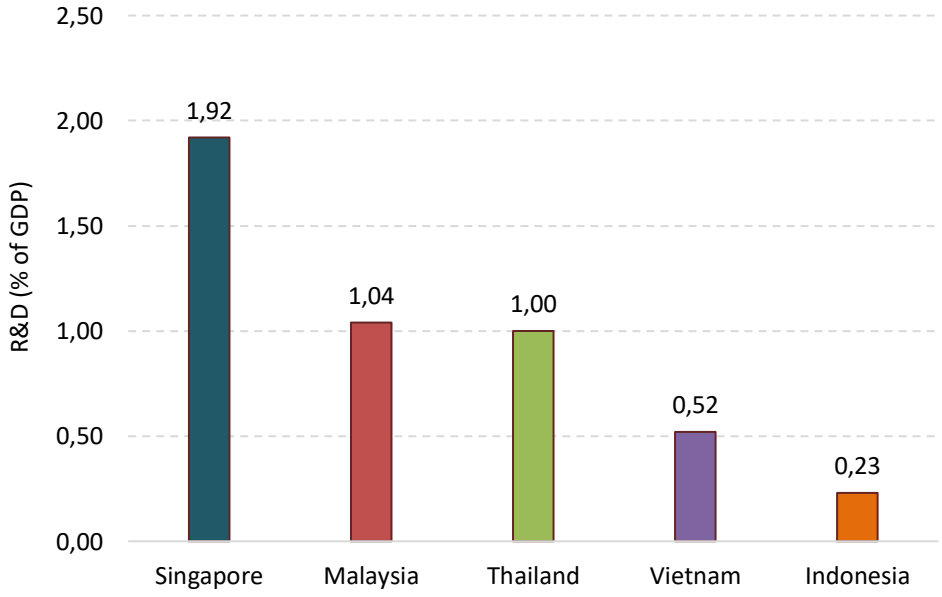
The policy for the development of the business community is always focused and, by the end of 2022, Vietnam had developed a business community consisting of 714,000 firms operating in a wide variety of areas. However, the majority of these businesses are located in large cities such as Ho Chi Minh City (31.9 %) and Hanoi (20 %). As of right now, the business community is responsible for the creation of jobs for 14.5 million people, many of whom are seeing their earnings increase (GSO, 2019). The World Bank's report from 2107 comes to the conclusion that the quality of human resources, qualified workforce, and innovative activity in the form of coming up with new ideas are going to be extremely important factors in determining whether or not the economy will be able to stand and flourish successfully in the coming era (World Bank, 2017).

Countries such as Vietnam absolutely require a paradigm shift in their approach to economic growth in order to break free of the challenges posed by the "middle-income trap." The model for economic growth needs to be founded in science and technology, with a strong emphasis placed on both fundamental and applied research. As a result, the government of Vietnam has persistently placed science and technology at the center of its long-term development strategy, and the business community in Vietnam has taken significant steps to expedite this approach. However, in general, the potential of the Vietnamese business community is still

rather low, resulting in relatively low levels of investment in R&D. According to a report that was published by the World Bank in 2017, the ability of the business community in Vietnam when it comes to science, technology, and innovation is still fairly low, and the innovation system in the production units is still fragmented and small. In general, R&D spending in Vietnam's manufacturing sectors has not received the attention it deserves (World Bank, 2017). This circumstance has demonstrated that a large number of businesses have a tendency to become mired in production procedures that require an excessive number of people or an ongoing requirement for extra cash.

The level of attention paid to Vietnam's R&D investments by governments throughout the years has resulted in various shifts in that level of investment. In spite of this, as compared to other nations in Southeast Asia, the resources available to Vietnamese businesses for investment spending on science and technology in general, and R&D in particular, are still relatively low. According to R&D World's statistics, Vietnam's R&D spending in 2020 is only equivalent to 0.52 % of GDP. This percentage is quite low when compared to Singapore's 1.92 % of GDP and Malaysia's 1.04 % of GDP. Spending on R&D by businesses in Vietnam ranks just 70th out of 141 nations, according to data compiled by the World Economic Forum (WEF, 2019). This is a very low ranking when compared to Singapore (14th), Malaysia (24th), and Thailand (48th), all of which score far higher. According to the statistics, there is a lack of investment in R&D in Vietnam.

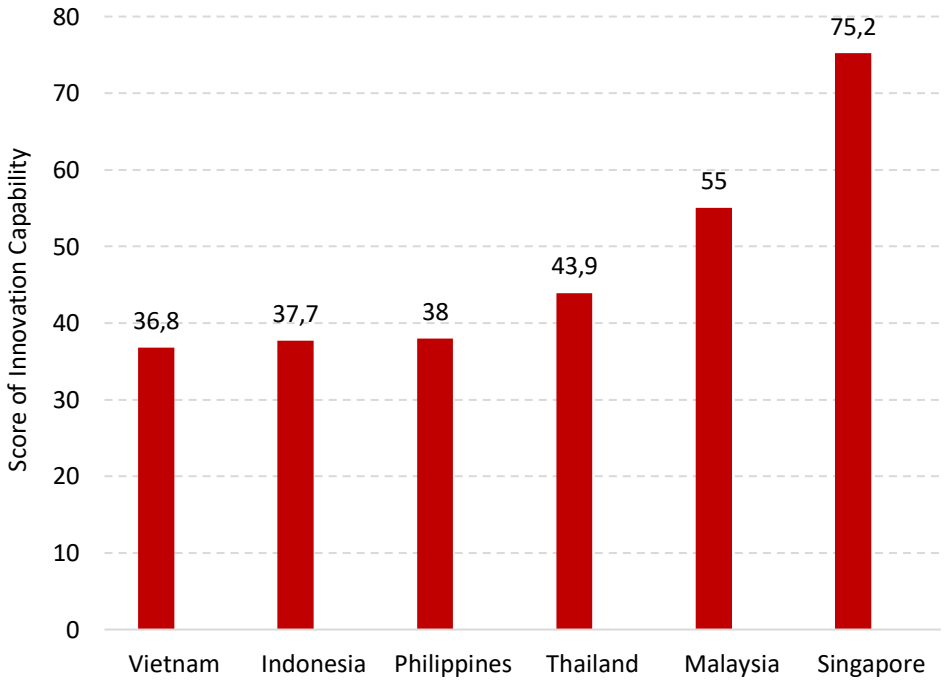
Figure 2. R&D spending as a percentage of GDP in some Southeast Asian countries, 2020



Source: R&D World and World Development Indicators.

The analysis of the innovation situation that was included in the 2019 edition of the Global Competitiveness Report produced by the World Economic Forum (WEF, 2020) found that the innovation capability score of the business community in Vietnam was the 6 lowest among the 6 ASEAN nations. To be more specific, Vietnam has a score of 36.8 (ranking 76th out of 141 nations), Indonesia has a score of 37.7 (ranking 74th), the Philippines has a score of 38.0 (ranking 72th), Thailand has a score of 43.9 (ranking 50th), Malaysia had a score of 55 (ranking 30th), and Singapore had a score of 75.2 (ranking 13th). Aside from that, there has not been much progress made by Vietnam. The Score of Innovation Capability for the economy was 3.3 (73/141 nations) in 2019, but it has since climbed to 36.8 and moved up three places, to 76/141 countries. According to the statistics, the business community in Vietnam is still somewhat "passive" when it comes to the implementation of activities related to innovation. In spite of the fact that Vietnam has had a rate of economic growth that is among the highest in recent history, the Score of Innovation Capability has only made very slight progress.

Figure 3. Innovation capability scores of some ASEAN countries



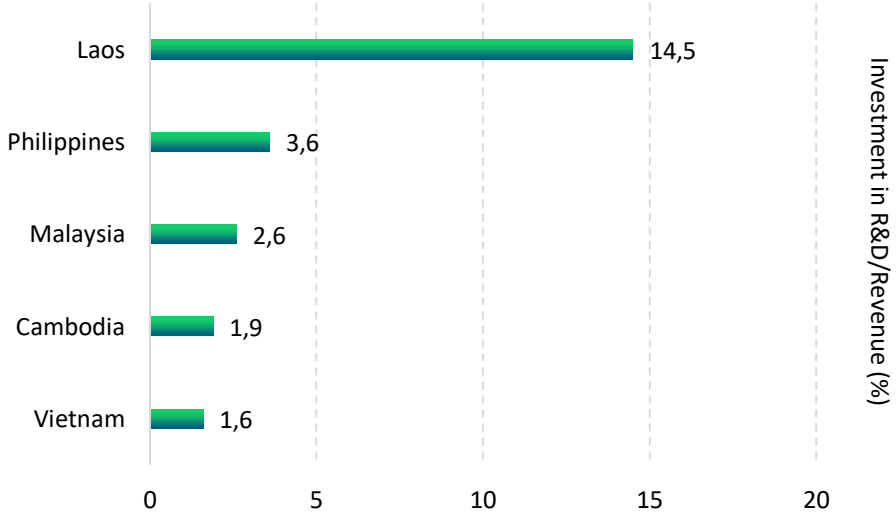
Source: World Economic Forum, 2019.

To promote the development of science and technology and promote R&D activities at enterprises, Decree No. 95/2014/ND-CP was issued with regulations that state-owned enterprises must deduct from 3 % to 10 % of pre-tax profits to set up their science and technology development funds. Non-State businesses are entitled to deduct up to 10 % from pre-tax income to set up a science and technology development fund. According to information obtained from a survey of 7,450 businesses, however, just 6.23 % of businesses (which is comparable to 464 businesses) claimed that they engage in R&D activities (GSO, 2016).

According to information obtained from the World Bank Report titled "Enhancing Enterprise Competitiveness and SME Linkages" which was published in 2017, it is concerning that Vietnamese businesses generally do not spend money on R&D. As a result, the creativity and capacity of Vietnamese businesses to launch new products are currently low when compared to other Southeast Asian countries (World Bank, 2017).

The survey data collected by the World Bank in 2017 in Vietnam shows that just 26 % of medium and large organisations engage in R&D activities; nevertheless, it is "alarming" that only 9 % of small businesses engage in this activity. In light of the fact that the authorities in Vietnam are making efforts to promulgate regulations in order to foster innovation in general of the whole economy, the most expected object, the business community of Vietnam, appears to be relatively inert and has little change. According to research conducted by the World Bank (2017), the proportion of a business's total income that is allocated to R&D investment in Vietnamese businesses is quite low when compared to the average level of businesses operating throughout Southeast Asia. Even more concerning is the fact that Vietnamese businesses consistently lag behind those in Laos or Cambodia.

Figure 4. Ratio of investment in R&D/revenue of enterprises in some Southeast Asian countries, 2017



Source: World Bank, 2017.

The unavoidable consequence of low investment in R&D/revenue ratio is that Vietnamese businesses, despite their attempts to improve managerial capacity and production processes, are "rare" in the introduction of new products to the market with new functions in comparison to existing products. According to Ehie and Olibe (2010), the perception that R&D is the "key" to improvements in the competitiveness of businesses stems from the fact that these improvements can take the form of both new and improved products as well as more sophisticated service offerings. According to the findings of this survey (World Bank, 2017), only approximately 23 % of Vietnamese businesses have reported that they have upgraded an existing product, introduced a new product or service, or introduced both during the past three years. Therefore, the rate at which Vietnamese businesses introduce new products or new services is slower than the rate at which businesses in Cambodia and the Philippines do. In addition, only a tiny fraction of Vietnamese businesses believes that the enhancements they have made to their products or services are innovative in comparison to other businesses that are already operating in the market.

According to the data, the state of R&D activities in Vietnamese businesses has been rather "quiet" throughout the course of the last few years. Thus, poor spending on R&D activities has shown the core weakness that has lowered the competitiveness of Vietnamese businesses in general and Vietnam's products and services in particular on regional and global markets or even on the home market itself. According to the World Bank (2017), the fact that Vietnam lags behind other nations in the region when it comes to investment in R&D (and even lags behind certain countries that develop more slowly than Vietnam) is very concerning news for the future competitiveness of the Vietnamese business community in general.

Furthermore, endeavours related to R&D that are carried out by businesses may also be encouraged if the business community and the educational system work together. The R&D cooperation between businesses and the university system is a win-win relationship, as businesses are able to deploy R&D activities at a low cost by taking advantage of the resources of the university system. In contrast, the university system obtains research funding from businesses and the opportunity to commercialise research products from businesses. Nevertheless, information obtained from the World Economic Forum's competitiveness rankings (WEF, 2019) reveals that in Vietnam, the level of collaboration between the country's business community and its university system in the area of R&D implementation is not particularly high. In particular, the score for this type of cooperation activity in 2015 (University-industry partnership in R&D) was only 3.3, which resulted in it being placed in 92 out of 141 nations. By the end of 2017, the score of cooperation activities was 3.5, and Vietnam had gone ahead with a ranking of 62 out of 141 countries. As a result, although the collaboration in the application of R&D between the business community and universities is currently at a low level, this activity is gradually improving over the course of time.

According to the statistics, the level of spending on R&D activities in Vietnam, both at the national level and in the business community, is still quite limited in many aspects. These aspects include the ratio of R&D spending to revenue, the size of

R&D expenditures, the number of new outputs of R&D activities, and the degree of cooperation in R&D activities between businesses and the university system. In order to enhance R&D activities in businesses in particular and science and technology activities in Vietnam in general in the time that is to come, it is necessary to find answers to the challenges that currently exist.

4. Conclusion and Policy Implication

Following the implementation of doi moi for more than three decades, Vietnam has achieved remarkable success in a wide variety of economic and social spheres. The broad-based economic growth model is progressively giving way to the depth-based economic growth model in order to ensure that future growth will continue to be both rapid and sustainable. Therefore, R&D in particular and science and technology in general are the keys to the realisation of the comprehensive economic growth model in the period that is to come. Despite this, statistics compiled over the past few years have revealed that the current state of R&D activities inside Vietnamese businesses is still rather poor. The article presents some solutions to promote R&D activities in the business community in the coming time as follows.

First, the authorities should continue to push for the adoption of policies that would assist and encourage businesses in their efforts to integrate scientific and technological endeavours, in general, and R&D operations, in particular, into their production and operational procedures. Take steps to improve domestic and international business communities' ability to collaborate on R&D projects, and act on such improvements.

Second, the competent authorities need to increase their already stringent oversight of the establishment of scientific and technology development funds within businesses in accordance with the relevant legal instruments. To begin the process of generating cash for R&D endeavours within businesses, the fundamental first step is to monitor the allocation of funds for science and technology. Additional punishments for businesses that do not take the required deductions to establish science and technology funds should be considered in order to encourage the incorporation of R&D as a routine activity of the organisation.

