

Digital Technology as a Facilitator of Improving Organizational Performance and Workplace Satisfaction: A Bibliometric Analysis Using VOSviewer

Andreea BARBU

*National University of Science and Technology POLITEHNICA Bucharest, Bucharest, Romania
Academy of Romanian Scientists, Ilfov 3, 050044 Bucharest, Romania
Corresponding author, barbu.andreeab@yahoo.com

Mirona Ana-Maria POPESCU

*National University of Science and Technology POLITEHNICA Bucharest, Bucharest, Romania
Academy of Romanian Scientists, Ilfov 3, 050044 Bucharest, Romania
mirona.popescu15@gmail.com*

Iustina-Cristina COSTEA-MARCU

*National University of Science and Technology POLITEHNICA Bucharest, Bucharest, Romania
Academy of Romanian Scientists, Ilfov 3, 050044 Bucharest, Romania
costeamarcuiustina@gmail.com*

Gheorghe MILITARU

*National University of Science and Technology POLITEHNICA Bucharest, Bucharest, Romania
ghmilitaru.militaru@gmail.com*

Dana Corina DESELNICU

*National University of Science and Technology POLITEHNICA Bucharest, Bucharest, Romania
d_deselnicu@yahoo.com*

Ștefan Alexandru CATANĂ

*University of Bucharest, Bucharest, Romania
stefan.catana@faa.unibuc.ro*

Abstract. *To enhance employee collaboration and streamline operations, businesses are spending more money on digital solutions in the current environment of rapid technological advancement. Employees can operate efficiently remotely by utilizing online platforms for communication and cooperation, which improves job satisfaction and organizational performance. This paper proposes to present a retrospective analysis of publications on digital technology used in the context of performance improvement and satisfaction within organizations. In this sense, a bibliometric study is carried out based on the analysis of scientific works published in the Web of Science database. The searches were carried out using the keywords "digital technology", "performance", and "satisfaction". Querying the database revealed the existence of 1005 papers, collected data being analyzed with the help of Microsoft Excel and VOSviewer software. The collected and analyzed data highlighted the existence of several clusters of publications, authors or organizations that addressed the analyzed topic. This research also indicates clusters of keywords that suggest potential directions for future research and clearly identify the impact of digital technology on organizational performance and employee or customer satisfaction. Through this bibliometric study, the*

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authors provide valuable information from which to start those who want to investigate the digital domains, organizational performance, or satisfaction in organizations.

Keywords: digital technology, performance, satisfaction, bibliometric analysis, trends, data analysis, Vosviewer

Introduction

As the digital era continues to grow, it is becoming increasingly clear how technology affects employee satisfaction and performance in businesses. Within this framework, bibliometric research offers an invaluable viewpoint on the development of this field. An overview of a bibliometric research article examining developments and patterns in the effects of digital technology on job satisfaction and organizational performance is provided in this paper.

The authors of this study analyzed 1005 publications to determine keywords, popular trends, and areas for future research. In addition to giving a summary of current research, this study highlights the topic's significance and applicability.

Keywords like "performance," "satisfaction," and "technology" are highlighted in the paper along with popular terms like "COVID-19". The detailed analysis of the evolution of publications in this field reveals a significant growth in recent years, underlining the increased interest in studying the impact of digital technology on organizations, their employees, and their clients.

The goal of this study is to provide academics and experts in the fields of management and digital technology a strong framework for comprehending current and upcoming developments in the study of employee satisfaction and organizational performance in the context of digital technologies. Thus, the research of this paper can serve as a useful guide for the orientation and further development of studies and practices in this field.

Literature review

Faced with significant challenges generated by changes in the global market, organizations are intensifying their use of information and digital technologies to innovate products and processes, effectively manage relationships in value chains and gain or maintain a competitive advantage (Capestro et al, 2024).

Digital technology has a major impact on decision-making and work performance within businesses by enhancing collaboration, communication, and knowledge sharing (Deng et al, 2023.). Tsou & Chen (2023) present in their paper that the use of digital technology has positive influences on digital transformation strategy and organizational innovation, which in turn influence organizational performance. In addition, digital transformation strategy and organizational innovation played full mediating roles between digital technology use and enterprise performance.

Ratna & Kaur (2016) claim that the most affected factor by the introduction of new technology is performance, which is followed by work-life balance, productivity, health and safety, and job satisfaction. According to Hidayat et al (2023), job satisfaction is significantly positively impacted by digital leadership and digital competency. Additionally, information technology and digital leadership significantly improve employees' performance. Technology, job satisfaction, and organizational culture all significantly improve employee performance by providing motivation (Sapta et al, 2021).

