PROGRESS, TRENDS, AND UPDATES OF KNOWLEDGE MANAGEMENT RESEARCH IN THE CONTEXT OF DIGITAL TRANSFORMATIONS: A BIBLIOMETRIC ANALYSIS

Andra Nicoleta ILIESCU
National University of Political Studies and Public Administration,
Blvd. Expozitiei, No. 30 A, Sector 1, 012104, Bucharest, Romania
andra.iliescu@facultateademanagement.ro

Dan PAIUC
National University of Political Studies and Public Administration,
Blvd. Expozitiei, No. 30 A, Sector 1, 012104, Bucharest, Romania
dan.paiuc@facultateademanagement.ro

Abstract. *The intensified global Knowledge Economy is frequently reshaped under continuous disruptive technological advancements. Robotic process automation, artificial intelligence, machine learning, the internet of things, and big data analytics are only some of the hot topics on the agendas of organizational decision-makers in strategic development. The quest for knowledge management can no longer be separated from continuous tech transformations and innovations: knowledge mining, application, dissemination, and protection activities have grown connected to digital technologies. The present study offers a detailed insight into the knowledge management literature focused on digital transformations. As such, the relevant timeframe for the analysis starts from 2006 to 2022, as indicated by our findings. Working within a sample of 159 documents, the authors enable VOSviewer software 1.6.17 and R coding language features to identify the main research trends and updates for the selected topic. The endeavors cover countries' contribution analysis, review of academic interest evolution across short to medium timeframes (overlay analysis), and identification of potential future research directions which would enrich academic knowledge of the selected research segment. The main contribution of the present bibliometric analysis research is the visual mapping of knowledge management literature in the context of digital transformation.*

Keywords: *artificial intelligence; big data; bibliometric analysis; digital transformation; knowledge management; industry 4.0; innovation; VOSviewer; R coding language.*

Introduction

Like other socio-economical revolutions, the digital transformation phenomenon "is disrupting society, generating widespread concern about its impact across a broad range of issues including jobs, wages, health, resource efficiency, and security" (WEF, 2016). According to the World Economic Forum white paper on "Digital Transformation of Industries" (2016), developed in cooperation with Accenture, digital transformation impact on employment is expected to cause anywhere between 2 million to 2 billion job losses between 2016 and 2030, contributing to the sense of accentuated uncertainty. Nevertheless, the same study findings indicated that, at the moment of the research, up

to 6 million jobs were estimated to be created globally by the same transformational phenomenon until 2025.

The post-COVID-19 pandemic environment and the Eastern Europe conflict are increasing the workforce and supply chain challenges that organizations face at the beginning of the second decade of the 21st century. According to PwC's "Digital Factory Transformation Survey" (2022), only the *Digital Champions* have successfully navigated the contemporary global market, marked by key resource shortages. *Digital Champions* are represented by those companies that successfully implemented end-to-end production technologies and factory automation. At the same time, up to 64% of the surveyed companies have only started integrating digital and technological solutions into their workflows.

Furthermore, from the recently published research "Orchestrating Workforce Ecosystems" (2022) implemented by MIT Sloan Management Review and Deloitte with the help of over 4,000 leaders and managers, we find that in the post-COVID-19 environment, the main management challenge is represented by orchestrating internal and external resources, including contingent workers, consultants, and technological solutions. In the external resources category, we can include the knowmad type of workers (Moravec, 2008; Iliescu, 2021a, 2021b), as well as artificial intelligence, or robotic process automation on the other hand, as solutions for the workforce crisis.

In this way, strategic organizational knowledge and knowledge management strengthen their interdependencies with the firms' technological capabilities and potential development. Therefore, we consider that the radiography of the knowledge management (KM) and digital transformation (DT) fields of literature would prove highly relevant in the current business context and contribute to academic research by identifying current trends and updates, relevant gaps, and future research direction. As the first step in our endeavor, in the next section of the paper, the *Literature review*, we will introduce the relevant concepts for the paper.

The authors opted to implement a bibliometric literature review with the help of VOSviewer software and R language code development (Allaire, 2012; Gandrud, 2018; Verzani, 2011) on the KM in the DT context niche of literature. According to multiple authors (Akhavan, Ale Ebrahim, Fetrati & Pezeshkan, 2016; Ponce & Lozano, 2010), the ability to mix tools, frameworks, and methods to explore publication and citation patterns has been enabled by bibliometric analysis. When dealing with voluminous amounts of data, bibliometric analysis becomes essential for comprehending and presenting the conceptual structure of specific scholarly disciplines and monitoring the progress of particular subjects. (Van Eck & Waltman, 2010, 2011, 2020, 2021; Zupic & Cater, 2015). The third section, Methodology, will provide more details about data sampling and collection and analysis principles.

Four research questions have been formulated to guide the analysis:

RQ1: What is distribution per document type in the established field of literature?

