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EMPLOYMENT POTENTIAL VALUE OF OLDER PEOPLE IN THE COUNTRIES OF EUROPEAN UNION 28

Jozef BARTEK

Abstract

Europe's aging population brought the need to cope with the challenges posed by use of employment potential of older people in the labor market. One of them is to monitor the development of key factors: employment, health, well-being and education, which encourage or suppress the use of employment potential. Employment potential value of older people in the European Union 28 in the years 2008-2018 is used to monitor the development of factors, on the basis of which the values of individual countries are determined by their ranking. Data are obtained from Eurostat and UNECE databases. Finland recorded the most significant shift in the ranking among the countries, mainly due to the growth of the education factor. Estonia had the largest drop, mainly due to the decline in the well-being level of older people. Visegrad group countries had a dichotomous development: Poland, Slovakia and Hungary rose in the ranking due to the growth of the education factor, while the Czech Republic fell sharply due to reduced well-being values.

Key words:

ageing, employment potential, labor market, older people

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Introduction

Population ageing in the European Union 28 (EU 28) poses challenges that also need to be dealt with in terms of human resources and personnel management. One of them is the use of employment potential of older people in the labor market, as the social policy of states changed and key changes took place in increasing the years of retirement. This change is reflected in the setting of processes in the labor market, both in terms of supply and demand. The competitiveness of older people in the labor market is reflected in the use of their employment potential. Therefore, it is important to know the factors and indicators that play a key role. Which EU 28 countries are leaders and which lag behind in using the employment potential of older people in the labor market? This article is focused on the development of the employment potential value (EPV) of older people in the EU 28 in the years 2008-2018. The EPV is composed of employment, health, well-being and education factors. Based on these factors, the value is calculated, which reflects the position in the ranking according to the EU 28 countries and at the same time monitors developments in the period under review. The data are obtained from

Eurostat and UNECE databases. The article continues as follows: literature review, goal and methodology, findings, discussion, conclusion.

Literature overview

The literature review is focused on the use of employment potential and the four factors of the EPV of employment, health, well-being and education of older people. Using the employment potential of older people in the labor market is a long-term subject of research in the field of personnel management (Shatalova, 1999; White, 2007; Gregar & Pejřová, 2013; Gregar & Pejřová, 2014; Gregar et al., 2015). This interest persists due to the continuous growth of the cohort of older people in populations (Jeníček & Foltýn, 2003; Dudel & Myrskylä, 2017; Āwirlej-Sozańska et al., 2018) (Neary et al., 2019; Horváthová & Āhn, 2020; Vaňo, 2020) and phenomena associated with aging populations, such as the state of economic dependence of older people (Hu & Yang, 2012; Fiala & Langhamr, 2017; Abeysinghe, 2019; Hyndman et al., 2021), the issue of unemployment in old age (Zelezna & Kreidl, 2016; Amber & Domingo, 2017; Axelrad et al., 2018) and especially in pre-retirement age

(Gomezbellenge & Belgrave, 1984; Wuebbeke, 2011; Murray et al., 2015; Hetschko et al., 2019; Ponomarenko et al., 2019). The availability of jobs in the labor market is more complicated for older people, which is exacerbated by forms of gender discrimination (Leitner, 2001; Oskova, 2010; Pawera & Jančíková, 2017; Meliou et al., 2019; Busygina & Shtrikova, 2019) and ageism (Krajňáková & Vojtovič, 2017; Harris et al., 2018; Mirza et al., 2021; Kim et al., 2021). Good health of older people is a prerequisite for using their work potential. The level of health of older workers (Whitley & Popham, 2017; Schelleman-Offermans & Massar, 2020; Borchart et al., 2021) and the increase in life expectancy in relation to the employment of older people (Ediev et al., 2019; van der Mark-Reeuwij et al., 2019; Eurostat, 2020) are frequent subjects of research. The level of well-being is a significant motivating factor for older people in relation to the use of their employment potential in the labor market (Lakomy, 2019; Axelrad et al., 2020). A key factor in successfully exploiting employment potential of older people in the labor market is their level of education and lifelong development (Hallsten, 2012; Midsundstad & Nielsen, 2019; Groot & Van den Brink, 2000).

Goal and Methodology

Some EU 28 countries have long been at the forefront in exploiting the employment potential of older people in the labor market, while others are occupying the last places. The aim of the article is to evaluate the development of employment potential value of older people in the EU 28 countries in the years 2008-2018. The methods used to achieve the goal are literature review, induction, deduction, comparison and EPV. The EPV is created on four factors: employment, health, well-being and education. The employment factor is formed by the employment indicator of older people 65+, the health factor is formed by the indicators healthy life years at age 65 and life expectancy at age 65, the well-being factor is formed by indicators median income 65+, no poverty risk 65+, no severe material deprivation 65+, the education factor is formed by the indicators educational attainment 55-74 and lifelong learning 55-74. The EPV is calculated according to the formula (1) and subsequently determines the ranking in the EU 28 countries.

$$EPV = a + b + c + d + e + f + g + h \quad (1)$$

where, EPV = employment potential value, a = employment of older people 65+, b = healthy life years at age 65, c = life expectancy at age 65, d = relative median income 65+, e = no poverty risk 65+, f = no severe material deprivation 65+, g = educational attainment 55-74, h = lifelong learning 55-74.

Findings

The results offer an insight into two facts measured by EPV. The evaluation of the results is focused on the characterization of the values and ranking of EPV according to the years in Table 1 and on the reasons for the growth and decline of the ranking of selected countries. The description is focused on the ranking of the first three countries, the last place, especially the countries of the Visegrad Group (V4) with regard to the mutual comparison of the development in this region and the EU 28 average.

In the first year 2008, Denmark was in the first place with the value of 386.9, followed by Germany (386.5) and Sweden (384.5). Bulgaria was last at 271.9 points. The V4 countries were ranked as follows: the fourth was the Czech Republic (383.0), the tenth was Poland (367.6), the twelfth was Hungary (364.7) and the fourteenth was Slovakia (355.0). The EU 28 average was 346.1 points.

In 2010, Luxembourg was in the first place (400.9), followed by Sweden (393.4) and Germany (392.6), while Bulgaria (283.0) was the last. Of the V4 countries in the overall ranking, the fourth Czech Republic (392.2), the thirteenth Poland (371.3) fell by three places, the fourteenth Hungary (370.1) also fell by two places and the fifteenth Slovakia (367.9) fell by one position. The EU 28 average rose to 359.9 points.

In the following year 2012, Luxembourg (403.9) was again in the first place, followed by Denmark (398.0) and the Czech Republic (394.1). The order is closed by Bulgaria (296.7), which did not detach from the last place. The V4 countries from among the EU 28 countries occupied the following places: the third Czech Republic mentioned above, the twelfth Poland

(378.7) jumped up one level, the fourteenth Slovakia (369.6) overtook the sixteenth Hungary (366.0). The EU 28 average continued to grow to 365.9 points.

In 2014, the order of the first places was changed. Sweden was the first (411.5), Luxembourg was the second (407.3), Denmark (404.7) was the third and Bulgaria (327.9) was the last. The V4 countries won the following positions: the Czech Republic fell to the fifth (397.8), Poland (393.8) rose to the eighth, Slovakia (384.0) jumped to the thirteenth and Hungary (377.3) rose to the fourteenth. The EU-28 average, of course, rose further to 373.6 points.

In 2016, Sweden (408.0) remained in the first place, followed by Austria (404.2), which jumped four places compared to 2014, Denmark was the third (402.0) and Malta came down the last (326.8). There was a reversal in the V4 countries. That time the best was the sixth Poland (398.2), then the seventh Czech Republic (397.8), both the tenth Slovakia (390.9) and the twelfth Hungary (388.5) improved. The EU 28 average (376.2) continued to grow steadily.

In the last monitored year 2018, Sweden remained in the first place for the third time in a row (417.2), followed by Finland (404.0), which was thirteenth (363.0) in 2008, and France (403.8) in the third place. Malta (329.5) was the last. Development in the V4 countries was as follows: the seventh Poland (396.1) fell by one place, the ninth Slovakia (394.1) and the tenth Hungary (393.4) both grew and the twelfth Czech Republic (391.9) recorded the largest decline. The EU 28 average (377.1) grew only minimally.

Throughout the period under review, Finland recorded the most significant growth of 11 places in the ranking from the thirteenth position in 2008 to the second position in 2018. The most probable reason based on the selected indicators for

Finland was a significant increase in the educational attainment indicators 55-74 +18.6 points and relative median income 65+ +9.8 points between 2008-2018. France had a similar increase in the EPV by 9 places in the ranking from the twelfth position in 2010 to the third place in 2018, which caused an increase in the indicators educational attainment 55-74 +15.6 points and lifelong learning 55-74 +7.9 points. Estonia recorded the largest drop in the ranking in the period under review, when it moved from the eleventh place in 2010 to the twenty-first place in 2018, which caused a decrease in the relative median income indicators 65+ of -4.9 points and no poverty risk 65+ -10.9 points in the observed period. Luxembourg recorded a drop of 10 positions, from the first place in 2010 to the eleventh place in 2018, which on the one hand caused the unavailability of data for the indicator employment 65+ in 2008, 2016 and 2018, but at the same time there is a negative development in the indicators healthy life years at age 65 by -2.2 points and no poverty risk 65+ -5.1 points for the observed period.

The V4 countries had a heterogeneous development of the EPV. The Czech Republic has the biggest decline by 9 places, when in 2012 it was in the third place among the EU 28 and in 2018 it fell to the twelfth place, which caused a decrease in the indicators of relative median income 65+ -4.7 points and no poverty risk 65+ -2.7 points between the beginning and at the end of the reference period. The other three countries advanced higher in the EPV. Poland by 7 places due to a significant increase in the indicators no severe material deprivation 65+ +15.8 points and educational attainment 55-74 +16.2 points. Slovakia advanced in the ranking thanks to the growth of the indicators relative median income 65+ +10.9 points and educational attainment 55-74 +13.1 points. Hungary grew by 6 places, mainly due to the indicator of educational attainment 55-74 +21.4 points.

Table 1: Values and ranking of employment potential value of older people in the EU 28 countries

Country	2008		2010		2012		2014		2016		2018	
	V	R	V	R	V	R	V	R	V	R	V	R
Belgium	342,3	17	347,1	19	350,4	20	358,7	19	361,2	19	369,2	16
Bulgaria	271,9	28	283,0	28	296,7	28	327,9	28	334,3	27	332,4	27
Czechia	383,0	4	392,2	4	394,1	3	397,8	5	397,8	7	391,9	12
Denmark	386,9	1	390,0	5	398,0	2	404,7	3	402,0	3	399,9	5
Germany	386,5	2	392,6	3	391,2	5	394,7	7	396,9	8	398,1	6
Estonia	349,0	15	376,6	11	379,9	11	367,6	16	366,9	16	355,3	22
Ireland	347,0	16	363,9	17	366,2	15	374,6	15	376,3	15	390,3	13
Greece	322,8	21	328,4	24	346,5	22	348,4	25	354,7	22	359,2	20
Spain	324,8	20	337,8	20	353,3	19	360,8	18	363,3	17	359,7	19
France	371,0	8	375,0	12	383,5	9	398,5	4	400,8	5	403,8	3
Croatia	319,0	22	329,4	23	343,5	24	349,1	23	344,5	25	343,3	24
Italy	329,8	19	333,5	22	344,1	23	357,5	20	361,1	20	367,7	17
Cyprus	307,3	25	325,3	25	337,1	26	348,9	24	362,9	18	365,9	18
Latvia	292,4	27	349,1	18	359,5	17	352,8	21	344,5	24	339,4	26
Lithuania	331,3	18	364,5	16	357,1	18	365,9	17	359,9	21	355,9	21
Luxembourg	380,4	5	400,9	1	403,5	1	407,3	2	390,2	11	392,7	11
Hungary	364,7	12	370,1	14	366,0	16	377,3	14	388,5	12	393,4	10
Malta	302,5	26	321,1	26	321,5	27	328,4	27	326,8	28	329,5	28
Netherlands	378,5	6	383,1	7	387,3	7	393,1	9	386,8	13	384,4	15
Austria	374,6	7	385,7	6	391,7	4	396,3	6	404,2	2	401,4	4
Poland	367,6	10	371,3	13	378,7	12	393,8	8	398,2	6	396,1	7
Portugal	314,9	23	317,9	27	339,1	25	334,3	26	336,8	26	340,7	25
Romania	313,6	24	336,8	21	348,6	21	349,6	22	353,5	23	352,7	23
Slovenia	369,8	9	376,7	10	378,2	13	386,8	12	385,2	14	384,5	14
Slovakia	355,0	14	367,9	15	369,6	14	384,0	13	390,9	10	394,1	9
Finland	363,0	13	377,9	9	383,2	10	392,4	10	401,6	4	404,0	2
Sweden	384,5	3	393,4	2	384,0	8	411,5	1	408,0	1	417,2	1
United Kingdom	366,8	11	378,2	8	390,9	6	390,7	11	393,7	9	395,1	8
EU 28	346,1	-	359,9	-	365,9	-	373,6	-	376,2	-	377,1	-

Source: Own calculations based on data from UNECE (2020) and Eurostat (2021a, 2021b, 2022)

V - Value R - Ranking

Discussion

We consider the findings and reasons for the growth and decline of selected countries in the EPV to be the most interesting. A common and strong indicator of the EPV's growth in Finland, France, Poland, Slovakia and Hungary was the education factor of older people, supported by

studies showing an increased job retention rate and a willingness to prolong older people's working lives as a result of upgrading qualifications (cf. Midtsundstad & Nielsen, 2019). Estonia, the Czech Republic and Luxembourg fell in the EPV due to reduced well-being rates, due to lower incomes and a higher risk of poverty. Nevertheless, the employment

rate of older people in Estonia and the Czech Republic increased slightly. We can therefore assume that the level of well-being remains an ambivalent motivating factor for the use of employment potential of older people in the labor market (cf. Lakomy, 2019). It cannot be said that focusing on education and promoting lifelong development has the most important and clearly the most important impact on using the employment potential of older people in the labor market, because as we see by EPV indicators, it is a complex matter, but those countries that invested in education of citizens, can monitor the positive impact and benefits in relation to an aging population and thus minimize undesirable phenomena in other areas, such as problems with the unemployment of older people due to insufficient qualifications. Progress in one area can have a positive effect in another one, for example in increasing health or well-being levels.

Conclusion

The use of the employment potential of older people in the labor market in the EU 28 countries increased in the years 2008-2018 according to the values of factors in the EPV. The ranking of countries was often changed significantly, but some countries, especially those at low ranks such as Bulgaria and Malta, remained in the same positions. The V4 countries had a dichotomous development: Poland, Slovakia and Hungary rose in the rankings, while the Czech Republic fell sharply from high position. Some countries had a

significant growth in the EPV. The common denominator above all the growth is the education factor. The most significant jumper was Finland, which advanced eleven positions from the thirteenth position in 2008 to the second position in 2018. The main reason was the increase in the education factor, specifically in the educational attainment ratio of 55-74 + 18.6 points. Estonia had the largest decline in rankings, mainly due to a decline in the level of well-being indicators in the relative median income 65+ of -4.9 points and no poverty risk 65+ of -10.9 points in the period under review. The education factor seems to play a key role in using the employment potential of older people in the labor market, while the well-being factor seems to be dragging down the employment potential value of older people. As the development of EPV had a declining trend in some countries as early as 2018, we can assume that it will continue in the coming years. However, the expected development of the EPV in the European Union countries in the near future is unclear and it is very difficult to predict it, mainly due to a several-year pandemic, economic recession, inflation, war near the European area and massive immigration.

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THE IMPORTANCE AND IMPLEMENTATION OF INFORMATION AND COMMUNICATION TECHNOLOGIES

Alena BAŠOVÁ

Abstract

The aim of the article is to point out the need to introduce innovations, digitization and new advanced technologies in the so quickly developed enterprises. We want to define the assess the use of information and communication technologies in the Slovak industrial sector, as well as the implementation of ICT in production processes. This trend has the huge impact on the development of enterprises, countries and ultimately the entire world economy. In the final practise part of our paper, we implement our knowledges to Slovak industry and evaluate the level of their use. In this paper we have used a several scientific methods. Starting with collecting information, especially from scientific works from both, foreign and home authors, too. Subsequently, we have sorted them into individual chapters. From the scientific methods we used mainly paired methods as induction and deduction, analysis and synthesis. We used graphical and mathematical methods, which are mainly used for the clearer presentation of our results in the chart.

Key words:

Information and communication technologies, industry, Internet of Things, Big Data, digitalization, electronic communication, benefits

JEL Classification: D47, L22, L51, M15, M21

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Introduction

In the modern world, information and communication technologies are becoming an integral part of everyday life, as well as it is therefore essential for any company that wants to find its place in the market to introduce new and new technologies into its processes and thus adapt to the rapid change in the world. (Alter, S.:2005)

The first important notions are data, which have a certain arrangement reflecting reality, but are meaningless in themselves. We know structured data, which are arranged in a certain structure, i.e. a database; unstructured data, whose structure cannot be defined and the computer system is not able to evaluate the data without the help of a human; or semi-structured, in which we can only identify a simple structure. Information can be understood as data that is processed for a purpose and has some importance to the user. (Feather, J. – Sturges, P.,2003) The information system is used to collect data, store it and provide relevant information to the users of the system in carrying out their work. (hereinafter IS) Nowadays this is mainly computers, but in the past the most widely used medium was paper. (Alter, S.,2005)

O'Brien defined an IS as an organised combination of people, technical resources - hardware, software, communication technologies, data, rules, procedures and standards, with the aim of capturing, storing, processing, disseminating and using information. (O'Brien, J.- Marakas, G.,2008)

The electronic IS enables the automation of many activities, thus relieving the burden the human workforce. It also opens the door to the processing of databases with large amounts of data, such as the Internet of Things (hereinafter IoT) or Big Data.