The COVID-19 pandemic has led to the adoption of remote working in many organizations, driving a shift towards digital workplaces, where the dynamic capabilities of organizations are essential to facilitate this transformation process. Thus, organizations' dynamic capabilities lead to improved digital transformation of the workplace, resulting in a better work-life balance for employees, which improves their performance and the performance of the organization, with a particular focus on the role of digital leaders in this process (Chatterjee et al, 2023).

High task-technology fit directly and indirectly influences individuals' job performance. By designing information and communication technologies according to the principles of task-technology fit, individuals are less likely to experience feelings of loneliness while working from home and are more likely to perform their work-related tasks better (Abelsen et al, 2023).

The perspective of software development business employees on the effects of public service digitization on their personal and professional experiences is presented in a recent study by Barbu et al. (2023). The findings demonstrate the benefits and drawbacks of digitization. Fast online payments and increased administrative effectiveness are benefits. Technical problems and communication problems are obstacles, nevertheless. The report suggests making investments in digital education, cyber security, and infrastructure to increase digitization.

Regarding the education sector, the use of technology in interactive learning has a big impact on how happy, successful, and functional students are in school. It is also mentioned that the use of technology to support self-regulated learning has improved academic achievement, academic satisfaction, and functional performance (Memon et al, 2022).

Fernández-Portillo et al. (2024) claim that there is a positive relationship of the digital business ecosystem with the satisfaction of both stakeholders, while employee satisfaction positively influences business performance. Also, they suggest that the satisfaction of both customers and employees in a digital environment improves business performance. According to Fernández-Portillo et al. (2024), employee satisfaction has a favorable impact on business performance, while there is a positive correlation between the digital business ecosystem and stakeholder satisfaction. Furthermore, they contend that enhanced employee and customer happiness in a digital workplace boosts corporate success.

To gain a deep understanding of the trends, evolution, and latest findings in relation to digital technology and its impact on performance and satisfaction in organizations, a bibliometric study would be useful. VOSviewer is used for bibliometric analysis (Yu et al, 2020, Wang et al, 2020), searching for subjects with unexplored potential for further research and locating the most frequently cited references in particular disciplines (Nandiyanto et al., 2020). Thus, a bibliometric study regarding the digital solutions as an enabler of effective technology and satisfaction in the organization is necessary for the development and adoption of a technological solution that can bring significant benefits in the contemporary work environment.

Methodology

A bibliometric analysis was carried out to assess publications focused on digital technology that function as a facilitator of organizational performance and employee and customer/user

satisfaction. This kind of analysis is commonly used to assess the qualitative and quantitative quality of publications within a certain field of study, being also used to guide the field's experts and researchers (Todeschini, & Baccini, 2016).

To assess publications about digital technology, organizational performance, and satisfaction, an investigation using the Web of Science (WOS) database was conducted, this being mostly accomplished by scanning the publications. The Web of Science database was chosen because it was easy to use, easy to access from educational institutions, offered a wide range of data extraction options, and covered articles at a higher level than those found in the relevant journals (Pranckutė, 2021). To conduct the analysis, the following key words were used: “digital technology” (All Fields), AND “performance” (All Fields), AND “satisfaction” (All Fields). The database query and analysis were performed at the beginning of February 2024.

Following the date-based interrogation, 1005 results were obtained. The data were extracted from the Web of Science database in accordance with the data collection criteria. Data was imported into Microsoft Excel and VOSviewer software. Microsoft Excel was used in the first phase to organize and analyze data. In the second phase, VOSviewer software was used to create visual maps based on bibliographic data, analyze, and visualize bibliographic relationships between publications, co-authorship between countries, co-citation and co-apprehension of key words. To observe the results, there were used three different kinds of data mapping: network, density, and overlay visualization.

Results and discussions

In Figure 1, it is presented the total number of publications regarding digital technology, performance and satisfaction over the years, the results indicating the period 1996-2024.

