Bibliometric analysis of knowledge management articles in the web of science database

Web of science veri tabanında yer alan bilgi yönetimi makalelerinin bibliyometrik analizi

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ABSTRACT

The aim of this study is to guide future research by highlighting prominent developments, trends, authors, publications, journals, and concepts in the field of knowledge management within the management and organization literature. In accordance with the research objective, a bibliometric analysis was conducted using the VOSviewer tool on 3,445 knowledge management articles published in the Web of Science database since 2000. The analyses conducted reveal the distribution of publications by years, the identities of productive authors, and the identification of influential articles, countries, and journals. The research also reveals the frequently used keywords in the field and the prominent research topics over by years. One of the most critical findings that will guide future studies in the field is the emergence of topics such as technological innovation, open innovation, environmental dynamism, innovation performance, COVİD-19, digital transformation, business model innovation, green innovation, and knowledge hiding as prominent areas of focus in knowledge management over the past three years.

Keywords: Knowledge Management, Bibliometric Analysis, Web of Science.

Jel Classification: D83,M10.

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ÖZ

Bu çalışmanın amacı, yönetim ve organizasyon literatüründe bilgi yönetimi alanında öne çıkan gelişmeleri, eğilimleri, yazarları, yayınları, dergileri ve kavramları belirleyerek gelecek araştırmalara yön göstermektir. Araştırma amacından hareketle 2000 yılından itibaren bilgi yönetimi alanında Web of Science veri tabanında yayınlanan 3445 makale bibliyometrik analiz yöntemiyle VOSviewer aracılığı ile analiz edilmiştir. Yapılan analizler doğrultusunda yayın sayısının yıllar itibari ile dağılımı, üretken yazarların kimler olduğu, etkili makalelerin, ülkelerin ve dergilerin hangileri olduğu tespit edilmiştir. Araştırmada bu tespitlerin yanında alanda sık olarak kullanılan anahtar kelimelerin ne olduğu ve yıllar itibari ile öne çıkan araştırma konularının neler olduğu ortaya konmuştur. Gelecekte alanda yapılacak çalışmalarda yön göstermesi açısından en kritik bulgularından biri ise son üç yılda bilgi yönetimi ile ilişkili olarak teknolojik yenilik, açık yenilik, çevresel dinamizm, yenilik performansı, Covid-19, dijital dönüşüm, iş modeli yeniliği, yeşil yenilik ve bilgi gizleme konularının öne çıktığı tespit edilmiştir.

Anahtar Kelimeler: Bilgi Yönetimi, Bibliyometrik Analiz, Web of Science.

Jel Sınıflaması: D83,M10.

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1. Introduction

The concept of knowledge has been a subject of continuous research and discussion throughout history. It has been a subject of research of philosophy, positive sciences and religions. This process, which began thousands of years ago with Socrates' pursuit of knowledge, has led to the continuous progress and development of knowledge. Knowledge is specific; it belongs to a certain time. It will become obsolete, change and evolve over time (Güçlü & Sotirofski, 2006: 351). Özdemirci & Aydın (2007) explained the concept of knowledge as, "It is an advanced level of personal activity related to knowing and comprehending to a large extent." From a source-based viewpoint, knowledge-based sources are more dependable for companies, as firms that effectively manage new knowledge sources generally outperform those that do not (Shahzadi et al., 2021).

One of the factors that leading to the emergence of knowledge management has been the downsizing strategy in organizations. With the aim of improving organizational performance, businesses have been adopting this strategy since the 1980s. Organizations have diminished their workforce through downsizing, leading to the forfeiture of both explicit and implicit knowledge possessed by the terminated employees.Businesses have realized the importance of managing information to prevent the loss of unique knowledge from laid-off employees and to ensure that a small number of employees can handle big data effectively (Aktan & Vural, 2005: 12). In the 1990s, businesses discovered that, by using management, they could keep up with change, and that knowledge provided a competitive advantage. Information and communication technology advancements have contributed to the emergence of knowledge management. Rapid developments in the 1990s gave rise to various disciplines such as artificial intelligence, software engineering, change engineering, and knowledge-based systems, from which knowledge management emerged. According to the literature, Dr. Karl Wiig introduced the concept of knowledge management in 1986. In 1994, consulting firms that could adapt to innovation began to use information systematically for the first time, providing services to their clients (Özgener, 2005: 271).

Knowledge management consists of three fundamental elements: people, processes, and technology. The humen element is necessary/ essential for the production, development and sharing of knowledge. Knowledge management consists of fundamental processes such as the acquisition, storage, distribution, and application of knowledge. Technology is necessary for the storage of information in networks, its distribution through programs and networks, and the ability for many people to access and collaborate on information (Aktan & Vural, 2005: 11).

Knowledge management has transformed organizations' structure, management, and goals due to the increasing importance of knowledge, today's rapid technological change, and the wealth of knowledge and communication tools (Giudice & Maggioni, 2014). Knowledge management is defined as a comprehensive set of management activities of the structure that ensures the implementation of knowledge-related processes in an organization, as well as the creation and development of the infrastructure that will feed these processes (Andreeva & Kianto, 2012). Another study identifies six stages in the knowledge management process: konwledge acquisition, storage, coding, sharing, application, and creation (Costa & Monteiro, 2016: 387). Odabaş (2006) explains the knowledge management process in nine steps. The steps include determining the necessary knowledge, identifying accessible knowledge, identifying knowledge gap, developing and acquiring knowledge, creating knowledge channels, ensuring knowledge sharing, benefiting from knowledge, and evaluating the knowledge.

The relevant literature has yielded significant findings by investigating the effects of various factors on this process in businesses from multiple perspectives. A key finding is that effective knowledge management positively influences organizational outcomes. In this regard, among the findings of studies highlighting its posivive effects, key topics include maintaining organisational competitiveness, providing efficiency in decision-making processes, ensuring sustainability, enhancing performance, and fostering innovation (Kavalić et al., 2021; Litvaj et al., 2022; Ode & Ayavoo, 2020). In their study, López-Nicolás and Meroño-Cerdán (2021) examines the impact of knowledge management on innovation capability and reveals hat these processes contribute to businesses gaining sustainable competitive advantage. Among the benefits of effective knowledge management in business processes are avoidance of repetitive mistakes, reduction of knowledge retrieval times, and cost savings by increasing operational efficiency.