Third, to develop effective policies to encourage R&D, it is vital to improve the statistics on R&D activities in businesses and keep these statistics current. Keeping statistics on activities related to R&D in the business community up-to-date is an essential stage in the process of establishing and modifying policies accordingly. In the not too distant future, the authorities will need to build a shared database of information on various applied research topics and emerging technologies for the business community to use in conjunction with one another for scientific and technological endeavours.

Fourthly, when it comes to the advancement of science and technology as well as the promotion of R&D, the authorities need to devise strategies that will enable them to better integrate the university system with the business community. Cooperation with the university system is a crucial step in promoting this activity. This is particularly important in light of the fact that the capacity of Vietnamese

businesses to conduct R&D projects is still quite low. While it is important to encourage financial support for applied research at universities, we must also obey the directives of local businesses.

Fifth, in the near future in Vietnam, it will be essential to take the appropriate steps to redress, bolster, and expand the financial resources that come from the national budget to support activities related to science and technology in general, and R&D in particular. To internationalise scientific and technical endeavours in general, and R&D endeavours in particular, it is important to promote the funding of basic research and applied research, as well as the publication of international research and the granting of international patents.

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Online Shopping and Consumer Behaviour

Cezara-Georgiana RADU[1]

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Abstract

Online shopping has developed a lot over time. Technology has become an indispensable resource in people's everyday lives. Consumers have come to use various websites or applications to buy the products they want for many reasons, such as saving time or avoiding crowded stores. This paper aims to study how the consumer's behaviour works when he chooses to shop online. The consumer's preferences in terms of online purchases will be analysed and the factors that lead to those choices. Furthermore, the literature review will be studied and correlations will be made based on the data obtained to better understand consumer behaviour when buying products online.

Keywords: consumer behavior, online shopping, technology, apps, digitalization.

JEL Classification: E20, M20, O1.

1. Introduction

Online shopping has developed a lot, and the COVID-19 pandemic, through its restrictions, has contributed even more in this sense (Huterska, Huterski, 2022). Technology has become an increasingly used tool in society, of high importance because it has a significant impact both on the business area, but also on consumers, increasing their number in the online environment (Davidaviciene et al., 2021).

Traditionally, online shopping was considered as an independent activity, but with the development of technology and new discoveries in the field of digitalization, people have changed the way they choose to make certain purchases, compare products or give feedback (Xu, Lee, 2020).

The digital environment competes with the traditional one, in the case of online shopping, physical stores are an alternative (Venkatesh et al., 2021). Thus, this paper will study what are the motivations behind consumer choices related to preferences for the online environment.

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2. Problem Statement

With the development of the Internet and its increasing use, but also of social networks, online shopping has gained in popularity (Nasidi et al., 2022). In the case of consumers, there are certain behavioural patterns. These represent the processes and ways of making decisions. Also, consumer behaviour when making online purchases is based on the action of buying goods or services through technology, such as websites, mobile applications, and so on. The decision-making process is a difficult one for people because they have to choose from several types of goods and services, and in the end they have to decide which is the best choice for them (Helmi et al., 2023).

Many young consumers prefer to shop online, because it is a good way to save money and time, but also because it can be done from anywhere there is an Internet connection (Helmi et al., 2023).

There are three approaches to better characterise consumer buying styles, starting from the perspective of consumer typology, the psychological side, and consumer characteristics. When consumers make choices regarding purchases, they use the mental and psychological side. This can influence what product to buy, in what quantity, from where and for whom (Helmi et al., 2023).

Also, there are several types of buyers, based on their shopping orientation, such as the economical buyer, the personalised buyer, the ethical buyer and finally the apathetic buyer. Consumers who make purchases by letting themselves be guided by impulsivity and carelessness generally do not plan their purchases but make them spontaneously. They do not take into account the number of products bought and spend much more money (Helmi et al., 2023).

On the other hand, in the online environment there are many changes, and things evolve quickly, so many companies are faced with a diverse supply of products and with the decision of customers to choose or not a certain product. Thus, in the end, when a company carries out its activity in the online environment, in addition to the price and quality of the products, it must take into account consumer behaviour, which significantly influences the supply of stores (Davidaviciene et al., 2021).

When the perception of value appears, expectations are created. When the consumer expects a certain product to be of high quality, he will shape an attitude during consumption. If his high expectations materialise, his attitude in the future will become more and more positive and consumption will increase. Thus, after purchasing the good, if it meets the customer's expectations, he will be happy and his needs will be satisfied (Riorini et al., 2019).

Moreover, trust plays an important role in the choices made by the consumer in connection with the purchase of products online. Studies have shown that when there is a relationship of trust between a seller and a customer, the consumer will buy products more easily and will be much more willing to use online payment methods or give their personal data (Ngan, Khoi, 2022).

3. Research Questions / Aims of the Research

This paper aims to study the consumer behaviour when he chooses to shop online. The questions to which this study will try to find answers are:

Q1: When the consumer is in crisis situations, does he show rationality in the purchases made?

Q2: Can the impulse of the moment make the consumer spend more money?

Q3: Can the impulse of the moment lead to shopping with a therapeutic effect?

The COVID-19 pandemic represented that crisis situation in which the consumer was faced with moments of uncertainty and anxiety. Thus, the previously stated questions will be researched, to establish if there is a link between crisis situations, limited rationality, impulse purchases and implicitly if there is a therapeutic effect when consumers choose to shop online.

Also, this study has certain limitations due to the small number of respondents, so that the results can be applied on a small scale.

4. Research Methods

In order to understand what influences the Romanian consumer to make online purchases, but at the same time to observe the preferences related to these purchases, between 12.04.2023 - 5.05.2023 an online questionnaire was created, using the Google Forms website. A number of 151 respondents were registered, 87.4 % coming from the urban environment, and the predominant gender being female with a weight of 72.2 %.

The factors that led to the behavioural patterns during the COVID-19 pandemic were identified and analysed. This was achieved by studying specialized scientific articles.

Also, this study has certain limitations due to the small number of respondents, so that the results can be applied on a small scale.

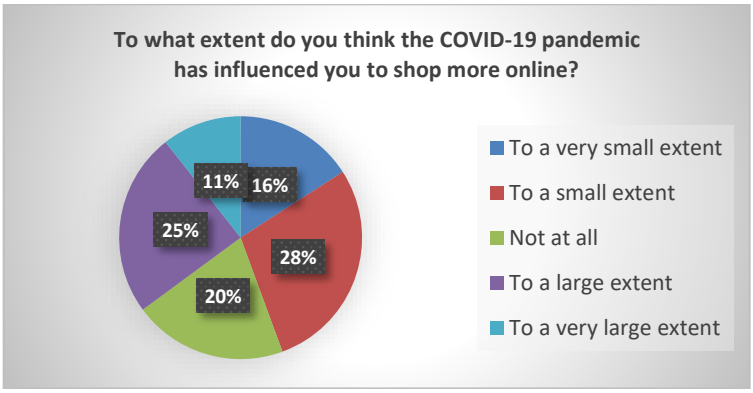
5. Findings

Based on the completed questionnaire, it was observed that the main reason why the consumer chooses to shop online is saving time, with 46.4 %. The second reason in the respondents' preferences is the easier way to make those purchases, compared to physical stores, where they can stand in line and waste time, but online they also have the opportunity to choose based on reviews, which 5.3 % actually do. In addition to all this, 19.9 % of the people buy online for convenience, but there are also people who prefer to avoid crowded places for obvious reasons, with a percentage of 7.3 %, but others do so for medical reasons, especially after the COVID pandemic -19.

When it comes to what the respondents preferred to buy most often, in the top of preferences were the products from the fashion range with 48.3 %. This is explainable especially after the last years of the pandemic, where most people worked from home and felt the need for a change in wardrobe, more precisely from office clothes to comfortable ones. Also, in second place were the products from the

electrical and household appliances range, and in third place were smart devices, such as PCs, laptops, tablets, and smartphones.

Figure 1. The influence of the pandemic on online purchases

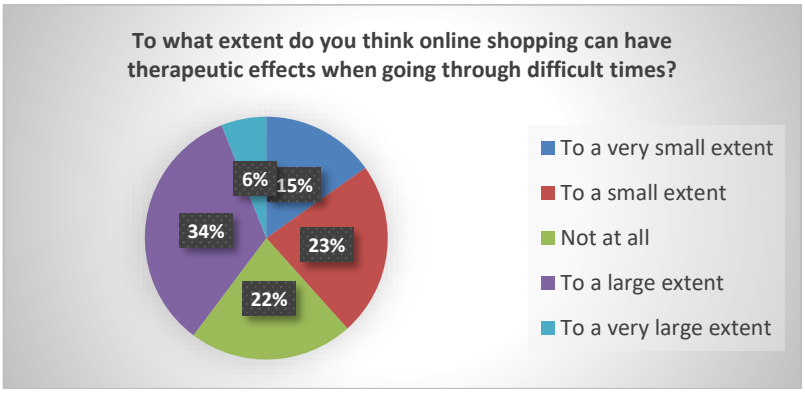


Source: Personal processing of the data obtained as a result of the research carried out during the period 12.04.2023 - 5.05.2023.

In the graph in figure 1, it can be seen that the respondents do not consider that the COVID-19 pandemic made them purchase more products, 28 %. While 24.5 % believe that the pandemic has influenced them to a great extent. At the same time, there is also the category of those who believe that they were not influenced at all in this situation, with 20.5 %.

All these things denote the fact that the respondents were not perfectly aware of their actions during the pandemic. At least during the beginning of the pandemic, most of the population stockpiled products. Action that occurred due to the uncertainty created by the COVID-19 virus, but also due to considerations related to survival. In those moments, man's instinct to survive and try to cope with the situation was not based on rationality but simply on that instinct of conservation, of survival, found many times also in the case of animals.

Figure 2. Online shopping and therapeutic effects

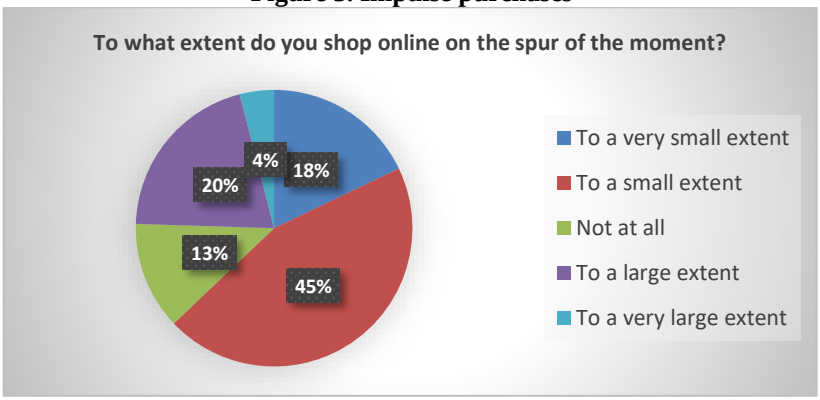


Source: Personal processing of the data obtained as a result of the research carried out during the period 12.04.2023 - 5.05.2023.

Even if in the previous graph it was found that the respondents did not consider that the COVID-19 pandemic caused them to buy more products, they consider that online purchases can have a therapeutic effect. Which in a crisis situation, such as COVID-19, has certainly been put into practice.

In addition to epidemiological challenges, the pandemic had negative effects both from an economic point of view and also from a social and psychological one. Many people who lived alone during that time ended up very emotionally damaged due to lack of physical human interaction. Thus, many of these people looked for ways to combat these conditions and found them through online shopping.

Figure 3. Impulse purchases



Source: Personal processing of the data obtained as a result of the research carried out during the period 12.04.2023 - 5.05.2023.

Also, 45 % consider that only to a small extent the impulse of the moment can make them buy more. But, precisely this in many critical situations will make people want to find a way to calm down, thus they will end up buying products, in the hope that they will get that therapeutic effect. Thus, by buying more, he will end up spending even more money.

6. Conclusions

When the consumer chooses to shop online, he thinks first of all to save time and money. Also, the state of health is not to be neglected, thus having a good way to avoid crowded places.

Secondly, in order for a consumer to continue making online purchases, they must be of good quality, to meet their expectations. From this point of view, a relationship of trust must be created between the seller and the consumer, based on quality products and mutual ethics.

In addition, the respondents considered that they do not make online purchases based on impulse, but on the other hand they consider that they can have therapeutic effects. For this reason, there is the possibility that many times precisely the impulse of the moment leads to that therapeutic effect from the perspective of the limited rationality that the consumer shows in crisis situations.

Finally, the consumer can use online shopping to make his life easier, but at the same time he must be careful about the extent to which he makes online purchases.

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AI – The New Player in Digital Economy

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Abstract

The current economic environment is strongly defined by digitalisation and its focus on guiding businesses, organisations, and governments to achieve their sustainability goals. Lately, alongside digitalisation, the implementation of the newest technologies has been followed by the introduction of AI in the business models and strategies, which allows the business environment to enhance even more in the digital economy. Therefore, the current paper aims to offer a short overview of how the introduction and the usage of AI technologies have impacted the economic environment and how liable the enterprises were to implement them in their activities, by reviewing the scientific literature and analysing the conclusions to this date. While researching, the authors will also plan to identify if the newest technologies have helped businesses gain more competitive advantages and to be more efficient in their activities, by approaching business processes more digitally, therefore considering AI the newest player in digital economy. Analysing and summarising the most important publications for the topic of this research, the authors had outlined the context for a better understanding of how the AI technologies have reshaped the economic activities and the business environment, focusing on gaining the highly desired competitive advantages that organisations are aiming for and the convenience that is nowadays driving the consumers behaviour in both consumption and daily activities. By the conclusions of this research, the statement provided by the author is describing how AI might represent the new player on the market, since it can act exactly as businesses and individuals, sometimes simultaneously being based on human-like Machine Learning and Decision Making focused on Deep Learning.

Keywords: AI, digitalization, digital economy, technology, sustainability, economic environment.

JEL Classification: A10, D1, E1, O1, O13, O14.

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1. Introduction

Artificial Intelligence (AI) has become a buzzword in the world of technology, and its impact has been felt in almost every aspect of modern society. From healthcare to manufacturing, and transportation to education, AI has revolutionised the way individuals live and work.

AI has the potential to disrupt traditional business models, improve operational efficiency, and create entirely new industries. It can help businesses to better understand customer behaviour, predict trends, and optimise their supply chain. It can also automate repetitive and time-consuming tasks, allowing employees to focus on higher-value tasks that require creativity and critical thinking. In short, AI has the potential to revolutionise the way entrepreneurs do business. On the other hand, the development of the latest digital technologies along with the evolution of internet and mobile devices, alongside with financial crises and economic growth, have issued heavy pressure on the global economics and on national economics, especially on budget deficit, financial services, and the business environment, affecting the profitability and the revenues of the economic players (Dirican, 2015).