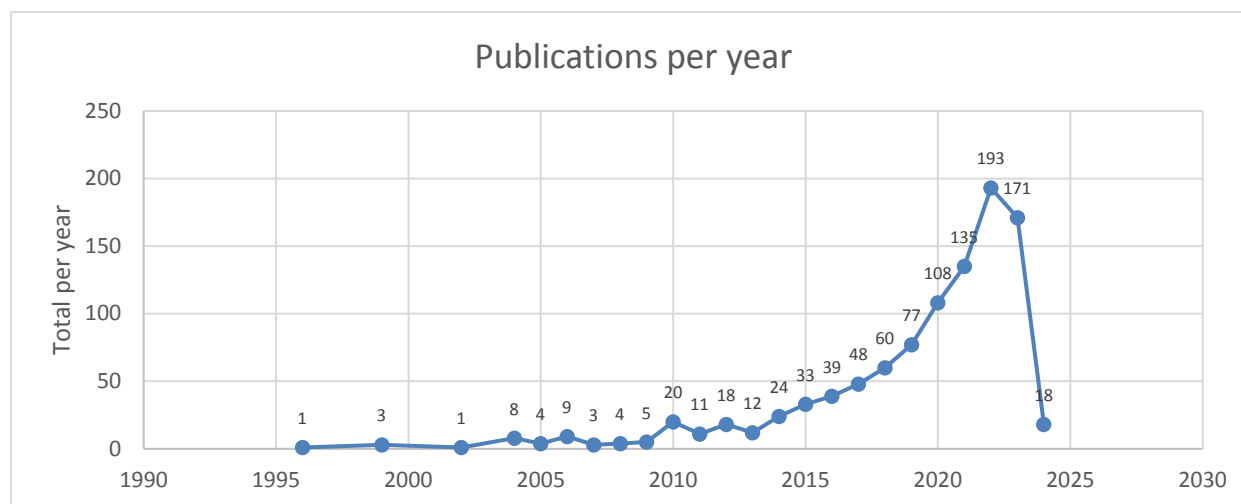


Figure 1. Publications per year

Source: Authors' own research based on the results highlighted by the Web of Science database.

Since 2014, an increasing trend can be observed in terms of studies that analyze how digital technology impacts performance and satisfaction in organizations. It can also be observed that starting with 2020, once the COVID-19 pandemic was declared (Tarkar, 2020), the number of

studies in this area increases considerably, exceeding 100 publications per year. The peak is met in 2022, where a total number of approximately 200 publications is registered. This considerably higher number compared to the beginning of the pandemic, may be since during this period, many of the companies had to go online, and had to find the most effective technological solutions, both to increase their performance, as well as to maintain or improve the satisfaction of employees who worked remotely.

In 2023, it can already be seen that the number of publications in this area remains high (171), but lower than in 2022, which indicates that researchers have tried to support organizations as soon as possible with scientifically proven results, from which the management of companies can learn and implement digitization solutions that help them achieve their goals and in a remote system. Taking into account the fact that the query of the database was carried out at the beginning of February 2024, and the number of results this year is a small one (18), but which does not necessarily influence the trend, the researchers still have 10 months at their disposal in which they can public in this field.

With the help of the VOSviewer software, collaborative networks of authors with more than 5 published articles were developed. Unfortunately, the results indicated the existence of only 4 important authors (out of 3511 authors who wrote in this field): Hwang Gwo-Jen with 21 papers, Al-Rahmi Waleed Mugahed and Wang Bo, both with 6 papers, and Mithas Sunil with 5 papers (Table 1).

Table 1. Authors who have published more than 5 papers in the analyzed field

Authors	Documents	Citations	Total link strength
Al-Rahmi, Waleed Mugahed	6	163	0
Hwang, Gwo-Jen	21	610	0
Mithas, Sunil	5	133	0
Wang, Bo	6	34	0

Source: Authors' own research based on the results highlighted by the Web of Science database.

Thus, to see at least a mini network of authors' cooperation, where the authors or teams of authors who have published the most and are the most representative for the analyzed subject can be observed, the map was redone in Vosviewer, this time choosing the authors with more than 3 items (Figure 2). The analysis indicates the existence of 15 clusters of these authors, with 31 authors who published more than 3 papers on the topic of digital technology, performance and satisfaction, the maximum number of published papers belonging to Hwang Gwo-Jen (21). The cluster that includes this author also includes 3 other authors: Chang Ching-Yi (4 papers), Kuo Fan-Ray (3 papers), Lin Chin-Jen (3 papers). Another more developed cluster involves Al-Rahmi Waleed Mugahed (6 papers), who is in a network of 6 authors. These small clusters identified with the help of the VOSviewer software indicate that, for the moment, there are only a few small networks of authors who are interested in how digital technology helps organizations to improve their performance, also ensuring the increase of satisfaction within it. Thus, there is still a need for more authors to publish in this field, so that research teams can bring much more relevant theoretical and practical results in the field.