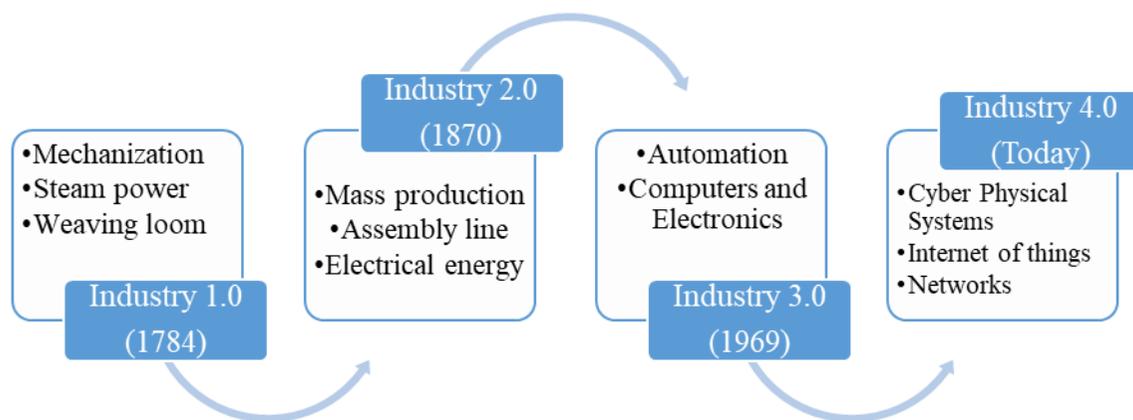
The results of which can then be used by enterprises to make decisions on, for example pricing and finding of gaps in the market, marketing tactics, etc. However, the human factor is still very necessary for the functioning of IS in the enterprise, e.g. for inputting data and evaluation of obtained data. In addition, people are the bearers of personal experience and knowledge, which are necessary in workflows. All these elements created the IS make it an effective whole to support the management and operation of the organisation.

1. First steps of implementation ICT

Scientific and technological change is driving economic progress throughout the world economy. They have been the catalyst for the dynamic growth of international trade, which was driven by the effects of globalisation. The main milestones that have fundamentally changed the

way the world works are the industrial revolutions, which led to the fulfilment of the human desire for develop. This has caused to major inventions in world society that have changed working conditions and people's lifestyles. These changes we can see in the diagram, where is shortly explained the industrial revolutions, which went through four phases.

Diagram 1: Genesis of the Industrial Revolutions



Source: Own processing according to Aberdeen Group (2017)(<http://www.aberdeen.com/>)

Digitisation is the use of digital technologies to change the business models and provide new opportunities to generate new sources of income. It is the process of moving towards digital commerce. Digitization is a modern trend that began to develop in the 1980s when the first home, personal computers (hereinafter PC) were introduced to consumer markets. In the twenty-first century, digitalisation is constantly changing society, our everyday life, culture as a whole, information and communication technologies, industrial and commercial activities of enterprises, activities of banks, media, competitiveness and level of education. Digitalization is an opportunity for companies and organizations to improve their business activities, their competitiveness in the market and

to reduce their costs, thus avoiding risks. (Brem A., Viardot E.,2017).

The Fourth Industrial Revolution began to evolve at the beginning of the 21st century, due it's the main factor its was spread the of the Internet and digitalization. This process began developed in Germany and has evolved in a planned manner, with great support of the German government, which analysed the impacts of new technologies on the country's economy.

Its basis is the real-time interconnection of devices, components and people through complex networks which, in cooperation with other technologies such as intelligent robots, huge amounts of data and elements of artificial intelligence, will create a production process with the ability to self-organise and it will be a system

with decentralised control and autonomous decision-making. Digitalisation with using all its functions, can bring revenue growth of up to 30-40%.

(<https://www.machinemetrics.com/blog/industry-4-0-advantages-and-disadvantages>)

2. Application of information and communication technologies in industry

Industry is a crucial sector of the world economy, as the modernisation of industrial production determines the development of the whole economy and ultimately of the whole society. Since its beginnings, it has strongly influenced all other sectors, especially the development of transport, agriculture, construction, energy and trade. This phenomenon is still being observed today. Industry can also be called the “engine” of economic growth, as it is key to all advanced economies, although the trend in the most developed countries is now more towards the tertiary sector.

(<https://www.economicshelp.org/tertiary-service-sector/>)

Industry is included in the secondary sector of the economy, sometimes referred to as the manufacturing or processing sector. It includes all sectors of human activity that transform the raw materials into semi products, products or goods. These may be goods destined for final consumers, or products and materials for further used in another production process.

Industrial production in Slovakia has played an important role in the Slovak economy for many years. The most important sector is the automotive industry, which contributes significantly to the GDP and employment in the country. On the second place is the production and processing of metals and the third place belongs to the production of electronic and optical products. In 2020, the industrial sector was significantly affected by the Covid-19 pandemic. Their production was limited due to strict pandemic measures and they had to adapt on material supply disruptions or staff absenteeism. Before the pandemic were digitisation, innovation and the implementation of modern technologies into production processes important part of the industrial sector.

In our paper we can use data from the Slovak Statistical Office, according to SK NACE, belong to section C - Industrial production, which includes divisions 10 - 33.

The basic industries include engineering, automotive, electrical, chemical, energy, metallurgical, construction, food, glass and textile. The modern methods used in the industry mainly include electronic communication, Enterprise Resource Planning (hereafter ERP), Just-in-time (hereafter JIT), Production Part Approval Process (hereafter PPAP), Measurement System Analysis (hereafter MSA) and many others.

Electronic communication (hereinafter EC) is a technology that enables fast and efficient communication throughout the whole supply chain. But another processing is required here using Enterprise Resource Planning, which is an intra-corporate software information system used to manage and coordinate all company resources. It is used for internal company processes, i.e. those in which external suppliers are not involved. It can be used in the areas of production, internal logistics, human resources and economics, with the possibility of selecting additional sub-modules from each area according to the needs of the company. If external processes need to be supported, extended ERP can be used, which also includes supply chain and customer relationship management. (Crandall, W. (2015.)

The Just in Time process was created in Japan, where it applies from the 1970 s. Its essence is the delivery of material directly to the installation line at a precise time and quantity. It is very important because the individual parts are arranged in the order in which they are scheduled for assembly. The main advantage is minimising storage costs, saving time and reducing the cost material, due it is purchased in accordance with need. On the other hand, a major disadvantage is the potential for accidents or closures, which can almost immediately have a negative impact on the continuity of the delivery cycle and thus the entire production process.

(<https://www.ifm.eng.cam.ac.uk/research/dstools/jit-just-in-time-manufacturing/>)

The Production Part Approval Process method is used to approve parts used in production, helping to reduce the risks of production failure and ensure a smoother production process. It is used

to demonstrate that the company correctly understands all the requirements of the product design documentation and all customer specifications and is able to produce the product in compliance with demands of customers. (<https://www.ideagen.com/thought-leadership/blog/what-is-ppap-and-why-is-it-important>)

Measurement System Analysis includes several of procedures, which serve as gauge in the production process. This access serves also as complex measurement system in a production process. The method focuses on the analysis of sources of uncertainty in the whole produce process, as it assumes that it is not sufficient to have only an accurate system for prevent because the external factors may also have an influence. Therefore, it is evaluated the measurement system as a whole, thus avoiding unnecessary loss of time, human capital and to generate waste. (<https://quality-one.com/msa/>)

Among the main IT advantages of Industry 4.0 include the flexibility of production processes, which, thanks to modern technologies, can quickly adapt to market requirements and thus respond more flexibly to customer requirements. It leads to a more efficient division of resources and materials, which the implement is more environmentally friendly processes and procedures, which will also lead to a reduction of the production costs. This change requires new business models. This also leads to the creation of new job positions such as data analysts, digital experts and engineers. As the final impacts of all the above factors will lead to higher living standards in countries, which should mainly benefit their citizens.

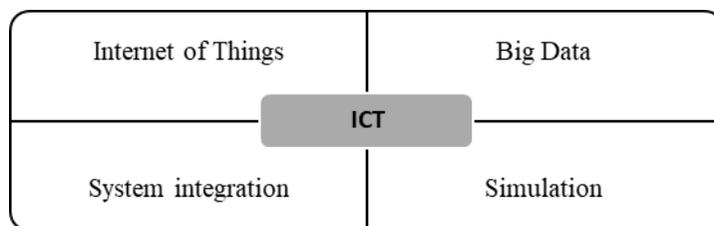
As we can expect, this new process will also bring many disadvantages. Among the main ones belong the lack of financial resources, because the development of sophisticated systems and robots are very costly. Also, a large amount of time will be needed to adapt factories and companies to the new technologies and processes. Another significant disadvantage is to secure highly educated people for new jobs. It is leading to the loss of many working positions for workers with less education, who's will be replaced by robots. <https://www.machinometrics.com/blog/industry-4-0-advantages-and-disadvantages>.

3. Introducing selected Information and Communication Technologies

Industry 4.0 brings with it many changes for enterprises, because they need to adapt to in order to remain viable in the market. For smaller ones is this process of implementing ICT systems seem easier, because it is usually covering a smaller area, but they have often problems with obtaining financial source. Here we can also see the need for the state, which is an important component in promoting investment in the country, especially in the industrial sector. “Smart” industry will move to developed countries for example to USA, France, Germany. ICT will benefit from rising productivity and reduction of costs and will required skilled workers. (Gilchrist, A.2016)

On the other hand, for larger enterprises, it requires a more complex and involved process and these changes will require the adaptation of infrastructure to more modern technologies. They also expect higher profits and the return of their investments.

Diagram 2: Selected elements of ICT



Source: *Own processing according to: Gilchrist, A.:(2016) Industry 4.0: The Industrial Internet of Things. Berkley: Apress, 2016. p.. 219-222. ISBN 978-1-4842-2046-7.*

Technology became an integral part of our lives a few years ago and it is almost certain that its influence will continue to grow significantly. They create the essence of the whole Industry 4.0 and will therefore be discussed in more depth in next part of paper.

Internet of Things

The Internet of Things (hereafter IoT) is the term most associated with the 4th Industrial Revolution. The British scientist Kevin Ashton was the first to come up with the concept of IoT in 1999. He was the first whom define it from an industrial perspective and he saw its huge potential. At the end of the 20th century, he saw computers as "brains without senses", because they only worked and analysed with data that people "give" them for processing. Based this knowledge the IoT is emerging, making computers much more sensitive and able to handle information without much human cooperation. IoT can be defined as a system of interconnected devices (mostly wirelessly) that are equipped with sensors. These are able collect

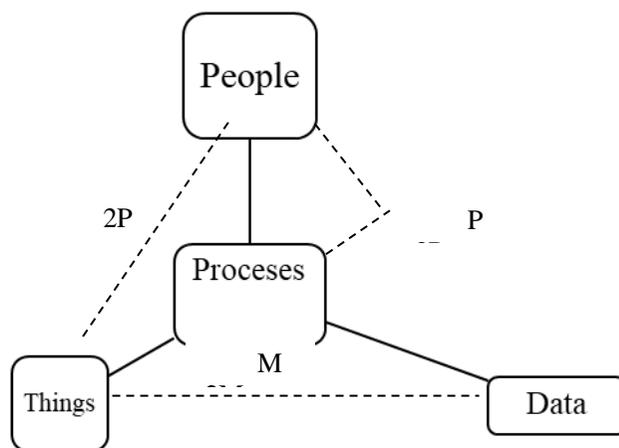
5.

data from surrounding the world around them and communicating with other "smart" devices, thus interconnecting with each other and forming an intelligent network where human intervention is not necessary. (Kramp, T.–Kranenburg, R. – Lange, S. 2013)

IoT creates four basic elements that make up the whole IoT. These are:

1. Things - for IoT to work accurately, they must be connected so that they can communicate. This can be either wired or wireless communication.
2. Data - every second new and new data are created that requires further processing, storage and analysis.
3. People - they are also an important component as they make decisions based on the data they receive.
4. Processes - take place between people, things and data.

Diagram 2: Relations among elements of IoT

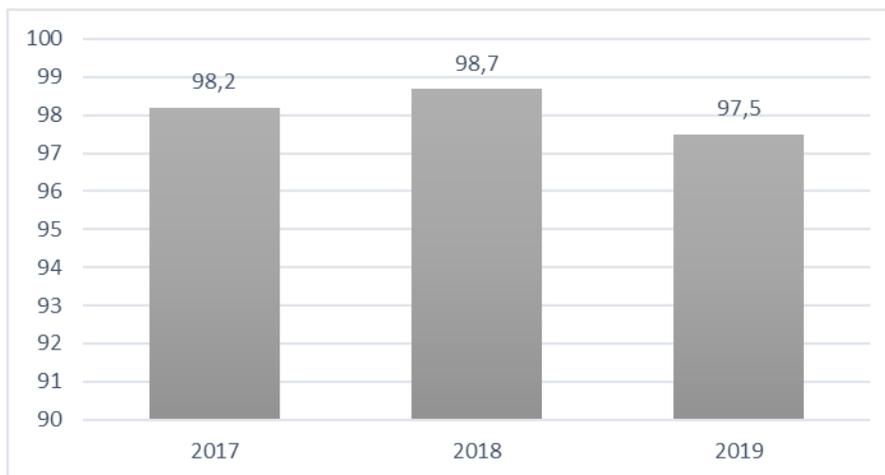


Source: own processing according: Tzafestas, S.:(2018) *Ethics and Law in the Internet of Things World*. In *Smart Cities*. 2018, p. 99. Available at: <https://www.mdpi.com/2624-6511/1/1/6>

Nowadays, concepts such as the computer and the internet have become an integral part of the modern and digitised world, and it is hard to imagine society functioning without their everyday presence. In Chart 1, we can see how the use of computers and computer networks has

evolved in Slovak industry from 2017 to 2019. It can be said that this is not a very dramatic development. There is only a 0.5 percentage point difference between the first and second year under review. Subsequently, in 2019 we observe a slight decline of 1.2 percentage points.

Chart 1: Use of computers and computer networks 2017-2019

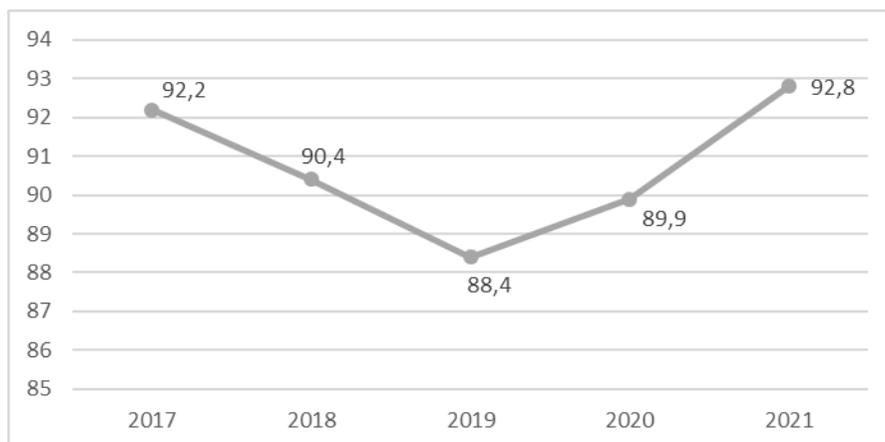


Source: own processing according data of Slovak Statistical Office

The second essential aspect in today's modern industry is the ability to connect to the internet. Its most important role is to connect devices, materials and products – mean physical reality

with virtual reality. The rise of digitalisation is leading enterprises to choose the appropriate form of internet connection, which is currently broadband. Its use can be seen in chart 2.

Chart 2: Broadband internet usage 2017-2021



Source: own processing according data of Slovak Statistical Office

In 2017, 92.2% of enterprises belonging to the industrial production sector used this type of internet connection. In 2018 and 2019, we observe a sharp decline, with the number of enterprises using internet was falling to only 88.4%. Gradually, during 2020 and 2021, this share will increase again to 92.8%. This positive

development was the result of the strict Covid - 19 measures. Online relations between businesses and customers, but also between businesses and each other, also developed positively.

Digital technology has a significant impact on changing the behaviour of businesses and

consumers, because ensure them to have direct contact via the internet, thereby reducing their costs. This digitalisation wave is also characterised by the creation of new jobs in the production, distribution and management of the digital industry, which create new relations as M2M, P2P or P2M models. (Brynjolfsson. E.,-Mcafee A. (2014)

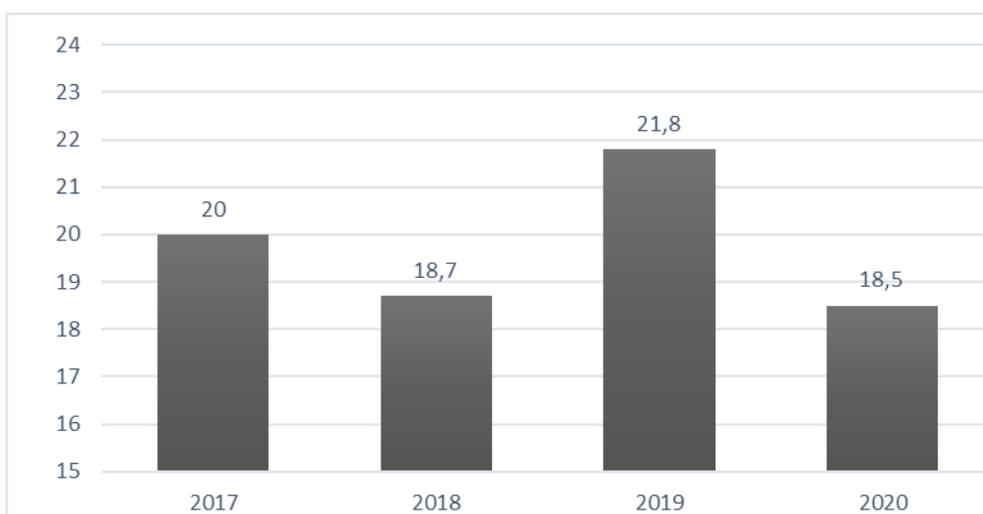
The concept of Machine-to-Machine (hereinafter M2M) is a process where two or more devices communicate with each other, i.e. they exchange the processed data on the basis of which they further perform the given activities. Nowadays, most of the time, at least minimal human involvement is required. M2M communication can be divided into wired, where devices are connected by cable. This form is becoming rarer. But most popular is wireless communication. In this case, devices are connected for example via Wi-Fi or Cellular Network (this includes 3G, 4G and more recently 5G network. <https://control.com/technical-articles/what-is-machine-to-machine-communication-m2m/>

The concept of People-to-People (hereafter P2P) includes communication between people within an enterprise, supply or customer chain, necessary

to secure all processes. It is about accepting different types of decisions (managerial, production) based on the data collected and subsequently analysed. A third concept that is associated with this issue is People-to-Machines communication (hereafter P2M), which means the allocation of tasks by people towards devices and machines, while at the same time the providing of the data by people. The interconnections between the different elements, together with the aforementioned types of communication between them. (Tzafestas, S.2018).