Digital economy is a term used to describe the economic activities that result from billions of daily online connections between people, businesses, devices, data, and processes. It encompasses all aspects of the economy that are enabled by digital technologies, including e-Commerce, online advertising, digital payments, and more. With the rise of AI, the digital economy is poised to undergo a radical transformation.

Meanwhile, as contouring the context of the research, it should be taken into consideration that regarding technology and growth, there were significant optimists and pessimists, represented by technology hubs, and alternatively, the economists, statisticians, sociologists, and government officials. And as the study conducted by Brynjolfsson et al. (2018) has concluded, an underrated area of scientific research is represented by how the latest AI technologies will drive new processes and business models to develop and to reshape the mainstream of the business environment. This is one important aspect especially for today's environment in which the impact of the latest COVID-19 pandemic has been overcome by adopting and implementing as soon as possible the new available and developed digital technologies, imposing the main economic paradigm to shift predominantly towards a digital economy, deeply shaping the digitized and digitalized current economic environment.

2. Problem Statement

The digital economy, in short words, represents mainly the recent and significant changes in the economic paradigm in which various segments of the economies are nowadays realised through processes and procedures based on the latest digital technologies developed by computer-assisted digitisation of data (Williams, 2021). This definition has been widely accepted by economists since it does not just imply changes in the classical principles of economic construction or is either involving the radical change of the economic mechanism. Mostly, it is the term that describes

how digital technologies are adopted, implemented, and used in the classical economics, while representing important tools of Industry 4.0 and unfortunately, with the level of development varying from one continent to another, and from one country to another country on the same continent, and even from one region to another region of the same country (Kolesnikov et al., 2020).

Generally observing, AI can be interpreted differently by different categories of scientific specialists, as the main definition given by economists is explaining AI as *automation*, *robots*, or *machines*. But on the other hand, this is a very narrow definition for an engineer which considers automation as the technology which allows processes or procedures to perform with minimal or none human assistance. Otherwise, it still represents more than just automation or the usage of digital technologies in business activities, as the Artificial Intelligence can be defined as *"a growing resource of interactive, autonomous, self-learning agency, which enables computational artefacts to perform tasks that otherwise would require human intelligence to be executed successfully"* (Lu, Zhou, 2019, p. 4).

At the same time, the technologies connected to the AI have been strongly growing and developing. Therefore, the first impression of AI representing only automation, robots, or machines has now broadened even more, including more interaction between the software and hardware platforms, developing technologies such as: deep learning machines; computer vision and image recognitions; smart robots; natural language processing and virtual personal assistants. Technologies that are being used daily by both individuals and businesses, slowly reshaping the business environment and 'forcing' the economic paradigm to shift to more digitised processes and procedures, highlighting the foundation of digital economy (Shevchuk, 2016).

As digital transformation can be described as the adoption, usage, and integration of the latest technologies into all areas of business procedures or processes, the implementation of digital technologies will definitely imply the need of transforming the traditional business strategies into business models that will reach the full potential of the business environment, determined by the development of the digital economy paradigm, as the past several years represented the transition from an analogue society to a digitised society, in which new methods of communicating, new business processes and procedures, new business models, and new disruptive technologies will influence changes and transformations on several aspects of the economic environment, such as: increasing efficiency; enabling higher revenues, controlling resource waste, gaining more sustainability. But, on the other hand, the implementation of AI in the current economic environment will impact the business environment as well, reshaping the way in which businesses are conducted, business models are implemented and conceived, and restructuring the jobs available on the labour market (Reier Forradellas, Garay Gallastegui, 2021).

At the time when the divergence of Artificial Intelligence was going on strongly, a study conducted in 2016 on the economic impacts of AI during the next 10 years (2016-2026) suggested that on private sector and venture capital investment, the economic impact of developing and adopting the AI technologies in the business

environment should be between $ 359.9 billion and $ 773.2 billion. On the other hand, analysing a set of benchmarks of significant technologies that share similar characteristics with the AI technologies (such as general IT investment, broadband internet, industrial robotics, and mobile phones), the same study has concluded that the economic impact of the AI might be between $ 1.49 trillion and $ 2.95 trillion over the same period of time (Chen et al., 2016). But given the fact that the economic environment since 2016 has been strongly impacted by the COVID-19 pandemic and its limitations, the current economic impact of adopting, implementing, and using the AI technologies in business could be much higher than the estimated values of the study. Therefore, since the economic paradigm has shifted to the digital economy, the investments in digital technologies and AI technologies have been continuously growing and will definitely be still growing due to the context being reshaped by the next industrial revolution.

On the other hand, Hang and Chen (2022) have shown in their paper that, even if it has been proved that it can create competitive advantages and can also underpin the main barriers that prevent it from reaching its fully grown potential, it might not benefit businesses as much as it was considered to. As the main studies analysed in the paper have concluded, the investment in AI might help firms and organisations to generate revenue much quicker, but only 40 % out of the 2500 enterprises stated that their business benefited from higher revenue after investing in adopting and implementing AI technologies. At the same time, it has been agreed that the short-medium-term impact of AI might not be as strong as the scientific literature was once promoting, since by interviewing senior managers in retailing, the conclusion was that, currently the business environment has not completely understood how to benefit from the main advantages of the full potential driven by the implementation of the latest AI technologies, at least not yet.

Meanwhile, the usage of AI can be remarked not only in business environments but in individuals' daily life as well, providing various services in Smart Cities through Big Data, even if these actions raise several concerns regarding ethics and confidentiality of data, improving urban governance and driving higher urban economic growth (Allam, Dhunny, 2019).

Therefore, AI is no longer a strange or new concept, but it is one that is in continuous development, as the usage of the latest technologies combined with the Big Data and Machine Learning are currently common in business models and society development, aiming to gain more economic growth and focusing in achieving the sustainability goals. As all the aspects have been taken into account, governments should distribute more funding in trying to fully develop the AI technologies for promoting the economic growth, especially due to the incensement in convenience brought by the Artificial Intelligence (He, 2019).

3. Research Questions / Aims of the Research

As scholars have already stated, humanity is currently positioning itself on the run of the fourth industrial revolution, in which the boundaries between the physical and the digital spheres have been highly overcome, while the empowerment

conducted by the emergent state of digital technologies led the need for adopting and implementing the latest technological instrument to increase *overnight*, especially in the actual economic environment, reshaped by the COVID-19 pandemic. Hence, businesses, individuals, and governments had to *embrace* the usage of Artificial Intelligence as a strong driver for maintaining the economic activities and for overcoming the sanitary crises. Therefore, while keeping in mind the need for collaboration to achieve the Sustainable Development Goals, the economic environment welcomed a new player, the AI. But the question is: *Will AI as the new player in Digital Economy act ethically?*

4. Research Methods

The main methods used by the authors in order to develop an answer for the research question are based on exploring the scientific background and on the critical analysis of the most recent publications on corelated topics and on former papers published in the scientific journals, using the keywords *Artificial Intelligence, Digitalisation* and *Digital Economy.* To provide a suitable answer, supported by the findings presented in this paper, the authors will summarise the main aspect highlighted by the scientific literature and will formulate the explanations needed for a deeper understanding of the topic.

5. Findings

5.1 General Implications of AI on Digital Economy

As a general implication of Artificial Intelligence on digital economy, it can be observed that even if in the last decade the predominant presumption was that technological progress would benefit all the individuals and organisations simultaneously, therefore nations and countries, the presumption has proved to be supported neither by the theoretical framework nor by the real evidence. On the other hand, during the past experiences, the literature has introduced several papers that are actually proving analytically, with econometrical models and calculations that the introduction of the latest digital technologies, hence the advance in the development of Artificial Intelligence has been both labour-saving and resource-saving in the context of the current competitive economy, in which a given amount of output is needed. In other words, the implementation of AI technologies has offered solutions for the great concern in developed countries regarding the natural resource-saving technological progress, so nowadays the linear cycle of consumptions has been replaced by the *use-recycle-reuse* consumption model. At the same time, since most individuals were concerned that Artificial Intelligence might be labour-saving, more specifically unskilled-labour-saving on a global level, the introduction of the latest technologies has influenced the demand for labour to increase, since at the existing factor prices, organisations were more likely tempted to increase their investments in digitisation and digitalisation, aiming to be more cost-efficient and to gain more profit in a shorter period of time, while increasing

their sustainable development and their production capacity. As a result, the development of AI technologies and other information technologies have led to greater concentrations of market power, so the economy might move to a new equilibrium conducted by the market power with higher rents for dominant economic players (Korinek, Stiglitz, 2021).

As long as the Artificial Intelligence can be considered to represent the capability of a machine to imitate the intelligence of the human behaviour alongside an agent's ability of achieving goals in a large spectrum of environments, AI might be deployed in the daily production processes of goods and services, while being able to change the methods of approaching business models and to generate new ideas for developing technologies in order to help solving complex issues, while still scaling the creative effort. Therefore, when analysing the implications of AI on digital economy, it should be taken into consideration that the technologies on which the Artificial Intelligence is based on, are capable of self-improve. Hence, leading the business environment to reshape, directly impacting the market structure, sectoral reallocation, and organisations (Aghion et al., 2018).

5.2 AI and the Economic Impact on Current Digital Economy

As it can be easily observed, AI is strongly impacting the current environment.

As it can be easily consulted in Table 1, the impacts of AI in the current environment are diverse and the list might be continued in future research. But most importantly, AI has reshaped the current economic environment, *forcing* the shift towards digital economy, for both enterprises and individuals, with the general aim of providing sustainable solutions for most of today's problems.

This is an important aspect that should be taken into consideration when analysing how AI technologies have actually impacted the economic environment, businesses, individuals and therefore the consumers' behaviour in the current state of the digital economy on which most of the markets are based.

Hence, since the digital technologies and therefore the development of AI have strongly impacted how markets function, the impressive reduction in costs for searching, transportation and production has created as well new opportunities for higher market efficiency, therefore highlighting once more how the implementation of the latest technological recourse led to more efficiency and higher revenues, conducting at the same time to competitive advantages, while keeping in mind that the increased importance of innovation and of managing and analysing consumers' data highly contributed to new challenges in competition and consumer privacy (Chen, 2020).

At the same time, AI should not be organised and controlled only by private entities or organisations. At the macroeconomic level, the adoption, introduction, and usage of the latest Artificial Intelligence technologies should be framed by the government's policies. Therefore, the diffusion patterns and the consequences of diffusion should be framed by the state, in order to regulate the privacy, trade, and liability of AI technologies. The common goal in applying policies should be followed by both private organisations and governments, since the adoption

of AI technologies in business processes and models will directly impact the labour market, inequality, and competition, while compromising the values of the society. In this aspect, the consequences should be limited by education policies to protect the safety net and promote the antitrust enforcement (Agrawal et al., 2019), because otherwise there will be more disadvantages reflected than the benefits of using AI in the economic environment.

Table 1. AI's impact on the current environment

AI's impact on	Impacts' explanation
Future of labour demand	Since AI can automate tasks previously based on human work, the development of the recent technologies has been biased on automation, therefore there was no focus on creating new tasks that require labour force to be employed. Hence, labour demand has stagnated, labour share in national income has been declining, rising inequality, and determining lower productivity growth (Acemoglu, Restrepo, 2020).
Innovation	AI possesses the potential to change the innovation process from the ground up, by providing new effective incentives for innovation, for diffusion, and for competition in the Research and Development field providing disruptive tools and increasing the efficiency of research activities (Cockburn et al., 2018).
Income distribution and unemployment	Since it is clear that AI owns the potential to disrupt labour markets in a significant way, taking into account its long-run implications of being implemented in business models and business processes, the magnitude of the future disruption will depend mostly on the speed and the factor-bias of AI's progresses (Korinek, Stiglitz, 2018)
Renewable Energy and Resources	Decision-making models with transparency can be used to build Renewable Energy Systems based on Machine Learning and Deep Learning models, in order to obtain better management for Renewable Energy and Resources, imposing direct implications on waste management as well, improving therefore the movement towards sustainable consumption and development of production processes (Ersöz et al., 2022).

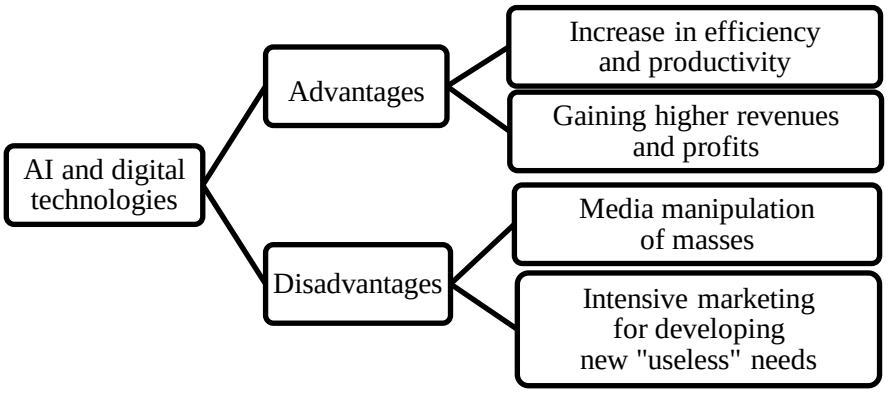
Source: Information collected and organised by the authors from the sources mentioned in the Impacts' explanation column.

5.3 AI – the New Player in the Digital Economy

There is no secret that the Artificial Intelligence has strongly affected numerous fields and disciplines, and economics is no exception of this, especially in a context in which creating human-like machines is the main goal for overcoming the high labour force expenses that the companies have with their employees, and in order to reduce their production costs while replacing the labour force with machineries that hold less power in determining interruptions in production processes and which will help organisations to increase the productivity and efficiency simultaneously, gaining more profits. Therefore, the evolving field of AI itself has over history bought various discussions in the use of technologies in economics. AI and several AI technologies and methods, such as Machine Learning, Big Data, expert systems, and knowledge-based systems, have been adopted and implemented by companies and organisations in order to achieve higher efficiency and higher revenues. At the same time, on the other hand, the AI technologies might be an obstacle in developing sustainable consumption and aiming for the ethics of the economic environment because they possess a high potential for misuse in activities such as media manipulation of mass population; spreading of deep fake information, and by using

the Machine Learning algorithms, certain racial or ethnic groups might be targeted or even individuals might be influenced through intensive marketing for developing new '*useless'* needs in order to be more tempted to buy and consume specific goods and services (Bickley et al., 2022). Therefore, as summarized in Figure 1, AI as a player in the current digital economy environment delivers both advantages and disadvantages, and it is up to the managers of the resources to decide how they will *play the cards*.

