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Yönetimde Metaverse Araştırmaları: Bibliyometrik Bir Analiz

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ÖZET

Organizasyonlar geleceğe yönelik amaçlarını gerçekleştirebilmek için teknolojik yenilikleri iş faaliyetlerine adapte etmişlerdir. Bu durum metaverse teknolojisinin organizasyon politikalarında yer almasını sağlamıştır. Organizasyon politikalarına yön veren yönetim mekanizması, metaverse uygulamalarını iş faaliyetlerine eklemiştir. Yönetimde metaverse araştırmalarında, literatürde yer alan araştırmalar incelenmiştir. Analizler Web of Science (WoS) veri tabanı yardımı ile bibliyometrik analizler kullanılarak gerçekleştirilmiştir. Araştırma konusuna ilişkin toplam 289 araştırmada, vurgulanan kelimelere, yazarlara, kullanılan kaynaklara ve ilişkilere yer verilmiştir. Araştırma sonucunda yönetimde metaverse araştırmalarının teknolojik değişim ve gelişime bağlı olarak pazarlama, turizm, eğitim, sağlık ve endüstri gibi birçok alanla ilişkili olduğu görülmüştür. Araştırma sonuçları metaversenin artık birçok organizasyonun politikasına yön verebildiğini göstermiştir.

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Metaverse Studies in Management: A Bibliometric Analysis

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ABSTRACT

Organizations have adapted technological innovations to their business activities to realize their future goals. This has enabled metaverse technology to take place in organizational policies. The management mechanism that directs organizational policies has added metaverse applications to business activities. In management metaverse research, studies in the literature were examined. Analyzes were performed using bibliometric analyses with the help of the Web of Science (WoS) database. A total of 289 studies on the research subject included the highlighted words, authors, sources, and relationships. As a result of the research, it has been seen that metaverse studies in management are related to many areas such as marketing, tourism, education, health, and industry, depending on technological change and development. Research results have shown that the metaverse can now shape the policy of many organizations.

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1. INTRODUCTION *(GİRİŞ)*

The interest in technology in people has led to many innovations to direct the activities in business life day by day. Technological changes have also changed the interests of individuals. In this respect, technological innovations such as the metaverse (or virtual universe) are among the strategic plans of many managers in today's organizations. Managers who can adapt Metaverse technology to their business activities will have the ability to compete with their competitors. The practical information that Metaverse applications will provide in business activities provides serious advantages to organizations. The research is aimed to clarify metaverse research in management from the perspective of organizations.

From an organizational perspective, the metaverse can be viewed as a business opportunity, not a technological problem. Metaverse provides efficiency, profitability, interaction, and communication in many business areas [1]. This allows the metaverse to be examined at the organizational level. Employees' work activities may be affected by the use of the metaverse. This situation makes it necessary for the management of the organization to consider the metaverse applications in their business activities.

The world of the metaverse can be both beneficial and harmful. Just as social media has its good and bad sides, so does the metaverse [2]. This shows that metaverse applications in management can have positive or negative results. In particular, the usage area of metaverse applications affects employees and other stakeholders (consumers, partners, society, and others). To achieve beneficial results, metaverse applications and the organizational system must carry out activities together. In this respect, the metaverse in management is a very effective system for the future of organizations.

The metaverse is a complex global system that is active outside of traditional or local areas. This situation shapes the meta-universe of governance and regulation, governments, and organizations suitable for virtual worlds [3]. The adaptability of this system to business activities by organizations may pose a serious problem for some organizations. Metaverse transformation can be difficult in organizations that do not have sufficient facilities or infrastructure. In organizations that carry out technology-oriented business activities, the use of metaverse can become more functional. In this case, organizational possibilities become effective. Both employee and consumer-based access opportunities affect the usage area of metaverse applications.

How the metaverse is adapted to an organization's overall strategy and business model is important. Organizations can develop their metaverse repository or invest in an established metaverse repository [4]. In this respect, metaverse applications and organizational activities should work in coordination. Effectively, metaverse applications contribute to the practicality and access possibilities of the work.

In organizations, management has a say in many decisions such as directing organizational policies, shaping future activities, and determining the application areas of employees. Metaverse applications are affected by the management mechanism in the organization. In this context, the research focuses on the metaverse perspective in management.

2. THEORETICAL FRAMEWORK *(TEORİK ÇERÇEVE)*

2.1. Metaverse *(Metaverse)*

The metaverse, which is the next stage of internet development, is expressed as the universe created by the mental perceptions of individuals using virtual reality tools without physical effort. Many people or organizations in the world are rapidly entering the metaverse process [6]. For example, Çelik et al. emphasized that today individuals and organizations can use the metaverse in their business activities [31]. Additionally, Mehta et al. stated that the metaverse facilitates people's communication with each other in many sectors of the business world [1]. Metaverse is a 3D virtual world where many activities can be done with augmented and virtual reality technology. The world of the metaverse is like the real world with the technology it uses (such as tablets, smartphones, smart glasses, headphones, and gloves) [7]. The use of metaverse in organizations brings innovations to the work activities of employees. In addition, the tools used in the workplace (such as machinery, and equipment) are also affected by this innovation. Technological changes bring new perspectives to the field of activity and the future goals of many organizations.

The features of the metaverse deliver an accessible, affordable, usable, beautiful experience and value: it ensures that it is used by users who are ready for technology and are competent in technology [8]. In terms of organizations, this can happen under the control of management. The organizational policies implemented by the management mechanisms affect the application area of the employees. In this respect, the use of metaverse in the organization is the result of management policies.