The high level of digitalisation in enterprises creates places for new jobs, namely for ICT specialists. They are trained professionals who are able to maintain, operate and develop ICT technologies and the whole systems. It is important to continuously educated, advance their skills and have learned the new trends. Such workers on the Slovak labour market, are missed because most of them leave for more interesting job offers abroad. Here arises a significant problem for companies, but also for Slovakia as a whole, which should not be ignored - the lack of a workforce to take care of the digital revolution already underway in our country. These negative trends are showed on next chart.

Chart 3: Employment of ICT specialists in 2017-2020



Source: own processing according data of Slovak Statistical Office

In Chart 3 we can see how many industrial enterprises employed ICT specialists in 2017-2020. The highest share - of 21.8% of businesses was reached in 2019, while in 2020 we saw a rapid decline of 3.3 percentage points.

The Internet of Things is an integral part of a future, because “things” will become active participants in business, information and social processes. In 2025 it is predicted that up to 21 billion devices will ability belong into the "smart" category. They will have the ability to connect to a network and interact with each other without human interaction. We will see increasing use of smart devices in both the manufacturing and service sectors. As can be expected, the interconnectedness of “everything” will bring many benefits, but also bring various risks, such as attacks by hackers trying to access sensitive data. This led the European Union in 2018 to implement the General Data Protection Regulation (hereafter GDPR), which should ensure a higher degree of data protection on the internet. <https://us.norton.com/internetsecurity-iot-5-predictions-for-the-future-of-iot.html>

In the twenty-first century, digitalisation is constantly changing society, our daily lives, culture and information and communication technologies enter to industrial and commercial activities of enterprises, banking, media, competitiveness and education. In the literature, we can also meet with the terms "digital disruption", "digital revolution", "digital storm" which are associated with a large and diversified database. This fact leads companies, which to use of modern technologies in processing amounts of data, which has led to the involving new term **Big Data**. (in diagram 2)

If Data are correctly processed and analysed, we can be used them to optimise products, identify where the production process is failing the most, to prevent anomalies and product defects. Big Data make able to take full advantage of new opportunities and ultimately enable "smart" decisions to be made. (Davenport, T.– Barth, P.– Bean, R.:(2012)

Another important part of ICT is **simulation** (in diagram 2), which allows to predict the production process. It is a software tool that allows to detect the dynamic behaviour of a production system where static calculations cannot be implemented or would not produce a

usable result. Using simulation can be complicated processes that would take weeks or months, but on a computer are made in few minutes. It is an ideal tool for decision-making at different levels of a company. It has found its use in testing and modelling new processes, helping to detect potential errors early and thus speeding up the implementation of new and improved processes in the enterprise. (Bali, V. 2021)

System integration means the effective interconnection of specialised IT systems into a single functional unit and to them of the common organisation. The aim is to create a network of systems, both in-company and those from outside the company, which are closely interconnected and are able to communicate with each other and thus accelerate the process of exchanging necessary information. There are two types of system integration: vertical and horizontal. Vertical integration involves a network of a large number of smaller subsystems in an enterprise that are hierarchically arranged. This integration leads to the emergence of intelligent facilities that are able to communicate with each other rapidly and to exchange large amounts of data. Horizontal integration, on the other hand, is not just about communication within a single enterprise, but about collaboration between multiple organisations. It involves the exchange of information between suppliers, customers and service providers, ensuring the smooth running of the entire production process. (Sony, M. (2018)

4. Evaluation ICT in Slovak industry

In this part of the article we present the practical application of selected information and communication technologies in the Slovak industrial sector. We use available data from the Slovak Statistical Office. As the statistical unit we chose a unit the enterprises which, according to SK NACE, belong to section C - Industrial production, which includes divisions 10 - 33. Due to the limited volume of data we can work with the selected ICT.

Internet of Things and robotics

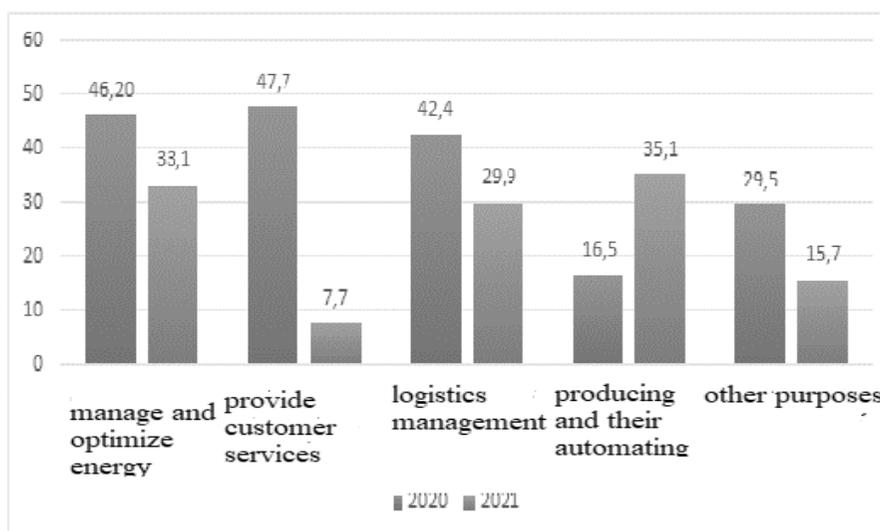
With the help of the Internet of Things are the individual devices, processes and workers are connected. This is one of the most important innovations, which can improve the operation of a business, optimise and automate individual processes, thereby reducing operating costs,

minimising downtime and improving the overall quality of output.

Only 18.2% of industrial enterprises were using IoT in 2020, and this share has almost doubled to 30.7% of enterprises in 2021. In the chart below, we can see a comparison of how IoT is being used in the industrial manufacturing sector. Overall, it can be observed, that the trend tends to decrease. IoT was mainly used for manage and optimize energy consumption in 46.2% of

enterprises in 2020, and the share dropped to 33.1% in 2021. To provide customer service with of smart cameras to monitor customer activity, 47.7% in 2020, but only 7.7% of businesses in 2021. For logistics management was used in 42.4% of enterprises, but in 2021 it dropped to 29.9%. For producing and their automating, IoT was used in only 16.5% of enterprises in 2020, and then it rises to 35.1%, what is more than doubling. IoT use for other purposes fell by 13.8 percentage points to 15.7% from 29.5%.

Chart 4: Comparison of manner of IoT in 2020 and 2021

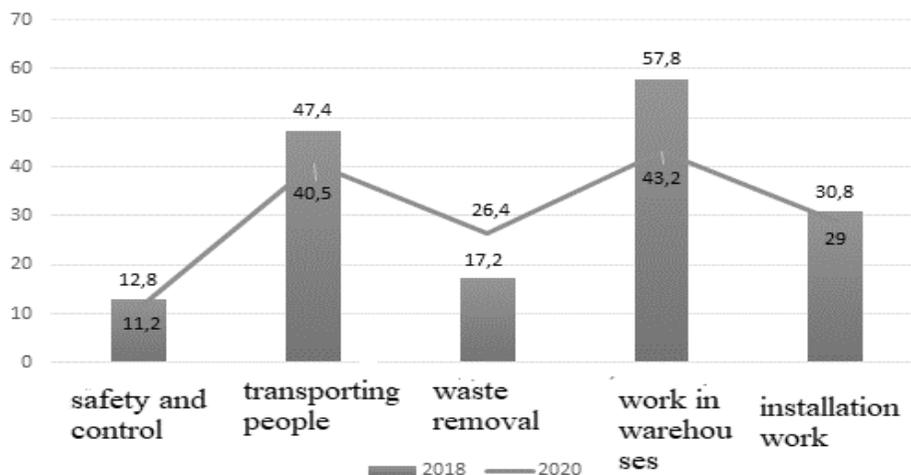


Source: own processing according data of Slovak Statistical Office

The use of robotics is becoming increasingly popular in industrial enterprises, due intelligent and autonomous robots can significantly change an ease monotonous and strenuous activities, which had been performed by humans. The Internet of Things plays an important role here, as

it ensures communication between robots and data transmission. In the chart 5 we explored the various uses of robotics in industrial enterprises. The data is collected from the enterprises that use robotics.

Chart 5: Comparison of uses of robotics for 2018 and 2020



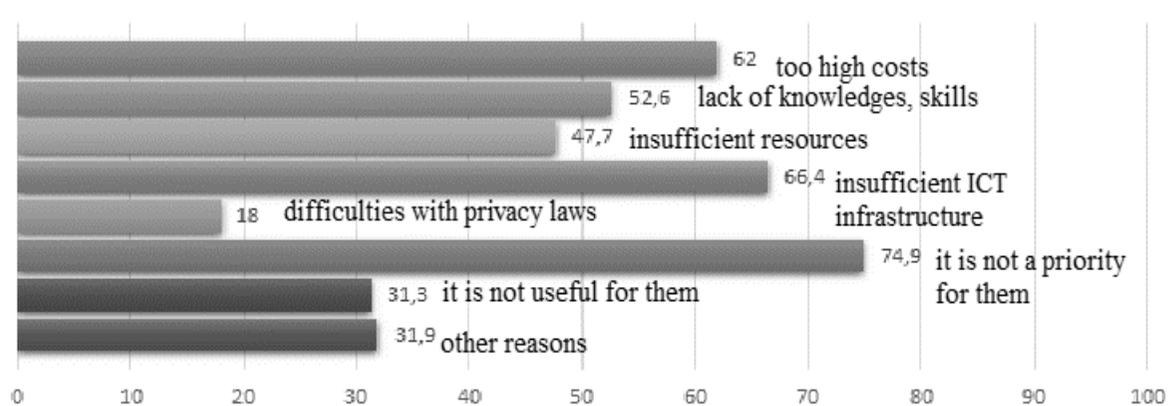
Source: own processing according data of Slovak Statistical Office

Robots, for safety and control, were used by only 12.8% of industrial enterprises in 2018, but it dropped to 11.2% of enterprises in 2020. As more as 47.4% of enterprises used robotics for transporting people and goods, but we see this dropping to 40.5%. In 2018 for cleaning and waste removal, 17.2% in 2020, this rose by 9.2 percentage points to 26.4% of businesses. In 2018, 57.8% of firms used robots for work in warehouses, what declined to 43.2%. For installation work, we see a decrease of 1.8 percentage points year-on-year, from 30,8% to 29%.

Big Data and Cloud computing

As we mentioned above, Big Data represents the huge amounts of data collected from various activities in an enterprise, for example: the production process, financial activities or marketing communications. In Slovakia in 2020, only 3.9% of industrial enterprises were using this modern processing of data. Due this negative fact, the Slovak Statistical Office made a survey with question, why enterprises do not use Big Data. The results were collected from enterprises, which were considering of using this technology.

Chart 6: Reasons for not using Big Data in 2020



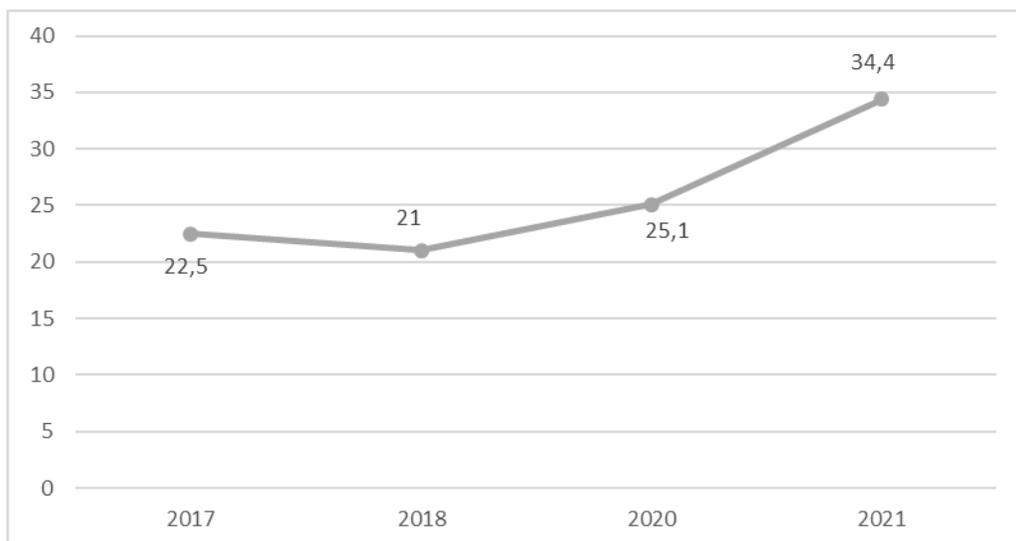
Source: own processing according data of Slovak Statistical Office

As many as 74.9% of analysed enterprises answered, that it is not a priority for them. As the second most common reason was insufficient ICT infrastructure - till 66.4% of enterprises. Closely followed by too high costs for 62% of enterprises. Other important reasons were lack of human resources, knowledge and skills (52.6%), insufficient resources of Big Data (47.7%), difficulties with legal framework with privacy

laws (18%), then other reasons (31.9%), finally it is not useful for the enterprises (31.3%).

The evolution of the use of cloud computing has been monitored in industrial enterprises – how are connected to the Internet. During analysed years, we can see that the development had an increasing trend from 22,5% to 34,4%, with the exception of 2018, when it drops of 1.5 percentage points.

Chart 7: Use of cloud computing in 2017-2021

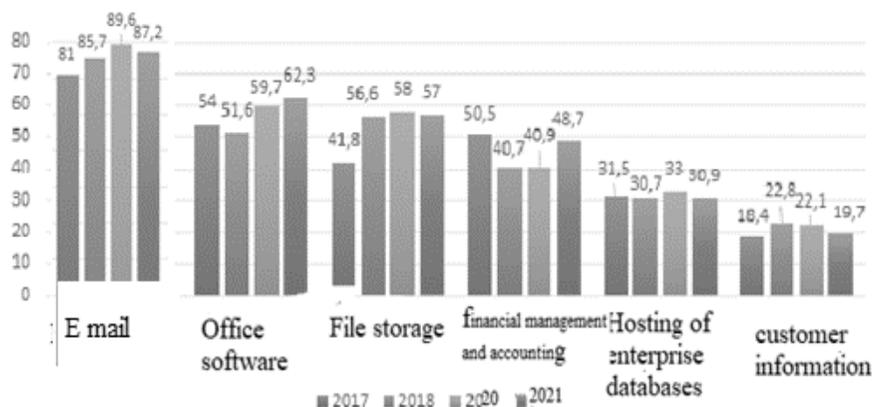


Source: own processing according data of Slovak Statistical Office

The different uses of cloud computing can be seen in chart 8. We can state, that enterprises use it on:

- Email: had positive increasing trend, in 2017 from 87,2% till to 81% and further to 87.2%
- Office software, which in 2017 was used by 54% of businesses, then saw a slight decline of 3.6 percentage points in 2018, but rising to 62.3% of businesses during 2020 and 2021.
- File storage was used by 41.8% of enterprises using cloud computing in 2017. In the next years, the values grew and ended up at 57% in 2021, which is an increase of 15.2 %.
- Software applications for financial management and accounting. For this purpose, in 2017 was used more than 50.5% of businesses. In 2018, we observe a significant drop to 40.7%. Subsequently, the values increase by 7.8 percentage points in 2021, ultimately representing 48.7% of industrial enterprises.
- Hosting of enterprise databases was used approximately 31% of enterprises, then this rose to 33% in 2020 and decreased to 30.9% of enterprises in 2021.
- For storing customer information, had slow increased trend, from only 18,4% with slightly increase to 19,7%.

Chart 8: Using of cloud computing for 2017-2021

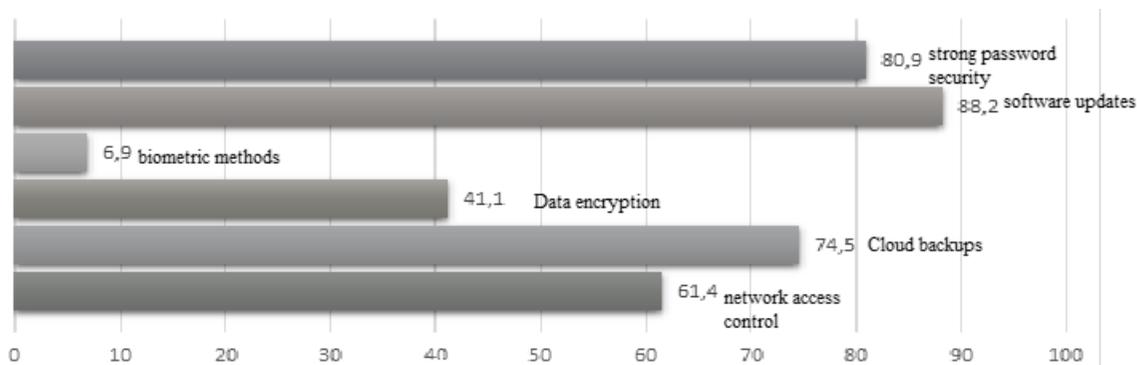


Source: own processing according data of Slovak Statistical Office

Information and communication technologies bring many benefits to the enterprise mainly in their processes, but it should not be forgotten that they also bring potential risks and threats. ICT security means applying various methods,

procedures and measures to ensure their confidentiality, integrity and availability. Without their implementation the ICT could very easily be disrupted due to widespread cyber-attacks and cybercrime.

Chart 9: ICT security measures



Source: own processing according data of Slovak Statistical Office

The chart shows that enterprises use software updates very frequently, with to 88.2% share. A large number of enterprises (80.9%) use strong password security as a protection method. Cloud backups are frequently used to protect data (74.5%). Popular is Data encryption (41.1%) and computer network access control (61.4%), too. User identification through biometric methods was used very little in enterprises (6.9%).

Conclusion

The implementation of ICT in enterprises has a significant impact on economic growth and the progress of society as a whole. The correct information using at the right time and right place creates the basis for an enterprise's ability to compete in the market. The using of ICT improves the management of information and knowledge in the firm, helps to reduce transaction costs and increases the speed of firm to respond to customer demand. The whole society,

especially the industrial sectors, is undergoing significant changes, while the growing use of ICT significantly affecting the development and functioning of the company's environment.

Now the application of ICT in production processes is one of the most important factors in evaluating the competitiveness of a company and, ultimately, the economy of a country as a whole. The rapid development of ICT and its growing importance for society also requires educated economists and managers to understand ICT. They have to make important decisions at all levels of management, leading to the higher efficiency of production and installation processes.