RQ2: Which are the most proliferate countries in the established field of literature?

RQ3: What are the strongest co-authorship relations in the KM and DT literature?

RQ4: Which are the most robust conceptual relationships in the KM and DT literature, and which have been the interest trends in the field over the past years?

In the fourth section *Results and discussion*, we present our analysis's main results. Finally, the *Conclusions* section will close the paper by summarizing the most important findings against the proposed research objectives.

Literature review

When analyzing KM literature, we establish the context as the Knowledge Economy (KE), understood as the unique set of circumstances emphasizing individual and organizational innovation and competitiveness. The KE's main processes are knowledge and information generation, dissemination, and application (OECD, 1996). As such, economies based on knowledge transactions face specific challenges that bring knowledge management to the attention of organizational strategists and decision-makers. According to Tomé (2020, p. 453) in the KE, "the most important task is to use knowledge assets as the driver of both innovative ways of creating and delivering new products and services as well as understanding a much more quality and value-orientated market".

The complexity and richness of KM academic literature are supported by its transversal and cross-disciplinary relevance (Davenport & Prusak, 2000; Nonaka & Takeuchi, 1995, 2019). According to Bratianu (2015), knowledge management pervades other management specializations due to its inherent purpose of enhancing organizational knowledge dynamics.

Traditionally, KM literature developed on the ground basis of understanding knowledge from a Newtonian perspective. Nevertheless, this approach had a set of downsides defined by the limits it poses to a nonlinear and intangible phenomenon, as knowledge is (Bratianu & Vasilache, 2009). The importance of knowledge management was evidenced during the COVID-19 crisis when the absence of critical knowledge lead to many economic, social, educational, and cultural problems (Bratianu, 2020; Bratianu & Bejinaru, 2021). According to Zbuchea and Vidu (2018), the attention in the KM research field progressively evolved from nonprofit and public organizations towards nongovernmental organizations, focusing on specific research sub-directions, summarized in Table 1.

According to Pinzaru, Zbuchea, and Vitelar (2018, p. 447), "the KM theories identify four key components: knowledge, people, processes and technology". Specifically, as regards the early adoption of new technologies, this adds to organizational competitiveness. In the mature KE, KM activities such as knowledge acquisition, application, distribution, protection, etc., are connected with the technological performance of the company and organizational knowledge entropy dynamics (Bratianu, 2019; Zbuchea & Vidu, 2018).

Table 1. KM literature attention areas evolution (Source: adapted from Zbuchea and Vidu, 2018 and Pinzaru, Zbuchea, and Vitelar 2018)

Phase	Academic focus domain	Sub-directions
I	Nonprofit and public organizations	Management and leadership style
		Organizational culture and intelligence
		Organizational development and innovation
		Technology
		Intellectual capital
		Knowledge sharing
		Stakeholder management
		Relationships between KM and technology
II	Nongovernmental organizations	Flexibility
		Stakeholders' needs
		Beneficiaries' needs

The intensified global KE is constantly reshaped under the forces of continuous disruptive technological advancements. On the one hand, basic access to global digital knowledge resources is impossible outside of the digital technologies' infrastructure. As indicated by Zbuchea and Vidu (2018), this idea points to the KM literature segment focused on the logistics value of digital technologies. Also, it is important to understand the mechanisms of decision-making based on the knowledge field dynamics (Bratianu et al., 2020).

On the other hand, Ebert and Duarte (2008) focus on a specific meaning of the digital transformation concept, which they abbreviated as DX, when analyzing the effects of integrating novel, disruptive technologies within organizational practices with three essential purposes: enhancing productivity, increasing value creation, and emphasizing social welfare. In other words, DX covers the meaning of social and organizational transformation due to digital technology adoption.

Methodology

This paper aims to explore the research progress, trends, and updates in the KM field, in the context of DT. The authors opted to implement a data science analysis to serve the research objective best. First, the data was collected on the 24th of August from Web of Science (WoS) and Scopus databases, two of the most reliable sources of data (Van Eck & Waltman, 2010, 2011, 2020, 2021; Janik, Ryszko & Szafraneic, 2021), following a unified search and extraction methodology, detailed in the following paragraphs.

The structure *"knowledge management" AND "digital transformation"* has been searched on both databases. Furthermore, the search was limited to the publications indexed in the business and management fields. As such, the search revealed 88 documents on Scopus and 104 documents on WoS. Next, the two databases have been corroborated, and 29 duplicated publications have been removed with the help of an in-house programming code in R language enabled within RStudio (Allaire, 2012; Gandrud, 2018; Verzani, 2011). As regards the geography and timeframe of the publications, no restrictions have been imposed in the initial search phase because the country affiliation

and timeframe evolution of academic interest will represent analysis areas in this research project.