Figure 1. AI – "playing" in digital economy



Source: Adapted from Bickley et al., 2022.

On the other hand, while the current development of AI rests mostly on technologies based on Machine Learning, Deep Neural Networks, Big Data, Internet of Things, and Cloud Computing, it can be understood as general-purpose technology and it might have the potential to drastically reshape the economic environment, since firms and organisations of all sizes and with various activity fields have started to perceive their development goals through the usage of AI, the impact of the latest technologies represents still a matter of concern, on both economic and social environments. Thereafter, the technological progress in Artificial Intelligence, firms and organisations, individuals, and governments should work in common in order to avoid the full dependence on AI for the future markets, in order to actually provide the most facile framework for using the available resources efficiently and ethically, aiming to reach the Sustainable Development Goals (Wagner, 2020).

6. Conclusions

However, the adoption of AI in the digital economy is not without its challenges. Concerns around data privacy, security, and ethics need to be addressed, and at the same time, solutions for those concerns must be provided. The deployment of AI systems must be transparent and accountable, and there must be a balance between innovation and regulation. Furthermore, there is a risk that the benefits of AI may

not be evenly distributed and may exacerbate existing inequalities. Therefore, to be an *ethical player* in the current digitised economic environment, AI technologies must be developed simultaneously with framework regulations regarding the adoption, implementation, and use of the latest resources.

Despite these challenges, the potential benefits of AI in the digital economy are too great to ignore. Therefore, it is essential to continue exploring the potential of AI and to develop policies and frameworks that ensure its responsible and ethical deployment, keeping in mind that AI based on digital transformation and rapid technological advances will create high benefits not only for firms and organisations, but also at macroeconomic level, encouraging developing countries to embrace digitalisation and its instruments even more (Aly, 2022).

Concluding with a metaphor, as well as individuals, the AI and digital technologies might sometimes act as their algorithm has been developed to make decisions and to follow rational patterns, therefore AI might be considered a player on the digital economy, too. But, as long as it acts ethically and aims to improve the business processes and the economic environment for achieving higher sustainable development, the AI represents a more than welcomed *new player* in the current state of digital economy environment.

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Shaping the Future: An Introduction of China's Digital Ambitions

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Abstract

This paper examines the role of government policy in shaping China's digital economy, with a focus on the Made in China 2025 and Digital Silk Road initiatives. It provides an overview of the digital economy and China's position in the industry, followed by an analysis of the government policies that have driven China's digital economy development. The Made in China 2025 initiative and the Digital Silk Road program are explored in depth, including their objectives, strengths, weaknesses, and impact on China's domestic industries and global positioning. The paper also compares China's digital economy with those of other countries and analyses the similarities and differences in government policy. Based on the findings, the paper provides recommendations for policymakers and businesses looking to engage with China's digital economy and discusses potential future developments in the industry and government policy.

Keywords: Digital Economy, China's Government policy, Made in China 2025, Digital Silk Road.

JEL Classification: F01, O33, O38, O53.

1. Introduction

The digital economy, a concept encompassing diverse economic activities facilitated by digital technologies (Tapscott, 1996), has evolved into an essential driver of global economic growth, innovation, and productivity. It contributes significantly to global GDP and offers substantial social advantages, such as enhanced access to information (Miao, 2021; Moşescu et al., 2022), education, and healthcare services, as well as promoting social inclusion (Tiwasing et al., 2022) and flexible work arrangements (Nambisan et al., 2017).

The digital economy has emerged as an indispensable catalyst for economic growth and innovation in the 21st century, with China swiftly rising as a dominant

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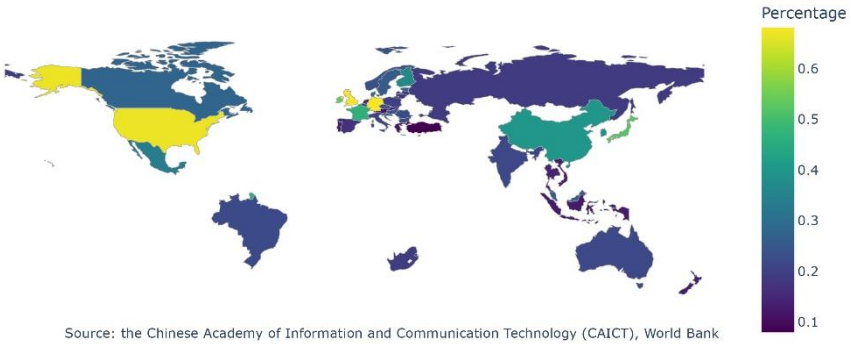
force in this domain, as shown in Figure 1. China's digital economy has exhibited remarkable growth, propelled by its vast population, swift technological advancements, and government backing (CAICT, 2022). It spans various sectors, such as e-Commerce, online payment, digital entertainment, online education, and cloud computing, with key players like Alibaba, Tencent, and Baidu dominating the market. The Chinese government has played a crucial role in shaping the nation's digital economy through top-down planning and market-orientated reforms.

The Chinese government's strategic policies, such as the Made in China 2025 and Digital Silk Road programs, have significantly contributed to the rapid development and expansion of the nation's digital economy. The Made in China 2025 initiative seeks to position China as a global leader in advanced technologies by focusing on ten key industries, fostering innovation, enhancing infrastructure, and augmenting the competitiveness of Chinese firms (Zenglein, Holzmann, 2019). The Digital Silk Road program aims to solidify China's role as a critical stakeholder in the global digital economy by fostering connectivity and collaboration with countries along the Belt and Road Initiative (BRI) (Shen, 2018).

In this paper, we analyse the influence of government policy on the development of China's digital economy, concentrating on the Made in China 2025 and Digital Silk Road initiatives. We explore the evolution of these policies, the tactics and measures instituted by the Chinese government, and their impact on the growth of China's digital economy. Through this analysis, we identify policy drivers, challenges, and risks associated with these policies, providing valuable insights for policymakers, businesses, and investors engaged in China's digital economy.

Figure 1. Digital economy as a percentage of total GDP by major countries in 2021



Source: The Chinese Academy of Information and Communication Technology, World Bank (2022).

2. China's Digital Economy and Government Policy

2.1 Objectives and Goals

The Made in China 2025 (MIC2025) initiative and the Digital Silk Road (DSR) program are two comprehensive plans launched by the Chinese government to

promote the development and upgrading of the country's manufacturing sector and digital infrastructure, respectively. Both initiatives aim to transform China's economy into a leading global force and facilitate the transition from an export-driven model to an innovation-driven model.

MIC2025 seeks to address issues such as lack of competitiveness, low technological sophistication, and overreliance on foreign technology in China's manufacturing sector. Its goals include enhancing innovation, upgrading manufacturing capabilities, optimising industry structure, and strengthening international competitiveness. The initiative aims to increase R&D spending, promote the adoption of advanced technologies like AI, robotics, and IoT, develop strategic emerging industries, and foster globally recognised brands and SMEs (Zenglein, Holzmann, 2019).

The DSR, a significant aspect of China's ambitious Belt and Road Initiative (BRI), aims to expand China's digital infrastructure and technological prowess beyond its borders, fostering global cooperation in various domains. Its main objectives include expanding digital infrastructure, fostering technological collaboration, enhancing China's digital exports, strengthening international digital governance, and promoting China's digital diplomacy. By financing and constructing projects such as fibre optic networks, data centres, and satellite systems, the DSR seeks to bridge the digital divide between nations and create a more interconnected world (Shen, 2018).

Both MIC2025 and the DSR program underscore China's commitment to establishing itself as a dominant force in the global manufacturing and digital landscape. The MIC2025 initiative represents a significant effort to promote the development of a more innovative and technologically advanced economy, while the DSR program highlights China's commitment to advance its global digital ambitions.

2.2 Judgement and Impact

The Made in China 2025 Initiative aspires to transform China's manufacturing sector through the adoption of advanced technologies such as artificial intelligence, robotics, and big data. This ambitious plan aims to climb the value chain, fostering innovation and global competitiveness. It aligns with China's broader economic goals of transitioning toward a consumption-driven economy, intending to stimulate domestic consumption and decrease reliance on exports, which have historically driven its growth.

Despite its potential benefits, the Made in China 2025 initiative faces several challenges. Its protectionist nature and perceived discrimination against foreign companies have drawn criticism, leading to concerns over unfair trade practices and strained international relations (Buysse, Essers, 2019). Implementing the initiative requires considerable investment and expertise, which many Chinese firms are still in the process of acquiring. This challenge is further compounded by the rapid pace of technological change, making it difficult for companies to keep up with evolving industry standards and best practices.

The Digital Silk Road program, on the other hand, is designed to expand digital infrastructure and foster economic development in countries of the Belt and Road Initiative (BRI) (Naughton, 2020). It aims to integrate these nations into global supply chains, boosting trade and investment. The program offers opportunities for technological leapfrogging, allowing participating countries, particularly those in the developing world, to embrace advanced technologies without going through intermediate stages of technological development.

However, the Digital Silk Road program has also raised concerns, particularly in terms of geopolitics. Critics argue that the program could lead to an increased dependency on Chinese technology, allowing China to exert political influence and control over participating countries, potentially compromising their sovereignty and exacerbating regional tensions (Cheney, 2019). Data privacy and cybersecurity are also major concerns, as the program's expansion of China's digital footprint raises questions over the protection of sensitive information and the potential for cyberattacks (Ly, 2020).

The Made in China 2025 Initiative and the Digital Silk Road program have had notable impacts on the Chinese economy and the global landscape. The Made in China 2025 Initiative has spurred investment in research and development, leading to the growth of new technologies and products, as well as the establishment of new industry clusters (Li, Lyu, Fan, 2020). This has bolstered China's manufacturing sector and its global competitiveness. However, the initiative has also faced domestic and international criticism over its favoritism towards state-owned enterprises and the potential exacerbation of income inequality (Levine, 2020).

In contrast, the Digital Silk Road program has expanded China's digital economy, presenting opportunities for Chinese tech companies to access new markets and revenue sources. However, this expansion carries risks, as an overreliance on foreign markets makes the Chinese economy vulnerable to fluctuations in global demand and geopolitical tensions (Ly, 2020).

In conclusion, both the Made in China 2025 Initiative and the Digital Silk Road program present a complex interplay of strengths and weaknesses. While they hold the potential to foster innovation, growth, and global connectivity, they also face criticism and concerns surrounding protectionism, discrimination, geopolitics, and data privacy. Policymakers, businesses, and investors must navigate these complexities as they engage with China's digital economy and manufacturing industry, and the broader global context.

3. Comparison with Other Countries

In order to better understand the development and status of China's digital economy, it is useful to compare it with the digital economies of other major players, such as the United States and Japan. This section will examine the similarities and differences in the digital economies of these three countries, focusing on the key sectors, market dynamics, and levels of technological innovation.

3.1 Digital Economies of China, the United States, and Japan

China's digital economy has experienced rapid growth in recent years, fueled by its vast population, advancements in technology, and strong government support. This growth has led to the emergence of various sectors, including e-Commerce, online payment, digital entertainment, and online education. While these sectors are also prevalent in the United States and Japan, the scale of China's market and the level of government involvement distinguish it from its counterparts.

The United States, often regarded as a global leader in technology and innovation, has a well-established digital economy, driven by companies such as Amazon, Google, and Facebook. The United States excels in areas like software development, social media, and cloud computing (Yang et al., 2017). Meanwhile, Japan's digital economy is characterized by its strength in consumer electronics, robotics, and advanced manufacturing (Kovacic, 2018). Companies like Sony, Panasonic, and Toyota have played significant roles in Japan's digital development.

However, despite these differences in focus, all three countries share a common emphasis on the importance of technological innovation, research and development, and entrepreneurship. This has led to the creation of dynamic ecosystems that foster the growth of start-ups and the development of cutting-edge technologies.

One key contrast between China's digital economy and those of the United States and Japan lies in the level of market concentration. While the United States and Japan both have highly competitive digital markets, China's digital economy is dominated by a few large players, such as Alibaba, Tencent, and Baidu. This has resulted in a more concentrated market, with these companies exerting significant control over their respective sectors.

Another noteworthy difference is the regulatory environment in which these digital economies operate. While the United States generally favors a market-driven approach with limited government intervention, Japan and China both feature more prominent government involvement in shaping their digital economies. However, China's approach is particularly characterized by its top-down planning and stringent control, which has led to the development of policies and regulations aimed at promoting domestic industries and limiting foreign competition.

In conclusion, the digital economies of China, the United States, and Japan exhibit both similarities and differences in terms of key sectors, market dynamics, and technological innovation. While all three countries recognise the importance of fostering digital development, their approaches to regulation, market concentration, and government involvement vary considerably. A thorough understanding of these nuances is essential for policymakers, businesses, and investors seeking to navigate the complexities of the global digital economy.

3.2 Government Policies and Their Influence

China's approach to digital economy policymaking can be characterised by a combination of top-down planning and market-orientated reforms. The Chinese government is known for its active role in shaping the development of the digital

economy, implementing initiatives like the "Made in China 2025" and the "Digital Silk Road." These programs aim to promote innovation, competitiveness, and international cooperation while maintaining social stability and control. However, some critics argue that China's policies are overly interventionist and protectionist, potentially hindering fair competition and trade relations (Davis, 2010).

The United States, on the other hand, largely adopts a market-driven approach with minimal government intervention. Policymaking in the United States focuses on creating a favourable business environment that fosters innovation and entrepreneurship, with an emphasis on free markets, competition, and intellectual property protection. This laissez-faire approach has led to the rapid growth of tech giants such as Google, Apple, and Amazon, which are at the forefront of global innovation. However, critics argue that this approach may result in insufficient regulation and oversight, leading to issues such as data privacy violations and the abuse of market power (Newman, 2013; Wu, 2018).

Japan, like China, features more prominent government involvement in its digital economy. The Japanese government has formulated several strategies and initiatives to promote digital transformation, such as the "Society 5.0" initiative, which aims to harness advanced technologies to create a more sustainable, inclusive, and innovative society (Fukuyama, 2018). While Japan's approach is more balanced than China's, it still places considerable emphasis on public-private partnerships, regulatory reforms, and targeted support for key industries. Critics point out that Japan's bureaucratic process and conservative business culture may hamper its ability to adapt quickly to technological changes and emerging trends (Schaede, 2020).