Nonetheless, research examining the influence of diverse variables on effective good knowledge management or its success is particularly noteworthy. The variables include organizational climate, organizational structure, leadership, trust, and technological capacity for knowledge (Chen & Huang, 2007; Koohang et al., 2017; Panda & Rath, 2021; Yew Wong, 2005). Yew Wong (2005) has thoroughly identified eleven distinct variables as important success criteria within a model for effective knowledge management in small and medium-sized enterprises (SMEs). The elements encompass management, leadership, organizational culture, information technology (IT), strategy, purpose, measurement, infrastructure, procedures, activities, motivational support, resources, training and education, and human resource management. Regarding knowledge management, he elucidates that these variables can be perceived as activities and practices that must be addressed to guarantee successful implementation. Effective management of knowledge resources necessitates dynamic capabilities, including knowledge management capabilities, to create, integrate, and reorganize both internal and external knowledge resources, enabling organizations to enhance their ability to confront external threats and seize opportunities while executing strategies. Knowledge management capabilities allow an organization to identify, develop, co-develop, evolve, evaluate, operate, and refresh knowledge resources in conjunction with other institutional capacities to provide effective solutions (Rafi et al., 2021).

The study aims to provide a comprehensive framework for academics to investigate knowledge management, outlining the focal points, contexts, and methodologies for their research, while also considering the implications for companies.

2. Conceptual Framework

In order to ensure the originality of our study, a search was conducted across various databases on February 16, 2024 to determine the scope, timeframes and differences of the studies on a similar themes in the literature. This literature review identifies six different studies that are relevant to the current study. Table 1 below provides information about the database where these studies were found, the years examined, their scope, the analysis program used, sample size and method.

Table 1: Bibliometric Analysis Studies in Knowledge Management

Source	Database	Time Interval	Scope of the Study	Program	Sample size
Farooq (2024)	Scopus	1988-2021	The study analyses articles on "knowledge management", "knowledge sharing" and "knowledge transfer" within specified year intervals.	R package	1016
Farooq (2023)	Scopus-Web of Science	1988-2021	The study analyses articles in which the words "knowledge management" and "performance" were used together during the specified years.	R package	1583
Fauzi (2023)	Web of Science	1975-2022	The study includes articles on knowledge management and research within the hospital or tourism sectors during the specified year intervals.	VOSwiever	1732
Karaboga, Sehitoglu, Karaboga (2022)	Web of Science	2013-2022	The study analyses studies that explore the concepts of "big data" and "knowledge management" collaboratively.	VOSwiever	622
Gaviria-Marin, Merigo, Baier-Fuentes (2019)	Web of Science	1960-2015	In this study, bibliographic records are obtained from Web of Science (WoS) database by searching with specific keywords such as "knowledge management," "knowledge creation," and "knowledge transfer," resulting in 42,795 bibliographic records.	VOSswiever	42795
Qiu, Lv (2014)	Web of Science	1993-2012	The study covers different fields including business, management, engineering and computer science, and examines all types of documents.	Unspecified	12925

As shown in Table 1, the first bibliometric study in the field is based on the works of Qui and Lv (2014). This study emphasizes that knowledge management has attracted attention in both academic and commercial fields and is recognised as an interdisciplinary area of study. Additionally, it emphasizes the importance of using bibliometric analysis methods to understand knowledge management research conducted between 1993 and 2012, as well as identifying trends collaboration patterns, and significant research topics in this field. The study includes various types of documents. It specifically focuses on academic works such as articles, conference proceedings, and reviews. In the second bibliometric study in the field, Gaviria-Marin et al. (2019) empasize the effectiveness of knowledge management in determining organizational strategies and developing competitive advantage. Additionally, the KM field comprises three generations, each building culminatively on the previous one. As seen in Table 1, this study obtained 42,795 bibliographis records from the Web of Science (WoS) database using the keywords "knowledge management," "knowledge creation," and "knowledge transfer." We have examined the historical development and thematic evolution of the literature in the field of information management using these records. This study differs from ours in its research objectives, year criteria, and inclusion of works from various disciplines. Another study in the same table covers research papers on knowledge management related to big data, which is increasingly becoming integral to our lives due to digitization. This study, conducted by Karaboğa, Sehitoğlu and Karaboğa (2022), focuses on a specific area, such as the concept of big data, which relates to knowledge management. Furthermore, the current study, presented in the same table and carried out by Fauzi (2023), aims to perform a bibliometric analysis of knowledge management studies in the hospital and tourism sectors. It is an important guide for researchers working in these specific fields. Faroog (2023,2024) has contributed to the knowledge management literature with two different bibliometric studies, as shown in Table 1. Our study reveals differences in trends and objectives when evaluating the details of these two studies. In his study, Faroog (2024) examines 1,016 articles obtained from the Scopus database between 1988 and 2021, employing the bibliometric method for analysis. The study aims to analyze scientific productivity in this field and identify the most influential authors, articles, and countries. In this context, the researcher filtered articles using the same keywords as shown in Table 1. The inclusion of the three concepts in the keywords restricts the number of studies. The study makes a significant theoretical contribution by highlighting the prominent themes in knowledge management research. The study also identifies two main thematic clusters as common themes in the field of knowledge management. The first focuses on implementing technological innovations and achieving success, while the second focuses on the creation and use of knowledge within organizations. Faroog conducted another study in 2023, as shown in Table 1 above, examining studies on information management and performance published between 1988 and 2021 using bibliometric analysis methods with data the Scopus and Web of Science (WOS) databases. The study assesses relevant research themes, keyword associations, citation analyses, and author collaborations through a combination of performance analysis and bibliometric mapping. Upon evaluating the two studies collectively, we deduce that incorporating additional concepts into the keyword search constrains the number of studies.

