

# Virtual workplace: current knowledge, changes and a new perspective on the way of work.

## A Systematic Literature Review.

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**Abstract:** *Today's world is full of rapid changes, accompanied by an unsustainable pace of technological development. Thanks to the advent of virtualization, the way of working is changing as the dependence on time and space ceases to influence work opportunities. Globalization, information, and communication technologies mean that we are encountering more and more concepts such as virtual teams, virtual leadership, or remote working in companies. At the same time, virtualization, accelerated by the COVID-19 pandemic, opens up a range of new issues that require greater interest from researchers - such as the specifics of women working from home, the gender gap, ways of coping with stress, and others. Our paper is therefore dedicated to a systematic review of the literature on virtualization. Based on a qualitative analysis of the 30 most cited works from the Web of Science database that relate to the topic of the virtual workplace and were published in 2018-2022, we provide an overview of the current issues and challenges facing the corporate sector today. The VOSviewer and Voyant Tools software were used for the systematic literature review. Our research provides an overview of the most important topics related to virtualization while presenting problems and existing research gaps.*

**Keywords:** VIRTUALIZATION, VIRTUAL WORKPLACE, VIRTUAL ORGANIZATION, VIRTUAL TEAM, VIRTUAL LEADERS

### 1. Introduction

In the field of technological innovation, there is currently an unprecedented boom and improvement. A major change is also virtualization and the emergence of a virtual work environment where physical distances or time zone differences no longer matter. Companies are responding to technological innovation by digitally transforming their processes. The crisis related to the COVID-19 pandemic has had an even greater impact on the digitalization and virtualization of the world of work.

Many companies have decided to reduce the risks by relying on remote or home working to prevent contact between people and thus the spread of the virus itself. In the immaterial world, the constraints of the material environment are disappearing and opportunities, but also obstacles and risks related to the use of the virtual workplace are emerging. This situation brings new issues for management that reflect the challenges of the business environment, such as labor productivity in a virtual environment [1-3], the issue of gender when working from home [4, 1, 5, 6] the quality of videoconferencing in a virtual environment [7] or the issue of leadership in a virtual environment [8], as well as mental health, stress and well-being. Not only new topics are emerging, but also new concepts such as work from anywhere [2] gig work and gig workers [9].

Current technological development is focused on finding new ways for people and technology to interact. Growth as the only acceptable outcome is driving companies towards increasingly sophisticated concepts of competitiveness. Technological progress is shrinking the physical world and shaping a virtual world whose potential seems limitless. The world of work in the age of virtualization is also a reason to reflect on the changes in the nature of work, the demand for work, and social insecurity, as well as on the management of work performance and the building of employee value in times of virtualization of work. Systemic, technological, and above all value-based changes, which are a consequence of progress, not only determine modern concepts of human resource management but also create a new perspective on work, the management of work performance, and the creation of value in the 21<sup>st</sup> century. The aim of our contribution is therefore to map the current state of research on virtualization and to provide a comprehensive overview of the current challenges for companies. Our research provides an overview of the most important issues related to virtualization while highlighting the problems and existing research gaps.

### 2. Theory background

The digital economy is a term that signals the use of information and communication technologies, especially in the production sectors and thus in society (digital society). Digital transformation is leading to far-reaching changes in all areas of value creation, resulting in more efficient business processes, stronger customer orientation, and new business models [9]. In the virtual environment, the content of the performance and the responsibility for it are changing. Relationships are transformed. Performance is the outcome, not the complexity and hassle of getting there. Current knowledge about the impact of digital transformation on work raises the question of readiness of companies to manage a new generation of employees and, at the same time, the readiness of employees to work in a virtual environment. A virtual organization is a flexible network of independent entities linked by telecommunications and computer technologies to share knowledge, skills, and access to expertise in a non-traditional way. It is a form of cooperation between companies, institutions, but also individuals who offer a product or service based on a common business interest. Individual subjects cooperate and present themselves as a single organization [11]. The current pandemic period has accelerated the transition from a traditional form of organization to a virtual organization. The foundation of a virtual organization is information and communication technologies (ICTs) [12]. Based on the above facts, the main characteristics of a virtual organization are the following: flat organizational structure, dynamism, informal communication, flexibility in all areas - e.g. working hours, multidisciplinary teams, focus on achieving goals, pro-customer orientation, working from home – an absence of a physical shared workplace, information sharing, use of outsourcing, the expertise of employees and managers. We believe it is important to explore the development and use of technological innovations in line with the demands of the digital world and at the same time with the appeal to humanize work. The potential of digitalization and working in a virtual environment is currently not fully explored. We, therefore, consider it essential to define basic terms such as virtual organization, virtual team, remote work, and virtual leadership.