On the other hand, in addition to significant positive effects, the introduction of ICT also brings several disadvantages. These significant

changes have an impact on production enterprises, which have insufficient experiences in using ICT. Another negative aspect is the lack of financial resources needed to build newer and more modern infrastructure. The last, but not least, disadvantage is that enterprises often becoming a victim to cyber-attacks, which are very frequent in the digital sphere.

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PRECARIOUS WORK IN PANDEMIC COVID-19 - WORK STATUS PERSPECTIVE

Katarína HAVIERNIKOVA, Małgorzata OKRĘGLICKA

Abstract

The COVID-19 crisis has caused drastic changes in the labor market in almost every country, increasing job insecurity at various levels, both in terms of employment and the type of contract with the employer, as well as working conditions. Under these conditions, the concept of precarious employment takes on a new meaning. The main aim of this study was to evaluate how the COVID-19 pandemic affected the labor market in the Slovak republic with particular emphasis on changes in the work status in the face of the pandemic crisis. The Descriptive Statistic, Student's t-test, and Chi-square Independence Test was used to evaluate data. The results of the realized analysis showed that the changes in the labor market were significant after April 2020. The stabilization of the rate of unemployment occurred in the summer of 2021. The Slovak Republic has introduced many strict measures to prevent the pandemic's spread, but it has caused a significant increase in unemployment with noticeable differences among Slovaks regions. The results of the questionnaire survey confirmed that in the early phase of the pandemic, job changes began to occur, and the number of home-office job offers increased.

Key words:

labor market, Covid-19, employment, work status

JEL Classification: J21, J41, J81

<https://doi.org/10.52665/ser20220103>

Introduction

The literature on the work status subject indicates that working conditions are of great importance and therefore should be widely represented in research, theory, and business practice (Blustein et al., 2020).

The COVID-19 pandemic has shattered the global economy. The crisis has hit the labor market particularly hard, both in developed and developing countries. COVID-19 has changed the global economic landscape through the rapid transition to long distance working, but also widespread loss or change in job status (Wang et al., 2021). Losing a job or changing employment status has become unprecedented and job insecurity has begun to renew for the majority of employees, both at the level of employment and deteriorating working conditions. In the United States alone, pandemic-related job losses exceed those lost in the Great Recession (Mack et al., 2021). This underlines the importance of changes, the consequences of which will be visible for many years to come.

This paper has been focused to diagnosis and evaluation of selected aspects of precarious work with particular emphasis on changes in the status of work in face to COVID-19 pandemic crisis in the Slovak Republic. The article consists of the following parts: introduction, review of international literature, research methodology, research results, and conclusions.

Literature review

The pandemic crisis has determined many aspects of people's lives around the world. Most countries have taken various measures to counter the pandemic and slow down the distribution of COVID-19, such as blockades, company closures or restrictions, sanitary regulations and social distancing, school closings and mobility tracking, etc. The consequences of the new reality are changes in working life, both in terms of both short-term and long-term nature. Moreover, the impact of the Covid-19 pandemic may result in not only the temporal disappearance of some workplaces and a huge growth in the others, but also in changes in the

status of some occupations and their value proposition (Editorial, 2020).

Occupational mobility, employment levels and job status are closely linked to economic shocks. Economic shocks can be defined as basically a sudden and unpredictable change in the economy that determines all or a significant part of the economic system, including the labor market, in relation to particular sectors and occupational groups. Shocks can lead to positive and negative changes in the labor market (Bennett, 2015), as well as to a rise or fall of various professional groups. Of course, the degree of layoffs, income declines and levels of job insecurity in the Covid-19 era largely depend on government support measures in each country, as well as existing labor laws that ensure the security of the labor market and workers' rights.

The shock of the COVID-19 pandemic, including the deep and sudden economic recession that followed it, has led to complex health, social, fiscal and political crises, severely impacting work, realizing that employment can change dramatically even in environments previously viewed as relatively stable and predictable. The crisis particularly influenced the increase in non-standard and informal workplaces (Ng et al., 2021), where there is no formal protection and benefits that are usually enjoyed by employees with permanent, full-time positions (Gunn et al., 2022). This change intensifies such negative positions on the labor market as: job insecurity, income inadequacy, and the lack of rights and protection (Voßemer, and Eunicke, 2015). In this context, workers may experience negative changes in their employment situation, lower income, as well as unemployment and poverty (Sumner et al., 2020). When focusing on unemployment, it should be noted that it is not only an economic category, as it is of great psychological importance for human life (Wood, Burchell, 2017).

The pandemic crisis caused many changes in the labor market, which in Europe could be described as relatively stable in the previous years. Meanwhile, the pandemic has caused a marked increase in job insecurity in many industries. The concept of "precarious work" took on meaning. In general, precarious

employment refers to any type of job of unsatisfactory quality. Such work includes precarious, less-paid work, work with limited benefits or informal work, and work with no prospects for development (Santilli et al., 2021). Precarious work is also characterized by greater difficulties in formulating personal and professional plans for one's future (Luijckx, Wolbers, 2018).

The concept of precarization of employment is analyzed as a mechanism of employee exclusion in at least one of three areas (Weller, 2011). These include, first, lack of access to labor markets, then all forms of exclusion from work (e.g. unemployment), and finally, restrictions on access to high-quality jobs (e.g. informal, part-time, fixed-term contracts). Sehnbruch et al. (2020) emphasize the problem of precarious work, considering such elements as the level of remuneration, job stability (having a contract by the employee) and employment conditions (social and health insurance as part of the contract, working time) (Señoret et al., 2022).

Precarious work refers to uncertain and insecure work with insufficient wages and limited rights and protection (Allan et al., 2021). Employees are afraid of losing their job, but also of changing job conditions, such as loss of working hours and income, or experiencing abuse and harassment in the workplace (Cubrich, 2020). It is an uncomfortable situation for a large group of employees, with professional, psychological and physical consequences. It is indicated here, inter alia, financial insecurity, occupational hazards and discrimination, career retardation. As a result, unstable work in the Covid-19 era generates difficulties in satisfying basic needs and mental stress in employees at various levels of the organizational structure (Allan, Blustein, 2022). Precarious work is also characterized by greater difficulties in formulating personal and professional plans and projects for one's future (Luijckx, Wolbers, 2018).

Uncertain work is placed at the center of debates on the future of employment, bearing in mind new socio-economic challenges such as globalization, digitization, changes in employer risk or the expectations of a more heterogeneous workforce (Rubery et al., 2018: 510), which

determine change in the labor market towards more flexible work for the employer, but often more precarious work for the employee. The situation even deepened during the Covid-19 pandemic. The tendency is that an increasing share of the labor force, especially young workers, is employed under degraded conditions - in temporary and low-skilled positions, which will determine their professional careers in the long run (Papadakis et al., 2022).

Methodology

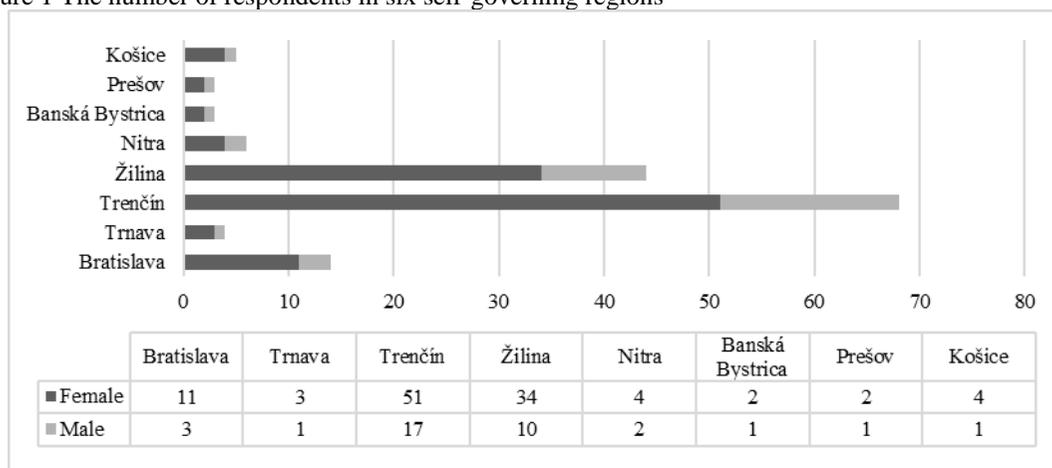
The aim of this study was to evaluate how the COVID-19 pandemic affected the labor market in the Slovak republic with particular emphasis on changes in the status of work in face to pandemic crisis. The study was conducted based on the results of official data of the Statistical office of the Slovak Republic and the results of the preliminary research and pilot test of questionnaire survey related to the research project VEGA No. 1/0718/22 Human resources development in small and medium-

sized enterprises in the context of the 21st century challenges.

The evaluated data in this paper were the rate of unemployment (%), job applicants (persons) and inflow of job vacancies (number). Data were obtained from registries of the Statistical Office of the Slovak Republic and Central Office of Labour, Social Affairs and Family.

Questionnaire survey was conducted one month after the first pandemic measures issued by the Slovak Government (April 2020). Respondents were chosen using the method of random selection and asked by personal to fill out an online questionnaire. In total 150 persons were approached from eight Slovak self-governing region. The total number of received questionnaire was 147 (Figure 1), of which 3 questionnaires were filled in by persons who belonged also to employers. The high number of respondents (46.26%) belonged to Trenčín region. 75,51 % of respondents were woman.

Figure 1 The number of respondents in six self-governing regions



The following claims regarding to aim of this study were formulate:

- C1: The labor market situation in the Slovak Republic was affected by pandemic in the period under review.
- C2: The status of the employees has been maintained in early stages of COVID-19 pandemic.

To confirm or reject the claims, descriptive analysis was used. In the interpretation of the results, the Student’s t-test to check whether there are statistical significance between the mean values of the unemployment rate in each year compared to 2020 was used. And using the Chi-square Independence Test we verified the assumption, that the status of the employees in the context of COVID-19 pandemic measures

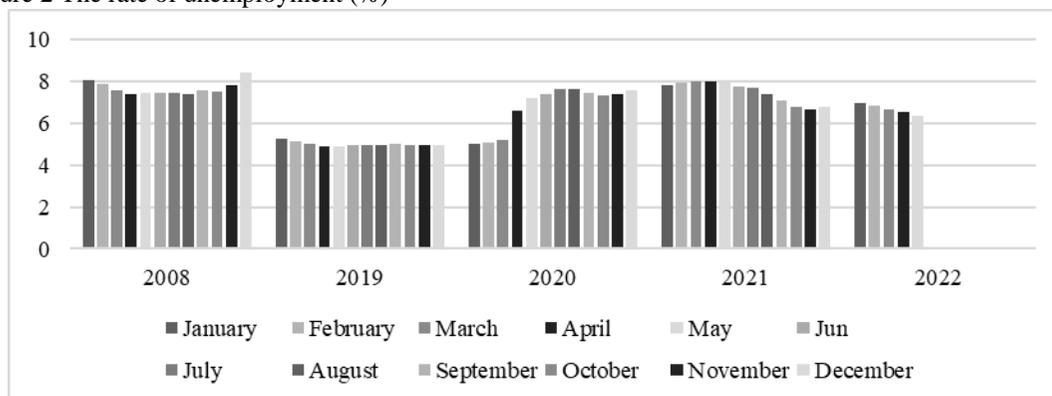
differs among male and female. The hypotheses were tested at the level of significance $\alpha=0.05$.

Results

The COVID-19 pandemic affected all areas of people's lives be it social, political or, above all, economic changes. The Covid -19 pandemic was reflected in a rapid rise in unemployment on the Slovak labor market. The economic development of the Slovak Republic after financial crisis in 2008 similarly as in other countries was stabilized in the following period with the help of various economic instruments, which also had an impact on the development of

unemployment. The average registered unemployment rate in 2008 was 8,39%, while in the following period a decrease was recorded (Figure 2). In January 2019 compared to January 2008, the registered unemployment rate fell by 34,74%. Its rapid increase can be observed only in April 2020, when it rose by 1,38 percentage points compared to the previous month and 1,59 percentage points compared to the January 2020. In the following period it is possible to observe its variable character. The highest level (8,00%) reached in April 2021. The following period was characterized by a decline of this indicator, from 7,92% in May 2021 to 6,35% to May 2022 (Figure 2).

Figure 2 The rate of unemployment (%)



Source: Central Office of Labour, Social Affairs and Family

This development was affected by measures, which the Government of the Slovak Republic adopted. Social distance, radical measures, and closures were ordered, which had a negative impact on the labor market. To protect human resources from contagion, their economic activity was suspended. This also has an adverse effect on the companies, which suffer financially from losing employment, which is directly linked to jobs. People were thus at risk of losing

their current jobs or having their working hours reduced or non-existent. Unemployed citizens have found it much more difficult to find a new job as recruitment has been suspended.

Figure 3 and Figure 4 present the rate of unemployment in April 2020 in comparison with April 2022 in eight self-governing regions. As we can observe, the highest rate of unemployment has been in observed periods in Košice, Prešov, and Banská Bystrica regions.

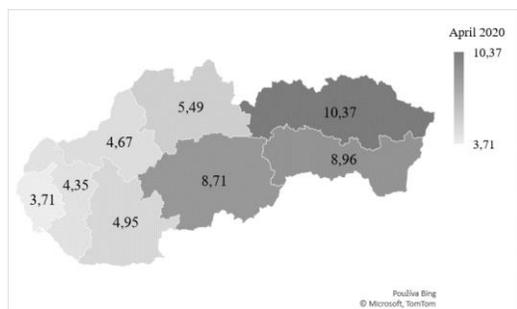


Figure 3 The rate of unemployment (April 2020, %)

Source: Central Office of Labour, Social Affairs and Family

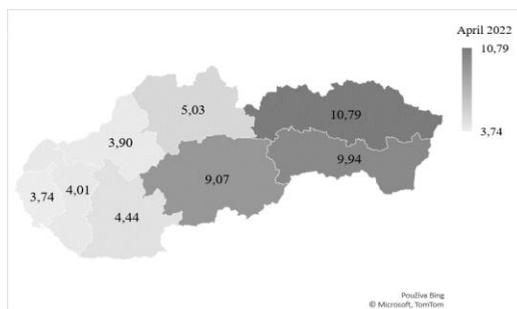


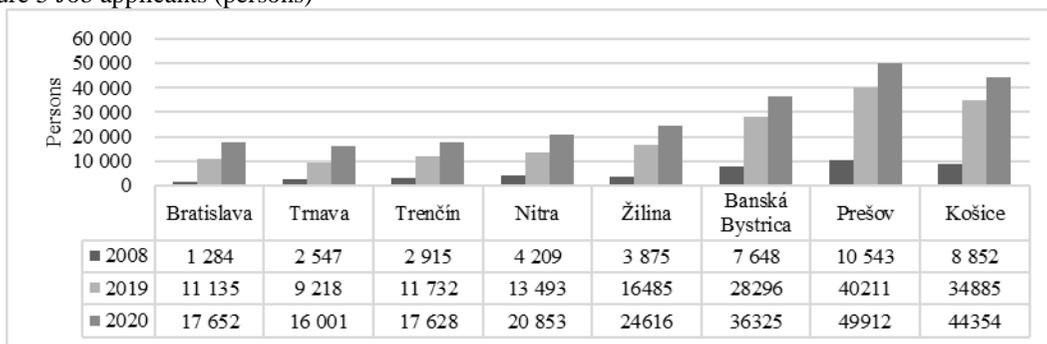
Figure 4 The rate of unemployment (April 2022, %)

Source: Central Office of Labour, Social Affairs and Family

A significant increase in the rate of unemployment is reflected also in an increase in the number of job applicants as we can see in Figure 5. Between years 2019 and 2020, the

number of job applicants increased of 37,40% in the Slovak republic. The highest number of job applicants in 2020 compared to the previous year was recorded in Trnava region (73,58%).

Figure 5 Job applicants (persons)

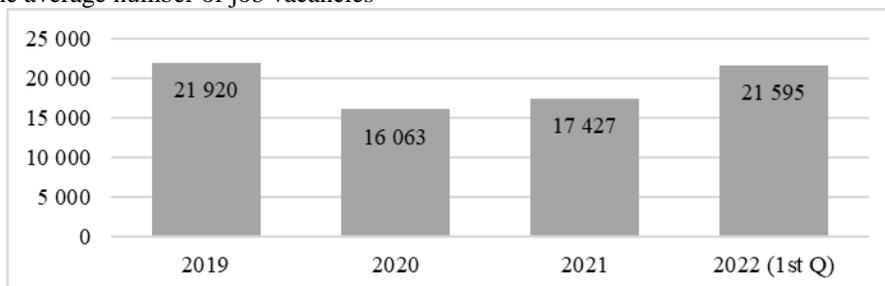


Source: Statistical Office of the Slovak Republic

The average number of vacancies was on a downward trend in 2019-2020 (Figure 6). A year-on-year decline of 26.71% was recorded. In the following year (2021) there was an increase

of 8.42% of this indicator, and in the first quarter of 2022 the number of vacancies returned to the level of 2019.

Figure 6 The average number of job vacancies

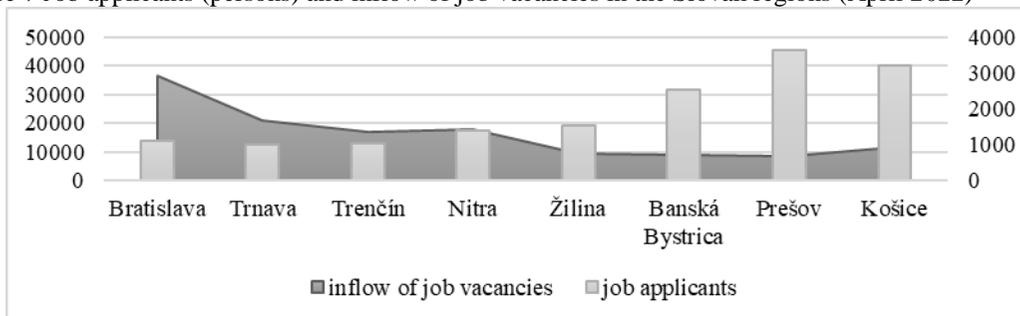


Source: Statistical Office of the Slovak Republic

Figure 7 illustrates the relation between job applicants and inflow of job vacancies in the eight Slovak self-governing regions in April 2022. The highest differences between these

indicators were observed in Žilina, Banská Bystrica, Prešov and Košice regions, where the rate of the unemployment reached the highest level.