2.2. Organizational Management *(Organizasyonel Yönetimler)*

Managers in organizations must have the knowledge and skills to apply new technologies effectively. Organizations' adoption of technological developments is effective for competition in the digital age. Managers should be able to respond to the needs of the staff and the organization as well as improve themselves [5]. There is a great need for human and machine collaboration in organizations, especially in environments that carry out technology-oriented activities. This shows the effectiveness of metaverse applications in organizations. The ability of

management to transfer their technological experience to employees contributes to the implementation of organizational policies.

Some organizations today are making strong investments in the metaverse. Metaverse is very important for the future of organizations. Metaverse provides opportunities to build a business in organizations. In addition, in the metaverse, there is virtual reality that is not limited by natural resources [9]. Organizations that can provide continuity in the future are those that can adapt to technological changes and harmonize the changes with their goals. Organizations that can adapt quickly and securely to metaverse change can achieve many goals sooner than their competitors.

3. METHODOLOGY *(METODOLOJİ)*

The research method was carried out within the framework of metaverse research in management. In the literature, metaverse research in management in the WoS database has been taken into account. No year or research-type limitations were made in the analysis. In the research application, bibliometric analyses were used. In the bibliometric analysis method, the social and structural relationships of different research components (such as subjects, institutions, authors, and countries) can be revealed [29]. In the research, the keyword searched in the WoS database was "Metaverse in Management". There was no category limitation in the research. Other information on the research methodology is as follows.

3.1. Bibliometric Analysis and R Program *(Bibliyometrik Analiz ve R Programı)*

In bibliometric applications, one or more bibliometric analysis or statistical software can be used for data analysis [26]. The bibliometric analysis package is an application written in R. R is software with an ecosystem running in an integrated environment of accessible books, algorithms, and graphics software [27]. In addition, biblioshiny, which is used with this software and has a powerful library feature, is divided into 7 categories. The biblioshiny categories are: 1) overview, 2) sources, 3) authors, 4) documents, 5) conceptual structure, 6) intellectual structure, and 7) social structure [28]. Metaverse bibliometric analyses in management were carried out using biblioshiny categories with the help of the R program.

Programs used in bibliometric analysis and mapping, such as SPSS and Pajek, and graphical interpretations of maps such as Vosviewer can be used [32]. It is emphasized in the literature that the application of bibliometric analyses in the R program is quite flexible, can be quickly upgraded, and can be integrated with other R packages. Researchers state that R is useful in constantly changing fields such as bibliometrics [26]. In this respect, bibliometric analyses were applied in the research with the help of the R program.

3.2. Basic Questions Related to the Research Problem *(Araştırma Problemine İlişkin Temel Sorular)*

In the analysis, solutions were sought for the following basic questions, taking into account the WoS database in metaverse research in management.

What is the general information (year, source, growth rate, number of authors, etc.) about metaverse research in management in the literature?

What are the title, author and highlighted keywords in metaverse research in management?

What are the trending topics in metaverse research in management, corresponding author countries and years?

What is the level of relationship between the concepts emphasized in metaverse studies in management?

What is the centralization and intensity of the concepts emphasized in metaverse studies in management?

How have the words emphasized in metaverse research in management changed over the years?

4. ANALYSIS RESULTS *(ANALIZ SONUÇLARI)*

Bibliometric analyzes of metaverse research in management were carried out on 26.07.2023. The studies in the WoS database were examined. The general results of the analysis are given below.

Table 1. Result of metaverse research in management *(Yönetimde metaverse araştırmaları sonucu)*

Main Information			
Timespan	*Sources*	*Documents*	*Annual growth rate*
2009-2023	*189*	*289*	*31.79%*
Authors	*Authors of single-aothored*	*International co-authorship*	*Co-authorsh per doc*
914	*33*	*42.91%*	*4.02*
Author's keywords	*References*	*Document average age*	*Average citations per doc*
1207	*15524*	*1.23*	*5.093*

As a result of the analysis, it was seen that metaverse research in management started in the WoS database in 2009. This shows that the research topic is quite up-to-date. It was understood that 289 studies from 189 different sources were included in the analysis. Annual growth rates of metaverse research in management represented a significant figure of 31.79%. This result reveals that there has been intense demand for metaverse research in management in recent years. As a result of the analysis, it was seen that 914 authors researched the subject, and studies with a single author consisted of 33 people. The rate of international co-authors in the study was 42.91%, and the rate of co-authors per study was 4.02. It is seen that the authors used 1207 keywords related to the metaverse in management and benefited from a total of 15524 sources. The average year of metaverse research in management is 1.23, with an average of 5,093 citations per research.

4.1. Metaverse Research in Management Annual Scientific Production Amount *(Yönetimde Metaverse Araştırmaları Yıllık Bilimsel Üretim Miktarı)*

The annual scientific production amounts of metaverse research in management are given in the figure below.

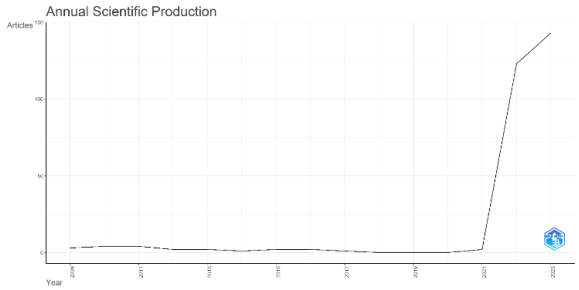

Figure 1. Metaverse in management, annual amount of scientific production

(Yönetimde metaverse yıllık bilimsel üretim miktarı)

As a result of the analysis, it is observed that metaverse research in management followed a horizontal course between 2009 and 2021. The results of the analysis show that metaverse research in management has increased significantly, especially after 2021. This situation reveals that metaverse research in management may have a more intense research network in the future.