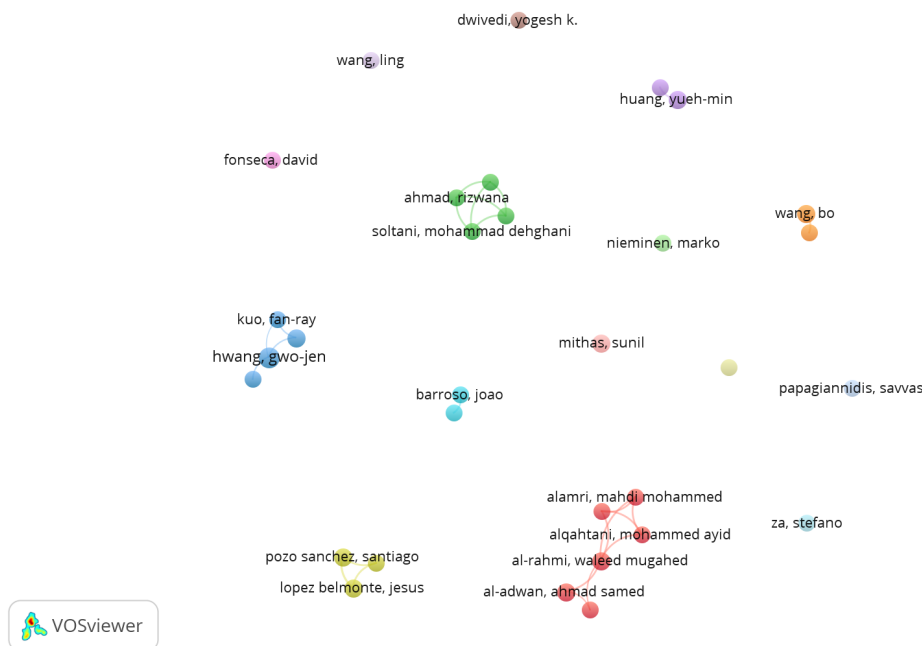


Figure 2. Authors who have published more than 3 papers in the analyzed field

Source: Authors' own research based on the results highlighted by VOSviewer.

Regarding the affiliation of researchers to different organizations, it is noteworthy that out of 1556 organizations, only 35 of them have more than 5 papers presented in the analyzed field (Figure 3).

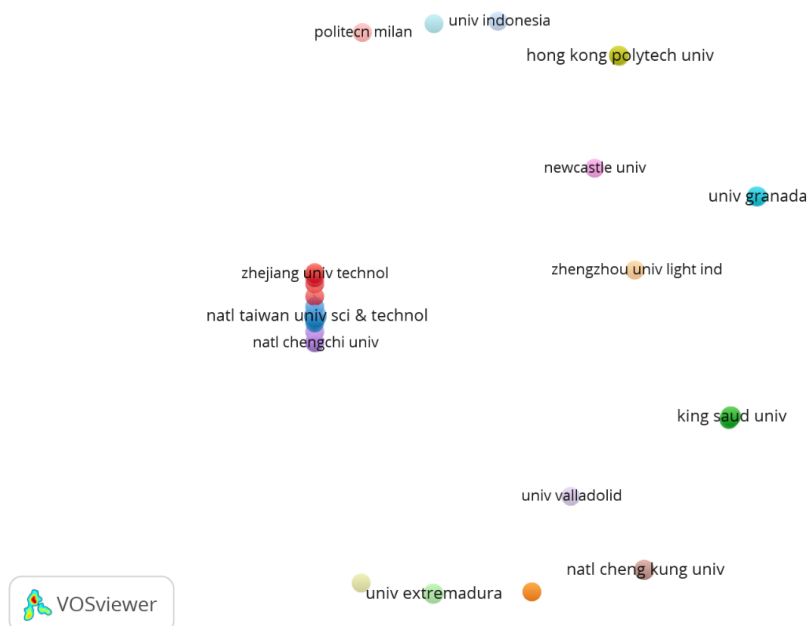


Figure 3. The affiliation of researchers to different organizations

Source: Authors' own research based on the results highlighted by VOSviewer.

The organizations that have published more than 10 papers about digital technology, performance and satisfaction in organizations are: National Taiwan University of Science Technology (32), University of Texas System (13), Hong Kong Polytechnic University (11), Indian Institute of Technology System IIT System (11), Egyptian Knowledge Bank EKB and University of Granada being the institutions with 10 publications in this regard. It can be observed that there are only small cooperation networks between institutions, which means that a large group of institutional cooperation has not yet been formed.

Regarding the countries from which the research came, out of 91 countries identified, in 55 of them at least 5 papers dealing with digital technology, performance and satisfaction in organizations were published (Figure 4).