In terms of influence, each of these approaches has had both positive and negative impacts on their respective digital economies. China's active involvement has spurred rapid growth and development, although its policies have raised concerns about protectionism, market concentration, and state control. The United States' market-driven approach has fuelled technological innovation and fostered global tech giants, but it also grapples with issues of regulation and data privacy. Japan's balanced approach has supported steady growth and technological prowess, but the country may face challenges in maintaining its competitive edge in a rapidly changing global landscape.

In conclusion, the government policies of China, the United States, and Japan exhibit different approaches to fostering the growth and development of their digital economies. Each of these approaches carries its own set of advantages and challenges, and the effects of these policies can be observed in the countries' digital industries. A comprehensive understanding of these policy differences and their implications is crucial for stakeholders seeking to navigate the complex landscape of global digital economy policymaking.

4. Conclusion and Recommendations

This paper examined China's digital economy, focusing on the development and growth of its e-Commerce, digital payment, and Internet sectors. China has become

a global leader in these areas due to factors such as large consumer base, widespread internet access, a strong entrepreneurial ecosystem, and supportive government policies. These policies have the potential to foster innovation, competitiveness, and international cooperation, but face criticism for being protectionist, discriminatory toward foreign companies, and encountering implementation challenges.

A comparative analysis of China's digital economy with the United States and Japan was conducted, highlighting differences in government policy approaches. China adopts a more interventionist approach, the United States prefers market-driven policies, and Japan strikes a balance between the two.

These findings provide a multifaceted understanding of China's digital economy, its government policies, and comparisons with other countries. The paper concludes with recommendations for policymakers and businesses that are interested in China's digital economy and discusses potential future developments in China's digital economy and government policy.

4.1 Policy and Business Recommendations

Based on the key findings of this paper, we offer several recommendations for policymakers and businesses looking to engage with China's digital economy. One recommendation is to encourage international cooperation and dialogue, which can address concerns regarding protectionism and discriminatory practices. By promoting transparency and fairness, countries can create a more conducive environment for global economic growth and the exchange of technology and ideas.

Another suggestion is to foster innovation and competition within the digital economy. Policymakers and businesses can work together to support research and development, encourage public-private partnerships, and facilitate access to new markets and technologies for both domestic and foreign companies.

Addressing implementation challenges associated with initiatives like "Made in China 2025" and "Digital Silk Road" is also essential. Policymakers should provide clearer guidelines, ensure equitable access to resources for private enterprises, and facilitate the acquisition of advanced technologies and expertise.

Developing workforce skills and capabilities is crucial for businesses to effectively compete in the digital economy. Companies can invest in employee training programs, establish partnerships with educational institutions, and create innovation hubs to attract and retain talent.

Adapting to local market conditions is vital for businesses engaging with China's digital economy. This may involve tailoring products and services to accommodate local preferences, ensuring compliance with local laws and regulations, and establishing relationships with local partners to navigate the complex business landscape.

Lastly, mitigating potential risks associated with the digital economy is critical. Policymakers and businesses should work together to address issues related to data privacy and security, ensure the ethical use of advanced technologies, and balance the potential benefits and drawbacks of government intervention in the digital sector.

4.2 Future Developments

As we look ahead, a complex interplay of factors will shape the trajectory of China's digital landscape.

China is expected to accelerate digitalisation and technology adoption in various industries. The ongoing integration of advanced technologies, such as artificial intelligence, robotics, and the Internet of Things, is anticipated to drive innovation and transform the country's digital economy. As China's digital footprint expands, so too will its influence on the global economy. With initiatives like the Digital Silk Road, China aims to strengthen its position as a global technology leader, leading to increased competition and cooperation between China and other major economies. Both challenges and opportunities will arise from this dynamic.

As China's digital economy continues to evolve, government policies and regulations will need to adapt to address emerging concerns and facilitate growth. Policymakers will need to strike a balance between promoting innovation and ensuring consumer protection, data privacy, and national security. A proactive and adaptive approach will be crucial in responding to the rapidly changing digital landscape.

Moreover, with an increasing emphasis on sustainable development and environmental protection, China's digital economy will likely see a growing focus on green technologies and solutions. This shift will create new opportunities for businesses and investors in areas such as renewable energy, smart cities, and green transportation.

Addressing digital inequality will become a pressing concern for policymakers as the digital economy continues to expand. Ensuring equitable access to digital resources, infrastructure, and opportunities for all segments of society will be crucial in maintaining social cohesion and stability.

Lastly, the rapid development of China's digital economy will likely give rise to new industries and business models, creating opportunities for both domestic and foreign enterprises. Firms that can quickly adapt to these changes and capitalise on emerging trends will be well positioned for success in this dynamic environment.

In summary, China's digital economy is poised to undergo significant transformations in the coming years, driven by rapid technological advancements, evolving government policies, and a growing global presence. By understanding these trends and developments, businesses and policymakers can better prepare themselves for the opportunities and challenges that lie ahead in China's digital future.

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Bucharest University of Economic Studies, Romania

One Belt – One Road

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Abstract

Economic development is always taking on new forms. From colonisation to economic grip, to the moment of excessive globalisation, economies are constantly having to grow in order to survive. Among the most vital elements for macroeconomic development is the infrastructure used by economic agents to develop your own businesses. As a result, it is only natural for this infrastructure to be targeted at those areas that are not fully exploited and to attract the attention of investors who can generate added value, which is, in fact, the essence of globalisation and the engine of capitalism. Recent global movements have captured such a plan developed by one of the main international economic players, namely China. Being a culture oriented toward long-term investments, they conceived the project recognised as Belt and Road or One Belt – One Road through which they want to form a common infrastructure system with most countries in Europe and from which all other nations can benefit. Being an achievable plan in the very long term, there are a lot of factors that need to be taken into account, such as the financial capacity of a country, monetary stability, quality of life, fiscal stability, but also factors related to the national social policies of the countries that are targeted in this process. There is no clear outline of the determinants that would lead to the exact implementation of this project, and the scale of the process is of such a size that the number of countries to be nonbeneficiaries or noncontributors cannot currently be projected. This paper focuses on strictly identifying the needs for which this project was designed, the promises that the initiative offers, as well as the needs it is supposed to meet.

Keywords: infrastructure, policy, investments, PPP, roads.

JEL Classification: E60, E66, F01, 02, F13, F30, F34, F35.

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1. Introduction

World economies like any private market segment must always develop. Thus, competitiveness at the international level is a phenomenon as real as structural development at a certain level of the national economy. This paper focuses on the phenomenon of the expansion of economic influence, on the strategies of economic development of countries at the international level, more specifically on China's initiative called "Builds and Roads", a common point on the agenda of discussions of Chinese economic policies that is found in different forms and under different names in several policies at the state level. Logistical and influence capability in order to shape a structure strong enough to provide them with a competitive advantage (Men, 2020). The main purpose of this structure is to develop trade with the countries of the European Union and with those in Africa in order to be able to procure quality services at a lower price than the market price at the current level. This initiative is not a wake-up call for nonmember countries for the simple reason that there is a possibility to create a monopoly on the transport structure. It is under discussion what would be those areas for which the countries that would participate in the project in question would benefit from the intervention of the Asian people in the European and African commercial areas. Among the most obvious effects would be the increase in the number of people employed in the real economy as a result of large-scale projects, the increase in the efficiency of production capacity that would bring added value in the long term and therefore a competitive advantage for the country in question, but also the attraction of investments from external sources that would lead to an increase in consumption and an increase in the flow of capital that the company itself has (Tjia, 2020). However, a dominant position in terms of China's presence in key points of the European economy may sound the alarm bells, as it is a producer with a high production capacity, a higher financial level, and an economic strategy to maintain the undervalued exchange rate, capable of creating major disturbances that affect the stability of other countries that have related links to economic activities (Aminjonov et al., 2019). Over the past decade, China has recorded increasing rates of economic growth every year, with national savings accounts increasing at the same time as the level of investment, thus demonstrating that it would now have the capacity to officially start such a project. The international positioning strategy has changed in the idea that since massive exports of goods and services, the economy has focused on producing goods with high added value that are dedicated to exports (Yu, 2018). The expansion of infrastructure thus ends up becoming not only a pertinent argument, but also a natural consequence of the strategy presented. The initiative described and analysed in this article cannot be summarised in a single process. This is the sum of several projects with an inaccurate degree of applicability that gradually target several countries as potential participants (Men, 2020). The projects cover several levels of activity such as the level of investment, the rate of return of the economy, the degree of corruption within the country, the level of development, the logistical capacity, the presence of legislative reforms applicable at European level, local and national legislation, the economic structures, the living standards of the people as well as other elements that depend

on the economic quality and the government poles adopted and the correction mechanisms that each country has. So, we are talking about a sum of projects and conditionings that together form the 'Builds and Roads' project. It should be noted that there is no publicly available inventory of official projects under this initiative, nor is there a final drawing of the points yet. Although the finality is established and it is known what the desired end is, there is no complete, concrete, and official set of reforms, actions, or policies that will lead in the direction pursued (Rencz, 2019). This article follows the importance of the project in light of an element which is the subject of analysis of the initiative and which forms one of the main points of the initiative, namely the infrastructure of the railways (Tjia, 2020). As mentioned above, the initiative targets two forms of development, namely on land and one on the maritime level. In the first part, it is about rail transport and in the secondary level there is talk about the profitability of roads and highways, but these are the subject of discussion for the final stage, because the costs are much higher, the level of profitability thus is reduced and there is room for further debate on the management strategy, the charging policy, as well as their positioning according to the strategy that each country participating in the project has (Tjia, 2020). The second strategy and which is the subject of analysis for a future article is the development of a maritime channel to the African continent, which is a separate but integrated part of the same plan. That article is the subject of a study of the importance of the structure of the railways and of the transport potential that it has, as a direct means of transporting products and as a critical infrastructure in the context of interconnected processes of trade at international level. The economic effects of foreign trade propagate internationally, this being the stake and also the reason why additional research is requested (Tjia, 2020).

2. Problem Statement

The issues addressed in this article can be seen as an already debated issue. Analysis of economic structures is a standard topic of analysis, being the most discussed and observed phenomenon, all the more so since it is a critical infrastructure point at the national level, such as the capacity and quality of the rail transport network (Rencz, 2019). Within this sector, discussions branch to several directions such as the quality of infrastructure, the efficiency of the machines used, profitability, geographical positioning, and the advantages or disadvantages they offer to an economy, as well as the need and financial strength of an economy to modernise or further develop such a transport system, be it commercial or public transport. Most of the time, this is a segment that cannot be competed privately by companies on the free market, being a very high level of investment and impossible to recover the money in a small period of time (Tjia, 2020). Being a good or a consumer service, serving the population as a whole, the taxation at a correct level of the market does not allow people to access that service, which is why it is the responsibility of the authorities either to fully bear the costs and form a strategy for the development of this area, or they are carrying out Public-Private Partnerships with certain companies that have experience in the field and that have the financial

capacity to bear for a while high costs (to deliver the services for which they were contracted before they were paid for the services provided, which is low probability due to the very high costs that this process presents). Specific to the analysis in this article is the impact that such a project would have at European Union level, thus being a causal chain that cannot be influenced by a single economy, which does not concern a geographically delimited area, but comprises a sufficiently large area so that countries do not consider themselves coordinators or managers at the level of the economy, but collaborators. Moreover, a vital point of this analysis is built by the quality of net beneficiary or net contributor of participating countries (Hillman, 2018). From an economic perspective, it seems simple that any of the international economies wants to reduce the impact of costs in the transport process (Rencz, 2019). However, China's completeness in the production of goods at a reduced level can and can be interpreted by certain economies as a threat to its own production capacity, and as a result, each aggregate economic operator must achieve its own opportunity cost and determine whether, logically and financially speaking, it is more cost effective not to participate and to continue production domestically, with a related market already formed, or if it invests in smoking a system that will increase its level of competition at international level over time. Starting from the basic principle that each country will focus on that unique production capacity, specific to the area in which it is located and for which it has a significant competitive advantage, one could observe the conditions in its own right for unanimous acceptance of the initiative (Tjia, 2020). However, today's market has reached a graph large enough of diversity and homogeneity that many of the unique products that a country could offer have been replaced by various complementary goods. For this reason, it is currently not possible to form a complete and final list of countries that will participate in this initiative (Rencz, 2019). Moreover, the question arises of the development of the economies that are in the process of being formed, the majority being the economies in the eastern and south-eastern parts of Europe that would have the capacity to increase the level of development from these projects (Herrero, Xu, 2017). As a result, each country must consider the possibility of catching up with the economic disparities of neighbouring countries and see whether the lack of involvement could not generate losses in the long term (Men, 2020). From a functional and infrastructure point of view, the level of investment is also different from one case to another. In the case of those countries with a technologically outdated system, investments will have to have a higher percentage of the total budget allocated and established. Moreover, such a logistics system can be caused by the lack of financial strength of the country in question, which raises questions about the ability to return the amounts of money granted through the project. Therefore, the biggest impediment of this project is the fairness that the granting of access rights to such an infrastructure surprises, the level of impact on the economy, as well as the degree of assuming the possibility of granting sums of money to competing economies without imposing credit conditions, but without which the project would not prove possible or profitable (Rencz, 2019). Therefore, the main dispute of the series of scenarios is the correctness of the contribution and benefit

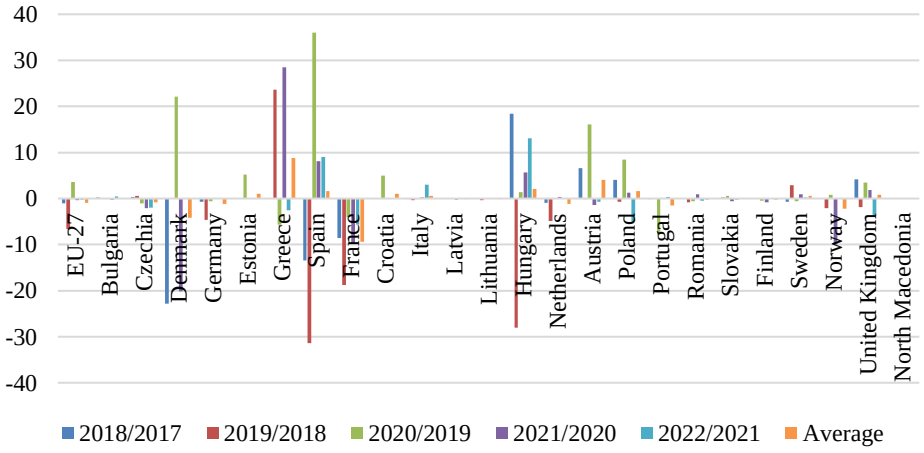
from the project. The need to establish a certain route is an essential precondition to be able to subsequently identify the actors who will be surprised in the construction process. The main elements underlying the mapping of the railway road and those adjacent to them are those related to the nature of the geographical area in the first part (Rencz, 2019). The more mountainous the area, the higher the costs will be, and here the cost of reorientation for a new route and the period of time for which the observed change is extended must be recalculated (Yu, 2018). Subsequently, it is about the direction that the route offers, about the ramifications that are desirable to reach all the production centres at the European Union level, as well as to the areas with high development potential (Hillman, 2016). Thus, following a logical course of the project, the main thing of the negotiation and start-up moment is the formation of a well-developed implementation framework containing all the scenarios and all the expeditions that may occur. In the contrary case, there is the possibility to give up the investments made up to that point along the way and thus lose significant amounts of money.