4.2. Metaverse in Management Title, Author and Keyword Matching *(Yönetimde Metaverse Başlık, Yazar ve Anahtar Kelime Eşleşmesi)*

The concepts emphasized by the authors in the metaverse research in management, the authors conducting research on the subject and the keywords used in general are stated below.

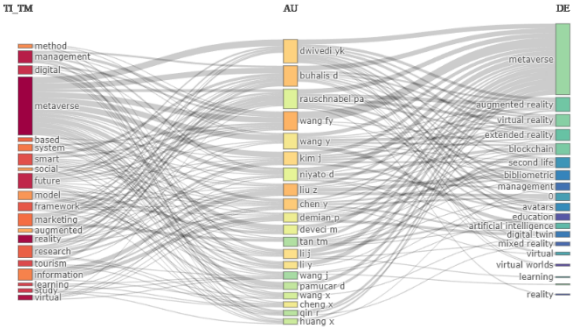

Figure 2. Metaverse research in management title, author and keyword matching

(Yönetimde metaverse araştırmaları başlık, yazar ve anahtar kelime eşleşmesi)

As a result of the analysis, in the title part of the authors' research: it has been observed that they mainly use the words method, management, digital, metaverse, based, system, smart, social, future, model, framework, marketing, augmented, reality, research, tourism, information, learning, study and virtual. Authors who carry out metaverse research in management: Dwivedi YK., Buhalis D., Rauschnabel PA., Wang FY., Wang Y., Kim J., Niyato D., Liu Z., Chen Y., Demian P., Deveci M., Tan TM, Li J. , Li Y., Wang J., Pamucar D., Wang X., Cheng X., Qin R., and Huang X. keywords used by the authors in metaverse research in management are: metaverse, augmented reality, extended reality, blockchain, second life, bibliometric, management, 0, avatars, education, artificial intelligence, digital twin, mixed reality, virtual, virtual worlds, learning and reality.

4.3. Metaverse in Management, Corresponding Author Countries *(Yönetimde Metaverse Sorumlu Yazar Ülkeleri)*

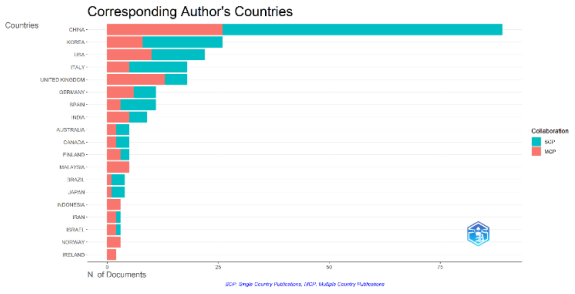

Figure 3. Metaverse studies in management, responsible author countries

(Yönetimde metaverse araştırmaları sorumlu yazar ülkeleri)

As a result of the analysis, the authors who carry out intensive research on the metaverse in management: are listed as China, Korea, USA, Italy, United Kingdom, Germany, Spain, India, Australia, Canada, Finland, Malaysia, Brazil, Japan, Indonesia, Iran, Israel, Norway, and Ireland. These results showed

that, in general, in developed and developing countries, a great deal of importance is given to metaverse research in management. Studies addressing Turkey on the subject were not included in the list. This situation shows that there is a great need for metaverse research in management for Turkey.

4.4. The Most Emphasized Words by the Authors in Metaverse Studies in Management *(Yönetimde Metaverse Araştırmalarında Yazarların En Fazla Vurguladığı Kelimeler)*

In the research, the most emphasized keywords by the authors in metaverse research in management are included. The relevant results are as follows.

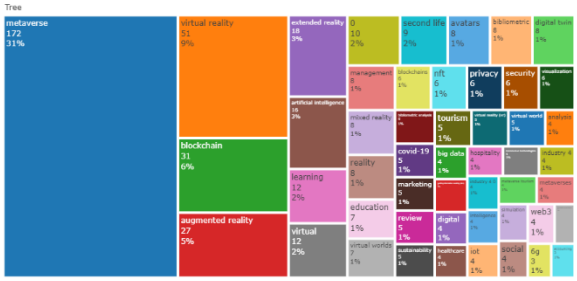

Figure 4. Keywords highlighted by authors in metaverse studies in management
(Yönetimde metaverse araştırmaları yazarların vurguladığı anahtar kelimeler)

The most emphasized words by the authors in metaverse research in management: metaverse, virtual reality, blockchain, augmented reality, extended reality, artificial intelligence, learning, virtual, 0, second life, management, avatars, bibliometric, mixed reality, reality, education, virtual worlds, blockchains, nft, privacy, security, visualization , bibliometric analysis, tourism, virtual reality, virtual world, covid-19, marketing, review, sustainability, analysis, big data, hospitality, digital, healthcare, industry, metaverse tourism, industry 4 0, metaverses, intelligence, simulation, web3, They are listed as iot, social, 6g and accounting. In addition to the metaverse being related to management, the results reached have relations with many different fields such as virtual realities, artificial intelligence, education, tourism, marketing, sustainability, health, industry, and social environments.

4.5. Trend Topics and Years in Metaverse Studies in Management *(Yönetimde Metaverse Araştırmalarında Trend Konular ve Yılları)*

Trending concepts in metaverse in management and the years they were trending are given below.

Figure 5. Trend topics and years of metaverse research in management
(Yönetimde metaverse araştırmaları trend konular ve yılları)

As a result of the analysis, it was observed that the years in which the metaverse concepts in management were trending generally belonged to the years 2022 and 2023. Trending concepts in metaverse research in management in 2022-2023: metaverse, blockchain, augmented reality, virtual reality, artificial intelligence. In the analysis, it has been observed that the concept of learning is a trend in 2022.