In addition to the aforementioned studies, some articles have carried out bibliometric analysis on a journal-based basis, targeting journals focusing on key knowledge management topics (Chaudhuri et al., 2020; Gaviria-Marin et al., 2018; Islam & Widen, 2023; Koç et al., 2019; Tok, 2022). Upon examining the studies listed in Table 1 above, we find no research that comprehensively identifies performance and trends in knowledge management in relation to the fields of business and management.

This research aims to assist future scholars by analyzing the chronology of the most significant articles, authors, journals, countries, relationships, key terms, and trends associated with "knowledge management" published in the business and management domain within the Web of Science (WoS) database using bibliometric analysis. In this context the research should focus on the following questions:

- What is the distribution of articles and citations for 'Knowledge Management' in the WoS, by year, from 2000 to February 2024?
- Who are the most prolific authors and what are the most influential journals for 'Knowledge Management' related articles in the WoS?
- What are the most cited articles on "Knowledge Management" in the WoS?
- Which countries have the highest number of citations for articles on "Knowledge Management" in the WoS?
- What is the structure of the co-authorship network for articles related to "Knowledge Management" in the WoS?
- What is the structure of the author citation network for articles on "Knowledge Management" in the WoS?
- What are the most common keywords used in the articles about "Knowledge Management" in the WoS?
- What structure emerges in the WoS in terms of keyword associations for articles related to "Knowledge Management"?

This article is expected to make various contributions within the framework of the aforementioned research questions. First of all, general information about the bibliometric analysis method is given to researchers wishing to conduct an in-depth examination of previous studies in a given field.

Furthermore, unlike similar studies, the years analyzed in this research are not addressed in other investigations considering the sample, scope, field of study, and selected document types. This study offers readers insights into the current landscape of authorship, national performance, citations, and keywords associated with articles from 2000, when "Knowledge Management" studies began to proliferate, through to February 2024, when the research was conducted.

3. Method

This study employs a bibliometric analysis methodology. Bibliometric analysis is a technique for investigating and evaluating extensive data sets, illustrating the evolution of a subject or body of knowledge within a certain domain across time (Donthu, Kumar, Mukherjee, Pandey & Lim, 2021). Bibliometric analysis is a quantitative assessment technique for publications and research generated in scientific and applied domains (Ellegaard & Wallin, 2015). Bibliometric analysis facilitates the assessment of research within a certain domain, including authors, journals, nations, and other relevant aspects (Van et al., 2018). Simultaneously, citation frequencies, keywords, and co-authors can be identified and mapped. The data is examined under two subheadings: performance analysis and scientific mapping. Performance analysis emphasizes metrics such as the total number of publications, the count of contributing authors, the overall citation tally, and the annual publishing frequency. Scientific mapping emphasizes the interrelations of elements, including co-authorship analysis, author citation analysis, and keyword co-occurrence analysis (Donthu et al., 2021). Bibliometric analysis provides a comprehensive overview of the literature, facilitating the identification of emerging patterns (Ellegaard & Wallin, 2015). Researchers employ bibliometric analysis to assess publication volumes and subjects over

time, identify significant titles and gaps in the field, and produce original concepts (Van et al., 2018).

For the bibliometric analysis, articles on knowledge management journals indexed in the Web of Science (WoS) database were analyzed. "Knowledge Management" was searched by selecting the relevant topic category in the Web of Science database. Filtering was performed by selecting 'article' as the document type. From 2000 to February 2024, the filtering process was carried out by considering the studies published in English language.

"Management" and "Business" categories were selected in the category filtering section and "Management" was selected in the citation topics (Citation Topics Meso) filtering section. In the last filtering section, "Social Science Citation Index (SSCI)" was selected as the index and the data obtained were analyzed. As a result of the filtering process, 3,445 articles were evaluated according to the data obtained from the WoS database. The data obtained were downloaded as " Tab Delimited File (standardized capitalisation of the file type)" and analysed using the Vosviewer program. Citation analysis of countries, co-authorship analysis, author citation analysis, keyword analysis and keyword association analysis were performed in VOSviewer program. Using the bibliometric analysis method, the study aims to help researchers identify important and critical articles in the field of knowledge management, provide structural links, understand the effective articles and their relationships identify trends for future studies.

4. Findings

The elucidation of the results corresponding to each aforementioned research question adheres to the sequence of the study purpose. Initially, we quantified the articles within the research area over the years and their citations.

A total of 3,445 articles on "Knowledge Management" were published in the WoS from 2000 to February 2024. The distribution of the studies by years and the number of citations are shown in the table below.

Table 2: Citations and Numbers of Articles by Years
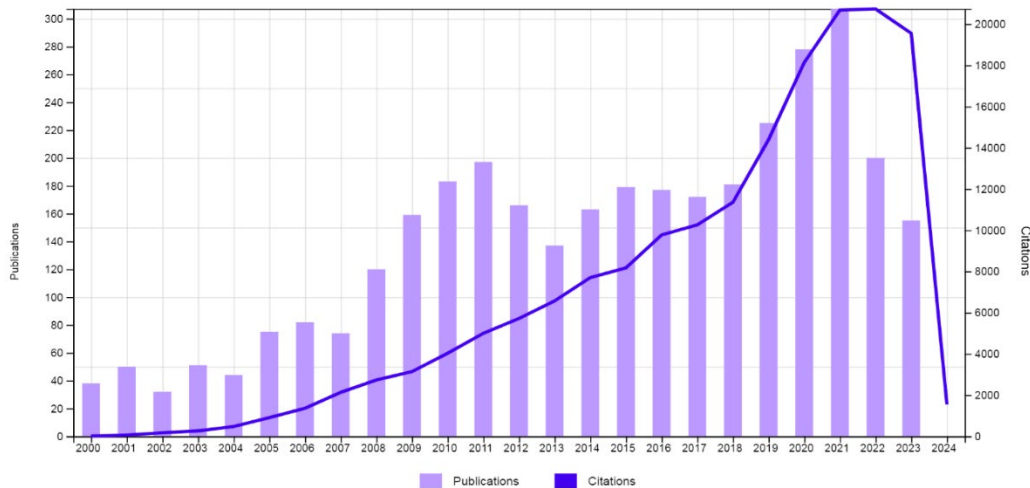
As seen in Table 2, the number of published articles has increased from 2000 to 2021, although not in a linear way. Given this increase, it can be concluded that researchers' interest in knowledge management is high. Until 2008, the number of articles published did not exceed two digits. On the other hand, there was a significant increase, especially between 2017 and 2021, with a rapid acceleration. In the last two years, there has been a sharp decline. The highest number of articles