#### 2.1 Virtual organization

The development of the Internet and the subsequent emergence of ICT have led to the emergence of virtual organizations. These are defined as temporary groupings of companies that work together and share their resources, knowledge, and skills to better respond to

changes in the external environment. For the first time, the term virtual organization appeared as early as the 1980s in the work of Mowshowitz, when the author spoke of such an organizational arrangement in which there is a consistent separation between the requirements and the ways to fulfill them. Somewhat later, the term appeared in the work of Malon and Davidow in the 1990s, with the authors emphasizing the temporality aspect - the structure is created to fulfill a specific business objective, after which it is dissolved. For a virtual organization, the use of ICT is key [12]. A virtual organization is created through the intensive use of ICT and has no specific structure. Based on the possibilities offered by technology today, the virtual organization functions independently of the concept of time and space. An organization can also have a digital structure and also provide opportunities to be closer to customers and markets. Virtual collaboration is thus defined by technologies that focus on socially integrative and easily connecting technologies. As we have already mentioned, the virtual organization is based on the strict separation of requirements and the way they are fulfilled [13]. This separation allows managers to easily and flexibly change the way requirements are fulfilled depending on the current circumstances - and this is exactly what the flexibility of this structure is based on. This makes the need for specialized management activities that examine and monitor the abstract requirements necessary to achieve a particular goal and at the same time, independently, examine and determine the concrete means of meeting those requirements, extremely demanding. At the same time, this creates pressure to coordinate activities to a high degree. By logically separating the requirements from the means of meeting them, management creates an environment in which the means of achieving the goal are constantly and routinely evaluated against explicit criteria. This governance structure ensures that requirements are always met as adequately as possible [13]. A virtual organization is characterized by a continuous organization through virtual teams and alliances, a unique management culture and set of norms, information and knowledge sharing enabled by information technology, and employee self-management [14]. In modern literature [15] the term virtual network structure is already used today, which seems to underline the fact that the virtual organization is only a superstructure of the network structure and is taken to a new level mainly through the use of ICT and the shift of the work environment to the virtual world.

## 2.2 Virtual team

A virtual team is a group of people working across different time zones, locations, and organizational boundaries, connected by communication technologies. They have complementary skills and are committed to common goals, have interrelated performance-based tasks, and share a work approach in which each member of the virtual team is personally accountable. Virtual teams are geographically dispersed and enable companies to collaborate and hire the best people regardless of location [16] point out that virtual teams consist of geographically separated employees working on a common goal and communicating with each other via information technology.

## 2.3 Remote work

Remote working increases the quality of life and allows employers to get the best employees wherever they are. Remote working also leads to savings in office costs. In practice, remote working can take the following forms:

Home office or work from home, i.e. working from home. By home office we usually mean an occasional situation where an employee stays at home for some reason to work from home, homeworking is used in cases where working from home is a pre-agreed norm.

The term telework is used for forms of remote work (from the Greek word tele - far) where the employee works either from home

or from another location outside the employer's workplace, making full use of current modern technologies.

The literature also mentions the term telecommuting, where this term includes employees who have a traditional office but work from another location 1-3 days a week.