4.6. Keyword Relationships Emphasized in Metaverse Studies in Management *(Yönetimde Metaverse Araştırmalarında Vurgulanan Anahtar Kelime İlişkileri)*

The co-associations (relationships) of the words emphasized in metaverse research in management are given below. The colors and thicknesses of the lines in the figure reveal the ratio and strength of the relationships.

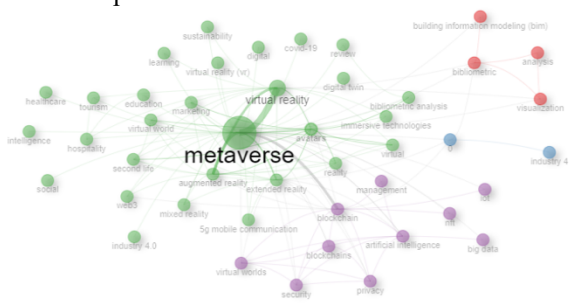

Figure 6. Keyword relationships highlighted in metaverse research in management
(Yönetimde metaverse araştırmaları vurgulanan anahtar kelime İlişkileri)

As a result of the analysis, it is understood that the metaverse has the strongest relationships with the words virtual reality, augmented reality, and blockchain. Considering the relationships between the lines representing the same color in the research:

virtual reality with metaverse, augmented reality, avatars, extended reality, reality, marketing, mixed reality, 5g mobile communication, digital twin, bibliometric analysis, immersive technologies, virtual, industry 4 0, web3, second life, virtual world, virtual reality, It has been observed that digital, covid-19, review, sustainability, learning, education, tourism, hospitality, social, healthcare and intelligence show strong relationships. As a result of the analysis, it has been understood that the words blockchains, management, nft, iot, 0, artificial intelligence, big data, privacy, security, and virtual worlds are related. In the analysis, it was seen that the words building information modeling, bibliometric, analysis, and visualization have associations together. In the obtained results, it has been observed that the metaverse is used quite extensively in research, and many concepts such as the virtual world, virtual reality, technology, industry, digitality, education, tourism, and artificial intelligence reveal strong relationships in metaverse research in management.

4.7. Centralization and Density of Keywords Emphasized in Metaverse Studies in Management

(Yönetimde Metaverse Araştırmalarında Vurgulanan Anahtar Kelimelerin Merkezileşme ve Yoğunluk Düzeyi)

In the figure, the centralization and density levels of the keywords emphasized by the authors in metaverse research in management are given. It has been stated in the studies that there are different visualization techniques in the thematic map. It is emphasized that these strategic diagrams are classified according to centrality and density measures. It has been stated that the variables in the charts are enriched with bibliometric measurements [20]. In the figure below, the words in each group in terms of centralization and density had strong relationships with each other. The words in the motor themes section have a high level of both density and centralization. The words in the motor themes section for metaverse research in management both reveal strong relationships and are extensively researched in the literature. It is understood that the centralization level of the words in the niche themes is low and the density is high. The level of density and centralization is low in the disappearing or newly emerging theme. In the simple themes section, there are words with high centralization and low density.

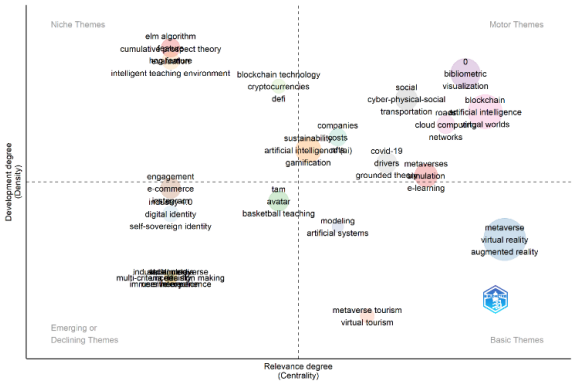

Figure 7. The level of centralization and density of keywords highlighted in metaverse research in management

(Yönetimde metaverse araştırmaları vurgulanan anahtar kelimelerin merkezileşme ve yoğunluk düzeyi)

As a result of the analysis of metaverse studies in management, it was observed that many words emphasized by the authors were included in the motor themes section. Motor themes are in the first group of words: blockchain, artificial intelligence, virtual worlds, blockchains, nft, privacy, security, iot, web3, and 5g mobile communication. Both the level of centralization and the intensity of these concepts are high. It is seen that concepts such as blockchain, artificial intelligence, virtual world, and mobile communication are effective in the metaverse relationship in management. The second set of motor themes: is 0, bibliometric, visualization, analysis, building information modeling, industry, design, internet of things (iot), non-fungible token (nft), and smart city. In the third group: the words social, cyber-physical-social, transportation, foundation model, organizations, organizations (daos), parallel management, and transformers were included. Fourth group: metaverse consists of the words simulation, e-learning, immersion, behavior, emerging Technologies, environment, learning management system, and virtual learning. In the fifth group word list: roads, cloud computing, networks, scene understanding, and software. The sixth group: is formed from the words covid-19, drivers, grounded theory, meta, pandemic, and tourism marketing. In the seventh group: The words companies, costs, nfts, trust, and value creation are included. The eighth group: consists of the words sustainability, artificial intelligence (ai), gamification, knowledge, game, data, data mining, experience, extended reality (xr), and games.