3. Research Questions / Aims of the Research

The BRI (Bridges and Roads Initiative) thus contains a number of distinct projects which form one of the main points of the analysis, namely rail transport. This sector taken individually by the rest of the issue has the capacity to expand trade, to attract financial investment for all countries in European areas (even if not equally and not at the same time), to contribute to achieving key factors of social policies for all countries such as reducing the rate of risk of poverty and social exclusion, all this by reducing the costs for trade at the agreed level, individually or collectively (Men, 2020). However, as mentioned above, certain countries may have more to lose from these lawsuits than they would benefit from if the situation remains unchanged. Firstly, if the project were fully completed and implemented, the infrastructure would have the full capacity to reduce the response time according to the needs of each country. So, whether it is the time that individuals spend as employees on the road, or the merchandise that has to travel a certain distance (all the more so as perishable products like raw meat products are discussed), the costs are reduced. From the perspective of individuals, the quality of life increases through less time to travel to work, and companies have the ability to bring cheaper labour from disadvantaged backgrounds, and people in those areas in turn will increase your income (Tjia, 2020). Moreover, this would reduce the costs that the authorities have to pay for unemployed individuals or those who are in the category of people at high risk of poverty. From the point of view of the companies, they will pay less for the transport, they can fulfil the orders in a shorter time, and they have the opportunity to increase the diversity of the products offered by easier access to different resources, the advantages being thus present for all the parties involved (Tjia, 2020). However, this project is only in the design phase and has several effects, which, in particular because of the complexity it has, is difficult to specify what the long-term effects would be. Although sectors of activity that are very time-sensitive, such as the production of vegetables and fruits or the chemicals industry, would benefit fully

and directly from the reduced response times, in the long run there is a possibility of competitive development in several areas. The advantages would not only materialise for small and medium-sized agencies, but also for all organisations that are active in the economy (Hillman, 2016). It can thus be seen that, implemented incorrectly and without having a well-established policy system, there is a possibility that the added value will not necessarily have an effect far superior to the current situation, but rather accelerate the speed of reaction, the processes remaining identical. In addition, the possibility of this project to take place, but also to have the expected result at the end of production, depends to a very large extent on the quality and accuracy of execution of the other projects that are targeted. The selection of those impaired infrastructure and the assessment of the work points that need to be brought to a uniform level before starting the main procedure are key topics, vital elements that can lead to either the failure or success of the percentage. In order to ensure a certain quality and accuracy, the mechanisms available to most of the participating countries must first of all have a relatively homogeneous degree of infrastructure (Men, 2020). Therefore, in the case of a contract, there is a good chance that the points that have not been aligned with the rest of the procedures are the very blocking elements that lead to a lack of time and money for the investment (Rencz, 2019). Good controller and observation of the imposed conditions are vital elements because the infrastructure does not justify your costs if it does not reach the desired size. If there are areas where projects cannot be implemented, then from that moment on all the procedures must be reassessed in order to find an alternative, being a situation that only leads to waste. Therefore, before implementing any project, participating members must have a uniform degree of development and have an infrastructure that allows the other economies implicitly to carry out the activity under similar efficiency conditions (Aminjonov et al., 2019).

Figure 1. Total length of railway lines (% compared to previous year)

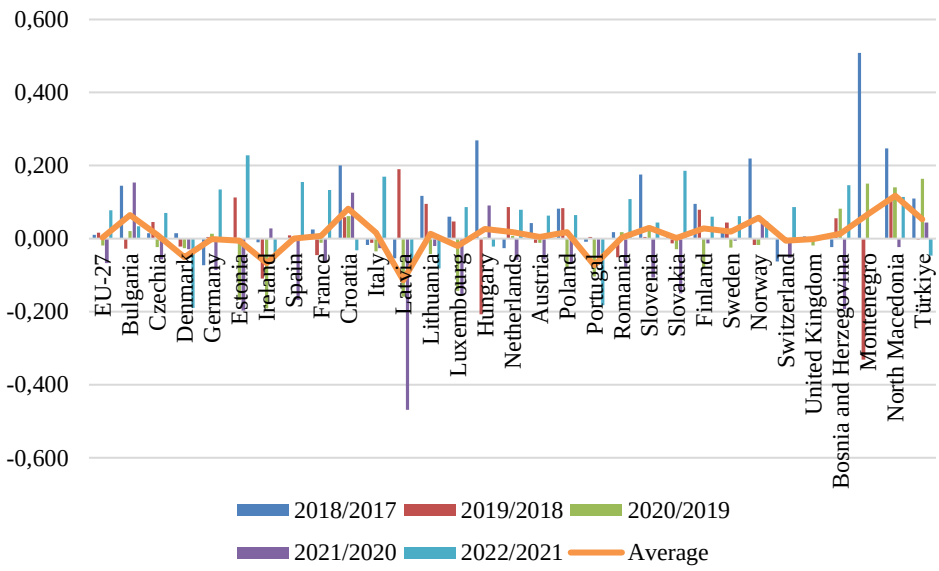


Source: Authors' own processing of data from Eurostat database.

As can be seen in Figure 1, at European Union level, in the last 5 years, more kilometres of train rail have been dismantled than they have been built. The decisions were obtained following the decommissioning, caused by the lack of investment and their poor management (Herrero, Xu, 2017). The main cause is that of lack of financial involvement. If there is no sufficiently high demand for transport at the high aggregate level, then the high costs for this area are not justified, and so the rationale is to decommission areas and reduce maintenance and personnel costs for administration (Yu, 2018). The decision on the start of the railway road project that the BRI presents thus becomes increasingly difficult to adopt. At the macrocosmic level, infrastructure investments are often not proven to be cost-effective, either due to a lack of industries or due to good road infrastructure. However, internationally, railways are the most optimal transport solution, which is cheaper and the fastest (Herrero, Xu, 2017). Moreover, the bureaucratic apparatus is less in this field of transport, the mobility, and the possibility of deviation of an economic agent from the established path being lower. Most often, when discussing reduced transport times, time spent at customs for the necessary controllers is also brought into question, rail transport having a special regime that can be regulated in such a way that customs control becomes more of a formality than a need for safety. One of the defining criteria of this common act is the trade policies applicable at national and European Union levels. The set of rules and regulations imposed must be unanimously accepted by all parties and take into account the common interests of the whole process, not just the competitive advantages at the national level (Tjia, 2020). So, the set of rules has to be clear, concise, and not change. Stability plays a very important role in accepting the individual profiles and conditions of the alleged trade pact, which is why, before determining the quality and level of conduct of these policies, it must be determined as clearly as possible what the duties and obligations of each party are, what are the common points, what are the individual points, and to where the autonomy of decision-making extends and where the application of the common set of actions of the Parties. One of the main players in the private market that can be the basis for PPP projects (public-private partnerships) are credit institutions that have the financial capacity to help carry out this project. The advantages come from both sides (Aminjonov et al., 2019). Mainly, at national level there will be a number of cash availability that can be oriented toward these BRI project implementation activities from the railway perspective. Moreover, financial organisations would be encouraged to offer money for lending given that it is the state, that is, the main guarantor of last resort, which is why they can offer, due to the certainty of recovering money, lower interest rates that would relax the state budget (Herrero, Xu, 2017). The only point that may capture vulnerabilities is that of rising inflation, where countries are more likely to increase inflation in order to be able to complete processes well. However, the final results have the capacity to cover the deficits by gradually collecting costs, thus not being a solid basis for the authorities to resort to such cyclical and harmful processes to society. Complementary policies can automatically lead to an increase in long-term added value. As can be seen in Figure 2, at the European Union level there is a tendency to

increase the use of railway means as the main means of transport for goods. However, it applies mostly to international transport, i.e., to the export situation of countries, which is why it can be used as an argument for the implementation of BIS processes. Competitiveness is often rendered by reducing costs and maintaining quality or through innovation processes that allow economic operators to produce products at identical costs with a higher value added value for the final consumer (Hillman, 2016). As a result, from an economic point of view, it would be sound to implement such a project because the lower costs incurred at the end of the financial year would allow companies to direct the sums of money to areas of innovation, research, diversification, or operation (Hillman, 2018). As a result, it is not the ability to reduce costs that would be a criterion of survival and competitiveness for companies, but the quality of services. The homogenisation of fixed or variable costs, but fully found in the accounting of each company, depends most of the time on the quality of the services of the other traders on the market and on the policy decisions imposed at national level by the authorities. Changing the paradigm toward a more professional approach from a working point of view would lead to an increase in the quality of production in the long term (Rencz, 2019).

Figure 2. Goods transport by rail (% compared to previous year)



Source: Authors' own processing of data from Eurostat database.

There are, as always, a number of risks to which such a project is subject. The main problem is that of the implementation over time. As this is a project of this scale, it is difficult to establish a timetable (Rencz, 2019). Moreover, attracting penalties due to non-compliance with time conditions cannot be a solution because

it attracts even greater financial pressure, the aim of the project is to reduce costs, not to generate a new source of penalties. Moreover, the jobs created by the economy would largely be only cyclical ones, a situation not sustainable in the long term because the number of people who are supposed to have the capacity to manage the infrastructure is far lower than the individuals who would be contracted to implement the procedures in the first instance. Subsequently, the costs will not always be in line with what is passed in the work processes. As these are long-term costs, inflation already exists in each country, as well as fluctuations in the exchange rate due to the level of imports and exports, and those factors will affect that amount over time, and it will have to be constantly adjusted to market prices. The BRI initiative is a long-standing process that has as its main purpose the connection and integration of the total potential of national economies. Corridor economies have the capacity to generate the added value in this way, but only in the long term, which forms some inability to project its relevance at the moment.

4. Research Methods

The method used for the analysis was that of processing the data identified on the basis of Eurostat data. The data were collected in a connotated manner by the European institutions in collaboration with national organisations at the European level. For indicators concerning the length of active railways between countries data was taken and processed from the official reports of the country. The values were expressed in millions of kilometres and for the graphic situation were processed percentages. Thus, the values for each year are obtained by comparing the value in year n with that of year n-1 from which the number 1 was subtracted. For the indicator that analyses the number of products that were marketed / transported using railway means, the calculation method was identical. Moreover, the data on the quantity of products / goods that were commercial through the specific means of the railways were obtained in the urn of the interrogation of the organisations authorised in this regard at national level, based on the tax returns registered by the companies with the authorities, as well as with the help of the waybills, an instrument that is found in the legislative base of any analysed country and which presents to the economic agent the obligation to declare nature, the direction, and purpose of the products which are distributed for commercial purposes.

5. Findings

The implications of a process such as the BRI one have multiple effects at the local level, up to the international level. The added value of this project is visible and desired by all participants, the important question being whether it is also possible in the manner in which it is presented at this time. As these are several subprojects and several actors involved, the cost-effectiveness and efficiency of the process can only be determined by the individual assumption of all the economies participating in the project, as well as the financial and social involvement of all these parties. It is necessary to see what the approach is at individual level and how it will translate

at a common level, the working agendas of the authorities in terms of implementation time must be observed, as well as the degree of freedom that each economy will have at the time of completion of the project. Moreover, the openness of the actors involved will have a decisive role in the final result, as it is about the need to take decisions unilaterally and homogeneously, and the higher the number of actors concerned, the lower the chances of this happening.

6. Conclusions

The project has the capacity to bring added value to all existing levels. Moreover, electricity supply, high transmission capacity, and flexibility of use, all of which are elements that encourage the adoption of the project. It should be noted whether the solutions proposed by this project also coincide with the interests at national level or whether in the case of a contract the national opportunity costs are low enough to ensure the unanimous collaboration of all actors. Although it is broadly known what would be the necessary steps to be able to operate efficiently, the project depends on a multitude of factors, both within countries such as the interests at the time, as well as external factors such as the geopolitical situation of neighbouring countries or of a geographical interest group. The reduction of costs will automatically lead to an increase in the standard of living, as well as to the increase of international competitiveness, which will generate an extra chance for society as a whole. However, before all these processes take place, it must be clearly established what the duties, rights, and obligations of each of the parties are.

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Artificial Intelligence in Education: a Systematic Review

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Abstract

This systematic review presents a comprehensive synthesis of recent scientific findings concerning the disruptive effects of artificial intelligence on the educational sector. In light of the rapid expansion of AI integration in education over the past three years, this study draws upon a sample of 17 scholarly outputs from the post-pandemic era to derive meaningful insights. Although previous studies have shown that AI can generate positive outcomes for both teachers and students, there is a lack of knowledge on how AI is used in the educational process. Hence, this research article aims to investigate not only the benefits and risks emerging from the implementation of AI technologies in education but also the educational level at which AI instruments are mostly integrated into teaching and learning and the characteristics of AI-based models currently used. While few studies have been found on this critical topic, the current references offer up-to-date information on various dimensions of AI systems in education (knowledge, instruments, activities, and consequences). The findings reveal that AI tools have greatly improved students' conceptual understanding related to artificial intelligence, algorithmic thinking, robotics, artificial neural networks, and computer science, as well as the acquisition of other valuable competencies like creativeness, literacy, cooperative research, and emotion control. Finally, future directions for exploring AI in education are presented.

Keywords: artificial intelligence, AI tools, education, educational technology, human-machine.

JEL Classification: I21, I24, I28.

1. Introduction

Over the past decade, digital technology has not only been the driving force behind the current transition to the era of advanced manufacturing but has also

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spurred the rise of the Industrial Internet of Things, signifying the convergence of cyber-physical systems and the integration of digital technologies in industrial processes. As predicted by Moore's law (Moore, 1998) for more than a half century, the development of digital technologies not only exponentially increased the efficiency and performance of various devices and gadgets, but also improved their operational capabilities (Jiahong, Weipeng, 2022).