in the table was 307 in 2021, 278 in 2020, and 225 in 2019, respectively. As shown in the same table, the number of citations to articles increased linearly between 2000 and 2023. Particularly after 2016, this increase appears to be very rapid. The year with the highest number of citations was 2022, with a total of 20,734.

Table 3: Authors with the Highest Number of Publications

Queue	Author	Number of Articles	% of 3.445
1	Kianto A	21	%0,61
2	Del Giudice M	20	%0,58
3	Bontis N	17	%0,49
4	Ferraris A	17	%0,49
5	Cegarra-navarro JG	16	%0,46
6	Vrontis D	16	%0,46
7	Lee S	14	%0,40
8	Papa A	14	%0,40
9	Scuotto V	14	%0,40
10	Bresciani S	12	%0,34

Table 3 displays the rankings of the top 10 authors with the highest productivity in publishing knowledge management articles. The most prolific author is Aino Kianto, with 21 articles, followed by Manlio Del Guidice with 20 articles. Additionally, Bontis N. (17 articles) and Ferraris A. (17 articles) were identified as the third most prolific authors.

Table 4: The Allocation of Journals Determined by the Quantity of Articles Published

Ranking	Journal Name	Number of Articles	% 3.445
1	Journal of Knowledge Management	682	%19.79
2	Knowledge Management Research Practice	332	%9.63
3	Journal of Business Research	127	%3.68
4	International Journal of Technology Management	108	%3.13
5	Management Decision	88	%2.55
6	Journal of Intellectual Capital	81	%2.35
7	Information Management	67	%1.94
8	Ieee Transactions on Engineering Management	61	%1.77
9	Total Quality Management Business Excellence	56	%1.62
10	Technological Forecasting and Social Change	52	%1.50

Table 4 is a compilation of the ten leading journals with the highest volume of papers pertaining to knowledge management in the WoS. The "Journal of Knowledge Management" ranks first with 682 published articles. This statistic represents almost 20% of the 3,445 articles analyzed.

"Knowledge Management Research Practice," with 332 articles, occupies the second position in the rankings, succeeded by "Journal of Business Research," which has 127 articles.

Table 5: Most Cited Articles

Title	Authors	Total Citation	Total Annual Citation
Why should I share? Examining social capital and knowledge contribution in electronic networks of practice	Wasko, M; Faraj, S	2806	140,3
Creating and managing a high-performance knowledge-sharing network: The Toyota case	Dyer, JH; Nobeoka, K	1960	78,4
A pragmatic view of knowledge and boundaries: Boundary objects in new product development	Carlile, PR	1843	80,13
Contributing knowledge to electronic knowledge repositories: An empirical investigation	Kankanhalli, A; Tan, BCY; Wei, KK	1668	83,4
Knowledge sharing: A review and directions for future research	Wang, Sheng; Noe, Raymond A.	1578	105,2
Managing knowledge in organizations: An integrative framework and review of emerging themes	Argote, L; McEvily, B; Reagans, R	1225	55,68
It is what one does: why people participate and help others in electronic communities of practice	Wasko, M; Faraj, S	1062	42,48
IT competency and firm performance: Is organizational learning a missing link?	Tippins, MJ; Sohi, RS	1021	46,41
Diagnosing cultural barriers to knowledge management	De Long, DW; Fahey, L	963	38,52
Work groups, structural diversity, and knowledge sharing in a global organization	Cummings, JN	950	45,24

Table 5 presents the ten most cited papers included in the study's results. The table additionally presents the yearly citation count for each publication. The most referenced article, as seen in Table 5, beginning with "Why should…" is authored by Molly Wasko and Samer Faraj. Since its release, this article has garnered a total of 2806 citations.This essay examines the reasons why individuals communicate ideas and disseminate knowledge across electronic application networks. Figure 1 illustrates the network map of knowledge management research across several countries.
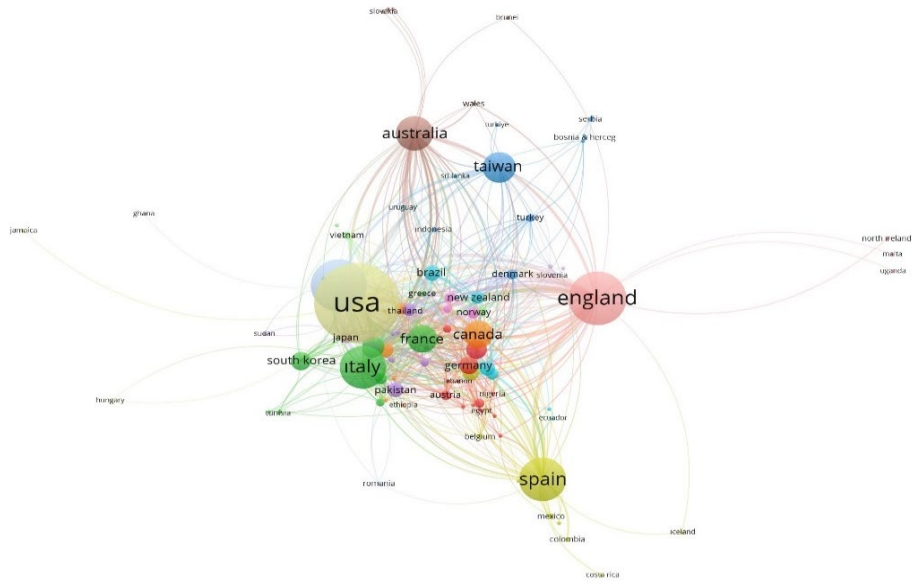
Figure 1: Citation Analysis of Countries