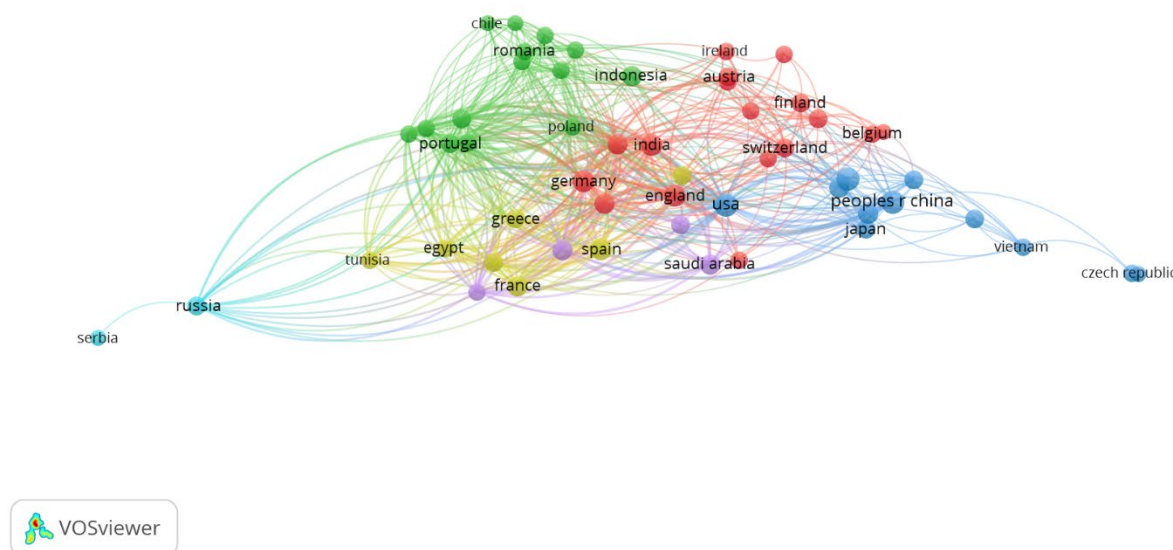


Figure 4. The most active countries of research about digital technology, organizational performance, and satisfaction

Source: Authors' own research based on the results highlighted by VOSviewer.

Figure 4 indicates the existence of 6 clusters representing the 55 countries and the links between them. It can be seen from the connectivity in Figure 4 that the connections between the nodes are dense and complex, indicating that there are many cooperative relationships between different countries. The United States of America has the most papers (15.82% of all papers published in this field), being closely followed by the People's Republic of China (13.93%) and Taiwan (10.64%). Also, the European countries with the most papers from the analyzed topic are Spain (9.05%) and England (7.96%). The United States of America also has the most citations (4663), while the People's Republic of China has approximately half of them (2397), and Taiwan has 2298 citations (Table 2).

Table 2. Information table of the top 10 major research countries with published articles

Rank	Country	Documents	Citations	Total link strength
1	USA	159	4663	146
2	England	78	2397	129
3	Italy	50	917	97
4	India	66	1407	93
5	Malaysia	39	844	87
6	Germany	55	1042	78
7	Netherlands	29	814	77
8	Spain	91	1644	69
9	United Arab Emirates	12	700	69
10	France	32	881	68

Source: Authors' own research based on the results highlighted by VOSviewer.

Romania has only 12 papers published in this regard, registering a total number of 93 citations and a connection with 19 other countries, both from Europe and outside it (Figure 5).