Consequently, technology plays a pivotal role in transforming human perspectives and actions toward sustainability through its ability to educate and inform individuals about their carbon footprint, thereby influencing their attitudes and behaviours (George et al., 2021; Schroder et al., 2021; Dwivedi et al., 2022). In contrast, the notable deficiency in awareness about climate change concerns and their interconnection with digitalisation and technological innovation necessitates the implementation of a green IT curriculum at the secondary school and higher education levels to effectively address this issue (Perkins et al., 2018; Marques et al., 2019; Miller, 2020).

Nevertheless, the COVID-19 pandemic has impeded the pace of digital transformation, as evidenced by its adverse effects on economic growth irrespective of a nation's level of development (Habibi, Zabardast, 2020; Corejova, Chinoracky, 2021). On the one hand, among various factors, including macroeconomic stability, foreign direct investment, and trade openness, the level of digitalisation emerges as one of the significant determinants of competitiveness, exerting a substantial influence on a nation's economic growth (Boikova et al., 2021). On the other hand, this factor must be addressed by highly educated labour in order to make a positive impact on economic development (Volchik et al., 2018; Kolade, Owoseni, 2022; Werfhorst et al., 2022).

Furthermore, the global impact of COVID-19 has compelled educational institutions to swiftly explore inventive remedies within a compressed time frame (Tam, El-Azar, 2020), while all learning was diverted online due to the self-isolation period (Sloan, 2020). Given the limited time available for contemplating educational intricacies, the closure of schools and universities worldwide in response to the pandemic has resulted in the disruption of learning for nearly one billion students (UNESCO, 2020). The paradigm shift in education, triggered by the sudden shift from traditional schooling to the online environment, has propelled the embrace of open innovation and Education 4.0 (Akimov et al., 2023).

Consequently, in the context of infrastructure, Education 4.0 encompasses the provision of cutting-edge educational platforms, software, and applications, facilitating a novel educational paradigm characterised by human-machine interaction (Gennari et al., 2023). In view of this, artificial intelligence (AI) in education has become an intriguing topic of increasing interest for educators and researchers, as it has the ability to personalise learning experiences (Tahiru, 2021; Lee, Yeo, 2022; Liu et al., 2022; Mizumoto, Eguchi, 2023; Ray, 2023; Wand et al., 2023).

1.1 Justification, Aims, and Research Questions

The field of education is undergoing a profound transformation through the deliberate integration of novel technologies and paradigms into its processes, driven by the objective of addressing the evolving needs and demands of students in a proactive manner (UNESCO, 2020; Sipică, Toma, 2022). Moreover, the COVID-19 pandemic has underscored the significance of incorporating innovative technologies, implementing novel educational methodologies, and reconfiguring conventional learning settings and practices (Sloan, 2020; Tam, El-Azar, 2020; Fahey, Hino, 2020; De' et al., 2020). The synergistic utilisation of augmented reality and artificial intelligence holds the potential to facilitate this transition, thereby presenting a multitude of educational advantages and avenues (Ceobanu et al., 2022; Akimov et al., 2023).

While numerous studies (Cropley, 2019; Jiahong, Weipeng, 2022; Lee, Yeo, 2022; Liu et al., 2022; Denes, 2023; Chiu et al., 2023; Akimov et al., 2023; Iku-Silan et al., 2023; Jiahong, Weipeng, 2023; Mizumoto, Eguchi, 2023) have explored the implications of artificial intelligence (AI) for future education, there is a dearth of evidence related to the implementation of AI in education through public policies. Accordingly, the objective of this study was to conduct a systematic literature review to critically examine the existing body of knowledge and research on the utilisation of augmented reality and AI in education within the framework of public policy regulations. In addition, this systematic review examines the ramifications of the COVID-19 crisis on the expeditious uptake of educational policies concerning the incorporation of artificial intelligence into the pedagogical process, thereby elucidating the effects and consequences of the pandemic on the educational domain. The following research questions (RQs) were designed to guide the investigation:

Research Question 1 (RQ1): What are the advantages derived from the amalgamation and integration of artificial intelligence into the educational process?

Research Question 2 (RQ2): What are the main threats and risks associated with the integration of AI into the educational process?

Research Question 3 (RQ3): Which countries have yielded the most substantial body of research on this subject matter?

Research Question 4 (RQ4): In which educational phase is the application of artificial intelligence in education more commonly observed?

1.2 AI in Education

As the utilisation of AI technologies in education continues to grow, there has been a corresponding increase in the volume of published research on this subject. For example, Chiu et al. (2023) identified four prominent functions performed by AI in the educational context, enhancing the overall value of learning, training, assessment, and management processes. They revealed that AI can: (1) delegate assignments tailored to individual aptitudes; (2) facilitate human-machine dialogues; (3) assess student artefacts for constructive critique; (4) improve adaptability and interactivity in the digital world; (5) provide adaptive teaching strategies;

(6) improve teachers' instructional competencies; (7) support teachers' professional development; (8) provide automatic assessment; (9) predict student performance; (10) improve the performance of the educational unit management platform; (11) provide convenient and personalised service; (12) and support fact-based educational decision making.

Additionally, Tahiru (2021) revealed through their research that AI tools had already been adopted and employed within educational institutions in advanced nations such as the United States of America, Japan, as well as other developed countries including South Korea, Hong Kong, Estonia, among others, before the occurrence of the pandemic.

Earlier studies have also made a partial contribution towards comprehending the attributes and constituents of AI within the framework of Education 4.0 and open innovation competencies. Mollick and Mollick (2023), for example, emphasised the importance of AI tools for advancing teaching and learning practices provided that they are used carefully and thoughtfully in the classroom, as well-designed AI applications can expand teachers' capabilities, enhance learning, and support evidence-based teaching practices. Likewise, AI-based chatbots present many opportunities for preservice teachers to develop their pedagogical competencies by providing personalised interaction on a meaningful task (Lee, Yeo, 2022).

Furthermore, a comprehensive review conducted by Jiahong and Weipeng (2022) investigated the influence of artificial intelligence on early childhood education (ECE). Their results revealed a significant enhancement in children's conceptual comprehension of AI, automated learning systems, informatics, and robotics, along with notable improvements in complementary proficiencies such as inventiveness, emotion regulation, collaboration, reading ability, and computational problem solving. These findings align with recent research conducted by Iku-Silan et al. (2023), which similarly demonstrated that the intelligent conversational agent, according to their model, confers significant advantages in terms of students' learning outcomes, commitment levels, mental workload, and confidence and self-assurance.

In addition, the utilisation of a chatbot employing AI techniques has the capacity to foster a favorable reading experience while capturing students' attention and cultivating their interest in the learning process (Liu et al., 2022). Current investigations primarily center on assessing the impacts of ChatGPT, an AI-based chatbot devised by OpenAI and introduced in November 2022. ChatGPT builds upon OpenAI's foundational models, namely GPT-3.5 and GPT-4, and has undergone refinement via the utilisation of superintended and underpinning learning techniques.

Within the realm of education and training, ChatGPT holds potential for various applications including: (1) tailoring education materials and lesson plans to align with individual learners' requirements and preferences; (2) providing learners with timely feedback and guidance throughout their educational journey; (3) developing captivating educational materials such as quizzes, tests, collaborative exercises, and multimedia productions; (4) supporting instructors with rating tasks, automated essay scoring, and productive feedback to pupils; and (5) creating flexible learning

contexts adequate for each learner's performance and progress (Mizumoto, Eguchi, 2023; Ray, 2023).

2. Methodology

This section elucidates the research approach by offering a discerning viewpoint on the selection of the present systematic literature review approach, along with the meticulous process that underlies the emergence of the conclusions and inputs presented in this research article.

2.1 Methodological Framework

In order to address the aforementioned research inquiries and accomplish the established objectives, a systematic exploration of the literature was carried out according to the guidelines outlined in the Statement of Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA). Given the diverse range of experimental studies, reports, assessments, suggestions, and hypothetical investigations encompassing the domain of AI in education, a meta-synthesis was deemed the appropriate approach. The adoption of the PRISMA statement was motivated not only by its rigorous criteria and principles, but also by its well-established reputation as a method widely employed in various subject areas, including education, to provide comprehensive insights.

To conduct a scientifically rigorous study, a comprehensive search strategy was employed, involving an in-depth combination of keywords across three prominent databases: Web of Science (WoS), SCOPUS, and Google Scholar. Notably, the utilisation of the WoS and SCOPUS databases yielded the retrieval of the most relevant and accurate documents, in line with their recognised status as high-impact scientific databases.

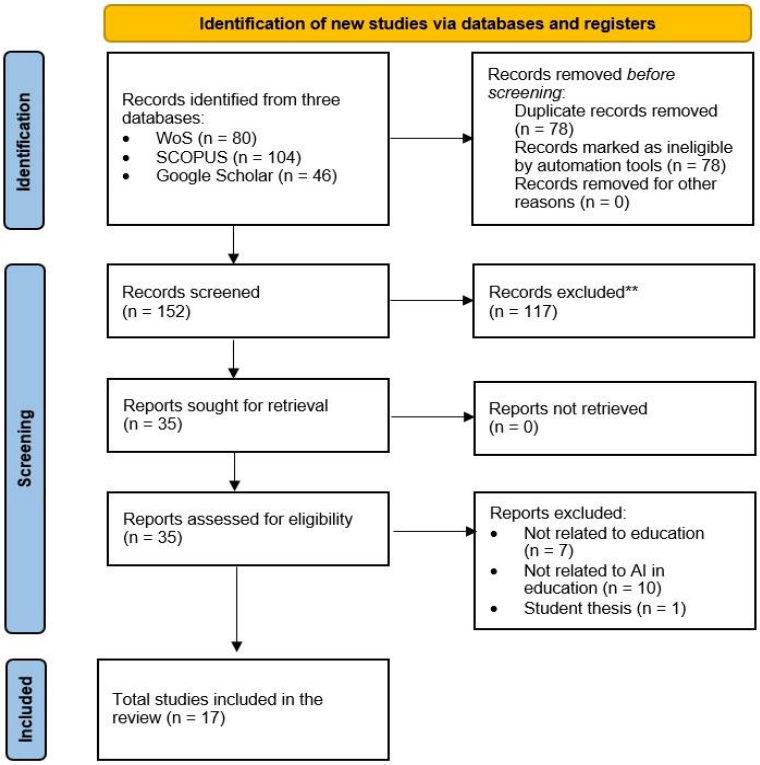
2.2 Meta-analysis Process

Data were collected from the period spanning 2021 to May 2023, with the objective of encompassing public policies pertaining to the integration of AI technologies in the educational domain, both prior to and in the aftermath of the pandemic crisis. A relevant and comprehensive search equation was employed to survey the literature concerning AI in education, encompassing a wide range of educational levels and topics. Considering the multidisciplinary character of the subject, the subsequent search string was utilised: "('artificial intelligence') AND ('AI') AND ('education' OR 'school' OR 'teach' OR 'college' OR 'student' OR 'learn' OR 'policy')".

The entire process of identifying scholarly literature through database searches is presented in Figure 1, adhering to the comprehensive steps and guidelines outlined in the PRISMA 2020 Checklist. In the beginning, a total of 230 studies were retrieved from the three databases (104 from SCOPUS, 80 from WoS, and 46 from Google Scholar). Among these documents, 78 were identified as copies and excluded from the analysis, resulting in a pool of 152 articles for screening. The primary

addition criteria encompassed the combined utilisation of artificial intelligence applications and tools, direct relevance to the scholastic process, and the inclusion of empirical studies, educational AI tools development, research syntheses, or theoretic contributions. Of the 152 documents, 117 did not meet the predetermined research criteria and were subsequently excluded from the study. The remaining 35 documents were successfully obtained for further examination. Supplementary evaluation led to the exclusion of 18 additional studies that did not satisfy the established research criteria. As a result, a total of 17 studies were included in the review and subjected to detailed analysis.

Figure 1. PRISMA flow diagram



Source: Authors' own contribution.

The 17 identified documents were categorised into three distinct groups: empirical studies, proposal and prototype papers, and theoretical papers. The appraisal and abstract papers underwent comprehensive scrutiny to identify their primary findings. Similarly, the proposal and prototype articles were scanned and analysed to determine their findings and recommendations. As for the experimental studies, a systematic analysis was conducted based on several variables including the state where the study was piloted, educational phase, application area, development category, sample size, main objective, research methodology, primary variables of interest, research mechanisms and tools utilised, AI instrument's name,

software development approach, programming tools employed, computing platform, devices employed in the experimental setup, key AI characteristics, and the focal findings derived from the study.

3. Findings

Table 1 presents a comprehensive overview of the 17 studies included in this research, providing details on the author(s), authors' country, publication year and title, investigation objectives, design of study, participants, AI applications utilised, and key conclusions. The table presents a detailed description and characteristics of each study, enabling a comprehensive understanding of their key aspects and outcomes.

Next, a comprehensive analysis was conducted using a combination of qualitative and quantitative methods to examine the data. Through a rigorous examination of the articles and their respective variables, the outcomes obtained are presented in the following section.

First, the countries (RQ3) that exhibited a substantial presence in conducting pragmatic research on the incorporation of artificial intelligence into the educational process are the United States, Taiwan, Japan, China, Singapore, the UK, Sweden, and Italy. Countries such as China, Germany, Hong Kong, Australia, the United Kingdom, Vietnam, India, and Ghana have actively engaged in the implementation of systematic reviews and conceptual papers within the realm of artificial intelligence in education.

Secondly, the majority of studies focused on the implementation of AI at all levels of education (freq. = 9, pct. = 52 %); followed by the assimilation of AI technologies in early childhood education (freq. = 2, pct. = 12 %), secondary school (freq. = 2, pct. = 12 %), and high-school (freq. = 2, pct. = 12 %); and primary school (freq .= 1, pct. = 6 %) and university (freq. = 1, pct. = 6 %) (RQ4). The majority of papers focused on understanding the opportunities and provocations of AI in education for both educators and students, as well as for the management of their educational units (52 %).

Notwithstanding the varied objectives of the articles, a considerable portion of them predominantly focuses on examining the influence of AI, particularly the effects of transformer-based language models, on learning outcomes, classroom effectiveness, and student engagement. Additionally, attention is paid to addressing the potential ethical implications arising from the use of AI in educational contexts.

Moreover, it is worth noting that the empirical studies encompassed a diverse range of research methods, including survey-based questionnaires, quasi-experiments, and experiments, thus providing a comprehensive examination of the topic at hand. In contrast, the conceptual papers used a mix of qualitative and quantitative approaches.