Table 6: Articles and Citations by Countries

Country	Number of Articles	Citations	Total link strength
United States of America	751	68295	476
England	427	19586	424
China	416	15179	307
Spain	320	16785	169
Italy	316	12081	295
Australia	229	6333	199
Taiwan	200	8513	63
Canada	171	10377	161
France	168	6075	229
India	112	3200	97
Finland	101	3749	83
South Korea	95	4262	67
Germany	91	4531	83
Malaysia	87	2788	77
Netherlands	81	4196	62
Brazil	77	1907	47
Sweden	72	2923	81
Pakistan	69	2209	96
Iran	67	1140	33
New Zealand	56	1732	44
United Arab Emirates	55	1948	74
Singapore	53	4092	53
Portugal	52	2078	50
Norway	50	2970	65
Russia	47	3095	76
Ireland	44	1071	36
Japan	42	3049	26
Scotland	42	2422	47
Austria	40	1356	42
Denmark	40	3472	48
Switzerland	37	2317	30
Saudi Arabia	31	935	38
South Africa	30	540	37
Cyprus	29	1513	39
Poland	28	694	27
Türkiye	28	937	27

Table 6 ranks countries based on various factors influencing the production of knowledge management articles. The criteria include the number of publications and citations and also the overall link strength. The United States excels with a high volume of articles and citations, while China and the United Kingdom exhibit comparable academic impact.

As indicated in the table's footer, 12 nations in the region possess fewer than 50 articles. This data is essential for comprehending the performance disparities among countries in academic research and assessing research plans.

4.1. Co-authorship Analysis

Co-authorship analysis facilitates the examination of collaboration ties among writers and their influence on the spread of information. By emphasizing the collaborative efforts of writers in generating scientific output, it underscores the network structure inherent in these collaborations. Analyzing author collaboration allows for the identification of primary authors and proficient research groups within a particular domain.
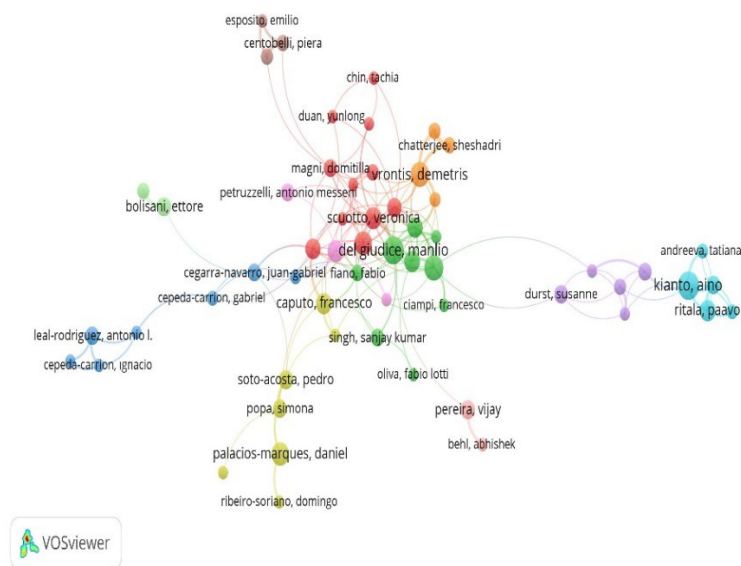
Figure 2: Co-authorship Analysis Network Map

Figure 2 shows the network map of the co-authorship analysis. Authors with a minimum of 5 articles and 1 citation were included in the analysis. We identified 58 articles that met this criterion. As a result, the co-authorship map revealed 58 articles, 11 clusters, 151 links, and 282 total link strenght.

Table 7: Co-authorship Analysis Cluster and Its Elements

Cluster and Number of Items	Author Name	
Cluster 1 🟥 Red 11 items	Roberto Chierici	Alice Mazzucchelli
	Tachia Chin,	Rosa Palladino
	Valentina Cillo	Armando Papa
	Luca Dezi	Veronica Scuotto
	Yunlong Duan	Antonio Usai
	Domitilla Magni	
Cluster 2 🟩 Dark Green 9 items	Stefano Bresciani	Fabio Fiano
	Francesco Ciampi	Fabio Lotti Oliva
	Manlio Del Giudice	Gabriele Santoro
	Maria Rosaria Della Peruta	Sanjay Kumar Singh
	Alberto Ferraris	
Cluster 3 🟦 Dark Blue 7 items	Antonio I. Leal-Rodriguez	Antonio Leal- Rodriguez
	Ignacio Cepeda-Carrion	Jaime Ortega-Gutierrez
	Gabriel Cepeda-Carrion	Silvia Martelo-Landroguez
	Juan Gabriel Cegarra-Navarro	
Cluster 4 🟨 Yellow 7 items	Francesco Caputo	T. Ramayah
	Alberto Mazzoleni	Domingo Ribeiro-Soriano
	Daniel Palacios-Marques	Pedro Soto-Acosta
	Simona Popa	
Cluster 5 🟪 Purple 5 items	Murad Ali	Eric Tsui
	Susanne Durst	Muhammad Saleem Sumbal
	Muhammad Shujahat	
Cluster 6 🟦 Blue 5 items	Tatiana Andreeva	Josune Saenz
	Aino Kianto	Mika Vanhala
	Paavo Ritala	
Cluster 7 🟧 Orange 4 items	Sheshadri Chatterjee	Alkis Thrassou
	Ranjan Chaudhuri	Demetris Vrontis
Cluster 8 🟫 Brown 3 items	Piera Centobelli	Emilio Esposito
	Roberto Cerchione	
Cluster 9 🟪 Pink 2 items	Alexeis Garcia-Perez	Antonio Messeni Petruzzelli
	Vahid Jafari-Sadeghi	
Cluster 10 🟧 Light Pink 2 items	Abhishek Behl	Vijay Pereira
Cluster 11 🟩 Light Green 2 items	Ettore Bolisani	Enrico Scarso

The clusters, the number of items and the list of authors in the clusters are shown in Table 7. For example, Cluster 1, which is more prominent on the map and shown in red, has 11 items. These are Roberto Chierici, Tachia Chin, Valentina Cillo, Luca Dezi, Yunlong Duan, Domitilla Magni, Alice Mazzucchelli, Rosa Palladino, Armando Papa, Veronica Scuotto and Antonio Usai. It is evident that these authors are in cooperation in their studies on knowledge management. In addition, when we look at the institutions and geographical regions where the authors are located, it is seen that 2 of the 11 authors are located in China, 9 of them are located in Italy and 3 of them are located in Milano-Bicocca University.