Next, a first data cleaning process was implemented for the 163 obtained documents. First, three documents have been removed for being in German, Russian, and Spanish. Next, the authors revised the data lake, and an additional document was manually eliminated from the 160 English documents due to relevance issues.

Consequently, 159 relevant documents have been selected for the bibliometric analysis, implemented with the help of VOSviewer software 1.6.17 (Van Eck & Waltman, 2010, 2011, 2020, 2021). Within them, a total of 930 keywords have been identified.

The following types of analysis have been run over the collected data:

- Publications analysis per database (Scopus and WoS) and combined publications distribution per type of document.
- Analysis of most frequently associated countries in the research on KM in the DT context.
- Co-authorship relationship analyses with VOSviewer.
- Key-words co-occurrence analysis emphasizes conceptual relationships, overlay analysis, and density interpretations.

Results and discussion

In Figure 1 we present the document type distribution after combining the two databases' extractions and eliminating the duplicated and non-relevant documents.

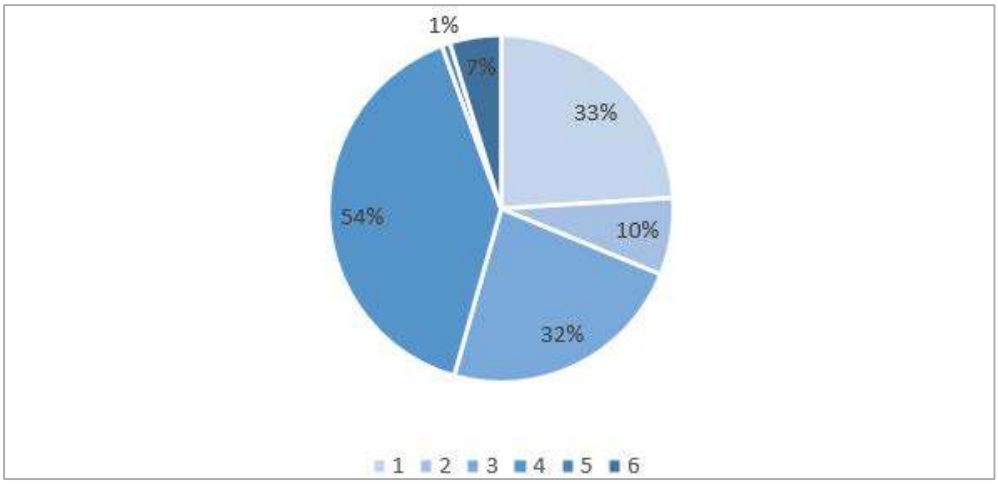

Figure 1. WoS and Scopus publication distribution per type of document after R coding and data cleaning (Authors' own research)

As such, out of the total 159 relevant documents for our bibliometric analysis, 64 are articles (1 – 33%), 9 are books or book chapters (2 – 10%), 29 are conference papers

and reviews (3 – 32%), 50 are proceeding papers (4 – 54%), one is an editorial material (5 - 1%), and 6 are reviews (6 – 7%).

As supported by data presented in Table 2 below, the search structure *"knowledge management" and "digital transformation"* findings describe the continuous growth of academic interest for KM and DT, especially starting with 2017 up to 2021 for both Scopus and WoS databases publications. The continuous positive trend over the complete temporal interval supports this research's relevance and the selected topic for bibliometric analysis.

Even though the percentages of 2022 for WoS (12%) and Scopus (13%) are less significative than the ones for 2021 (30%, respectively 29%), indicating a potential decrease of activity in this niche of KM literature, we must consider the moment of the research (August 2022). The authors suggest that revisiting the topic a few months after December 31st, 2022, will help grasp a better understanding of the academic activity of 2022 in the targeted research area.

Table 2. Scopus and WoS publications analysis (Source: authors' research)

Database/ filters	Oldest publication	Newest publication	Total findings	Weight per year
Scopus/ Business, Management and Accounting	2006	2022	88 publications with abstract and keywords in English	2022 – 13% 2021 – 29% 2020 – 34% 2019 – 11% 2018 – 15% 2006 – 2017 – 5%
WoS/ Business; Management.	2007	2022	104 publications with abstract and keywords in English	2022 – 12% 2021 – 30% 2020 – 24% 2019 – 10% 2018 – 13% 2017 – 9% 2007 – 2016 – 3%

In addition, the authors have illustrated in Figure 2 the map of publications based on the affiliation of the prominent authors. As such, out of a total of 51 countries, the top 10 countries according to the number of publications reverted by WoS and Scopus databases when using the search structure "*knowledge management" AND "digital transformation"* at the date of the research are:

- Italy (24 publications);
- United Kingdom and Russia (13 publications per country);
- Germany (11 publications), France (10 publications), Australia (8 publications), Austria, Colombia, and the USA (7 publications per country), Finland and India (6 publications per country).