**Table 1: Advantages and disadvantages of remote work**

Advantages of remote work	Disadvantages of remote work
Employees often perceive it as a benefit.	Little opportunity to control employees.
It provides employees with a sense of freedom and flexibility.	Great demands on the organizational skills of individuals and managers.
Time-saving (commuting to/from work as well as on business trips is eliminated).	Demanding on employees' self-discipline.
Saving commuting costs for the employee.	High costs of hardware and software equipment.
Saving office space costs.	Brain drain - even if employees do not physically move to their employer's country, they often provide their talent abroad.
The opportunity to employ people from abroad who do not have to travel or leave their homes.	The emergence of new ethical problems - employment of cheap labor force from abroad and non-respect of human rights.
The opportunity to obtain a cheaper labor force from abroad, without the need to move for work.	The risk of mutual alienation of employees.
The opportunity to work even with certain health restrictions - (e.g. a broken leg) or when treating a sick child.	Absence of non-verbal communication.
Lower environmental impact due to elimination of travel.	Social isolation of employees. [17] state that the more people use the Internet, the more they feel lonely and depressed, experience more stress, and their communication with family members is tied, and their circle of friends narrows.

Source: Skorková, Z. 2019. Práca na diaľku ako inovatívna forma organizácie práce = Remote Work as an Innovative Form of Work Organization / Zuzana Skorková. - VEGA 1/0109/17 In: Aktuálne trendy v manažmente [electronic resource]: peer-reviewed collection of scientific papers, České Budějovice : Vysoká škola evropských a regionálních studií VŠERS, ISBN 978-80-7556-058-2. - S. 158-167 CD-ROM.

## 2.4 Leadership in the virtual workplace

The question of leadership is of course related to the development of virtualization. One of the biggest challenges for virtual teams is leadership. We define leadership as a relationship between a leader and his/her followers who work together to implement changes that lead to the fulfillment of their common goals [18]. In a virtual environment, the influence of transformational leadership of people is highlighted, which can increase performance, satisfaction [19], and motivation [20]. According to [21], there are three basic roles of a virtual leader:

- liaison between team members to interpret events and the overall environment.

- it is necessary to ensure a consistent specification of purpose, while the goal of each activity must be consistent with the overall goals and intentions of the team.
- the main role should be played by the response coordinator to identify the right resources and develop tactics to solve problems.

The main reason for the unsatisfactory state of virtual work is its leadership aspect, which has been underestimated and overlooked. From the perspective of some researchers, virtual teams are independent and have no formal leadership [19].

### 3. Research methods

#### 3.1 Research question and data selection

The aim of this systematic literature review is to identify the current theoretical level and the current changes in the area of virtualization, especially in connection with virtual workplaces and remote work. Our research provides an overview of the main topics related to virtualization, while also presenting the issues and existing research gaps.

At the beginning of the research activity and to achieve the goal of this paper, the following research question was defined:

**RQ:** What is the current level of knowledge and structure of research in relation to the virtual workplace?

For the purpose of developing a systematic literature review, the authors used a standard procedure through a keyword search. In the field of the virtual workplace, which is the primary topic of this review, the following group of keywords was used:

**Used keywords:** virtual workplace, remote workplace, virtual office, home office, telecommuting, virtual work.

To the point of the research, the scientific database Web of Science was used, from which the 30 most cited research papers were selected based on keywords and the number of citations. This selected database was further analyzed more deeply through two online tools.

#### 3.2 Data analysis

Two analytical tools were used to process the results: Voyant Tool and the VOSviewer tool. For word analysis, we used Voyant Tools. Voyant Tools is web-based text reading and analysis environment. It is a scholarly project that is designed to facilitate reading and interpretive practices for digital humanities students and scholars as well as for the general public (voyant-tool.org, 2022). We analyzed the headings and abstracts of the 30 most cited articles in Web of science, which were focused on virtual and remote work. In Voyant Tools, for correlation, it is used Pearson's correlation coefficient. The correlation coefficient is calculated by comparing the relative frequencies of terms (relative to each document for the corpus or relative to each segment of the document). A coefficient that approaches 1 indicates that values correlate positively, they rise and fall together. A coefficient that approaches -1 indicates that values correlate negatively; frequencies rise for one term as it drops for the other. Coefficients that approach 0 indicate little correlation, positive or negative. This value is Pearson's correlation as calculated by the Apache Math Commons Library Simple Regression class.