The second cluster, shown in dark green, consists of 9 authors. These authors are Stefano Bresciani, Francesco Ciampi, Manlio Del Giudice, Maria Rosaria Della Peruta, Alberto Ferraris, Fabio Fiano, Fabio Lotti Oliva, Gabriele Santoro and Sanjay Kumar Singh. Of these 9 authors, 7 are affiliated with universities in Italy, 1 with an institution in Brazil and 1 in the United Kingdom. This shows that authors from the same institutions or geographical regions collaborate.

4.2. Author Citation Analysis

Author citation analysis is a bibliometric technique used to assess the influence of scientific research. This research examines the citation frequency of a writer's work, identifies which writers cite each other more frequently, and assesses who has greater influence in the literature.

Figure 3: Author Citation Analysis
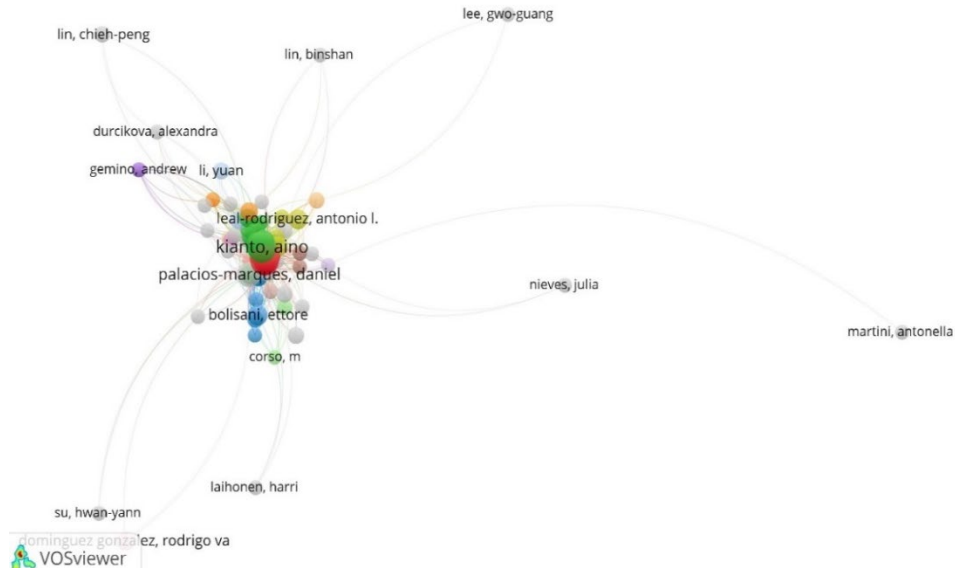
Table 8: Author Citation Analysis

Author	Number of publications	Number of citations	Total connection strength
Del Giudice, Manlio	20	2112	284
Santoro, Gabriele	11	1226	216
Ferraris, Alberto	17	1575	208
Dezi, Luca	10	836	176
Bresciani, Stefano	12	1164	169
Papa, Armando	14	641	157
Kianto, Aino	21	1675	122
Scuotto, Veronica	13	834	120
Vrontis, Demetris	16	809	119
Soto-Acosta, Pedro	10	959	114
Della Peruta, Maria Rosari	5	534	98
Thrassou, Alkis	6	572	86
Cillo, Valentina	11	612	78
Popa, Simona	9	514	78

In the author citation analysis, the minimum criteria were set at 5 published studies and at least 10 citations. As as result, 109 authors from a total of 7,251 were analyzed. Among these authors, the first 10 authors with the highest number of citations and publications were selected. The most cited authors in knowledge management are Manlio Del Giudice, Aino Kianto, Alberto Ferraris, Gabriele Santoro, Stefano Bresciani. Manlio Del Giudice, who has the highest number of citations, has a total of 20 articles on knowledge management and 2112 citations. The total link strength was 284. Aino Kianto ranks second, with 21 publications and 1,675 citations. Thirdly, Alberto Ferraris has 17 articles, 1575 citations and 208 total link strength.

4.3. Keyword Analysis

Figure 4: Keyword Network
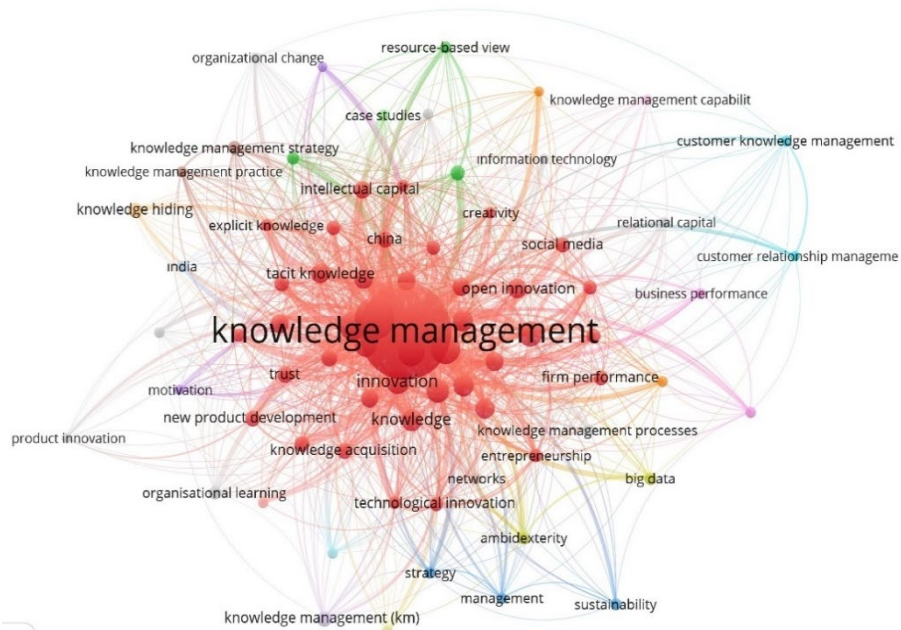
Figure 4 shows the keyword network map obtained as a result of bibliometric analysis. Keywords used at least 20 times in the VOSviewer program were analyzed. The analysis revealed 77 clusters.