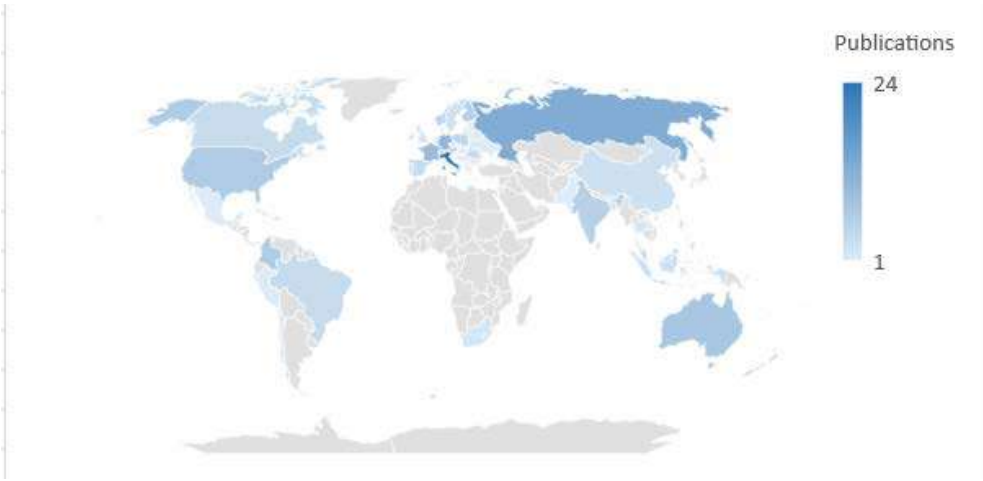

Figure 2. Map of publications distribution, based on the affiliation of the first author (authors' own research)

As regards Romania, our country closely follows the top 10 countries, being placed in the 12th position with four publications indexed in WoS and Scopus, at equality with countries like Brazil, Canada, Malaysia, and Spain. This indicates that the Romanian academic field is part of the active ones in the field of KM in the DT context, leading in front of many other countries. It is important to note that in our analysis, there are only 17 countries better positioned than Romania, while 33 follow regarding academic activity and the number of publications.

To further develop our understanding of the selected academic field dynamics, we implemented a co-authorship analysis with the help of VOSviewer software, and the findings are coherent with the map of publications distribution. As such, in Figure 3, we see the 14 countries that meet the minimum number of 5 publications and the co-authorship relationships developed between authors from these countries. We notice how the best-represented countries are associated with the most prominent circles on the VOSviewer map (England – purple, Italy – yellow, France – blue).

Moreover, from the links displayed by the software based on collected data analysis, we understand how the collaboration relationships are established between the most important map connectors: Switzerland, Italy, France, and England, followed by the USA, Russia, India, and Germany, forming semi-independent groups of countries, based on their further regional connections. For example, England is closely connected with Norway, while Germany's publications are connected to those of Austria, Finland, and Sweden.

The above findings help us understand how scholars in the academic field collaborate toward developing knowledge in the KM and DT fields. These activities can be supported by organizational collaborations, cultural proximity, or congruent development policies. Undoubtedly, the universal facilitator of academic cooperation toward knowledge

development is the digital environment which eliminates time and space limitations and facilitates instant knowledge co-creation, sharing, and distribution.

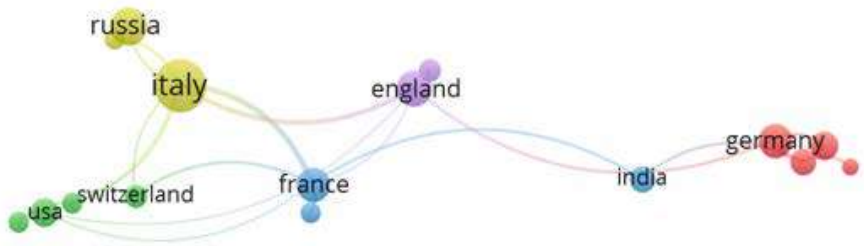

Figure 3. Network visualization of top 14 countries co-occurrence analysis obtained within VOSviewer 1.6.17 software
(authors' research)

Additional significant findings on the trends, progress, and potential future research directions in the KM and DT field are obtained when implementing an intellectual review with the help of keyword co-occurrence analysis (Van Eck & Waltman, 2010, 2011, 2020, 2021). In our case, working with the previously described collected data and enabling VOSviewer-specific features, we obtained 40 keywords with a minimum of 5 occurrences, grouped in 5 clusters, with 430 links and a total link strength of 251.5.

In Figure 4 below, we can visually identify Cluster 1, represented by innovation (red), Cluster 2, represented by knowledge management (green), Cluster 3, represented by information technology (blue), Cluster 4, represented by industry 4.0 (yellow) and Cluster 5 represented by digitalization (purple). A first observation relates to the map's density, indicating the relevant and robust relations established between the top 40 concepts of the intellectual map of KT and DT.