In the research, the first group of the niche themes section where the density is high and the level of centralization is low: is cumulative prospect theory, evaluation, intelligent teaching environment, Pythagorean fuzzy set theory, and teaching

importance. In the second group: the words elm algorithm, feature, hog feature, lbp, torsional neural network, and traffic sign recognition are included. The third group: blockchain technology consists of the words cryptocurrencies and defi.

The first group of disappearing or emerging themes: consists of the words engagement, e-commerce, Instagram, machine, satisfaction, shopping, and telepresence. In the second group: the words industry 4.0, digital identity, and self-sovereign identity were included. Third group: tam, avatar, basketball teaching, customization, enjoyment, usage intention, and virtual space. The fourth group: consists of the words industrial metaverse and user interaction. In the fifth group: the word multi-criteria decision making is included.

The first group of the simple themes section, where the level of centralization is high and the density is low: metaverse consists of the words virtual reality, augmented reality, extended reality, virtual, learning, second life, digital twin, mixed reality, and avatars. In the second group: the words metaverse tourism and virtual tourism were included. Third group: consists of the words modeling and artificial systems.

4.8. Change of Keywords Emphasized in Metaverse Studies in Management by Years

(Yönetimde Metaverse Araştırmalarında Vurgulanan Anahtar Kelimelerin Yıllara Göre Değişimi)

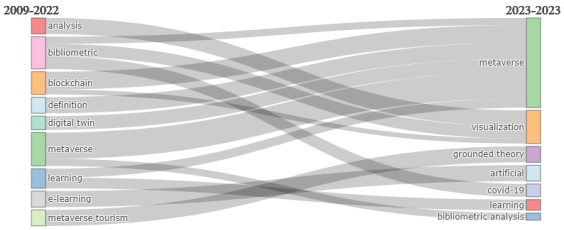

Figure 8. Change of keywords highlighted in metaverse research in management by years

(Yönetimde metaverse araştırmaları vurgulanan anahtar kelimelerin yıllara göre değişimi)

As a result of the analysis of metaverse research in management, in the years 2009-2022: it is understood that the words analysis, bibliometric, blockchain, definition, digital twin, metaverse, learning, e-learning, and metaverse tourism are emphasized. In 2023, it has been observed that the word metaverse is used extensively, and the words visualization, grounded theory, artificial, covid-19, learning, and bibliometric analysis are frequently emphasized. The obtained results show that the help of bibliometric analyzes on metaverse is frequently used in management. In addition, it is understood that the concept of metaverse is very popular, especially in 2023. It is observed that the metaverse in management is used or studied by individuals in many different fields.

4.9. Metaverse Research in Management, Global Citation Rates *(Yönetimde Metaverse Araştırmaları, Küreselde Alıntılanma Oranları)*

Below are the most cited sources globally in metaverse research in management. In the analysis, the responsible authors of the most cited sources in management metaverse studies, the year of publication of the work, and the information of the journal in which it was published were included.

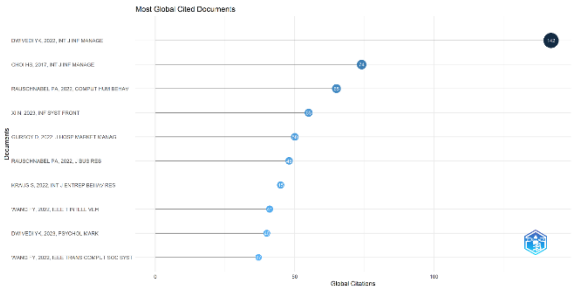

Figure 9. Metaverse research in management, global citation counts

(Yönetimde metaverse araştırmaları, küreselde alıntı sayıları)

As a result of the analysis, it was understood that the most cited source in metaverse research in management is 'Dwivedi YK., 2022, International Journal of Information Management'. The most cited sources are 'Choi HS., 2017, International Journal of Information Management', 'Rauschnabel PA., 2022, Computers in Human Behavior', 'Xi N., 2023, Information Systems Frontiers', 'Gursoy D., 2022, Journal of Hospitality Marketing & Management', 'Rauschnabel PA., 2022, Journal of Business Research', 'Kraus S., 2022, International Journal of Entrepreneurial Behavior & Research', 'Wang FY., 2022, IEEE Transactions on Intelligent Vehicles,' 'Dwivedi YK., 2023, Psychology & Marketing', 'Wang FY., 2022, IEEE Transactions on Computational Social Systems'. The results showed that the most cited sources were generally research published in recent years.

5. DISCUSSION *(TARTIŞMA)*

Metaverse application areas are developing day by day and can provide many conveniences to organizations. In addition to facilitating organizational activities, it can also contribute to advertising, information, transportation, and research and development opportunities. In the literature, Çelik et al. [31] stated that the metaverse creates advantages

for businesses, consumers, institutions, and many areas of life. Researchers have emphasized that organizations can communicate without limitation with their employees, business partnerships, other businesses, and stakeholders.

In metaverse research in management, it has been observed that Covid-19 is among the keywords emphasized by the authors, motor themes, and topics researched in 2009-2022. Covid-19 has caused changes in many applications both at the individual and organizational levels. Organizations have tried to integrate technology more into their business activities in terms of remote working opportunities. In the literature, Wisnu Buana [7] emphasized that in covid-19, where restrictions are experienced, individuals are more oriented to the digital world and this situation develops the metaverse.

As a result of the analysis, it has been shown that metaverse studies in management are studied in the field of tourism. It was seen that tourism was very popular in the keywords emphasized by the authors, in the metaverse relationship network in management, in the motor themes of tourism marketing, and in the simple themes section of metaverse tourism in the years 2009-2022. This situation has shown that metaverse applications are effective in management in the field of tourism. Adaptation to technological innovations in tourism activities has contributed to the functionality of metaverse applications. In the literature, Buhalis et al. [8] the building blocks of metaverse tourism: are network infrastructure, enabling devices, empowering platforms, and technology-ready users. They stated that although the metaverse is still in its infancy, it affects the competitiveness of tourism and organizations.