Table 9: Most Used Keywords

Keyword	Frequency	Total connection strength
Knowledge management	1561	1620
Knowledge sharing	289	403
Innovation	265	442
Knowledge transfer	138	225
Organizational learning	130	208
Intellectual capital	107	137
Absorption capacity	98	140
Knowledge creation	90	153
Performance	80	152
Information	83	128
Organizational performance	77	132
Dynamic capabilities	73	102
Tacit knowledge	69	124
Case Analysis	68	99
Being open to innovations	68	79
SMEs	63	104
Organizational culture	61	116
Social capital	57	107
Learning	57	100
Intellectual capital	50	69
Human Resources Management	49	85
China	46	79
Competitive advantage	43	67
Obtaining information	43	67
Technological innovation	36	71
Cooperation	36	67
Leadership	35	69
Human capital	35	73

Table 9 lists the frequencies and total link strength of the keywords in the network. The most frequently used keywords are knowledge management (1561), knowledge sharing (289), innovation (160), knowledge transfer (138) and organizational learning (130).

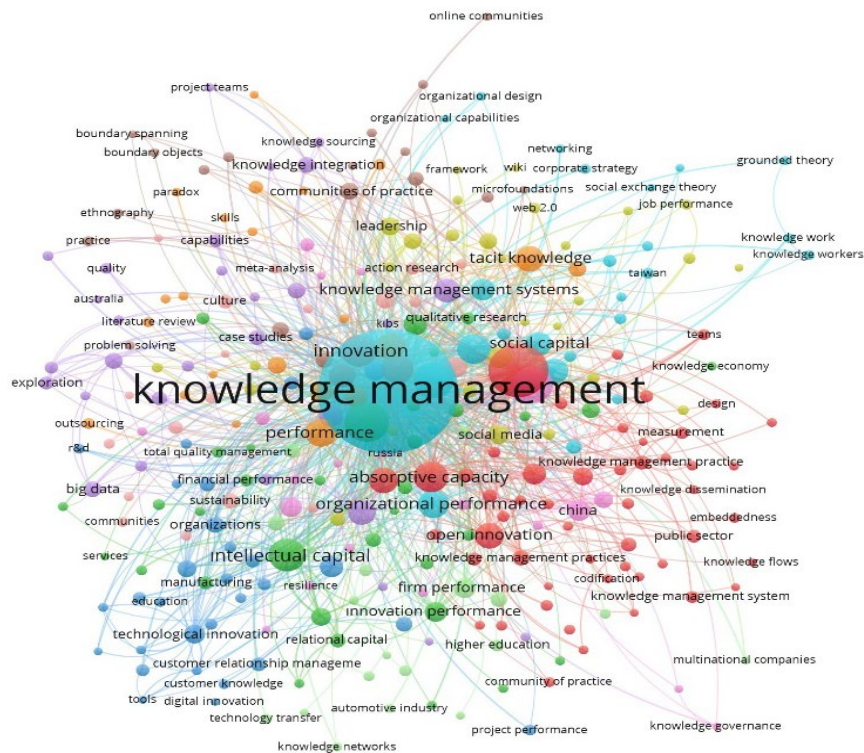**Figure 5: Keyword Association Network Map**

Figure 5 shows the concept association network map obtained through bibliometric analysis. There are 7171 keywords in total. In order to reach more meaningful results, the analysis was adjusted to include only keywords found at least 7 times. As a result, 300 words meeting the criteria were identified and the keywords are shown in the network map below. As a result, the keyword association map revealed 11 clusters, 3,927 links and 7,935 total link strength. For example, there are 51 elements in Cluster 1, which is shown in red color on the map. Some of the densest ones include keywords such as knowledge sharing, knowledge acquisition, open innovation, absorptive capacity and knowledge management strategy. This domain focuses on the learning capacities of organizations, knowledge generation, and the processes through which knowledge is cultivated at the organizational level. The second cluster, shown in dark green, consists of concepts such as intellectual capital, human capital, innovation, innovation performance, firm performance, new product development, and structural capital. This cluster encompasses research examining the impact of knowledge management strategies on organizational performance and innovation processes. This cluster emphasizes the enhancement of knowledge management performance and the administration of innovations. The yellow cluster encompasses themes including "strategic planning," "leadership," and "organizational capabilities." In strategic management, knowledge management emphasizes leadership and planning. The purple cluster has keywords including "innovation," "community of practice," "organizational culture," and "knowledge transfer." Efforts have concentrated on knowledge dissemination and fostering an innovative culture. The sixth cluster, shown in blue, mostly consists of words such as social capital, knowledge creation, organizational learning, human resource management, organizational culture, and organizational performance. This cluster addresses the installation and utilization of knowledge management systems and their effects on knowledge sharing within the organization.

Figure 6: Keyword Association by Years

The time map of keyword co-occurrence shows keywords used between 2000 and 2020, color-coded by years. The years with the highest usage of a certain keyword are indicated by colors. The mid-2010s are represented by the green tones, whilst the early 2000s are depicted in blue and purple tones. As a result, the discipline of knowledge management research grew quickly in the early 2000s. More basic terms like "organizational learning," "tacit knowledge," and "knowledge creation" were the topic of keywords. The foundational theoretical framework of knowledge management was established at this time by research on the production, exchange, and management of knowledge. The primary motifs that emerge are:

-The significance of tacit knowledge and knowledge creation concepts: Organizational knowledge creation and dissemination are frequently the subject of theoretical research.