VOSviewer is a software tool for constructing and visualizing bibliometric networks. Our used network includes 30 selected research papers and it was created based on the citation score in the area of virtual workplace research. VOSviewer also offers text mining functionality, which is used for the purpose of data analysis and the discussion of this systematic literature review.

## 4. Results and finding

### 4.1 Data analysis: Voyant Tool

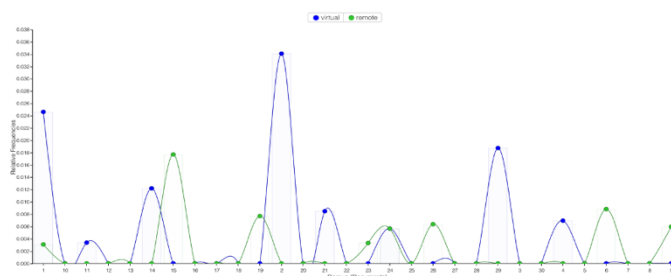
This corpus has 30 documents of 30 abstracts and includes 7,111 total words and 1,677 unique word forms. Most frequent words in the corpus: work (172); covid (64); home (61); research (50); job (50). The most used words are shown in Table no. 2.

**Table 2:** The most frequently used words

TERM	COUNT	TERM	COUNT
work	172	employees	46
covid	64	pandemic	38
home	61	telework	30
research	50	telecommuting	29
job	50	performance	29
working	46	effects	29

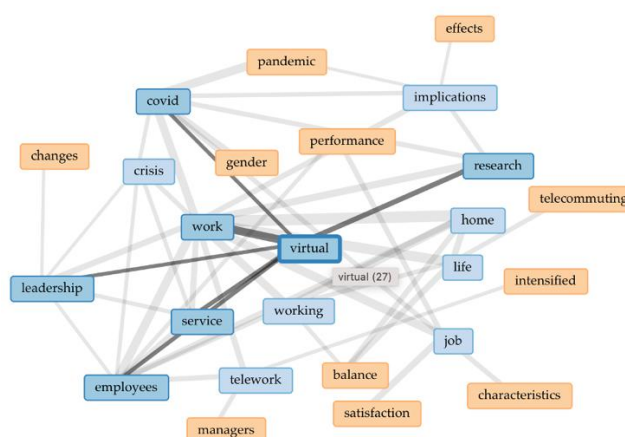
Resource: data analysis

Trends in Graph 1 is a visualization that represents the frequencies of terms across abstracts in the corpus. Each series in the graph is colored according to the word it represents, at the top of the graph a legend displays which words are associated with which colors – the word virtual and the word remote. The word virtual is more common in the whole corpus, it is more used by authors. Virtual work and remote work are similar concepts, but they have some differences. Virtual work refers to a type of work where employees use technology to perform their job functions from a location outside of the office. Remote work, on the other hand, is a broader term that includes virtual work. Remote work can refer to work done from home or a co-working space. The word virtual has become increasingly popular in recent years, as advances in technology have made it easier for employees to connect and collaborate from virtually anywhere.



**Graph 1:** The most frequently used words

Collocates Graph 1 represents keywords and terms that occur in proximity as a force-directed network graph. We used 25 words that relate to the word virtual. The strongest connections are with work, covid, research, service, employees, and leadership. The words in the maroon color are indirectly connected with the word virtual.



**Figure1:** Links with word virtual

According to Figure 1, the strongest positive correlation is between Work and Virtual, but the significance is weak. Other correlations are irrelevant because the significance is high (Table 3). It could be also because of the small number of values.