In the research, it has been observed that the concept of digital is included in the words emphasized in metaverse research in management and the relationship matrix. In the thematic map, the concepts of digital twin and digital identity took place. The construction of knowledge and knowledge modeling has also been involved in metaverse research in management. In the literature, Mancuso et al. [10] have metaverse opportunities for digital business model innovations in organizations: they emphasize that they provide physical transformation, internal processes, virtual transformation, and positive activities for customers. In addition, the information supported in virtual scenarios in terms of metaverse: stated that it encourages virtual communities, and increases intuitive design, user satisfaction, and loyalty. Gadalla et al. [25] stated that most of the products concerning the metaverse are digital. They stated that social experience, flexibility, production, and creative opportunities are provided with metaverses.

In metaverse studies in management, it has been seen that the word social is included in the highlighted keywords and in the motor themes section. In addition, the word cyber-physical-social was also included in the motor themes. In the literature, Serpil and Karaca [11] emphasized that the meta-order can change positively if individuals with digital addiction use social networks with a high level of awareness.

In the analysis, the importance of metaverse research in management is emphasized for organizations. It is stated that organizational policies should act with integrity with metaverse practices. In this respect, the metaverse can have many advantages in organizational activities. In the literature, Gauttier et al. [4] emphasized that an organization that wants to take advantage of the metaverse strategically should consider whether it has advantages and the ability to act flexibly. In this respect, Park et al. [12], on the other hand, emphasized that the physical constraints of any workplace cause a disadvantage in the organization. However, they stated that the metaverse environment does not have any physical or spatial barriers, thus creating an advantage.

Metaverse has shaped the lives and activities of individuals in many areas. The intense use of technology and digital media in many places and areas has expanded the application area of the metaverse. In the literature, Narin [13] emphasized that in the digital universe created by the metaverse, individuals can perform many activities such as working, shopping, traveling, having fun, and getting an education.

In the metaverse application in management, it has been observed that sustainability is included in the highlighted keywords, relations section, and motor themes. A sustainable metaverse occurs when organizational policies support activities. In the literature, Truong et al. [14] emphasized that the metaverse should have a financially complete and stable economic system in terms of sustainability. They stated that the virtual contents in the metadata store should retain their value.

The research revealed that the term "avatars" appeared within the highlighted keyword list, and thematic mapping in the analysis of the metaverse within the field of management. Metaverse research in management has also involved visualization. Visualization: It has been seen that it is used quite intensively in the highlighted keywords, relationships, motor themes, and in 2023 research. In the literature, Lyons [15] employee avatars: emphasized that it was

effective in developing remote equipment service and operational metrics by utilizing data visualization, remote sensing systems, and technology. Šímová et al. [33] emphasized that with the metaverse application in the organization, employees can carry out their business activities, communication, and creativity opportunities in a virtual environment by using their avatar identities.

In management metaverse research, a great deal of emphasis has been placed on the concepts of blockchain and artificial intelligence. These algorithms are very effective in the formation of the metaverse. In the literature, Nagy et al. [16] emphasized that a blockchain-based metaverse with digital asset management was created using artificial intelligence information processing, data visualization, and emotion recognition technologies. Zvarikova et al. [17] stated that with cloud and edge computing technologies, remote monitoring capability and virtual connections can be optimized by using artificial intelligence-supported virtual agents in metaverse operation management.

It has been observed that metaverse research is used seriously in tourism, health, education and industrial areas, and management. The analysis also revealed that metaverse applications in management are associated with many other fields and organizations. This has shown that the metaverse plays an active role in many sectors. In the literature, Koohang et al. [18] revealed that the metaverse is related to many fields such as tourism, production, education, health, operations, and human resources management.

Metaverse is a very influential factor for organizational activities. Organizations should demonstrate their technological activities to achieve their future goals. This situation brings the concept of metaverse, which has been used frequently in recent years and emphasized in many areas, to the agenda. In the literature, Setiawan et al. [19] emphasized that the metaverse has become important for the business world and affects businesses. They stated that the metaverse reduces the risks in business activities.

In the research, it has been seen that words such as virtual, virtual reality, virtual identity, virtual worlds, virtual learning, and virtual tourism are frequently used in metaverse research in management. In addition, the word avatars is often used. This situation is closely related to the virtual reality created by the metaverse. In today's digital technology era, the virtual environment has influenced many fields of activity. People have started to live their lives with virtual habits. In the literature, Wang et al. [21] emphasized that people represented by avatars in the metaverse can communicate with virtual environments, virtual identities, digital objects, and items created by computers, and they develop the phenomenon of cooperation and socialization. Ning et al. [22] stated that new worlds can be discovered with the metaverse, and time and resource savings can be achieved through activities and meetings in the virtual space.

It has been seen that sociability and security are included in the words used by the authors in metaverse research in management. In terms of organizations, sociability in the working environment contributes to the management of business activities. The adaptability of the metaverse to the social field of activity also contributes to the continuity of the organization. With the help of the metaverse, organizational activities must be risk-free and reliable. In the literature, Lee et al. [23] stated that the metaverse should be similar to society in the physical world, compatible with content creation, virtual economy, social norms, and regulations. They stated that individuals should not face privacy risks and security threats in their activities. Choi et al. [24] revealed that social metaverse experience increases psychological well-being in terms of managing mood in individuals.