On the one hand, KM and DT (both parts of cluster 3) are not placed in the center of the map but more in the middle-right area. This aspect emphasizes the segregation of clusters and the complex relationships established within and between the clusters, described further in this paper. On the other hand, the central concepts of every other cluster (highest value items) are polarized in the proximity of the map epicenter: innovation (cluster 1), industry 4.0 (cluster 4), big data (cluster 3), and digitalization (5).

These findings indicate that the scholarly interest in this niche of literature has been complex and divergent, covering multiple intellectual connections. This allows us to understand the KM in the DT context, without having any blind spots on our map (fully missing critical associations). At the same time, this type of distribution can indicate the

need for further development of the research on specific points of interest, across different periods of time.

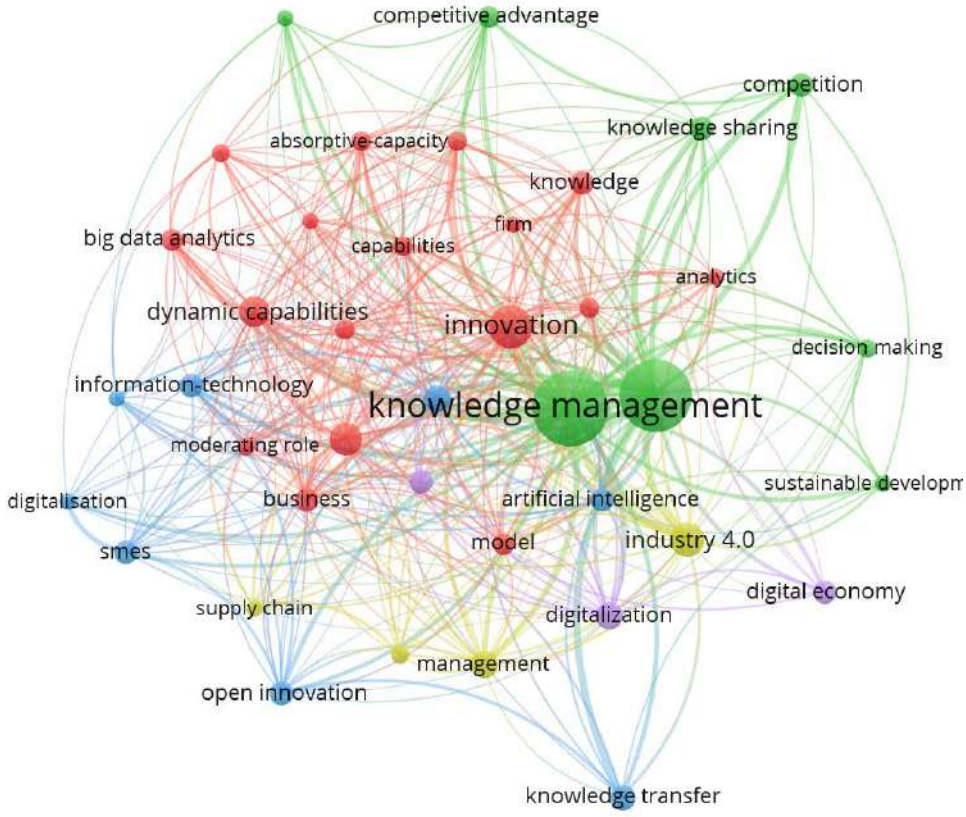

Figure 4. Network visualization of top 40 keywords co-occurrence analysis obtained within VOSviewer 1.6.17 software
(authors' research)

The clusters and associated values are also represented in Tables 2-6 below. First, in Table 3, we present the keywords, occurrence values, link values, and link strength values of Cluster 1 (red) created by VOSviewer. The cluster is formed by 16 items relatively equally distributed at the top center of the map. Of course, we notice certain polarizations of items next to the top 4 items. These differentiate themselves from the rest of the cluster items: "innovation", "performance", "dynamic capabilities" and "knowledge".

Nevertheless, the rest of the cluster items also have strong connections between themselves and the other clusters' items, and they complete the visual map of the KM and DT analysis. As such, we mention "business", "big data analytics", "model", "absorptive-capacity", "capabilities", "impact", "systems", "firm performance", "moderating role" or "networks" as concepts completing the intellectual distribution of Cluster 1.