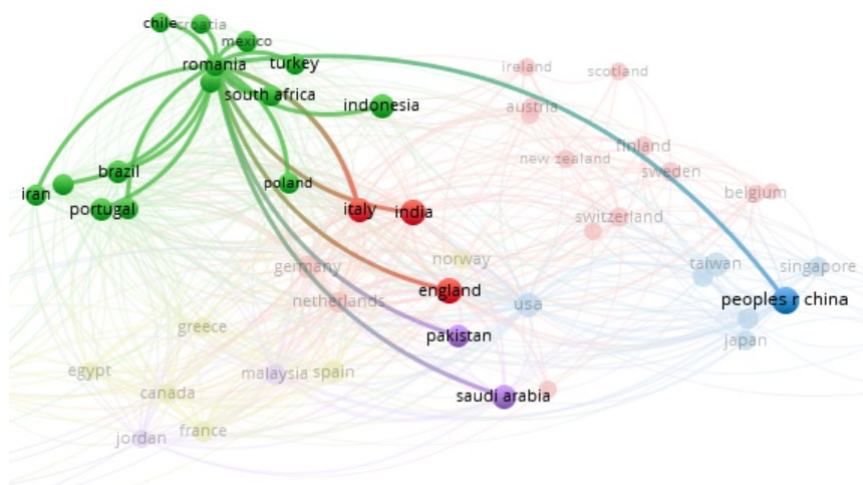


Figure 5. Romania's connections with other countries

Source: Authors' own research based on the results highlighted by VOSviewer

This small number of publications coming from Romanian authors could suggest the fact that there is an unexploited potential in research and innovation in the field of digital technology in Romania. Thus, it can be said that there is an opportunity for both researchers and institutions to explore and contribute to this field in a significant way. But for this aspect to be achievable, it is necessary to have support from the government, higher education institutions, and from private economic agents. The more financial resources and institutional support there are in this regard, the more the creation of published papers in this field could be stimulated. In addition, this position of Romania could be improved if there were more national and international collaborations between academic and research institutions that publish more quality papers. Thus, not only would the exchange of ideas and knowledge be encouraged, but this research of Romanian authors could be better promoted, which could contribute to increasing international interest and recognition in the field of digital technology in Romania.

Regarding the publishers where the most papers dealing with both digital technology and its impact on organizational performance and satisfaction were published, in Table 3 it can be

observed the top 10 of these publishers. Thus, it is noted that most papers were published in Elsevier (13.03%) and Springer Nature (11.14%). The publishers Emerald Group Publishing (8.86%), IEEE (8.76%) and MDPI (8.36%) are quite appropriate in terms of value.

Table 3. Top 10 publishers in the analyzed field

Rank	Publishers	Number of papers	% of 1005
1	ELSEVIER	131	13.03%
2	SPRINGER NATURE	112	11.14%
3	EMERALD GROUP PUBLISHING	89	8.86%
4	IEEE	88	8.76%
5	MDPI	84	8.36%
6	TAYLOR & FRANCIS	67	6.67%
7	WILEY	44	4.38%
8	SAGE	34	3.38%
9	FRONTIERS MEDIA SA	27	2.69%
10	JRNIR PUBLICATIONS, INC	2.5	0.25%

Source: Authors' own research based on the results highlighted by the Web of Science database.

However, when it comes to the most published papers in a journal, “Sustainability” journal is the one that stands out in this field (3.38%). Table 4 shows the top 20 publications in which the papers focused on the keywords analyzed in this research are published, among which we can mention: “Computers Education” (1.59%), “Frontiers in Psychology” (1.49%), “Lecture Notes in Computer Science” (1.49%), “Interactive Learning Environments (1.39%), “International Journal of Environmental Research and Public Health” (1.19%), “Journal of Medical Internet Research” (1.19%), “INTED Proceedings” (1.00%). Thus, it can be observed that a large part of the papers published in these journals focused on educational organizations.

Table 4. Top 20 publications in the analyzed field

Rank	Publication Titles	Number	% of 1005
1	SUSTAINABILITY	34	3.38%
2	COMPUTERS EDUCATION	16	1.59%
3	FRONTIERS IN PSYCHOLOGY	15	1.49%
4	LECTURE NOTES IN COMPUTER SCIENCE	15	1.49%
5	INTERACTIVE LEARNING ENVIRONMENTS INTERNATIONAL	14	1.39%
6	JOURNAL OF ENVIRONMENTAL RESEARCH AND PUBLIC HEALTH	12	1.19%
7	JOURNAL OF MEDICAL INTERNET RESEARCH	12	1.19%
8	INTED PROCEEDINGS	10	1.00%
9	BRITISH JOURNAL OF EDUCATIONAL TECHNOLOGY	9	0.90%
10	EDUCATIONAL TECHNOLOGY SOCIETY	8	0.80%
11	COMPUTERS IN HUMAN BEHAVIOR	7	0.70%
12	HELIYON	7	0.70%
13	IEEE ACCESS	7	0.70%
14	INFORMATION TECHNOLOGY PEOPLE	7	0.70%
15	IFIP ADVANCES IN INFORMATION AND COMMUNICATION TECHNOLOGY	6	0.60%

Rank	Publication Titles	Number	% of 1005
16	MIS QUARTERLY	6	0.60%
17	PICMET 2010 TECHNOLOGY MANAGEMENT FOR GLOBAL ECONOMIC GROWTH	6	0.60%
18	PLOS ONE	6	0.60%
19	TECHNOLOGY IN SOCIETY	6	0.60%
20	ADVANCES IN INTELLIGENT SYSTEMS AND COMPUTING	5	0.50%

Source: Authors' own research based on the results highlighted by the Web of Science database

For the 1005 articles in the selected sample, the most frequently used keywords were analyzed. 5090 keywords were identified, of which 3957 appear only once (77.74%). For this analysis, those keywords that were used by the authors and were highlighted more than 5 times in the WOS database were further analyzed. Thus, out of the 5090 keywords, only 328 reached this threshold. Among these, the 3 most used keywords are "performance" (87.20%), "satisfaction" (71.04%), and "technology" (39.63%), which was to be expected, considering the analyzed field (Table 5).