In the metaverse analysis in management, it has been observed that the concepts of virtual reality, augmented reality, extended reality, reality, and mixed reality have strong relationships. This situation has shown that metaverse applications in reality province administration have intense scrutiny. In this respect, it is necessary to ensure harmony in the organization in terms of virtual and reality. In the literature, Guan et al. [30] stated that if the metaverse and physical domains fail to communicate consistently to work together, there may be incompatibility, resulting in overloading for both physical and virtual domains.

6. CONCLUSION *(SONUÇ)*

As a result of the analysis, the metaverse in management is generally: virtual environments (such as virtual world, virtual reality, virtual identity, and virtual learning), technology, education, health, tourism, marketing, artificial intelligence, blockchain, sustainability, digitality, industry, and social environments. This situation shows the effect of metaverse applications in management in many different fields and organizations. In particular, the intense research network in recent years reveals that organizations should consider metaverse applications depending on technological changes.

As a result, management creating some digital activities for employees with the help of Metaverse can contribute to employee productivity. Metaverse applications can be used to increase employees' workplace motivation. Virtual applications can be created by taking into account technological changes in the relationship between managers and employees. Metaverse can be used to help employees introduce innovations regarding their business activities. Metaverse can be used to help employees gain experience in new jobs. Metaverse applications can be used in administrators' application-oriented policies.

Metaverse contributes to the training and development of employees in organizations with its applications. Information about organization activities is organized quickly and securely with the metaverse. By integrating technological innovations into business activities, the production of goods or services can be carried out more effectively. In this respect, metaverse applications contribute to reducing the workload of employees and using time effectively. It provides convenience in terms of workflow control with metaverse applications in manager-employee interaction. In promoting and advertising organizational outcomes, metaverse applications are a valuable tool.

The research application is limited to July 2023 and WoS database research. In future research, serious contributions can be made to the literature by using different databases on the subject. In addition to metaverse research in management, the effects of metaverse use, especially on the habits of young individuals, can be examined. In addition, social relations, and human and machine power in the organization, can be evaluated within the framework of the metaverse.

REFERENCES *(KAYNAKLAR)*

[1] M. Mehta, G. Pancholi and A. Saxena, "Metaverse changing realm of the business world: A bibliometric snapshot", *Journal of Management Development*, Vol. 42, No. 5, pp.373-387, 2023. Doi: 10.1108/JMD-01-2023-0006

[2] M. Damar, "Metaverse Shape of Your Life for Future: A bibliometric snapshot", *Journal of Metaverse,* Vol. 1, No.1, pp.1-8, 2021.

[3] M. Kalyvaki, "Navigating the metaverse business and legal challenges: Intellectual property, privacy, and jurisdiction", *Journal of Metaverse,* Vol. 3, No.1, pp.87-92, 2023. Doi: 10.57019/jmv.1238344

[4] S. Gauttier, W. Simouri and A. Milliat, "When to enter the metaverse: Business leaders offer perspectives", *Journal of Business Strategy*, pp. 1-8, 2022. Advance online publication. Doi: 10.1108/JBS-08-2022-0149

[5] M. E. Khatib, A. A. Khayat, S. A. Mansoori, A. Alzaabi and A. Ankit, "Metaverse skills for executives and senior managers: The pros and cons", *International Conference on Business Analytics for Technology and Security (ICBATS),* pp. 1-7, May 2023. Doi: 10.1109/ICBATS57792.2023.10111483

[6] A. D. Yemenici, "Entrepreneurship in the world of metaverse: Virtual or real?", *Journal of Metaverse,* Vol. 2, No.2, pp.71-82. 2022.

[7] I. M. Wisnu Buana, "Metaverse: Threat or opportunity for our social world? in understanding metaverse on sociological context", *Journal of Metaverse,* Vol. 3, No.1, pp.28-33. 2023. Doi: 10.57019/jmv.1144470

[8] D. Buhalis, D. Leung and M. Lin, "Metaverse as a disruptive technology revolutionising tourism management and marketing", Tourism Management, Vol. 97, pp. 1-11, 2023. Doi: 10.1016/j.tourman.2023.104724

[9] A. E. Williams, "Human-centric functional modeling and the metaverse", *Journal of Metaverse,* Vol. 2, No.1, pp.23-28, 2022.

[10] I. Mancuso, A. M. Petruzzelli and U. Panniello, "Digital business model innovation in metaverse: How to approach virtual economy opportunities", *Information Processing and Management*, Vol. 60, pp.1-28, 2023. Doi: 10.1016/j.ipm.2023.103457

[11] H. Serpil and D. Karaca, "The metaverse or meta-awareness?", *Journal of Metaverse*, Vol. 3, No. 1, pp. 1-8, Doi: 10.57019/jmv.1093347

[12] H. Park, D. Ahn and J. Lee, "Towards a metaverseworkspace: Opportunities, challenges, and design implications", *CHI,* pp. 1-20, 2023. Doi: 10.1145/3544548.3581306

[13] N. G. Narin, "A content analysis of the metaverse articles", *Journal of Metaverse*, Vol. 1, No. 1, pp.17-24, 2021.