Figure 7 Job applicants (persons) and inflow of job vacancies in the Slovak regions (April 2022)



Source: Central Office of Labour, Social Affairs and Family

Table 1 presents the results of the statistical analysis of the rate of unemployment in the first five month of the observed years in comparison with 2020. The p value of t-test ($p=0,00$) is lower than the level of significance ($p=0,05$) between 2021 and 2020, thus it can be stated that the null hypothesis is rejected, respectively, as the average of the year 2021 is not equal to the average of the same period of 2020. We can conclude that there were significant differences between the averages of the rates of the

unemployment, and as can be seen in 2021 there was a greater level of unemployment in comparison with previous year. For the years 2019 and 2022, the null hypothesis was not rejected. Through the results of this analysis, we can consider that the Covid-19 pandemic influenced the labor market reducing the number of employees on the market on average by 2,12 percentage points with significant effects in 2021. We can confirm claim C1 only for year 2021.

Table 1 Statistical analysis of the rate of unemployment in the first five month of the observed years in comparison with 2020

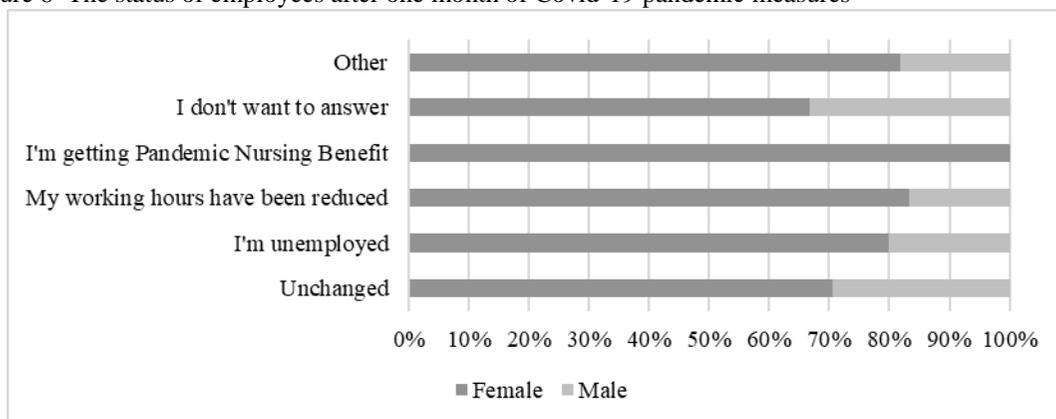
	2019	2020	2020	2021	2020	2022
Mean	5,046	5,798	5,798	7,922	5,798	6,676
Standard dev.	0,164	1,020	1,020	0,075	1,020	0,245
Observation	5	5	5	5	5	5
Difference	-0,752		-2,124		-0,878	
Df	4		4		4	
t stat	-1,439		-4,796		-1,570	
p value	0,223		0,009		0,192	

Source: own processing based on data of the Central Office of Labour, Social Affairs and Family

The results of pilot test of the questionnaire showed, that in 62,59% cases, there were not changes in job position and only 6,80% of respondents lost their job (Figure 8). 12,24% of respondents declared that their working time was reduced. The results of Chi-square Independence

Test ($p=0,35$) showed, that the null hypothesis is not rejected, and we can conclude that there is no difference between statement of male and female in connection to the first restrictions due to the Covid-19 pandemic measures. The claim C2 was confirmed.

Figure 8 The status of employees after one month of Covid-19 pandemic measures



Source: own research

Thanks to the pandemic, teleworking and home office work have become much more widespread. Before the Covid-19 pandemic, there were very few telecommuting jobs' offers where the employee did not need to visit the workplace at all (Table 2). In 2022, it has been

about 3% of all offers. By comparison, job offers that offered the option to work from home already accounted for about 4% of all offers before the pandemic. Currently, 12% of advertisements offer this option (Macháčová, 2022).

Table 2 Jobs' offers for home office

Year	Number of jobs' offers for home office	Share of all offers (%)
2017	10159	4
2018	14964	6
2019	19902	8
2020	17970	10
2021	30181	10
2022	14176	12

Source: Macháčová, 2022

Conclusion

The COVID-19 pandemic generated a global crisis that caused or exacerbated social inequalities. The labor market, in particular, suffered as unemployment increased and the number of working hours fell, which resulted in significant losses in labor income. As a general result of the pandemic in the area of the employment, it is necessary to point out the intensification of problems of job insecurity and income insecurity as well as weaker respect for workers' rights around the world (Gunn et al., 2022; Quinlan et al., 2001).

The COVID-19 pandemic affected the Slovak labor market as well. The registered rate of unemployment rapidly increased in first

month of pandemic measures in 2020 and we can observe the changes in work offer and statement of employees. Nowadays situation getting better. The registered rate of unemployment is below 7% in 2022 and it is gradually declining. However, it varies across regions. The regions with the highest unemployment rates are still the Banská Bystrica, Prešov, and Košice regions. The lowest rate of unemployment is in the Bratislava region. The results of this study confirm changes in case of jobs' offers for home office and disparities between inflow of job vacancies and job applicants. The limitation of this study is primarily a small research group; therefore the

research should be treated as preliminary research.

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EFFECTIVENESS OF JUST-IN-TIME PRINCIPLE IN TODAY'S CIRCULAR ECONOMY AND ITS NEGATIVE EFFECT

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Abstract

In the context of circular economy, manufacturers aim to improve the quality of the environment and human life. With regard to the nature of their production, business entities within circular economy adopt the philosophy of the Just-In-Time method. This paper analyses the impact of this method on the current supplier-customer relations in the Czech Republic as well as the quality of fulfilment of its obligations. Moreover, it is evaluated whether the concept of Just-In-Time method is suitable for efficient functioning of this economy. Based on the data obtained, a comparison analysis of the research problem is performed. The level of meeting deadlines for supplies in the manufacturing process of a domestic business entity is examined. The analysis performed did not confirm the idea of combining speed with the adaptive response to change. In the Czech Republic, the Just-In-Time method is currently influenced by a number of negative factors, which significantly affect the current supplier-customer relations and the quality of fulfilment of their obligations. The key factors affecting the effectiveness of the Just-In-Time principle include the extension of the stock replenishment period and inaccurate logistics cooperation in the area of production planning.

Key words:

Circular economy, Just-In-Time, stock, effectiveness of manufacturing process, production, automotive, production theory, minimization of costs

JEL classification: L620, L210

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Introduction

Circular economy is a concept adopted by individual countries' governments as an attitude to increasing uncertainty related to natural resources, environmental degradation, and climate changes. The historical background of this issue date back to the 1960s, when mass consumption was predominantly enhanced in post-war policies, and the economic, cultural, and social context of consumption was neglected. Disinterest in this issue lead society to the brink of the global environmental crisis (Crocker, 2018).

At that time, many business models are created and innovated, which respond to resource depletion, waste of resources, and emissions. Circular economy thus gains popularity both in the academic community and in industry and policy making (Geissdoerfer et al., 2020).

The society is already diversified these days. Companies supporting circular economy transform the infrastructure of its business economy into a closed continuous cycle, which

is seen as a basic principle of circular economy. Manufacturers now strive for reducing waste and use of non-renewable resources, recycling raw materials, composting, reprocessing goods and reusing them, or sorting waste. By increasing the efficiency of production, they aim at improving the quality of the environment and human life. With regard to the nature of production and own philosophical conception of closed circuit, companies introduce a method that increases the productivity of their processes. Under ideal conditions, this method represents a principle of effective production process management, which combines the required speed with the adaptive response to a change. In simple terms, these are steps performed in a precisely defined quantity, time, and according to the customer's requirements. This method is referred to as Just-In-Time (JIT).

Early studies of this method focus on improving operational efficiency and minimizing waste. The experience from the last decades combines the Just-In-Time principles with efficient logistics, mainly with the timely distribution of raw materials in the production

process and subsequently finished products to customers (Memari et al., 2018).

Based on understanding the concept of the process functioning in an optimal market economy, the objective of this paper is to identify the negative impact of this method on the circular economy of the Czech Republic in 2022, at a time of impeding economic crisis and a time strongly affected by the effects of the COVID-19 crisis, or to analyse the impact of this method on the efficiency of the production process and society.

For the purposes of meeting the objective set, two research questions are formulated:

1. How is JIT method currently influenced in the Czech Republic by the supplier-customer relationships and the quality of fulfilling their obligations?
2. Is the concept of JIT still suitable for the efficient functioning of this type of economy?

1. Literature research

The philosophy of the JIT is the manufacturing excellence, which reduces waste and improves productivity. Production based on customer requirements, i.e. the maximally flexible and effective, it aims to significantly reduce the manufacturing costs related to storing materials and semi-finished products, and maximization of productivity. Assuming that the elements of the supply chain, such as supply, production, and distribution are flawlessly secured, the most commonly used logistic concept of JIT is justified and can be considered the key element in the competitiveness of companies. The links in the supply chain are influenced by the current circular economy.

The process of efficient supply is influenced by a number of factors. The key ones include the availability of the necessary material and raw material in the market, proper planning and purchasing stock, optimal use of input, production and sales warehouses, operational and strategic management and optimization of stock. In the event of a failure of some link, the production cannot be quickly adapted and customer requirements satisfied (Suleiman et al., 2021). The flexibility of production process is directly subordinate to the JIT supplier method.

Aghazadeh and Seyed (2008) analysed factors influencing labour productivity. The authors examined the effects of stable production supporting work in progress, employee management, and investing in employees on the process efficiency. Memari et al. (2018) also examined this extensive logistic problem of JIT. They pointed to the new factor, a source of uncertainty. They propose to consider this factor when dealing with the limited supplier capacity and increased customer demand, which encourages production.

In production, for the application of JIT, it is necessary to ensure reliability of processes. In linear regression analysis of the impact of lean principles on the operational performance of manufacturing companies all over the world, Belekoukias, Garza-reyes and Kumar (2014) focused on improving the operational performance when using the method of machinery maintenance, TPM (Total Productive Management), the process of efficient use of equipment OEE (Overall equipment effectiveness), the process of efficient use of machinery TSM (Total Service Management), the process of ensuring quality TQM (Total Quality Management), the process of ensuring efficiency in administration and the concept of continuous improvement within elimination of waste. Although the supply in such a divided production with subsequent processes corresponds to the principles of JIT, it is very energy-intensive. Zhou and He (2021) focused on the analysis of energy costs management in the process of car manufacturing. Furthermore, they evaluated the impact of stock minimization on the production efficiency. The diversification of production and small-batch distribution of material in production can be in conflict with the required energy savings, which is one of the goals of circular economy. Ahmad et al. (2003) deal with the managerial interest in the infrastructure and the effects of the infrastructure on the internal environment of the manufacturing entity. They analysed the effective processes in the manufacturing entity when using normative, universal configurational, and unpredictable management models. Another negative impact of the Just-in-time method was addressed by Tortorella et al. (2018). From the perspective of organization and supply chain, the principle of Just-in-time is seen as a strictly defined process.

The implementation of Just-in-time in the production process requires a cognitive load, which is in contrast with the capacity to process the workload of individual employees. The implementation of Just-In-Time puts emotional pressure on employees. Tortorella et al. (2018) analysed the impact of Just-in-time on employees' operational performance and health, as they are exposed to constant stress. They evaluated that the implementation of Just-in-time principles requires employees to be actively involved and deal with large degree of changes, certain level of self-organization of tasks and cognitive skills. Such demands may not be always good for employee health and satisfaction.

The difficulty of distributing goods lies in the proper determination of the optimal distribution and decision on own or external logistics. Efficient logistics leads to a reduction of operating costs related to storage and overall operational optimization. Chakrabarty, Roy and Chaudhuri (2018) compared two warehouse models. They analysed unit costs of storage in rented and owned warehouses. The function of total costs is performed under the effect of JIT setup costs. If order exceeded the capacity of own storage premises, excessive goods were stored in a rented warehouse, but there were higher unit costs of storage.

Manufacturing industry is a backbone of economy, which converts the input material into strategic products. Production diversification, or small-batch distribution of material puts emphasis on logistic accuracy. As part of the agreed supplier-customer relationships, storage facilities are moved to trucks on roads. The environmental behaviour of entities will change, as the global transport industry faces a negative impact of the COVID-19 pandemic. Timely supply is significantly influenced by lack of workforce, non-fulfilment of production deadlines of subcontractors, closure of their operations and non-systematic search for substitute suppliers, extension of delivery time when using international maritime transport, technical problems in shipping and road transport. Circular economy strives for reaching industrial symbiosis. The European standard classification of economic activities (NACE) used in the European Union since 1970 includes the statistical data on the industries of

manufacturing sector ranging from steel, cement or minerals to chemicals. In terms of emissions and intensive use of energy and resources, the existence of manufacturing industry has a great impact on the environment (Mendez et al., 2021). Within specific production operations, sustainability requirement is directed at managers, who need to find and manage such process and methods that would increase the efficiency of resources and overall sustainability. Kurdve and Bellgran (2021) conducted research where they analysed the impact of managers' and production operators' involvement on the final improvement of the overall environmental behaviour. The improvement was achieved by setting priorities and environmental improvements identified as crucial by production micro teams. The authors analysed the theory of green lean manufacturing and its integration with circular economy in the context of production. They found that efficient production is focused on performance and time lost, while green manufacturing enhances minimization of resource waste and the amount of waste.

The principle of circular economy also consists in reusing end-of-life products or material recycling. Parajuly, Keshav and Wenzel (2017) analyse potential sales revenues and revenues from material recovery. Similar issue is addressed by Wiebe et al. (2019). They extended the idea by considering the limited world resources. They assumed 10 billion of people in 2050, with the same material requirements as today's high-income countries. They analysed whether circular economy ensures sustainable growth and evaluated the decrease in global mining, which is positive and with small impact on employment. They considered the transition from resource extraction sector to the services sector, where there are more job opportunities for qualified and female workers.

2. Methodology

2.1 Research problem

As mentioned above, the level of output of a business entity and continuity of its production process Just-in-time is significantly influenced by a number of factors. The key ones include reliability, timely delivery, quality, and flexibility.

Automotive is one of the drivers of Czech economy. The year-on-year increase in GDP showed significant drops compared to the period before the COVID-19 which is most likely a cause of the global economic crisis. Due to the lack of employees, manufacturers do not have the capacity to meet their export deadlines and thus put their customers in a situation that disrupts the continuity of their production or even leads to suspension or cessation of production. In the application part of this work, the degree of their flexibility in these complex conditions is evaluated, as well as their reliability, or supplier level.

2.2 Procedure and methods

To achieve the goal of the paper, it is necessary to evaluate the negative impact of failing supply on the circular economy of the Czech Republic in 2022. The most transparent factor for a comparative analysis appears to be the factor of meeting the delivery date, or the

continuity of the supply process. Due to the inefficiency of JIT, the point evaluation of approved suppliers deteriorates across the whole transparent sample of them. For the purposes of the paper, an analysis will be performed, which will also evaluate the level of continuity of the supply process. If the level of supply declines, conclusions can be made.

In order to collect data, a business entity Kostečka Group s.r.o. was selected. The company has an internal tool of evaluation criteria (see Table 1). This tool includes comparison criteria by significance in ascending order. For individual delivery of goods in the monitored period, the tool evaluates the accuracy of the delivered quantity, its quality, and reliability concerning meeting the delivery date. Other values represent the degree of fulfilment of each criterion. Fulfilment of evaluation criteria is based on a point scale from 1 to 5, where 5 represents the highest score, 1 is the lowest one.

Table 1. Evaluation criteria tool

CRITERION	SCORE of approved suppliers				
	5 – very good	4 - good	3 - neutral	2 - acceptable	1 - poor
Delivered quantity	Corresponds to the order	Quantity exceeds the ordered quantity by less than 5 %	Quantity exceeds the ordered quantity by more than 5 %	Delivered quantity is not met by more than 5 %	Criterion not met by more than 10 %
Quality	Higher than stipulated in the contractual conditions	Partially higher than stipulated in the contractual conditions	Corresponds to the contractual conditions	Minor deficiencies	Significant effects of some products, complaints necessary
Delivery date	Met precisely	Delivered less than one week before the deadline	Delay by more than 1 day, delivered more than 1 week before the deadline	Delayed by more than 1 week delay	Delayed by more than 2 weeks, delivered after urgency

Source: Kostečka Group s.r.o. (2022), authors.

2.3 Data

Subsequent analysis evaluated the data of a selected business entity obtained from its corporate information system. The monitored period includes the years 2018-2021.

The primary data for all deliveries executed in the relevant period were stated in writing on delivery notes. Based on the acceptance of goods, a responsible employee stamped and signed the delivery note and evaluated the individual criteria in writing. In the case of the selected company, the responsible persons are the warehouse manager, and the head of the quality department. These employees are fully responsible for the accuracy of the primary data. The warehouse manager is responsible for the criterion of the delivery date and quantity delivered, while the head of the quality department is responsible for quality. The evaluation of supplier level can be performed already at the stage of acceptance of goods, since the selected company and the approved suppliers have agreed such delivery conditions that also prescribe the form of the delivery note. Delivery note must contain information about goods, its specification, quantity, agreed delivery date, etc. The necessary information for evaluating the supplier level is thus made available.

At the moment of the receipt of the tax document for such a delivery, or the relevant delivery note, the business case is submitted to the accounting department. Here, it is posted, paid, and the relevant data of the evaluation criteria are entered into the company software. The selected company uses the information system ESO9.

In the annual balance, each approved supplier is informed about the results of this evaluation. The results are further used as a basis for assessing the approved suppliers and new contracts.

3. Results

The analysis of the supplier level of approved suppliers of Czech business entity, company Kostečka Group s.r.o., focuses its three key suppliers of goods in the monitored period 2018-2021.

These are two foreign and one Czech company. The Spanish company Eurofred S.A., Carrer del Marquès de Sentmenat, 97, 08029 Barcelona is an approved supplier of heat pumps and air conditioners. The Chinese company Midea Group, Beijiao, Shunde/Foshan is also an approved supplier of heat pumps and air conditioners, the Czech company HOTJET CZ s.r.o., Průmyslová 966, 747 23 Bolatice is an approved supplier of heat pumps.