Table 5. Top 20 keywords used by the authors in at least 5 of the analyzed papers

Rank	Keyword	Occurrences	Total link strength
1	performance	286	1687
2	satisfaction	233	1499
3	technology	130	761
4	impact	116	755
5	model	92	577
6	information-technology	77	546
7	user acceptance	53	404
8	adoption	56	402
9	management	56	365
10	acceptance	49	339
11	quality	59	338
12	customer satisfaction	54	320
13	information	50	319
14	students	46	284
15	education	53	281
16	design	50	268
17	technology acceptance model	33	261
18	perceptions	35	252
19	higher-education	30	237
20	internet	36	231

Source: Authors' own research based on the results highlighted by VOSviewer.

In addition to these keywords, it is also noteworthy those related to the acceptance and use of technology, management but also education, elements that suggest that in both business and educational organizations, more and more problems have recently arisen in the way technology it can be used effectively to improve both performance and satisfaction in organizations.

The map presented in Figure 6 shows the most used keywords, which are grouped into 6 clusters. The main keyword per cluster is “satisfaction” (green cluster), “performance” (red cluster), “impact” (purple cluster), “management” (dark blue cluster), “technology” (light blue cluster) and “outcomes” (yellow cluster).

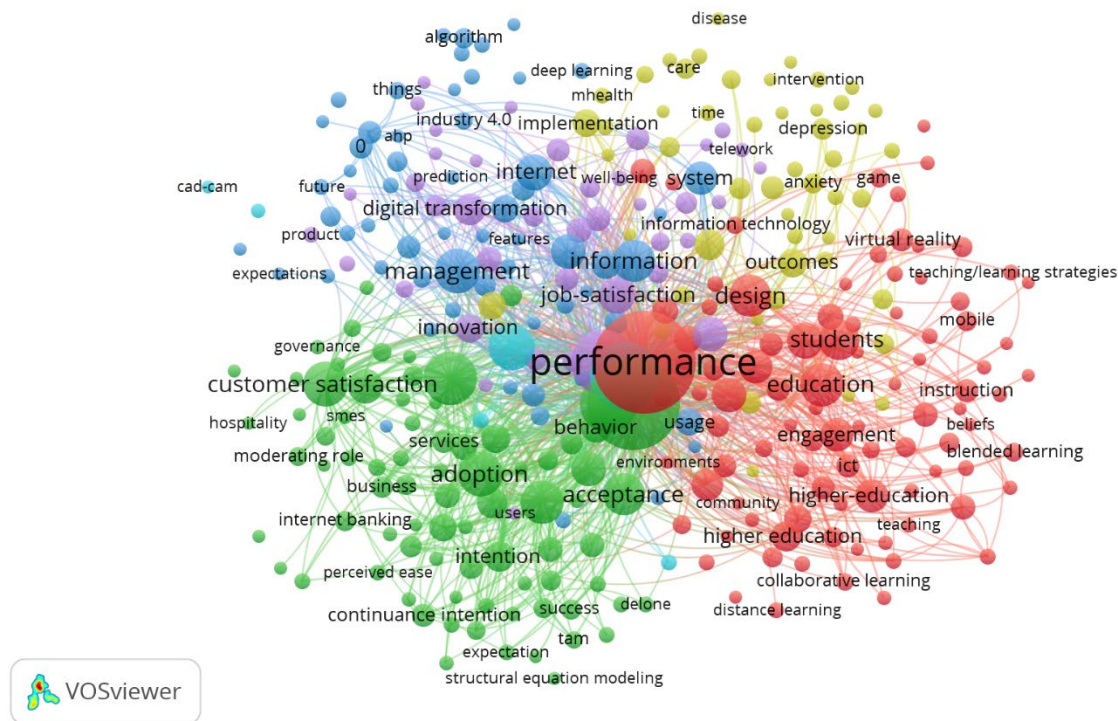


Figure 6. The analysis of key word co-occurrence on digital technology, performance, and satisfaction

Source: Authors' own research based on the results highlighted by VOSviewer.