Table 3. Keywords co-occurrence analysis breakdown – Cluster 1 (red)

Keyword	Occurrences	Links	Link strength
Innovation	30	34	121
Performance; dynamic capabilities; knowledge	18; 15; 10	31; 27; 21	92; 72; 35
Business; big data analytics; model	9; 8; 8	32; 23; 20	62; 43; 42
Absorptive-capacity; capabilities; impact; literature review; systems	7; 7; 7; 7	25; 22; 26; 23	40; 40; 49; 41
Firm performance; moderating role	6; 6	21; 21	37; 34
Analytics; firm; networks	5; 5; 5	14; 18; 23	23; 24; 35

Next, in Table 4, we present the keywords, occurrence values, link values, and link strength values of Cluster 2 (green) created by VOSviewer. This consists of 8 items: 2 central items and six additional items, connected with the central two in a radius distribution. As such, cluster 3 has the shape of a fan opening toward the top right part of the map. This means that the conceptual relationship between cluster 3 items is more powerful between the ones in proximity (e.g.: "knowledge sharing" and "competition"), and weaker between distanced ones (e.g.: "digital technologies" and "sustainable development"). As such, the authors consider that increased academic attention could benefit sustainable development in digital technologies.

The dominant items, "knowledge management" and "digital transformation", have the highest values across all clusters (93-39-298, respectively 83-39-256). A causal explanation for this phenomenon is that two combined items represented the search structure. As such, the VOSviewer analysis findings prove the internal coherence of the research methods mix. The value 39 in the Links column associated with both items indicates that each is related to all the other 40 keywords in our co-occurrence analysis. That is why corroborated with the occurrence's values, KT and DT have the heaviest link strengths on the map, visually represented as the most prominent spheres.

Table 4. Keywords co-occurrence analysis breakdown – Cluster 2 (green)

Keyword	Occurrences	Links	Link strength
Knowledge management	93	39	298
Digital transformation	83	39	256
Competition; knowledge sharing	9; 9	10; 19	30; 37
Competitive advantage; decision making	8; 6	17; 16	38; 26
Digital technologies; sustainable development	5; 5	13; 9	22; 16

In Table 5, we present the keywords, occurrence values, link values, and link strength values of Cluster 3 (blue) created by VOSviewer. Cluster 4 is formed of 8 items and is

located on the top left side, mirroring the visual distribution of cluster 2. A similar fan shape can be distinguished, with the center associated with the "big data" item, radiating towards "information technology", "digitalization", "SMEs", "open innovation", "knowledge transfer" and "artificial intelligence". Out of the items with the highest values, we mention "big data", "knowledge transfer", "artificial intelligence", "information technology" and "open innovation". With lower values, "SMEs", "digitalization" and "industry 4" are part of the same cluster.

Table 5. Keywords co-occurrence analysis breakdown – Cluster 3 (blue)

Keyword	Occurrences	Links	Link strength
Big data; knowledge transfer	12; 11	32; 10	61; 29
Artificial intelligence; information-technology; open innovation	10; 10; 10	19; 24; 20	39; 47; 44
SMEs	9	21	37
Digitalization; industry 4	5; 5	15; 27	18; 25

In Table 6, we present the keywords, occurrence values, link values, and link strength values of Cluster 4 (yellow) created by VOSviewer. In cluster 4 VOSviewer software grouped only four items with relevant connections with items of all other four clusters. "Industry 4.0" is the most prominent item in the cluster (19-34-85), followed by "management", "supply chain" and "sustainability". Cluster 4 brings together key concepts related to managing knowledge in the DT context, as big data analytics and knowledge transfer represent some of the critical challenges of the era.

Table 6. Keywords co-occurrence analysis breakdown – Cluster 4 (yellow)

Keyword	Occurrences	Links	Link strength
Industry 4.0	19	34	85
Management	13	23	54
Supply chain	5	15	24
Sustainability	6	15	19

Finally, in Table 7, we present the keywords, occurrence values, link values, and link strength values of Cluster 5 (purple) created by VOSviewer. In cluster 5, there are three items: "digitalization", "digital economy" and "transformation". We can assign to cluster 5 the role of the context cluster, grouping together the main pre-conditions and forces enabling the emergence of DT.

Table 7. Keywords co-occurrence analysis breakdown – Cluster 5 (purple)

Keyword	Occurrences	Links	Link strength
Digitalization	12	23	52
Digital economy	9	9	14
Transformation	9	22	41

Generally, the low values items of the clusters received less scholarly attention, distributed closer to the extremities of the map and further from the center. In order to grasp a better understanding of recent research trends and potential future directions, it is essential to run an overlay analysis. In Figure 5, *Overlay visualization of top 40 keywords co-occurrence* we notice how the most common intellectual links have been approached by scholars over time, in the timeframe 2019 – 2021.