For each delivery of goods executed in the monitored period, these selected approved suppliers were awarded a corresponding rating for fulfilling a given criterion. Fulfilment of evaluation criteria was based on the aforementioned point scale (see Table 1). For the calculation of the mean level, simple arithmetic mean was selected. The secondary data were obtained from the corporate information system of the selected company.

The values obtained based on the rating were summarized (see Figure 2). On the basis of this sample, data were evaluated using the method of the mean value and a graph of relevant supplier level was compiled (Graph 1).

Fig. 1. Evaluation of supplier level of selected suppliers of company Kostečka Group s.r.o.

Supplier	Eur ofred S.A.																										
Criterion	15.01.2018	03.04.2018	07.07.2018	08.09.2018	11.12.2018	average	17.01.2019	05.03.2019	09.06.2019	10.08.2019	13.11.2019	17.12.2019	average	12.01.2020	01.03.2020	04.06.2020	05.08.2020	08.11.2020	12.12.2020	average	15.01.2021	03.04.2021	07.07.2021	08.09.2021	11.12.2021	average	
Quantity delivered	5	5	5	5	5	5	5	5	4	5	5	5	5	5	5	4	5	5	5	5	5	5	5	5	5	5	5
Quality	3	2	3	3	2	3	4	3	3	2	3	4	3	4	4	3	2	2	3	3	3	2	3	3	2	3	
Deadline	5	4	5	5	3	4	5	4	5	5	3	3	4	5	3	2	1	1	1	2	1	1	1	1	1	1	
Evaluation	12						12						10						9								

Supplier	Midea Group																										
Criterion	03.02.2018	05.07.2018	20.10.2018			average	10.01.2019	25.02.2019	29.05.2019	20.06.2019			average	07.03.2020	15.08.2020	09.12.2020				average	05.02.2021	23.05.2021	27.08.2021	18.10.2021		average	
Quantity delivered	5	5	5			5	5	5	5	5			5	5	5	4					5	5	5	5	5		5
Quality	3	2	3			3	4	3	3	3			3	4	3	3					3	3	2	3	3		3
Deadline	5	5	5			5	5	4	5	4			5	2	1	1					1	1	1	1	1		1
Evaluation	13						13						9						9								

Supplier	HOTJET CZ s.r.o.																										
Criterion	20.02.2018	17.05.2018	20.11.2018	10.12.2018		average	17.02.2019	05.05.2019	09.08.2019	10.10.2019	13.12.2019		average	17.02.2020	30.04.2020	23.08.2020	17.11.2020				average	25.01.2021	23.04.2021	17.07.2021	28.09.2021	30.12.2021	average
Quantity delivered	5	5	5	5		5	5	5	5	5	5		5	5	5	5	5				5	5	5	5	5	5	5
Quality	3	2	3	2		3	4	3	3	3	3		3	3	3	3	3				3	3	2	3	3	2	3
Deadline	5	5	5	5		5	5	4	5	4	4		4	1	1	1	1				1	1	1	1	1	1	1
Evaluation	13						13						9						9								

Source: Kostečka Group s.r.o. (2022), authors.

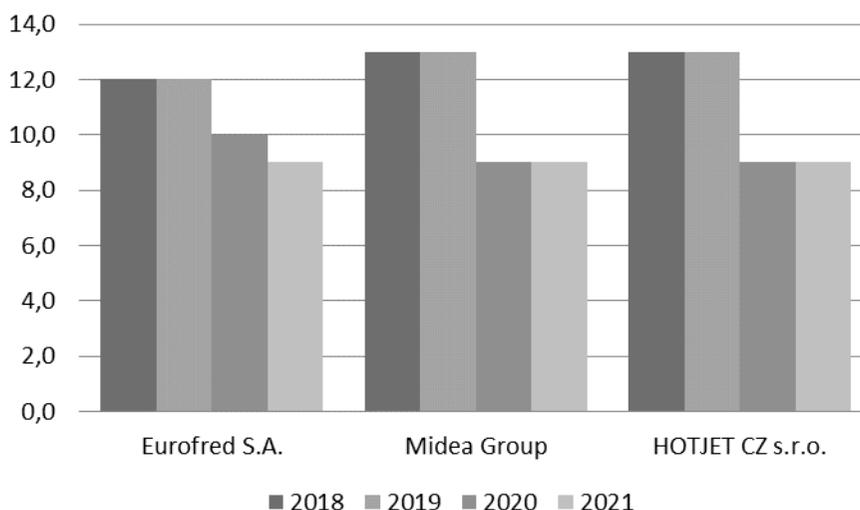
4. Discussion of results

In order to achieve the set goal of the paper submitted, two research questions were formulated:

1. How is JIT method currently influenced in the Czech Republic by the supplier-customer relationships and the quality of fulfilling their obligations?
2. Is the concept of JIT still suitable for the efficient functioning of this type of economy?

The analysis of the supplier level of approved suppliers of a given Czech business entity in the years 2018-2021 showed a downward trend. Despite the fact that the company Kostečka Group s.r.o. ensured more approved suppliers for its key products in the supply portfolio, the efficiency of the supply process was significantly disrupted. From the year 2020, there is a clear downward trend. The level decreased by up to 4 evaluation points, i.e. 31 %.

Graph 1. Evaluation of supplier level in the years 2018-2021



Source: Kostečka Group s.r.o. (2022), authors.

The level of the criterion “quantity delivered” is stable. The criterion “quality” shows a deteriorating trend. The worst results were recorded in the case of the criterion “delivery date”.

By deduction, the author concludes that this is caused by several factors. First of all, it is a lack of qualified and trained production staff of the supplier. It can be assumed that the supplier compensates for the drop in production capacity with new employees whose quality of work shows imperfection. Other problems the suppliers have to face are related to the lack of material, goods, or problems in logistic routes.

It can thus be concluded that there was a decrease in the level of supply. Inefficient functioning of the JIT methods significantly affects the production and the original concept of the methods appears to be insufficient for the efficient functioning of the economy.

Conclusion

When achieving the set objective of this paper, the philosophy of the JIT method was examined. Previous research on this issue shows that it is a specific approach to production shaped by the characteristics of a specific business entity. When following a set of defined rules and procedures, under optimal conditions,

it is possible to produce goods in a specified quantity, time, and in accordance with the customer requirements, with increased productivity of work and efficiency of machinery, minimizing costs, and in maximum quality. Excess stock is reduced, and so are the costs of inventory and storage space. The efficiency of production and sales and thus the return on investment is ensured.

For the purpose of achieving the set objective of this paper, an analysis was performed with the aim to find answers to the formulated research questions. Specifically, it was an analysis of the level of supplier-customer relationships that directly influence the supply of a business entity in the Czech Republic.

The performed analysis did not confirm the idea of combining speed and adaptive response to change. In the Czech Republic, the JIT method is currently affected by a number of negative factors, which significantly influence the current supplier-customer relationships and the quality of fulfilment of their obligations. The most important factors include the extension of stock replenishment time and inappropriate cooperation of logistics in the area of production planning. The concept of JIT is thus not suitable for ensuring efficient functioning the current

circular economy in the Czech Republic in 2022. The objective of the paper was thus achieved.

Research limitation is the small volume of the source data when analysing the supplier-customer relationships. Further follow-up research can thus be focused on addressing more business entities.

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TECHNOLOGIZED SOCIETY LIQUID POWER, LIQUID EDUCATION AND LIQUID CAREERS

Vojtěch KOŘEN

Abstract

This text is a critical - but not criticizing - essay focused on issues of the impact of technologization, globalization and liquid capitalism on the world of work and education. It is divided into four separate parts. The first part (From industrialization to technologization) deals with the definition of the key categories, which are industrialization, industrial revolution and technologization. The second part (Fluidity and Power) deals with the issue of Bauman's fluid modernity and related phenomena, which are fluid capitalism, globalization and changes in area of the division of labor. The third part (Liquid Education) is an analytical insight into the impacts of wider societal changes to the values in education, educational goals and the content of education in liquid capitalism. The last (4th) part (Liquid of work and occupation, liquid careers) deals with the changes of work and career in liquid modernity. The aim of the text is to provide a reminder, among other things, that despite the great respect for technological ability, intelligence and complexity of many engineers and technologists who create advanced robots (hardware but also software), issues of morality, ethics, culture, emotions and values belong in the hands of fields other than ICT. Even this still sovereign area of humanity is influenced by the advancing technologization of our society.

Key words

technologization, industrialization, industrial revolution, knowledge society, technocracy, liquid capitalism, liquid modernity, work, digital society, informational society

JEL Classification: : A14, B55, B24, B25, E24, J24, J31, J62, O33

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Introduction

Technology and its influence are not something new, despite what it sometimes looks like thanks to the proclamations of contemporary popular techno-messiahs. Metallurgy, mechanics, optics, the use of wind, water and geothermal energy have accompanied and changed humanity for much longer than computers and their advanced programs. But what has been happening in the last century is the massive penetration of technology into the everyday life of the individual. Gradual and almost pervasive technologization creates Freudian prostheses for people to such an extent and with such a degree of obviousness that humanity becomes more and more dependent on them, without fully realizing it (cf. Störig, 2007 p. 486). The same technologies that were and are supposed to liberate humanity often become an element of restraint and control rather than an instrument of democratization, freedom and autonomy. Modern society may have brought autonomy *de jure* to many people, but autonomy

de facto remains inaccessible to most. The use of technology is not the cause of this situation, but the facilitation of its existence (cf.: Bauman, 2020 and 2021). On the one hand, technology liberates us, but on the other hand, it creates dependencies of a completely different kind and different nature.

Despite the high degree of globalization influences, which enable the rapid transfer of technology and information to almost all parts of our world, it is not yet possible to speak of a global unity of development associated with industrialization. From the point of view of social science research activities, this can be quite a useful situation, because there are different communities at different stages of industrialization at the same time. It is thus possible to research the effects of industrialization and technology in an environment of almost natural experimentation. Of course, it is important to take into account that these societies are not completely isolated

and can be influence at least informationally, however, with a suitable choice of indicators, the observed research results can be compared, and scientifically significant conclusions can be drawn from the results of comparisons. After all, this is one of the reasons why various sciences (eg: sociology, economics, history, ecology, medicine, psychology, cultural anthropology, political sciences, technical sciences and educational sciences) deal with the phenomenon of industrialization and technology relatively intensively. However, it would be rash to say that science deals with the phenomenon of industrialization mainly for a purposeful reason in the form of the availability of information resources and the "social attractiveness" of the topic. One of the important reasons for the interest in the given phenomenon and the effects of its operation is its undeniable influence on the world of work, and thus also on education (at least in the field of professionalization), its values, goals and content. With the change of means of production, the nature of work and its organization also changes, and all this is naturally responsible for the changes in society (compare: Bauman, 2021; Becker, 2013; European Commission, 2020; Ivanová & Staněk, 2016; Ivanová, Masárová & Koišová, 2019; Kořen, 2020; OECD, 2018; Schwab, 2016; Spitzer, 2012).

It is questionable if terms such as Industry 4.0, the Digital Industry or the Digital Society are the cause or consequence of the pressure of postmodernity on the field of work or vice versa. However, one thing can be said with certainty: technologies have made it possible and still make it possible to materialize and create reality of humanity's happy dreams and nightmares much more than we might want to admit. This is not a reason to refuse, but to be vigilant and cautious in assessing the benefits and potential risks.

FROM INDUSTRIALIZATION TO TECHNOLOGIZATION

Without ignoring the determining importance of industrialization for development and changes in area of work, working conditions and the working environment, it is necessary to consider not only industrialization itself, but also its fundamental side-effect phenomenon, or

perhaps even another stage of evolution, which is *the technologization of society*.

The technologization of society means the degree and extent of advanced use of technologies (robotics, digitization, automation, artificial intelligence, ICT, etc.) in the everyday reality of social and private life. Just as we can talk about highly and minimally industrialized societies, we can also talk about societies that are highly and minimally technologized. And thus, just as we can talk about industrialized societies in the intentions of different stages of industrialization (basic, advanced, high), they can be also categorized according to the levels of their technologization. The boundaries between the considered stages do not have completely sharp contours, because even within single societies, different semi-stages can naturally coexist. However, the purpose of thinking in given categories is not separation, but delimitation through typical (typological) dominant characteristics. We can use the related terms - the first, second, third or fourth *industrial revolution* - similarly. Many authors who focus on industrialization also use the *terms Industry 1.0, 2.0, 3.0 and 4.0* analogically with these revolutions (compare: Becker, 2013; Ford, 2015; Frey & Osborne, 2017; Hecklau, Galeitzke, Flachs, & Kohl, 2016; Ivanová & Staněk, 2016; Kamensky, 2017; Mařík & al., 2016; Reich, 2002; Schwab, 2016; Staněk & Ivanová, 2017; Tupa & Benešová, 2017). It can be said (in general) that more than a revolution, it is a gradual evolution and the milestones mentioned (1.0 - steam engine, 2.0 - electricity, 3.0 - automation, 4.0 - artificial intelligence) tend to point to the main technological discoveries and applications of technologies that have had and continue to have a significant influence on production, the division of labor, education and individual life than on moments of revolt and the tearing-down of the old social order. Technologies that surpass a person's physical or volitional cognitive abilities (It is important to separate "volitional cognitive abilities" from general cognitive abilities. The volitional behavior (controlled by the will) is the ability and skill to consciously and deliberately mobilize certain activities (cognition is primarily about thinking and memory). Volitional cognitive abilities are accessible to our perception and knowledge through awareness.

Therefore, their speed, scope and quality can be relatively easily compared with the scope and quality of operations performed, for example, by computer technology. For the time being, we can only compare those parts of cognitive abilities that are not accessible to our consciousness and often also to our cognition only to a very limited extent and, moreover, often only significantly indirectly.) have always had and still have a major impact on the transformation of society. What has been crucial in the last century is the massive penetration of technology into everyday life. This gradual and pervasive technologization creates *Freudian prostheses* for people to such an extent and with such a degree of obviousness that humanity becomes more and more dependent on them, without being fully aware of it. This may be more enjoyable and definitely easier. There is a certain resemblance to Spitzer's comparison of *the smartphone* to *the Swiss knife* of the 21st century. Professor Manfred Spitzer, in his well-known monograph "*Digitale Demenz: Wie wir uns und unsere Kinder um den Verstand bringen*", published in Munich as early as 2012, says that someone who becomes addicted to a Swiss knife and then loses the knife, suddenly loses access to all the tools it contained (knife, saw, bottle-opener, file, scissors, screwdriver, pliers...). That person may then be severely paralyzed in many areas of their practical life because they do not have or cannot (any longer) master other tools. It is the same for someone who uses a smartphone connected to a global network to handle a significant number of their practical tasks (finding and obtaining information, opinions, recommendations, decisions, orientation, navigation, mathematics, translation, interpreting, recording). That person has unlearned other possibilities, or even has not learned them, so is dependent on the existence and functionality of the smartphone. If they lose their functional smartphone, they have no information, no access to money, no access to contacts. They do not have an "electronic" advisor to handle for them such trivialities as recommendations about going for walks, making purchases or shopping lists to top up the fridge, etc. They have no way to connect with friends who are equally dependent on smartphones, and with institutions that should automatically help in other circumstances. Even worse, they don't remember what number to call if they need to borrow someone else's phone because all their

numbers and contacts remain stored in the lost, stolen or broken device (Spitzer, 2012). Professor Spitzer's specialization (neurology) has enabled him to show that the use of digital technologies affects cognitive abilities and limits the formation and functioning of brain synapses, which are responsible for spatial orientation, for example. On the one hand, technology liberates us, but on the other hand, it creates dependencies of a completely different kind and different nature.

The level of technologization of society can be evaluated in three dimensions (indicators). The first dimension is the level of technology advancement used in the society. The indicator of level of the technologies used can be assessed by comparing the level of technologies used with the highest level of existing technologies. The second dimension is the level of their use (spread) among individual social actors across the society. The extent of use should be assessed not only through the availability of technologies, but also through their real usability (not all available technologies are usable in certain contexts, not all usable technologies are available). The third dimension is the level of influence on technologies (development, control of their use). The level of influence on technologies can be assessed through what active realization potential society has for their development (does society develop technologies or even create them?) and by the level of control of their development and use by society (does society have influence on their development and use?).

Because the extent of technologization of individual societies is naturally not at the same (often not even similar) level, their participation in the benefits of technologies is naturally different. Advancement in technology – paradoxically - can (and often does) bring significantly greater scope for growth of social inequality than in the pre-industrial period. The richest and most influential people have long been not monarchs, landlords, owners of mines or factories, but those who control technologies (compare: Bauman, 2020; Bauman, 2021; European Commission, 2020; Ford, 2015; Kamensky, 2017; OECD, 2018; Reich 2002; Shwab, 2016). Technologies allow modern powerful man not only to invest, mine and capitalize effectively, but also to influence public

opinion in order to favor their own intentions, or at least not to be able to defend against them effectively.

FLUIDITY AND POWER

According to *the theory of structural transformation* – formulated and developed by Jean Fourastié, one of the most influential European economists of the 20th century - technology and the gradual technologization of work and social space have a major impact on the transformation of the division of labor, economic activity and success, and thus society. Society as a whole is fundamentally determined by the division of labor, therefore it is also determined by technologies (Fourastié, 1952).

According to Fourastié and his followers, social evolution is mainly influenced by the ratio of the distribution of activities in single societies among three economic sectors: primary (resourcing), secondary (transformation of sources) and tertiary (services). Fourastié (1952) considered that societies with a predominance of primary sector activities are traditional ones which are essentially doomed to depend on those who can transform the raw materials they obtain into products intended for consumption. Although these societies have raw material resources, they lack the potential to process them and thus to create higher added value. For others, they are only as important as their raw materials are. From an economic point of view, these societies are at the lowest level of “the food chain” on the market. If their raw materials are not valuable enough, only the market determines their prosperity. If they have high value, their prosperity is determined by the will of those who are powerful, more capable and faster, who determine whether they will be able to sell their resources independently or under the supervision of "benevolent" more technologically savvy investors. However, neither society is an independent society, even though many might argue that resource ownership is in their favor. More technologically advanced societies can relatively effectively force them (for better or worse) into obeisance as a humiliated supplier.

Fourastié considers that societies with a balanced ratio of activities between the first sector (resourcing) and the second sector

(transformation of resources) but with a minority representation of the third sector (services) are societies in a transitional stage. These societies are able to obtain and transform resources (raw materials). Therefore, they are not as dependent as traditional societies (which they often exploit). The only thing that limits them is their ability to sell, innovate, develop or even invent products. These functions are provided by the third - the service - sector.