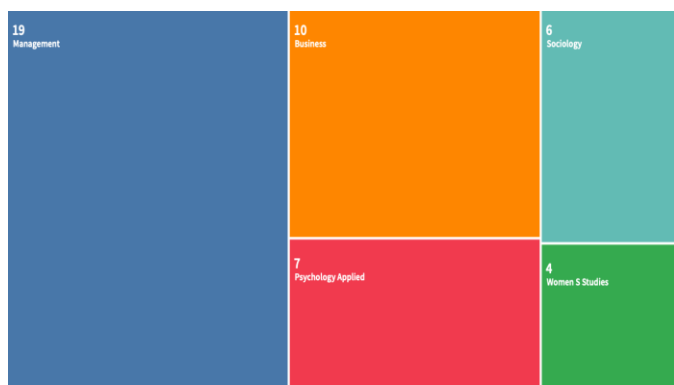
**Table 3:** Correlation and significance among the most frequently used words

Term 1	Term 2	Correlation (r)	Significance (p)
Work	Virtual	0.182	0.335
Covid	Virtual	0.049	0.711
Satisfaction	Virtual	0.019	0.705
Leadership	Virtual	0.006	0.891
Effects	Virtual	0.005	0.902
Family	Remote	0.002	0.940
Woman	Virtual	0.001	0.982
Man	Virtual	0.001	0.983

Resource: data analysis

#### 4.2 Data analysis: VOSviewer tool

By using the analysis in the VOSviewer tool, the visualization of selected articles on the topic of the virtual workplace was processed according to specific parameters, which were the publication category Web of Science categories (figure 2), and citation topics meso (figure 3).



**Figure 2:** Web of science categories – top 5

The topic of the virtual workplace is very popular within the categories of Management and Business, the third category is Psychology Applied, which in practice means that this topic is also closely connected to psychology as a scientific field.



**Figure 3:** Category: Citation topics meso

The most cited articles in the field of the virtual workplace were published in the USA, but the topic is also actively addressed in Europe (a total of 14 articles published), most in Germany.

## 5. Discussion

### 5.1 Qualitative synthesis of selected research papers

The most cited research paper from the analyzed database (in a total of 30) was subsequently processed qualitatively. A brief overview of the structure of the research papers according to the research method used and according to the focus of the results is shown in the following tables 4 and 5.

**Table 4:** Type of the research in analyzed research papers

Type of the research	Number of the research papers
Meta-analysis - Research based on the analysis of existing findings	4
Research processed from already existing data databases	3
Qualitative analysis	1
Original research – original data collection – research sample to 50 respondents	2
Original research – original data collection – research sample from 50 to 500 respondents	12 Avg: 233 respondents
Original research – original data collection – research sample from 500 to 1000 respondents	2
Original research – original data collection – research sample over the 1000 respondents	3
Literary research, comparative review	3

Resource: data analysis

Most of the research papers (12 out of the 30) used original data collection, while the range of the research sample was from 50 to 500 respondents.

According to the purposes of the research and results, the database of 30 research was clustered in four areas (Table 5). The first one with a focus on job satisfaction, work-life balance, motivation and well-being contained 11 research papers [22, 23, 8, 24, 25, 3, 26, 27, 28, 29, 30].

The second cluster was focused on job performance and leadership in the conditions of the virtual workplace, online and remote jobs [8, 31, 2, 32, 33, 34].

The third one contained results and conclusion about gender and women, especially in regard of inequality and different conditions of remote work [4, 1, 35, 36, 5, 6].

The last cluster pointed out virtual jobs in online environment and its technical parameters and tool [37, 38, 39, 40, 7, 41, 42].

**Table 5:** Structure of results in the research paper

Clusters of results/research outputs	Number of the research papers
Job satisfaction, work-life balance, motivation, and well-being	11
Job performance and leadership	6
Gender and women	6
Virtual job, tools, and parameters	7

Resource: data analysis

**Summary of the Research Methods:** 27 out of 30 research papers contained original data analysis or meta-analysis with formulated research questions. The most common method was hypothesis testing and analyzing the dependencies between selected variables.