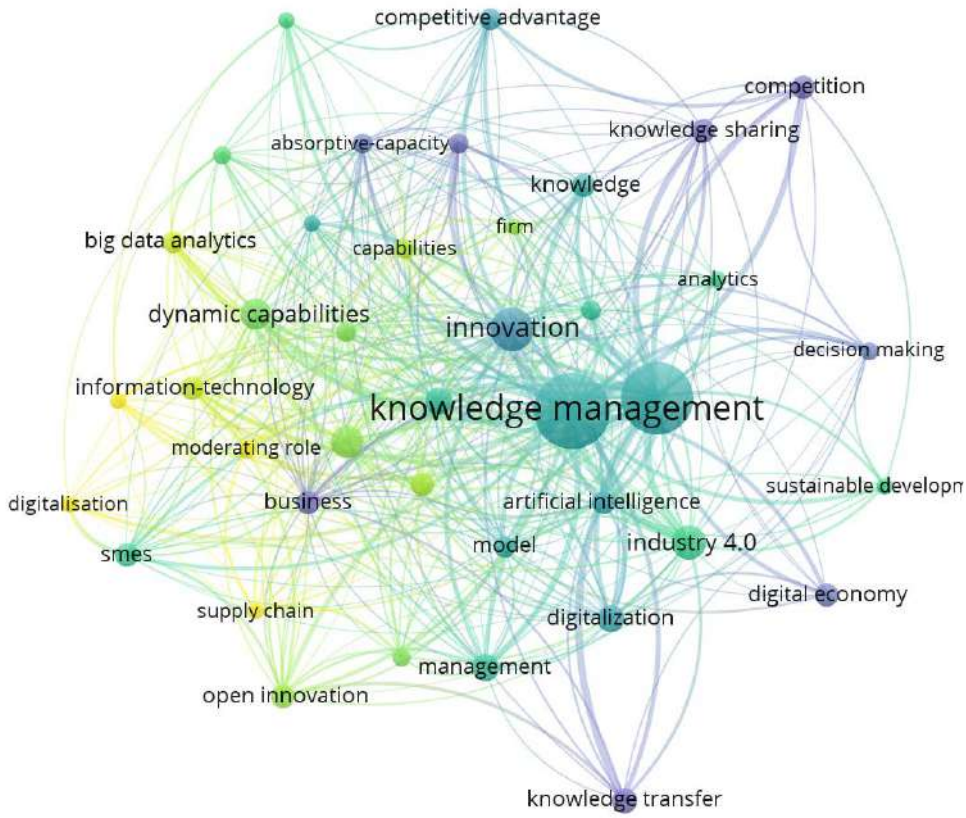

Figure 5. Overlay visualization of top 40 keywords co-occurrence analysis obtained within VOSviewer 1.6.17 software (authors' research)

First, publications on KM in the DT context dated 2019 are creating important intellectual links with "knowledge sharing", "knowledge transfer", "competition", "digital economy", "business" and "decision-making" (purple) and "innovation", "knowledge", "competitive advantage" or "artificial intelligence" (darker blue). Second, towards 2020, the attention shifts, and we identify significant interest in "dynamics capabilities", "sustainable development", "open innovation", "SMEs" in the context of "Industry 4.0" (lighter blue and green). Third, as of 2021, scholars' interest developed towards "big data analytics", "mediators", "firm capabilities", "supply chain" and "digitalization" (yellow).

Given the restricted timeframe of only three years of our overlay analysis, we consider that all topics on the map can be further investigated and developed within the literature. Nevertheless, research concerning big data, artificial intelligence, sustainable development, and supply chain digitalization will require increasingly more attention considering the business market trends.

Conclusions

In the post-COVID-19 crisis, digital transformations and the adoption within organizations are attracting interest and attention. If, traditionally, the objectives associated with digitalization were targeting *innovation* or *competitive leaps*, over the past two years, DT increased its strategic role and became instrumental in securing a *market presence* in a socially distant reality.

This study aimed to identify the main intellectual fabric of KM literature in the DT context. With the help of bibliometric analysis, the authors identified the most active countries associated with this research field. Furthermore, a detailed intellectual map has been developed with the help of VOSviewer software, composed of five different clusters. The visual map and associated bibliometric values are indicating towards a robust and sophisticated sub-segment of academic literature, covering several areas of interest. At the same time, the literature niche is very novel and under constant development. As such, we could not identify distinctive focal points in the literature. Rather, a set of divergent attention points have been identified.

Nevertheless, as virtual realities are gaining increasingly more territory, it is expected for the KM literature to continue developing in areas such as: sustainability and sustainable development, artificial intelligence, or big data analytics. Other interesting points of interest that might be studied further are represented by the main challenges of managing digital knowledge, such as solutions for instant knowledge sharing between different platforms, knowledge retention and protection interfaces, or knowledge protection in front of new security threats.

References

Allaire, J. (2011). RStudio: Integrated development environment for R. *The R User Conference,*14. https://www.r-project.org/conferences/useR-2011/abstracts/180111-allairejj.pdf

Akhavan, P., Ebrahim, N.A., Fetrati, M.A., & Pezeshkan, A. (2016). Major trends in knowledge management research: a bibliometric study. *Scientometrics*, *107*(3), 1249-1264. Doi: 10.1007/s11192-016-1938-x

Bratianu, C. (2015). *Organizational knowledge dynamics: managing knowledge creation, acquisition, sharing, and transformation*. IGI Global.