The highest stage of Fourastié’s social transformation is achieved by societies that carry out the maximum of their economic activities through the tertiary sector (services). These societies basically take advantage of societies in the traditional and transitional stage to ensure their own well-being. They do not mine, do not grow, do not produce physical products. There are focused primarily on high value-added services (trade, administration, research, technological development, education, intellectual services). Thanks to this, they can bring their members high social status and well-being. Thanks to surpluses generated by higher added value, they are able to invest significantly in their own development and also effectively create reserves for periods of crisis, which are often a complete disaster for first- and second-stage societies.

Fourastié and his followers thus laid one of the cornerstones of techno-optimism with their unusually precise analysis and prediction of future development. He optimistically believed in progress associated with the gradual transformation that technology development would allow. In addition, many adherents of his ideas make arguments in the form of sustainability, cultural development, and environmental protection. However, the truth of these arguments on a global scale is apparent. Many opponents of such progress will think that it is the progress of the select few, which is based on the exploitation of the less able, the less rapid, the others, the unknown.

"The fact that certain forms of industrial production are no longer visible does not mean that they do not exist, they have only been relocated. The blast furnaces of steel mills, and the chimneys of the petrochemical industry are burning and smoking as before, but in other

parts of the world where it is cheaper (Liessmann, 2009, p. 29). "

As Bauman (2020) says, in *the era of liquid capitalism*, the existence of which is largely conditioned by the technologization of the world, social actors can be divided into four main groups. First, they are modern (investment) *conquistadors* who, thanks to their ability to quickly transfer the financial capital, technologies and management structures of their companies, can quickly occupy territories suitable for their investment plans. Secondly, they are the physically or digitally mobile labor force (*nomads*), which more or less successfully complements labor resources that are not easily, cheaply or at all available in the territories occupied by the *conquistadors*. Third, modern (social) *serfs* who do not have the social, investment, or skill capital to be *nomads*. And finally, fourthly, *the administrators of the conquered and conquered lands* who seek to attract and retain *conquistadors* on their territory in order to obtain the means for them and the *serfs* present to become *conquistadors*, *nomads* themselves, or at least temporarily better (Bauman, 2020, 2021).

As was previously said, the level of technologization of society can be evaluated in three dimensions (indicators). The first dimension is the level of technology advancement used in the society. The second dimension is the level of their use (spread) among individual social actors across the society. The third dimension is the level of influence on technologies (development, control of their use). The mutual combination of these categories / indicators is key for defining and assessing the degree of technologization of societies. Societies in which advanced technologies are used only by a limited number of members operate differently from companies in which technologies are widely used. Societies that effectively influence technologies, or are able to develop them, or have their development and use under control, are likely to be different from societies that are not.

In a world for which the level and control of technologization is a key added value, the dominant societies are those that make extensive use of advanced technologies across the social space and have a significant impact on their

development and use control. Fourastié would probably say that they are at the highest stage of social transformation. In the technological world, such societies are the controlling societies. Their advantage is the possibility of using even those resources that they do not necessarily have directly at their disposal (raw materials, space, energy, food, production capacities), through rapid global investment. They are able to do this because of the technology and their dominance in its use. This is a key condition for success in the environment of *liquid capitalism*, in which the ability to quickly relocate investments and extract local resources without material ties to the territory in similar physical assets is essential. Those who can quickly analyze the potential of available resources and acquire them almost immediately are the winners (Bauman, 2020).

What may have surpassed Fourastié's brilliant reasoning and undoubtedly well thought-out predictions is the power that technology has placed in the hands of narrow groups of those who control them and can therefore control their use. The technologization of the world has enabled the emergence of new elites, whose greatest strength lies in their technology-facilitated ability to invest quickly and anywhere, in addition to changing public and thus political interests through effective lobbying.

At the opposite end are societies that do not control the management and development of technologies (or do so only minimally) and, if any of their members use them at all, these technologies are only low- or not very high-level. From the point of view of technologization stages, these are actually pre-technological societies. They are societies that have the characteristics of Fourastié's traditional societies. Such a society can only gain influence if current global resources are exhausted (or severely limited) and *conquistadors* or *administrators* with a high level of resource control would find it worthwhile to invest in transforming such societies into more technologically advanced societies (for example, certain countries whose economy is entirely based on the possession and extraction of oil).

However, it may be useful to remember that this is a description of the ideal types. The

existence of societies of the first variant (wide use of advanced technologies with a high degree of their control) or the second variant (minimum level of technologies, their use and their control) in a completely pure form is not entirely realistic. These variants can occur in various narrower social groups or communities, but modern, complex societies are often diversified and therefore heterogeneous. Their members use different levels of technology at different levels and have them under control at different levels. There are both groups of those who use and control technology and groups of those who do not use or control technology for various reasons. In such an environment it is easy to form close, privileged groups of controllers who often have the highest level of technology at their disposal in addition to control the whole society.

Evgeny Kamensky, in his relatively complex analytical reflection "*Society. Personality. Technologies: Social Paradoxes of Industry 4.0*", states that technocracy is becoming a decisive force in a technology-obsessed world. It has a huge influence, which comes from the ownership or at least control of technology and from its own ability to create social pressure (sometimes even ideological) for the need for technology, and all under the proclamation of the need for progress, further prosperity, economic necessity and the need to succeed in comparison with others (Kamensky, 2017).

"Pointing out the economic pressure to which everything is exposed has the advantage that almost no one dares to question these constantly repeated mantras. Competitiveness and job security always gain the upper hand. This market apotheosis, without it being understood as such, is firmly rooted in the Marxist theory of capitalism, or it is based on the fact that the economy is superior to all other spheres of life, that everything follows the unchanging laws of the market and in the end the only winners will be those who don't ask too many questions, submit to the Zeitgeist and strike while the iron is hot (Liessmann, 2009, p. 117-118)."

Bauman's *conquistadors* are the determining force in such a world. Dominance in influencing technologies allows them to put

direct and indirect pressure on *administrators*, who, if they succumb to it, create scope for easy exploitation of local resources (including human resources) and, in part, outlets for technologies that are often no longer used elsewhere (if you want to expand the use of technology, outdated technology is better than no technology). All this is happening in the name of the mantra of progress, welfare development and increasing independence and opportunities for emancipation through economic growth and competitiveness.

Nation states are gradually realizing the risks of possible negative impacts of gradual technologization of the world and increasing spatial flexibility of investments on individuals and societies. However, it is precisely at a time of global investment that the bargaining power of the small is becoming increasingly inadequate. Despite frequent criticism of various federal or union groupings, the fact that a strong federation or union has a much greater influence on global capital decisions than the naively autonomous economy of a small "free" state cannot be overlooked. The regulatory tendencies of the "big" ones are quite obvious. Unfortunately, their success and foresight are also limited.

"While technologies and artificial intelligence can do much good, including by making products and processes safer, it can also do harm. This harm might be both material (safety and health of individuals, including loss of life, damage to property) and immaterial (loss of privacy, limitations to the right of freedom of expression, human dignity, discrimination for instance in access to employment), and can relate to a wide variety of risks. A regulatory framework should concentrate on how to minimise the various risks of potential harm, in particular the most significant ones (European Commission, 2020, p. 10)."

However, it would be foolish to ignore the fact that various associations of states, including the strong ones, may cave in to the pressure (overt and covert) of investment capital. If investors' interests turn into the dominant political ideology of the superstate (union, federation), then its small members often have even less chance of defending themselves against this pressure than if they were

independent of the superstate. The pressure of investors is added to the pressure of the ruling administrators in the form of subsidies, restrictions, or legislative constraints. One example is the transformation of formal education content targeting, which is more and more dictated by central super-authorities (compare: Bauman, 2020, 2021; Ivanová & Staněk, 2016; Kamensky 2017; Liessmann, 2009).

LIQUID EDUCATION

Education in every era, including the technologized era, fulfills (intentionally and unintentionally) several social functions. These are mainly socialization, acculturation, enculturation, personalization and professionalization (compare: Brezinka, 1992; Hecklau, Galeitzke, Flachs, & Kohl, 2016; Illeris, 2009; Jarvis, 2007; Kořen, 2020). Education, as a practice-oriented discipline, is often in practice influenced by cultural and political paradigms. What, how and why it is used is more determined by social or political tasks and by world-view positions than by educational sciences (Brezinka, 1992). Technology and technologization and the influence of liquid capitalism enabled by them, or at least significantly facilitated by them, also influence the requirements for the goals and content of formal and non-formal education. In the world of liquid certainties, which are mainly influenced by the interests of *conquistadors*, the need for professionalization, i.e. preparing people to work, is often strongly emphasized. This is reflected, among other things, in the strong orientation of educational policy to meet the requirements for qualifications to perform the required occupations and work-related competencies. Qualifications can be understood and considered to be "objective" qualities to some extent, but competences are inherent in that they include personal and collective motivations, emotions and commitment, and their practical value depends to a large extent on the positive interest and attitude of society (Illeris, 2008).

"Most authors identify four main categories to classify competencies. Firstly, technical competencies comprise all job-related

knowledge and skills, whereas secondly, methodological competencies include all skills and abilities for general problem solving and decision making. Thirdly, social competencies encompass all skills and abilities as well as the attitude to cooperate and communicate with others. Finally, personal competencies include an individual's social values, motivations, and attitudes (Hecklau, Galeitzke, Flachs, & Kohl, 2016, p. 3)."

In fact, all the categories of competencies listed in the previous citation can be used to look at competencies for *liquid modernity*. Although it might seem that methodological competences, social competences and personal competences do not necessarily have anything to do with the world of work, the opposite is true. Methodological competences represent strategies for solving problems, which, however, very often have clearly defined and world-determined means, procedures and goals. If the set goal, essentially a political imperative, is technology development, digitization and decision-making through AI algorithms, methodological competencies must also be adapted to them. It is the same with social competencies. Learning usually includes three dimensions: cognitive (knowledge), emotional (feelings and motivation) and social (communication and cooperation). All are rooted in a socially situated context. Therefore, in addition to the psychological process of processing and acquiring knowledge and skills, a key factor in learning and education is the interaction between the learner and their social, cultural and material environment (Illeris, 2004a, 2004b, 2007, 2015). Personal competences are often only a necessary precondition for coping with the effects of a situation in which an individual finds himself, without the possibility of really influencing it (Bauman, 2020, 2021). Thus, education is always influenced by context. The implications of the context of liquid modernity are obvious.

"It is more appropriate to talk about a time when the subordination of knowledge to the parameters of the capitalist economy is finally coming to an end, which is knowledge friendly only if knowledge can be immediately appreciated or at least does not increase costs. Under these conditions, knowledge as such is deprived of its autonomy. Despite all the affirmation for the notion of education, the good

that used to be called education has little, if nothing, to do with knowledge in a knowledge society." (Liessmann, 2009, p. 36). "

There are also several legitimate objections to Liessmann's relatively radical stance. The massification of high school, college, and university graduates, which Liessmann sees as one of the causes of spreading "uneducation," on the one hand causes some "dilution" of quality, but also allows for a gradual, albeit still insufficient, yet increasing cultivation of the whole. However, it is true that in the ballast of quantity, there can be a deliberate, unintentional and sometimes even purposeful ignoring of the various goals of education. Liquid capitalism and its need for technology are probably the most important part of decisions about the content and forms of education. The content of education is often focused only on professionalization. Forms of education are evaluated according to the speed of transmission more than according to its quality. Goals in the field of cultivation, personalization and emancipation of the person tend to be relegated to the sidelines with reference to their immeasurability, ambiguity and impracticality. At best, this condition is caused by the ignorance or at least the short-sightedness of the decision-makers; at worst it is a calculated intention.

"It is striking that today the prevailing metaphors of educational policy demonstratively question the very goals that once motivated the conventional narrative on education - the autonomy of the subject, the sovereignty of the individual, the autonomy of the individual. Above all, do not think with your own head - as if this was the secret program of today's education. Anyone who is not willing to act as a team and in networks and flexibly adapt to everything that is required - by the way people do not require anything, it is always just the market, globalization or a straight future - no longer has a chance to meet the demands of the knowledge society... If someone is constantly preaching about networking without realizing that he is putting so much pressure on conformity, he is probably listening to the dictates of the times, and not to any even half-sovereign reasoning of his own (Liessmann, 2009, p. 50). "

The technologization of society necessarily permeates the area of promoted and supported content and forms of education. Following the needs of digitization and advanced automation associated with the advent of autonomous decision-making systems of so-called artificial intelligence (AI), different projects for identification and development of knowledge and skills, which are collectively referred to as Competence 4.0, are now created and generously subsidized from public funds. The need to include them in the official education curricula is considered crucial. This is evidenced, for example, by the European Union project "*Mapping future competencies as part of systemic measures to define labor market requirements (Competence 4.0)*". Its publicly declared goal is to support the adaptation of labor market institutions to the changes resulting from the 4th Industrial Revolution through early identification of future competencies and support cooperation between companies and schools to ensure mutual complementarity in relation to labor market needs (MPSV, 2021). Other projects on a similar topic are, for example: *Development of a system of further education of employees and employers in the field of digital competences* or *Development of system support for digital literacy* (MPSV, 2021). The primary mission of education from the point of view of these and similar programs is pure professionalization and, in some cases, even only the transmission of instrumental skills for work.

"It is not about education, it is only about knowledge that can be produced, traded, bought, managed and discarded as a raw material because, apart from special programs for new elites, it is a superficial patchwork of knowledge that is just enough to make people flexible for the work process and available to the entertainment industry (Liessmann, 2009, p. 39). "

However, it would be unfair to mention these programs as an example of only negative action. These projects respond to the fact that if separate economies would like to succeed in a world of liquid investment, they must be equipped with the necessary level of human capital. However, it is an effort driven by need, not a need driven by interest and free will.

There is no doubt that one of the key tasks of education is to prepare individuals to

take up an occupation. Nevertheless, it is important to recall that the role of educational institutions is not only to reproduce and transmit existing knowledge to other generations, but also to co-create or at least bring about suitable conditions for creating new knowledge. However, education when reduced to creating instrumental skills is not adequate for this purpose (Ellström, 2005). In addition to the most frequently exalted professionalization, the role of education is also socialization, humanization, personalization, managing the ethical aspects of life in society, developing exploratory curiosity and learning to be human in all aspects of what humanity means (Jarvis, 2007). Unfortunately, these aspects are often sidelined on the grounds that "we do not need more theorists, but people on the job". The question is whether such statements are the result of the predominance of theoretical knowledge or, conversely, a manifestation of its deficit.

"In a rapidly changing world, in which the qualifications, competencies and content of knowledge are said to be constantly changing, "uneducation", i.e. the abandonment of binding spiritual values and conventional education, has become a virtue that allows individuals to respond quickly, flexibly and without "educational ballast" to ever-changing market demands (Liessmann, 2009, p. 51)."

The paradox is that in addition to technology-obsessed education, there is also huge scope for ballast in the form of trendy education, which focus on human rights issues, multiculturalism and environmentalism. However, even here, there are often significant problems caused by the fluidity of topics, the shallowness of content and the calculated lobbying hidden behind social orders. The absence of clear, widely recognized or at least accepted - and therefore undisputed - goals means that efforts and energy are fragmented.

"Education was once associated with the ambition to prove that the supposed certainties of the time are illusory. A society that, in the name of supposed efficiency and dazzled by the idea that everything can be subject to economic scrutiny, is cutting back on freedom of thought, depriving itself of the opportunity to recognize illusions as illusions, has subscribed to uneducation, no matter how much information is

stored in its digital databanks (Liessmann, 2009, p. 119)."

Paradoxically, the original idea of mutual enrichment through openness to many starting points and paradigms contributes to shallowness or useless confusion rather than to building a better quality of society. Individualization throws us from the bondage of certainty to the bondage of uncertainty.

"In the absence of a Supreme Governing Office (or rather, there are many authorities vying for sovereignty, none of which have even a 50% chance of victory), the question of goals arises again and necessarily causes endless agony and hesitation, removes determination and is a source of a depressing feeling of utter insecurity, and thus of a state of constant anxiety (Bauman, 2020, pages 82-83)."

But this is by no means some kind of yearning for "the good old days", and it would be a mistake to talk about a desire to revise the original basis of the need for freedom. It is a critical insight into the supposed means of liberation. Even total individualization and absolute respect for otherness do not in themselves bring freedom. They only throw us out of one net of certainty about our required direction of travel and set of beliefs into a different net of uncertainties arising from the knowledge that it is difficult to orient ourselves within ourselves and in terms of our own values, let alone within the world around us. Instead of sharing ideals, we share the records of our own individuality (Bauman, 2020, 2021). Our decision on our direction of travel is perhaps even more unfree than it was a hundred years ago. The main lack of freedom does not lie in some external prohibition or command, but in the fact that we become prisoners of misinformation about what is and what is not, or what should and what should not be. The world is then filled with apparent saviors, who, however, often promote the values of other better-hidden doctrines in the name of liberating truths. The worst thing is that such doctrines are almost always hidden even in the unconscious of their own preachers.

"In the whole field of education, it is clear that instead of a knowledge society, we are moving towards a society of control at great speed, and almost everything that has been

discussed recently under the heading of 'autonomy' is governed by the imperative of a social structure based on self-control (Liessmann, 2009, p. 118)."

Education is becoming a market commodity in the technological world. However, in many cases it is mainly education that should bring the ability to create and develop other technologies (ideal for *digital nomads*) and in the worst case only instrumental skills to operate technological equipment (compare: Bauman, 2020; Ford, 2015; Kamensky, 2017; Liessmann, 2009). The real focus on ethical and social aspects of technology can only sporadically be found in the scope of so-called education 4.0. Is this a manifestation of the uneducation of education policy makers, or is it the elaborate lobbying of those for whom a broader social debate on the issues of technological impact would not fit in with their investment plan?

"The policy that should regulate the market is itself becoming a playground for lobbyists, parliamentary control is weakened, the responsibility of democratically elected institutions is shifting to 'independent' councils and boards. Public discourse is replaced by rankings compiled by evaluation agencies, and while some still dream about civil society, democracy is reduced to an electoral theater that is media-formatted exactly following the pattern of various TV spectacles (Liessmann, 2009, p. 117)."

Liessmann does not explicitly mention technological progress and the physical penetration of technology into everyday life as the cause of this. Nevertheless, the hints at the problem of technologization of the spirit, education and morality in his work cannot be overlooked.