However, the primary variables employed in the studies were directly linked to crucial aspects of students' educational journey, encompassing their learning achievements, drive levels, engagement levels, cognitive load experienced, and digital social well-being. A limited portion of the papers (30 %) concentrated on a

comprehensive examination of teachers' variables pertaining to AI, encompassing their preparedness for integrating AI in their instructional practices and their capacity to create educational content using AI guidance.

Table 1. Descriptive data of the incorporated articles

Author(s)/ Year/ Country	Article title	Research Aims	Research Design	Participant(s)	AI tools	Main findings
Chiu et al. (2023), Hong Kong	Systematic literature review on opportunities, challenges, and future research recommendations of artificial intelligence in education	Understand the opportunities and challenges of AIEd by examining the literature from the last 10 years (2012–2021)	Systematic review study	N=92 studies	Assessment System, Prediction Model, Robotic language tutor, Automatic scoring tool, Chatbot, Teaching System, Braille tutor	AI technologies play numerous roles in the key educational domains. Also, they provide 7 learning aftermaths of AIEd, and 10 major provocations.
Denes (2023), UK	A case study of using AI for General Certificate of Secondary Education (GCSE) grade prediction in a selective independent school in England	AI models as assessment tools	Ofqual algorythm model, Questionnaire	N=180 students (secondary school)	Machine learning model	Numerical models alone are not yet suitable to replace public exams.
Gennari et al. (2023), Italy	Design for social digital well-being with young generations: Engage them and make them reflect	Promote education to responsible design as a key for digital social well-being	Questionnaire, interviews	N=24 students (17-18 year-olds, second-last year of high-school)	IoTgo phygital toolkit	Teens were also able to critically replicate in design for societal digital well-being.
Iku-Silan et al. (2023), Taiwan	Decision-guided chatbots and cognitive styles in interdisciplinary learning	To scrutinise the impact of this AI-based learning model on learning outcomes, enthusiasm, collective efficacy, classroom engagement, satisfaction with the learning tactic, and mental workload of learners with diverse reasoning styles.	Quasi-experiment method	N=71 students, junior high school	Decision-guided chatbot	The advantage of the contingency-based guided-exploratory learning mode to multimodal learning, which could be a good approach for cultivating students' learning achievements in multimedia learning.
Jiahong and Weipeng (2022), China	Artificial intelligence in early childhood education: A scoping review	To evaluate, synthesize and display the latest literature on AI in early childhood education.	Scoping review	N=17 articles	Zhorai, WeChat remote control, Teachable Machine, PopBots, Cognimates AI platform, and PlushPal	AI educational robots can integrate different disciplines of knowledge and multiple technologies simultaneously to greatly enrich children's learning experiences.
Jiahong and Weipeng (2023), China	A systematic review of integrating computational thinking in early childhood education	How to effectively teach and learn computational thinking in early childhood education.	Systematic review study	N=26 studies (2010-2022)	Bee-Bots, Daisy the Dinosaur, Kodable, Coding bots, Aphid's Toys, Matatalab, CHERP, and Cubetto	With age-appropriate instructional design, children could develop early concepts and skills of computational thinking, as well as other related skills such as communication, collaboration, and problem solving.

Author(s)/ Year/ Country	Article title	Research Aims	Research Design	Participant(s)	AI tools	Main findings
Joksimovic et al. (2023), Australia & Germany	Opportunities of artificial intelligence for supporting complex problem-solving: Findings from a scoping review	Investigate the opportunities of AI for supporting complex problem-solving.	Scoping review	N=38 studies (2018-2023)	Social robots, Chatbots	The collaborative interaction between humans and machines in complex problem-solving tasks exhibits promising potential for enhancing the efficiency and effectiveness of problem-solving across diverse practical domains.
Kasneci et al. (2023), Germany	ChatGPT for good? On opportunities and challenges of large language models for education	Investigate how these models can be used to create educational material, enhance student commitment and communication, and personalize education experiences.	Scoping review	N=23 studies (2018-2023)	Large language models: GPT-3, BERT, BLOOM, T5, RoBERTa	The utilisation of large language models in the field of education necessitates the cultivation of competencies and literacies by educators and learners alike, encompassing a comprehensive understanding of the technology itself, as well as its limitations and potential vulnerabilities.
Kolade and Owoseni (2022), UK	Employment 5.0: The work of the future and the future of work	To highlight often conflicting views about technology ownership, work-less utopia, education reforms and the imperative of human centricity in appropriation of technology.	Systematic review study	N=68 studies (2011-2022)	Collaborative robots, Digital twins, Cyber-physical systems, Chatbots	In addition to embedding digital skills throughout the training curricula in the formal training courses, more resources in funding and time allocation need to be injected into the programmes for continuing staff development.
Liu et al. (2022), Taiwan	An analysis of children' interaction with an AI chatbot and its impact on their interest in reading	To understand the features of a chatbot built with artificial intelligence technologies as a book talk companion, and to survey the role of the interaction in students' commitment and attention in reading.	Experiment	N=68 students (11-12 year-olds; 6 weeks)	Chatbot including 157 books (based on the Google Actions Console framework)	The engagement of students in conversational interactions with the chatbot resulted in a sustained level of situational interest pertaining to the value dimension. In contrast, students who did not engage in the book talk with the chatbot experienced a substantial decline in their level of interest.
Mizumoto and Eguchi (2023), Japan & USA	Exploring the potential of using an AI language model for automated essay scoring	To evaluate ChatGPT's reliability and accuracy in performing automated essay scoring (AES).	Experiment	N=12,100 English essays (TOEFL11)	AI language model ChatGPT	Automated essay scoring (AES) systems can leverage artificial intelligence (AI) language models, such as ChatGPT, to enhance their validity and reliability in assessing and providing feedback on written texts across various domains and contexts.
McGrath et al. (2023), Sweden	University teachers' perceptions of responsibility and artificial intelligence in higher education - An experimental philosophical study	To investigate university teachers' relationships with emerging technologies by focusing on the uptake of artificial intelligence in higher education practices.	Online survey	N=194 university teachers	Learning analytics systems, AI-driven assessment tools, Automated short-answer grading systems	AI literacy was reported to be low among the university faculty, yet a considerable proportion of them perceived AI as a potential facilitator of more inclusive student support systems. Faculty development programs may be required to enhance their awareness and understanding of the implications of AI technologies for their pedagogy, and to equip them with the skills and competencies to effectively utilise the emerging technologies in their practice.

Author(s)/ Year/ Country	Article title	Research Aims	Research Design	Participant(s)	AI tools	Main findings
Mollick and Mollick (2023), USA	Using AI to Implement Effective Teaching Strategies in Classrooms: Five Strategies, Including Prompts	To show how teachers can create educational material using AI guidance.	Experiment	Bing AI (online) vs. GPT-4 (offline)	Large language models (LLMs)	AI can produce explanations, examples, practice problems, and diagnostic questions to support instructors, helping them spend less time on developing materials and more time focusing on students. While AI will not replace instructors, thoughtfully developed AI tools show promise in augmenting instructor capacity, improving learning, and supporting evidence-based teaching practices at scale.
Perkins (2023), Vietnam	Academic Integrity considerations of AI Large Language Models in the post-pandemic era: ChatGPT and beyond	To describe and demonstrate the potential that LLMs have in creating original, coherent text that can avoid detection by existing methods.	Scoping review	Chatbots	Large language models (LLMs)	LLMs have the ability to produce creative and articulate text that could be potentially utilised by students in academic examination, and we contend that LLMs have achieved a degree of complexity that makes it challenging for both human specialists and high-tech gears to invariably differentiate between LLM-generated and human-generated text.
Ray (2023), India	ChatGPT: A comprehensive review on background, applications, key challenges, bias, ethics, limitations and future scope	To provide an in-depth exploration of ChatGPT's role in advancing traditional bullnecks.	Scoping review	GPT-2, GPT-3, Bing Chat, BERT, T5, XLNet, RoBERTa, Transformer-based models from Hugging Face, SpaCy, BARD, NLTK, CTRL	Large language models (LLMs)	ChatGPT has facilitated the progress of generative AI in various dimensions, such as, (i) amended circumstantial interpretation, (ii) refined language construction, (iii) task versatility, (iv) polyglot know-how.
Tahiru (2021), Ghana	AI in Education: A Systematic Literature Review	To analyze the opportunities, benefits, and challenges of AI in education.	Systematic review study	N=23 articles (2010-2019)	AIED (AI in Education)	Ethical dilemmas arising from an AI system should be resolved by adhering to the established policies and standards, which specify the accountability for the information utilised by the system. A strategy to integrate responsibility in the application of AI in educational area would be an initial step to address the ethical challenges in AI.
Wand et al. (2023), China & Singapore	Preparing for AI-enhanced education: Conceptualizing and empirically examining teachers' AI readiness	To conceptualize and examine teachers'AI readiness.	Cluster analysis	N=3164 primary school teachers	AIED (AI in Education)	This paper investigated the notion of AI promptness for educators from four dimensions, namely reasoning, aptitude, perspective, and morals, and empirically confirmed that professors with different levels of AI promptness incline to differ in their perceptions of AI and invention and their work fulfillment.

Source: Authors' own contribution.

Thirdly, most of the studies highlighted the benefits of combining and integrating AI in education (freq. 11, pct. = 65 %), while the rest of the articles pointed out the main threats and risks associated with the implementation of AI in education (freq. 6, pct. = 35 %). On the one hand, most authors concentrated on determining the main advantageous functions of AI equipment in essential educational areas

(learning, teaching, assessment, and administration) (RQ1). For example, the contingency-driven guided-inquiry learning mode represents an effective approach for improving students' learning outcomes in multimedia learning (Iku-Silan et al., 2023), while the human-machine collaborative approach in elaborate problem solving has demonstrated to significantly increase the productivity and helpfulness of problem solving in a broad variety of concrete applications (Joksimovic et al., 2023). In terms of digital competencies, AI tools have the potential to develop students' computational thinking skills and noncognitive abilities such as analytical thinking, hand-eye coordination, and body-matter interaction (Jiahong, Weipeng, 2023; Gennari et al., 2023).

Additionally, cautiously developed AI applications present the potential for increasing instructor capacity, improving learning outcomes, and supporting evidence-based teaching practices while helping teachers spend less time on creating educational content and more time focusing on their students (Mollick, Mollick, 2023). Specifically, big linguistic systems like ChatGPT can be effectively applied as automatic essay grading instruments (Mizumoto, Eguchi, 2023) or as a tool for personalised learning materials development and real-time feedback to students during the educational process (Ray, 2023).

On the other hand, to maximise the potential of large language models for educational context, it is very important to address the usage of these AI tools with vigilance and judgmentally assess their restrictions, risks, and possible prejudices (Kasneci et al., 2023) (RQ2). The study of Denes (2023) assessed whether AI tools can substitute for the formal GCSE exam taken by 10th-grade students in the UK and concluded that human monitoring is still needed while using numerical models for assessment. At the same time, Kasneci et al. (2023) highlighted the importance of acquiring the competencies and literacies needed to understand and integrate AI technologies in teaching and learning. Other than including digital competencies all through the curriculum in the formal education area, authors also emphasise the importance of investments in terms of funding and time allocation for teacher training and formation (Kolade, Owoseni, 2022). Likewise, university teachers need support and training for a better understanding of the implications of AI techniques for their teaching practice (McGrath et al., 2023). Finally, policy makers should address the ethical issues determined by AI systems by incorporating accountability into the use of AI in education (Tahiru, 2021).

4. Discussion

This research article offers a systematic review of 17 WoS and Scopus articles conducted in different countries from 2021 to 2023, which allowed us to determine not only whether AI technologies have negative effects on educational outcomes, but also how these malicious consequences can be addressed. Generally, the studied papers present successful integration of various AI tools into the educational practices, as well as a rigorous description of the components and characteristics of their AI-based decision-guided chatbots. Papers apply different methodical

approaches in order to investigate the impact of large language models, especially chatbots, for both students and teachers.

The limitations of this current study must also be acknowledged. First, due to the relatively limited sample size of documents included in this analysis, there may be deficiencies in the research results. Second, our synthesis of previous studies only addressed documents written in English and might have omitted important publications from other scientific languages.

5. Conclusions

The post-COVID era has underlined the critical importance for both students and teachers to be equipped with AI readiness in order to make well-versed decisions about the utilisation and choice of AI tools (McGrath et al., 2023; Perkins, 2023; Wand et al., 2023). While the digital revolution in education created new issues such as the digital divide, lack of skills, or even misuse of AI instruments (Hatos, 2019; Werfhorst et al., 2022), education systems around the world must facilitate their transition to Industry 5.0 by developing 21st century competencies like resourcefulness and logical thinking, curiosity and resilience, affective and interpersonal skills, and metacognitive skills (Ceobanu et al., 2022; Sipică, Toma, 2022; Akimov et al., 2023).

Taking into consideration the social and ethnic obstacles underpinned by paucity and a deficiency of education for many people living in developing countries (Barnes, 2020; Fahey, Hino, 2020; De' et al., 2020), digital exclusion could only be overcome by the thoughtful adoption of educational policies that regulate the integration of AI technologies in education (Sipică, Toma, 2022). Therefore, the instruction of digital capabilities in a holistic way has the potential to improve teacher skills in terms of classroom organisation, cognitive stimulation and positive environment (Lee, Yeo, 2022; Runge et al., 2023; Mizumoto, Eguchi, 2023; Wand et al., 2023). Moreover, the direct involvement of teachers in educational activities in the field of digital media appears to allow a deeper engagement of students in the educational process (Gui et al., 2023; Iku-Silan et al., 2023; Mollick, Mollick, 2023; Jiahong, Weipeng, 2023; Mizumoto, Eguchi, 2023; Ray, 2023; Joksimovic et al., 2023).

Based on this systematic review, we can summarise that there are at least three methods to AI incorporation in education. First, AI-based e-learning systems (for example, large language models) can ensure a supportive environment for students' personalised learning activities, as well as enhance their interest and motivation (Jiahong, Weipeng, 2022; Liu et al., 2022). Second, AI technologies can also provide personalised lesson plans and diagnostic questions to support teachers in spending less time creating educational content and more time on focusing on students (Tahiru, 2021; Mollick, Mollick, 2023; Mizumoto, Eguchi, 2023). Third, AI educational robots can offer an interdisciplinary approach to learning and help improve children's learning experiences and skills, more specifically critical thinking, computational thinking, human-machine interaction, and complex problem

solving (Jiahong, Weipeng, 2022; Iku-Silan et al., 2023; Jiahong, Weipeng, 2023; Joksimovic et al., 2023).

Therefore, further research should be piloted to assess the assimilation of AI tools at all educational levels since AI-based large language models are more rapidly evolving and learning than the education field has the capacity to keep up with their pace.

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