## 5.2 Summary and overview of the key results

On the basis of a selective analysis of the most cited research papers, a clear graphic synthesis of the most frequent and used words was processed (figure 4). Then a graphic visualization containing a time factor was processed (figure 5), which shows gradual changes between individual keywords in the analyzed articles. The shift in 2020 compared to 2019 shows the new topics that appeared in connection with the virtual workplace, namely well-being, gender, and job satisfaction.

From the analyzed database of 30 research papers, the largest number of articles was published in 2020 (13), and five of them were published in 2021. The others were published before the COVID-19 pandemic, in 2018 there were 3 research papers and in 2019 were published 9 of them.



**Figure 4:** Visualization of the most frequented words across the entire

*Resource: data procession Voyant*

- methods and possibilities of managing work-life balance and building well-being strategies, managing stress, and building resilience;
- the area of developing mindfulness (Mindfulness is beneficial in overcoming the difficulty of disconnecting from work; difficulty in maintaining concentration on work tasks and reducing fatigue from exposure to the screen);
- identification of the optimal and effective leadership style - task orientation versus people orientation, adaptive leadership, transformational leadership, authentic leadership, virtual leadership;
- improving job satisfaction and methods of motivating employees - factors at the individual level, factors related to tasks, and factors at the company level;
- voluntariness and the possibility of choice in the case of a hybrid model of work – involuntariness causes lower performance and resistance to work as well as more conflicts, the possibility of choice reduces the level of stress and the intention to leave work. The agreement is beneficial for both parties;
- changes in the style of work, communication, and cooperation, ways of measuring performance in remote work, higher autonomy and degree of independence = greater emphasis on self-management and intrinsic motivation;
- key prejudices hindering the support of work from home by the employer and possibilities of the optimal implementation of the remote model in the companies;
- fundamental barriers and differences in the perception of men and women working from home in relation to productivity and job satisfaction, deepening of the "gender gap", remote work, and gender inequality.

The identified areas above should be analyzed together with measurable performance factors: productivity, employee satisfaction, turnover rate, and employee engagement.

## 6. Conclusion

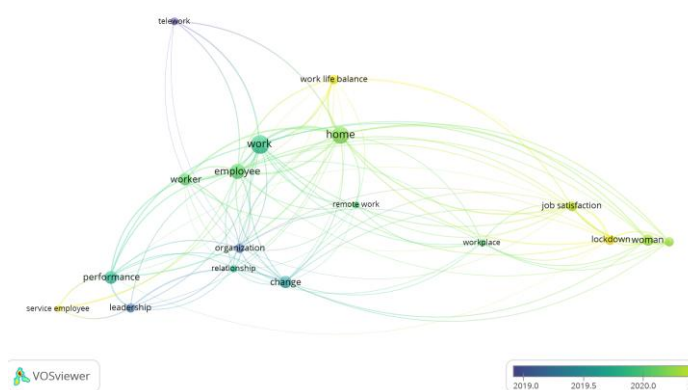
The boundaries of the labor market, working hours, and working environment are disappearing as the global workplace enters a virtual environment. The current challenge for people management caused by the pandemic crisis is social distancing. The validity of researching the management of people in a virtual environment is also supported by an intensive appeal for sustainability and new forms of management and leadership of people in a virtual space that affects work performance. We consider it important to explore the post-pandemic people management trend associated with the virtual workplace, which defines the future of work and education.

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**Figure 5:** Overlay visualization – changes among the crucial words over time

*Resource: Data procession VOSviewer*

Based on the analysis of the most cited articles and scientific outputs (N=30), the authors defined essential current variables and key research areas that can be the object of data analysis in further research aimed at looking into the virtual workplace and remote work. In the monitored period of 2019 and 2020, there was a shift towards topics that closely connected the virtual workplace with job satisfaction, work-life balance, and gender issues.

It appears that the following research areas are essential for further study in the field of virtual workplace and remote work:

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