[14] V. T. Truong, L. B. Le and D. Niyato, "Blockchain meets metaverse and digital asset management: a comprehensive survey", *IEEE Access,* Vol. 11, pp. 26258-26288, 2023. Doi: 10.1109/ACCESS.2023.3257029

[15] N. Lyons, "Talent acquisition and management, immersive work environments, and machine vision algorithms in the virtual economy of the metaverse", *Psychosociological Issues in Human Resource Management,* Vol. 10, No. 1, pp. 121–134, 2022. Doi: 10.22381/pihrm10120229

[16] M. Nagy, P. Kubala, E. R. Tucmeanu and A. Mişa, "Metaverse-based industrial services, ambient intelligence and simulation modeling tools, and brain-inspired cognitive and empathetic computing systems across 3d digital twin factories", *Journal of Self-Governance and Management Economics,* Vol. 10, No. 4, pp. 9–23, 2022. Doi: 10.22381/jsme10420221

[17] K. Zvarikova, J. Cug and S. Hamilton, "Virtual human resource management in the metaverse: Immersive work environments, data visualization tools and algorithms, and behavioral analytics", *Psychosociological Issues in Human Resource Management,* Vol. 10, No. 1, pp. 7–20, 2022. Doi: 10.22381/pihrm10120221

[18] A. Koohang, J. H. Nord, K-B. Ooi, G. W-H. Tan, M. Al-Emran et al., "Shaping the Metaverse into Reality: A Holistic Multidisciplinary Understanding of Opportunities, Challenges, and Avenues for Future Investigation", *Journal Of Computer Information Systems,* Vol. 63, No. 3, pp. 735–765, 2023. Doi: 10.1080/08874417.2023.2165197

[19] K. D. Setiawan, A. Anthony, Meyliana and Surjandy, "The essential factor of metaverse for business based on 7 layers of metaverse – systematic literature review", *ICIMTech,* pp. 687-692. August 2022.

[20] M. J. Cobo, A. G. Lopez-Herrera, E. Herrera-Viedma and F. Herrera, "SciMAT: A new science mapping analysis software tool", *Journal of the American Society for Information Science and Technology,* Vol. 63, No. 8, pp. 1609–1630, 2012. https://doi.org/10.1002/asi.22688

[21] Y. Wang, Z. Su, N. Zhang, R. Xing, D. Liu, T.H. Luan and X. Shen (2023). "A survey on metaverse: fundamentals, security, and privacy", *IEEE Communications Surveys & Tutorials*, Vol. 25, No. 1, pp. 319-352, Doi: 10.1109/COMST.2022.3202047

[22] H. Ning, H. Wang, Y. Lin, W. Wang, S. Dhelim, F. Farha, J. Ding and M. Daneshmand, "A survey on the metaverse: The state-of-the-art, technologies, applications, and challenges", *IEEE Internet of Things Journal*, pp. 1-18, Doi: 10.1109/JIOT.2023.3278329

[23] L-H. Lee, T. Braud, P. Zhou, L. Wang, D. Xu, Z. Lin, A. Kumar, C. Bermejo and P. Hui, "All one needs to know about metaverse: A complete survey on technological singularity, virtual ecosystem, and research agenda", *Journal of Latex Class Files*, Vol. 14, No. 8, pp. 1-66, September 2021.

[24] D. Choi, H. K. Lee and D. Y. Kim, "Mood management through metaverse enhancing life satisfaction", *International Journal of Consumer Studies,* Vol. 47, pp. 1533-1543, 2023. Doi: 10.1111/ijcs.12934

[25] E. Gadalla, K. Keeling and I. Abosag, "Metaverse-retail service quality: A future framework for retail service quality in the 3D internet", *Journal of Marketing Management,* Vol. 2, No. 13-14, pp. 1493-1517, 2013. Doi: 10.1080/0267257X.2013.835742

[26] M. Aria and C. Cuccurullo, "Bibliometrix: An R-tool for comprehensive science mapping analysis", *Journal of Informetrics*, Vol. 11, pp. 959–975. 2017. Doi: 10.1016/j.joi.2017.08.007

[27] H. Derviş, "Bibliometric analysis using bibliometrix an R package", *Journal of Scientometric Research,* Vol. 8, No. 3, pp. 156-160, 2019. Doi: 10.5530/jscires.8.3.32

[28] J. A. Moral-Muñoz, E. Herrera-Viedma, A. Santisteban-Espejo and M. J. Cobo, "Software tools for conducting bibliometric analysis in science: An up-to-date review". *El Profesional de la Información*, Vol. 29, No. 1, pp. 1-20, 2020. Doi: 10.3145/epi.2020.ene.03

[29] N. Donthu, S. Kumar, D. Mukherjee, N. Pandey and W. M. Lim, "How to conduct a bibliometric analysis: An overview and guidelines", *Journal of Business Research,* Vol. 133, pp. 285-296, 2021. Doi: 10.1016/j.jbusres.2021.04.070

[30] J. Guan, J. Irizawa and A. Morris, "Extended reality and internet of things for hyper-connected metaverse environments", *2022 IEEE Conference on Virtual Reality and 3D User Interfaces Abstracts and Workshops (VRW), Christchurch*, New Zealand, pp. 163-168, 2022. Doi: 10.1109/VRW55335.2022.00043

[31] Z. Çelik, B. Dülek, İ. Aydın and R Saydan, "Metaverse: Bibliometric Analysis, A Conceptual Model Proposal, and a Marketing-Oriented Approach", *Bingöl University Journal of Social Sciences Institute*, Vol. 24, pp. 383-394, 2022. Doi: 10.29029/busbed.

[32] N.J. Eck and L. Waltman, "Software survey: VOSviewer, a computer program for bibliometric mapping", *Scientometrics,* Vol. 84, pp. 523–538, 2010. Doi: 10.1007/s11192-009-0146-3

[33] T. Šímová, K. Zychová and M. Fejfarová, "Metaverse in the virtual workplace: Who and what is driving the remote working research? A bibliometric study", *The Journal of Business Perspective*, Vol. 28, N0. 1, pp. 1-16, 2023. Doi: 10.1177/09722629231168690