Technologization is transforming the world so dynamically that if someone wants to succeed, they must adapt their behavior to the dictates of the need for lifelong education. On the one hand, there is the need for a universal, flexible, ever-learning worker of the new age, and on the other, the individual's interest in security of living conditions, freedom of action and the right to self-determination. The original idea of education as a means of emancipation rather becomes the need for an ideology of the need for adaptation.

LIQUID WORK AND OCCUPATION, LIQUID CAREERS

With the change of means of production, the nature of work and its organization also changes, and all this is naturally responsible for the changes in society. (compare for example: Bauman, 2021; Becker, 2013; European Commission, 2020; Ivanová & Staněk, 2016; Ivanová, Masárová, & Koišová, 2019; Kořen, 2020; OECD, 2018; Schwab, 2016; Spitzer, 2012). The dynamic development of technologies also has a fundamental influence on the dynamization of development in society. The results of a number of surveys (OECD, EU, G15) show that this development has an impact on the labour market, the structure of skills needs and the growing importance of new types of responsibilities and qualifications and competencies (Kořen, 2019).

The development of technology enables fast communication, travel, but also migration of investment capital. In line with Zygmunt Bauman (2020), advanced technology has significantly supported a new kind of "light" capitalism that is no longer dependent on the place where production and material resources are allocated, as was the case in traditional "heavy" capitalism often linked with Frederick Taylor or Henry Ford. The originally desirable model of closely linking the human-employee life story with a production organization that is firmly allocated and built to "stay here forever" is being replaced over time by a completely different model. In *liquid modernity* and its accompanying (or integral) phenomenon of "light" capitalism, the dependence of capital on local conditions (source, legal, political, economic) has decreased so much that the need for long-term loyalty has been displaced by short-term loyalty in the spirit of "Your personal story is connected to mine only until I find out where someone else is, more convenient for me." This applies both to employers and to the countries in which such "liquid employers" operate, and this also applies to their workforce (Bauman, 2020). The only difference between these strategies and the gold diggers' strategies is that the "deposits" ripe for investment are far more accessible and variable over time than there have been and are for real mineral deposits. Extraction and relocation are much easier, and

the delineation of mining space has long been determined not by any local authority but by a market in which the key factor for success is not so much "having the right idea" and hard work, but investment strength and speed of response.

The effects of all-pervading technologization can also be traced in the area of individual work. It is probably not necessary to engage in relatively redundant debate as to whether the primary cause of the advent of technologization was the development (and associated requirements) of society, or whether it was vice versa. The development of society is undoubtedly closely linked to the activities carried out in it, including the world of work. All variables in a complex system are in complex interaction with each other, and therefore they can act as influences and set conditions, and in fact they often do. Thus, work is influenced by the possibilities and needs of technologization and, *vice versa*, technologization by the needs and possibilities of work. This comes with both benefits and risks.

"Technological innovations such as automation and digitalisation drive productivity growth, increase revenues, generate new jobs and thus can contribute to better living standards. But will this new future of work bridge or increase divides among people? Which workers will be replaced by robots and artificial intelligence? How can workers adapt and take advantage of technology? And, how will these changes occur in different places? (OECD, 2018, p. 19) "

In addition, Bauman (2020) adds that while in the modern era the need for loyalty to the organization has displaced loyalty to the land and the feudal lord, in the postmodern "liquid" era, loyalty to organizations is displaced by primary loyalty to one's profession. This is related both to the deepening diversification of occupations - the accompanying phenomenon of advanced specialization is a situation where people are more loyal to their profession than to the employer (Šimek, 1996) - and to the dynamic instability and uncertainty of organizations. If organizations do not change dynamically enough, they disappear. In that case they are unstable. Nowadays, loyalty to the profession is much more pragmatic than loyalty to the employer.

"Robert Reich argues that economically active people can be divided into about four broad categories. The first is "symbol manipulators", people who come up with ideas and ways to make them desirable and marketable. Those involved in (re)production of workforce (educators or various welfare state officials) fall into the second category. The third category includes people employed in the field of "personal services" requiring direct contact with consumers. The greater part of this category consists of product sellers and manufacturers of desire for various products. The last, fourth category includes the people who formed the "social substrate" of the workers' movement throughout the 20th century and the middle of the 19th century. They are, as Reich says, "routine day laborers" attached to an assembly line or (in a more updated version) to computer networks and automatically operating devices as their supervision. They have few special qualities that would inspire their employers to try to keep them at all costs. They have only negligible, if any, bargaining power. They know that they are actually single-use, so bonding and being true to their job is of little importance to them, as is maintaining lasting relationships with co-workers (Reich, 1991; IN: Bauman, 2020, pp.204-205). "It is a natural response to the 'flexibility' of the labor market, which, translated into the experience of individual life, means that long-term security is the last thing that can be associated with the job one is currently pursuing (Bauman, 2020, p.205)."

It is also true that time dynamizes the variability of the content of the work of individual professions as well, but their primary mission does not change. Even though there is a huge difference between the content of work and especially the procedures and tools used, for example, by people operating milling machines today and fifty years ago, the subject of the work (milling) remains the same and therefore stable. It is important to emphasize that the subject of the work does not change. What is changing, and often very significantly, is the content.

Occupations are changing and disappearing as a result of the change in the content of work, but the speed of their change is probably not as dramatic as in the case of organizations. Even though several dozen occupations have disappeared in the last quarter

century, compared to the number of emerging and disappearing employers' organizations, which go into the hundreds of thousands per year, these numbers are negligible (OECD, 2018). In addition, the decline of the mining and manufacturing industries in parts of the world traditional for the Industrial Revolution (Europe and North America) does not mean its disappearance globally. Even though Western civilization (somewhat boastfully, it has to be said) attaches to its imaginary signboard a label such as *the knowledge society, the knowledge economy, the service economy or the digital society*, there is still a need to produce what these so-called advanced societies are increasingly consuming. Modern society is thus becoming less and less self-sufficient and is becoming dependent on the productive power of "less developed" societies. That the promoters of the knowledge and information society tend to ignore and sometimes even purposefully hide this fact is a paradoxical state in which, more than anything else, *a society of uneducation and disinformation* is created (Liessmann, 2009).

The constant pressure to adapt and the mantra of flexibility not only divide society, but even create an environment in which it pays not to be individualized. Together with the gradual transformation (perhaps even the disintegration) of traditional institutions "caring" for the upliftment of the masses and the transformation of civil society, man is now directly and indirectly forced into hypertrophied individualization. In agreement with Bauman, it can even be said that *liquid modernity* (as Bauman calls this era) has thus significantly reduced or even completely removed the traditional certainty that people, if they do not want to stay on the margins of society, have no choice but to completely individualize their own lives. Taking care of oneself without relying on social institutions is an accompanying phenomenon at a time when institutions can no longer provide any fundamental certainties (Bauman, 2020).

More than one liberal might say that individualizing a solution is a manifestation of freedom. However, it must be remembered that freedom does not lie in the mere fact that we are free, but rather in the fact that we can choose between freedom and non-freedom at any time. In the spirit of George Orwell's ideas, which can

be found in one of his most famous novels, "1984," it is useful to know that a free man can be one who comes to his own, unconditional belief that being free was his own free choice. Thus, there can be free slaves on the one hand and slaves to freedom on the other. As Bauman (2020, 2021) says, even in the case of freedom, it is necessary to consider freedom and autonomy *de jure* and *de facto*. Do we have to be free because we want to, or do we want to be free because we have to? And in this case, is individualization a necessity because we need it, or do we need it because it is a necessity?

"Belief in the inevitability of our epoch is probably one of those illusions that is necessary for the inevitable to become truly inevitable (Liessmann, 2009, p. 119)."

Even though the production of risks and contradictions is a social obligation to deal with them, it is individualized. Individualization is destiny, not choice. The individualization game cannot be escaped, or it is not possible to refuse to participate in it. However, this also has societal implications in the form of weakening civil society. The citizen, Bauman says, is a person who tends to pursue his well-being through the welfare of the community, while the individual is lukewarm, skeptical, and cautious in matters such as the "*public interest*," "*equitable society*". After all, he is a mandatory participant in the game, which says that everyone is primarily responsible for themselves. In the logic of such a community of individuals, it is the "common interest" to allow everyone to primarily satisfy their individual rather than the interests they hold in common (compare Bauman, 2020, pp. 50-52).

Another problem with postmodern freedom, which is also strongly related to work, is its outward appearance. The pressure to constantly adapt to change does not make a person freer than the pressure for stability. If the only certainty is change, which is, moreover, influenced by those who are least affected by the hardest of these changes, then there is essentially no such thing as individual choice. The attribution of social status defined by origin changes into an attribution defined by constant change. Although the strong emancipation movements of late modern and postmodern society have severely limited the traditional

reference groups which have shaped individuals' attitudes toward work, profession, and career, we must not forget that it was postmodern development that created different limits.

"We have less and less models, codes and rules we could to adapt to, to choose as stable marks for orientation nowadays. ... Such a workforce tends to undergo countless profound changes during its career before it reaches a single real end: that is, individual life (Bauman, 2020, p. 15)."

The rhetorical question which it is logical to ask in the context of the previous paragraphs, is: "Shouldn't the task of progress be to make life easier rather than more complicated?"

Despite the undeniable advances in the development of artificial intelligence, we cannot ignore the fact that AI has led to modern society gradually moving towards a certain simplification of decision-making processes. However, this is not because it should be easier to make the right decision, but because even the most advanced artificial intelligence decision-making algorithms are not yet able to handle the trillions of variants that the human brain's neural network allows. So often people have to simplify their decisions not because they are right, but because machines need a given degree of simplification in order to work. So, it is not machines serving people, but people serving machines. Rather than the correctness of the decisions, it is a question of the acceptable level of incorrectness (compare: Kamensky, 2017; Spitzer, 2012). The important question, however, is: "What is the right criterion for deciding the level of admissibility which is going to be enough?"

Despite the respect for the technological prowess, intelligence and complexity of many technologists who create advanced robots (real, but also software), issues of morality, ethics, culture, emotions and values fall into the hands of fields other than ICT. But even this still sovereign area of humanity is affected by advancing technology.

"The growing technological complexity in the context of Industry 4.0 technocratic capitalism is in inverse proportionality to the spiritual sphere which is simplified in the postmodern tradition of misconceptions of

consumer society and a mass actor-consumer's false sense of involvement in the innovative development of techno-environment and knowledge economy (Kamensky, 2017, p. 9)."

Technologies that surpass a person's physical or volitional cognitive abilities have always had and still have a major impact on the transformation of society.

It is true that many technologies surpass man in his physical and volitional cognitive abilities. However, it is important to point out that the phrase is volitional cognitive. In addition to thinking, memory, and a variety of mental operations (analysis, evaluation, combining, decision-making), there is a wide range of what our brain and nervous system can do, but we ourselves are not in control of these processes and they remain hidden from our direct consciousness. As Jostein Gaarder says: *If our brain were so simple that we could understand it, we would have to be so constrained by its simplicity that we could not understand it* (compare Gaarder, 1995). This is by no means to question the level of technological progress, because that is definitely respectable. However, when an electronic device can calculate something faster and more accurately than a human at the same time, and when a computer can beat even a chess grandmaster in a game of chess, this still does not change the fact that, at least for now, even the most powerful computers and so-called Artificial Intelligence have come into existence, as far as we know, thanks to humans, not the other way around. This, of course, may change in the future. However, the question is whether we are becoming dependent on technology because of our reluctance to give it up rather than the simple fact that we need them in our lives. Even a complex nuclear power plant is controlled by computers, not because people as biological creatures need it, but because they want it. If technologies are used in the future to avert huge natural, man-made disasters, it will not be because of the will of the machines, but because of the potential that people have given them in the beginning. So far, however, the question whether humanity has improved through technology is often still an open one.

The use of digital technologies and artificial intelligence has a huge impact on

traditional job models and forms of work collaboration. The ability of many digital professions to work anywhere is almost unlimited. From one point of view, this option could make people who can do it more independent. On the other hand, there are several complications for the current employment system and existing labor law rules. Protecting employees with local laws is complicated in different countries, and it does not matter if we are talking about an independent state in our region or a country on the other side of the globe. Thus, under what law will an Austrian-based programmer be employed for a Mexican company in the Bahamas? How will compliance with any such laws be monitored, and how will they be possibly enforced? The problem of working in conditions of spatial flexibility is much more complex and therefore cannot be reduced to the question of supply and demand or the speed of connection to the global information network "internet" (Kofen, 2019).

CONCLUSION

Fear of progress has accompanied mankind since time immemorial. The unknown, the incomprehensible and the uncontrollable have been, are, and probably will always be a source of frustration arising out of feelings of imperfection, inadequacy and helplessness. No matter how these fears have manifested themselves, they should not be a reason for trivialization or "positive" manipulation. This applies both to adherents of technology and the global market, and to those who look at their accompanying phenomena with more concern and reservations.

It cannot be disguised that this essay is a critique, but it would be unfair to assess it as primarily or even purposefully critical. Its main purpose is to relativize techno-optimism and provoke a debate that will be broader and deeper than just the constant social discourse dominating the proclamation of new, better tomorrows that will guarantee technological progress for humankind. Progress, like science, does not readily lend itself to value judgments such as good, bad, beneficial, unhelpful. It is necessary to apply broad, purposefully unreduced knowledge and consistent critical

thinking of its impact. In the society of knowledge, if it really is such a society, that is what it is about.

"A society that defines itself through 'knowledge' could be understood as a society in which reason, judgment, balance, foresight, long-term thinking, clever reasoning, scientific curiosity, and critical self-reflection, gathering arguments, and hypothesis research finally outweighed irrationality, ideology, superstition, conceit, greed and ignorance (Liessmann, 2009, p. 22)."

The current discourse over the changes that accompany, follow or sometimes even provoke the technologization of society is quite significantly dominated by states that are highly uncritically optimistic. This is due to the overly one-sided focus of modern social engineers, who, and hopefully unintentionally, create pressure for change without a deeper insight into the broader social context (compare Širůček, 2017, 2018). This focus is a partly purposeful - and, it should be noted, often very sophisticated - promotion of the ideology of the need for technological development in all areas of human existence, which conspicuously becomes an ideology accepted and supported by society as a whole. Modern technocracy has the strong potential to influence social opinion through the astute control of the information space. Anyone who is not always ready for transformation becomes a renegade who does not understand the needs of the current time.

"Today, it is necessary show willingness to reform, a person who resists reform is bad. Reform is good, it is a defense against evil, the world is divided into supporters of reforms and enemies of reforms. And like any good ideology, the reformist spirit does not have to justify itself (Liessmann, 2009, p. 110)."

Paradoxically, the use of the term "knowledge reform" exposes the limited knowledge of the reformers themselves, because to reform means to return to the original form, meaning, purpose. Thus, the reformer, in the true sense of the word reform, is not the one who abandons the original forms and establishes others, but the one who returns to the origin and its basic values (Liessman, 2009). However, it is not for us to stagnate in an old-fashioned manner, complain about a bad future, and dream

about the past. We cannot forget that in assessing the past, moreover, uncritical remembrance optimism plays an important role. It would be enough to respect existing knowledge, at least until it is refuted in Karl Popper style.

Zygmunt Bauman said that one of the fundamental changes associated with fluid modernity that is a hallmark of the post-industrial and postmodern eras is the loss of faith in long-lasting truths and goals. This is an accompanying phenomenon of emancipation, but it can, and often does, cause a completely

different kind of limitation. Whereas in the past we used to be paralyzed by the path that someone else chose for us, today we are paralyzed by the need to constantly move and constantly catch up and, above all, to constantly make choices. Our choices are no longer permanent, so as a result of our knowledge and changes around us, they are constantly changing. However, our own responsibility for them remains (Bauman, 2020). It is therefore in our own interest not to succumb to the delusion of the absence of other possibilities and ideas. This would be irresponsible to ourselves.

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Manuscripts **should not exceed** 22 standard A4 pages in length.

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- Title of the paper – centered, capital letters (11-point font size, Arial Bold);
- Author's name – centered, do not include professional, official or academic degrees (12-point font size, Arial *Italics*);
- Abstract (8 – 10 lines) – English language (9-point font size, TNR *Italics*);
- Key words (at least 5 words) – written in Slovak (Czech) and English language (9-point font size, TNR *Italics*);

Body of main text: *Introduction* (establish the existing state of knowledge of your research topic, identify the specific focus of your work, include relevant citations from primary literature, justify how this topic requires additional study, state specific objectives/hypotheses, methods, describe the meaning of your research); *Goal and Methodology*; *Findings*; *Discussion*; *Body of main text* should be divided into chapters and subchapters. Chapter titles are to be numbered, 11-point font size bold, align left; *Conclusion*; *Notes*.

Manuscript formatting:

- aligned to block,
- 10-point font size, Times New Roman,
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- indent each new paragraph 3 pt,
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Tables and graphs are to be in black and white colour, numbered in order of their being referenced in the text. Table titles (Table 1), graph titles (Graph 1) and/or figure titles (Fig.1) should be written in 10,5-point font size, Times New Roman *Bold Italics*. Indicate source in 8-point font size, Times New Roman. *Source: Cihelková. (2009). Svetová ekonomika, s.23., By: www.slovakia.culturalprofiles.net/?id=-13602, (2012-15-03).* **Formulas** are to be numbered using a parenthesis.

References in the text (Harvard style – APA styles (American Psycho-logical Association 6th edition) should be set in parenthesis in this type of format: (a surname of an author(s) of a work, comma the year of edition and number of pages, for example: (Romer, 1985, pp. 998-1020; Snowdon (Ed.), 1998, p. 100; Snowdon et al., 1998, pp. 100-121; Romer, 1985, pp. 998-1020).

References should appear in the reference list at the end of the paper. List references in alphabetical order by surname and name of the author in line with the applicable Slovak style of reference/citation. References within the text (name, date and page number) may be given in parenthesis (Drucker, 2005, p. 87). Do not use footnotes.

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Name SURNAME of the authors (Arial italics font 11)

Abstract Times new roman Italics Body text (9)

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Introduction (Times new roman Body text 10)

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Goal and Methodology (Times new roman Body text 10)

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Findings (Times new roman Body text 10)

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Discussion (Times new roman Body text 10)

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Mcheill, A. (2002). Correlation and dependence. Dempster, M.A.H. (ed.): *Risk Management: Value at Risk*. Cambridge: Cambridge University Press, 176–223. (kapitola v knihe)

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