As shown in Figure 6, the red cluster gives access to the performance recorded in the educational field, especially in the university environment, where the authors looked for solutions to see how technology can improve the performance of students, as well as that of teachers and the teaching process. The green cluster emphasizes satisfaction. The keywords in this cluster suggest that some of the papers have analyzed the factors that determine the acceptance and use of technology by customers and employees, to increase their satisfaction. The yellow cluster focuses on the effects recorded using technology, emphasizing both the physical and mental health of users, as well as the efficiency related to the use of time in carrying out tasks. The purple cluster emphasizes the impact of digital technology at the workplace, focusing more on the resource side of the organization, the possibility of working from home, but also the costs associated with these technologies. The light blue cluster emphasizes technology, quality, and personality, looking at how technology can help create customized solutions to increase user satisfaction. The dark blue cluster targets organizational management and how technology affects all organizational processes.

The Internet, industry 4.0, automation, implementation barriers are also important aspects emphasized by this group.

Figure 7 demonstrates the network map of trending topics by keywords used from 2018 (purple) to 2022 (yellow).

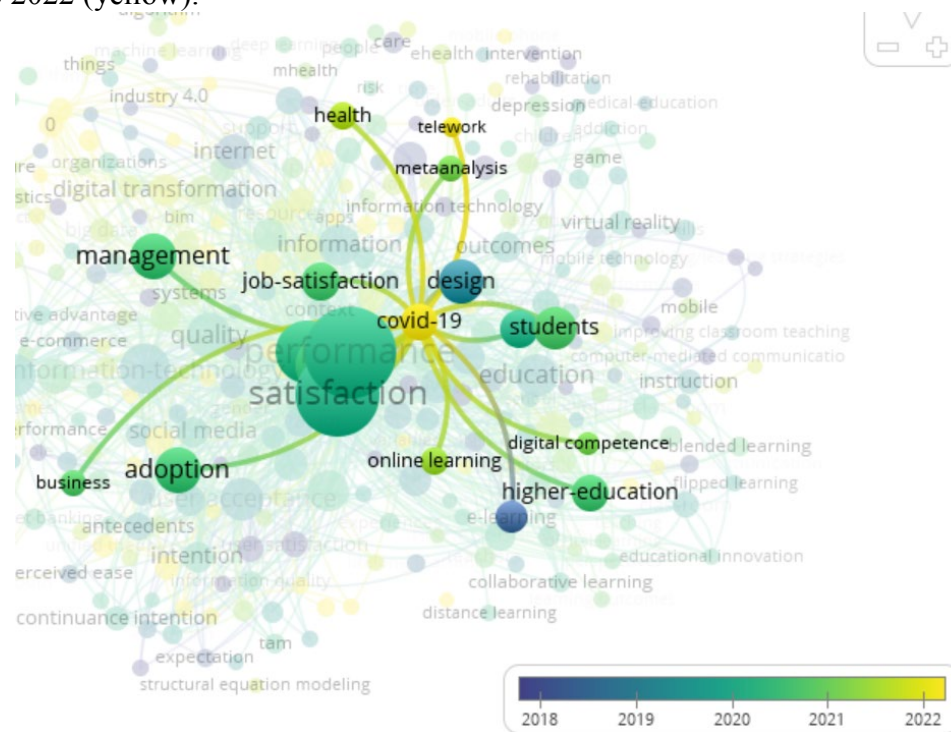


Figure 7. Analysis of key word co-occurrence between 2018-2022

Source: Authors' own research based on the results highlighted by VOSviewer.

Thus, it is noted that the most recent studies focus on how technology was used during the COVID-19 pandemic to help improve performance and satisfaction in both the educational and economic environments, where telework has affected not only the performance of the company, but also the health of the employees.

Conclusion

This bibliometric research brings relevant information about the state of digital technology as a facilitator of improving organizational performance and job satisfaction, identifying trends and research opportunities by selecting and analyzing the content of the most relevant articles published in this research field.

This paper highlights the key words used in the field of analysis research. The most relevant keywords I use are "performance", "satisfaction", "technology", while most of the recent keywords are related to "COVID-19" and "social-media". In addition, the research highlights the growing interest in the studies of digital technologies, with an emphasis on their impact on performance and satisfaction in organizations. In the last ten years, the volume of publications has increased 10.72 times, from 18 articles in 2012 to 193 articles in 2022, proving the growth trend in this research field. The keywords observed with the help of the VOSviewer software suggest an increase, year by year, of the research that links digitization to both the economic environment and the educational environment.

The 6 clusters of analyzed keywords highlight potential directions for future research and clearly identify the impact of digital technology on organizational performance and employee or customer satisfaction. Thus, by analyzing the most recent and relevant articles, conducting research can provide valuable leads to study for those who are investigating or intend to investigate digital technologies, organizational performance, or satisfaction in organizations.

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