-Organizational learning: During this time, research concentrated on the subjects of enhancing an organization's capacity for learning and leveraging it as a competitive advantage.

Building on the theoretical framework, it started to incorporate creative applications and tactics in the middle of the decade. This era's dominant vocabulary focused on concepts like "knowledge management systems", "intellectual capital" and "organizational performance". Among the noteworthy subjects were:

Systems for managing knowledge: During this time, extensive research was conducted on how digital technologies can systematically assist and handle information.

Intellectual capital: The role of knowledge in value creation and the significance of managing intellectual capital have gained attention.

Performance of the organization: Research was done on how knowledge management affects business performance.

The map's yellow-toned regions correspond to the keywords that gained popularity in the run-up to 2020. Knowledge management study appears to be concentrating on issues like

performance, innovation, and digitization at this time. During this time, terms like "digital transformation", "innovation" and "absorptive capacity" were commonly used. These themes highlight the significance of innovation processes and the function of digital tools in knowledge strategy management:

Digital transformation: Research increasingly concentrated on how knowledge management changed in the digital era and how digitization affected knowledge sharing.

Creativity and innovation: The emphasis was on the ways in which knowledge management facilitates the processes of invention.

Absorption capacity: Organizations' ability to absorb and apply new information became more significant.

5. Discussion and Conclusion

This study examines the articles published in the field of knowledge management over the past 20 years using the method of bibliometric analysis, providing a comprehensive resource for those interested in conducting research in this field. We analyzed the data using Voswiever program, which accessed article data from the Web of Science database. The study found that broadcasts grew very quickly between 2017 and 2021, then declined quickly in 2022 and 2023. In 2021, the year with the highest number of articles published, 225 papers were published. The most productive authors in the years analyzed in the study were Kianto A. (21 articles), Del Guidice M. (20 articles), Bontis N. (17 articles), and Ferraris A. (17 articles). In terms of academic research performance, the United States has a high number of articles, while China and Britain exerts a strong academic influence. The mentioned countries can be considered among the primary contributers to their significant investments in knowledge technologies, innovation ecosystems, education systems, and research and development (R&D) activities.

Among the journals in which the articles analysed in the study were published, the 'Journal of Knowledge Management' ranks first with 682 articles. It is followed by "Knowledge Management Research Practice" with 332 articles. In the third place, 127 articles were published in the "Journal of Business Research".

Another important finding specific to the field is which articles are most effective in terms of the number of citations. The article by Molly Wasko and Samer Faraj (n = 2806), titled "Why should I..." has the highest number of citations in field covered by this research. When the details of this highly cited article are examined, it is found to have been conducted to answer the question of why individuals help/share knowledge in electronic networks of practice. According to the study, the factors that influence people's contribution to knowledge-sharing are professional reputation, experience, and networking structures (Wasko & Faraj, 2005). The second study describes Toyota's production network and the factors behind the fast and effective realization of knowledge sharing. Toyota's knowledge network succeeded by solving three key dilemmas. First, members were motivated to share valuable knowledge while preventing unwanted spillovers to competitors. Second, free riders were blocked, preventing the unauthorized use of knowledge. Third, methods were developed for terminating different types of valuable knowledge and reducing access costs. The research argues that the dynamic learning capability that creates competitive advantage should cross firm boundaries (Dyer & Nobeoka, 2000). The third study explores the proposition that knowledge can be both a barrier and a source of innovation in new product development. It was observed that knowledge is structured differently, creating boundaries and the use of the boundary object was proposed (Carlile, 2002).

When analyzed in terms of the number of author-based citations in the field of knowledge management, all studies conducted by an author were included and evaluated. The

most cited authors in knowledge management are Manlio Del Giudice, Aino Kianto, Alberto Ferraris, Gabriele Santoro, Stefano Bresciani. Manlio Del Giudice, with the highest number of citations, has a total of 20 articles on knowledge management and 2112 citations. The total link strength was 284. In second place is Aino Kianto with 21 publications and 1675 citations. Third is Alberto Ferraris, with 17 articles, 1575 citations and 208 total link strength.

When examining the frequency of keywords used in articles published in the field, the most common keywords are knowledge management, knowledge sharing, innovation, knowledge transfer, and organizational learning. In the association network analysis showing the co-use of keywords, various clusters were identified. The most intensely used concepts in the first cluster consist of keywords such as knowledge sharing, knowledge acquisition, open innovation, absorptive capacity and knowledge management strategy. In the second cluster, the key concepts are intellectual capital, human capital, innovation, innovation performance, firm performance, new product development, and structural capital. The third cluster includes terms such as social capital, knowledge creation, organizational learning, human resource management, organizational culture, and organizational performance.

Another important finding in the research is the use of the specified keywords by years. In this respect, especially after 2020, concepts such as technological innovation, open innovation, environmental dynamism, innovation performance, COVID-19, digital transformation, business model innovation, green innovation and knowledge hiding have become prominent keywords in the field of knowledge management. Studies have increasingly highlighted the contribution of key terms related to knowledge management as an important tool for businesses in achieving sustainability, innovation, flexibility, and environmental compliance in recent years (Feng et al., 2022; Polas et al., 2023; Makhloufi et al., 2023). Researchers conducting knowledge management studies should focus their attention on the relationships between the mentioned concepts, given their specified contributions and importance.

Many factors are transforming the future of the business world. An evaluation of these factors highlights the adaptation of organizations to technological changes, the permanence of hybrid and remote working models, and the reshaping of human resources policies. In this transformation, topics such as artificial intelligence, digital surveillance, and employee safety emerge as key areas of focus (Kraus et al., 2023). Policymakers and managers should focus on research on these prominent topics to understand how knowledge management should evolve and adapt during this process.

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