Bratianu, C. (2019). Exploring knowledge entropy in organizations. *Management Dynamics in the Knowledge Economy*, *7*(3), 353-366. Doi: 10.25019/MDKE/7.3.05

Bratianu, C. (2020). Toward understanding the complexity of the COVID-19 crisis: a grounded theory approach. *Management & Marketing. Challenges for the Knowledge Society*, *15*(S1), 410-423. Doi: 10.2478/mmcks-2020-0024

Bratianu, C., & Bejinaru, R. (2021). COVID-19 induced emergent knowledge strategies. *Knowledge and Process Management*, 28(1), 11-17. Doi: 10.1002/kpm.1656

Bratianu, C., & Vasilache, S. (2009). Evaluating linear-nonlinear thinking style for knowledge management education. *Management & Marketing*, *4*(3), 3-18.

Bratianu, C., Vatamanescu, E.-M., Anagnoste, S., & Dominici, G. (2020). Untangling knowledge fields and knowledge dynamics within the decision-making process, *Management Decision, 59*(2), 306-323. Doi: 10.1108/MD-05-2019-0559

Davenport, T.H., & Prusak, L. (2000). *Working knowledge. How organizations manage what they know*. Harvard Business School Pres.

Ebert, C., & Duarte, C. H. C. (2018). Digital transformation. *IEEE Software*, *35*(4), 16–21. Doi: 10.1109/MS.2018.2801537

Gandrud, C. (2018). *Reproducible research with R and RStudio*. CRC Press.

Iliescu, A. N. (2021a). The emergence of knowmads from the knowledge workers. *Management Dynamics in the Knowledge Economy, 9*(1), 94-106. Doi:

10.2478/mdke-2021-0007

Iliescu, A.N. (2021b). Knowledge mapping of the knowmad concept – a text mining analysis. In C. Brătianu, A. Zbuchea, F. Anghel, & B. Hrib (Eds.), *Proceedings of the STRATEGICA – International Academic Conference* (pp. 958-968). https://strategica-conference.ro/strategica-2021/

Janik, A., Ryszko, A. & Szafraniec, M. (2021). Exploring the social innovation research field based on a comprehensive bibliometric analysis. *Journal of Open Innovation*: *Technology, Marketing and Complexity*, *7*, 226-230. Doi: 10.3390/joitmc7040226

MIT Sloan Management Review, Deliotte. (2022). *Orchestrating Workforce Ecosystem*s. https://sloanreview.mit.edu/projects/orchestrating-workforce- ecosystems/

Moravec, J.W. (2008). A new paradigm of knowledge production in higher education. *On the Horizon, 16*(3), 123-136. Doi: 10.1108/10748120810901422

Nonaka, I., & Takeuchi, H. (1995). *The Knowledge-Creating Company*. Oxford University Press.

Nonaka, I., & Takeuchi, H. (2019). *The Wise Company: How Companies Create Continuous Innovation*, Oxford University Press.

OECD (1996). *The knowledge-based economy*. https://www.oecd.org/officialdocuments/publicdisplaydocumentpdf/?cote=OCDE/GD%896%29102&docLanguage=En

Van Eck, N. J., & Waltman, L. (2010). Software survey: VOSviewer, a computer program for bibliometric mapping. *Scientometrics, 84* (2), 523–538. Doi: 10.1007/s11192-009-0146-3

Van Eck, N. J. & Waltman, L. (2011). Text mining and visualization using VOSviewer. *ISSI Newsletter,7*(3), 50–54.

Van Eck, N. J. & Waltman, L. (2020). *VOSviewer 1.6.16 Manual*. Universiteit Leiden.

Van Eck, N. J. & Waltman, L. (2021). *VOSviewer 1.6.17 Manual*. Universiteit Leiden.

Verzani, J. (2011). *Getting started with RStudio: an integrated development environment for R*. Sebastopol.

Ponce, F. A., & Lozano, A. M. (2010). Highly cited works in neurosurgery. Part I: The 100 top-cited papers in neurosurgical journals: A review. *Journal of Neurosurgery, 112*(2), 223–232.

PwC. (2022). *Digital factory transformation survey 2022*. https://www.pwc.de/en/strategy-organisation-processes systems/operations/digital-factory-transformation-survey-2022.html

Tomé, E. (2020). Actors in the knowledge economy: a typology. *Management Dynamics in the Knowledge Economy, 8*(4), 451-461. Doi: 10.2478/mdke-2020-0029

Zbuchea, A., & Vidu, C. (2018). Knowledge management in the digital era. In C. Brătianu, A. Zbuchea, & A. Vițelar (Eds.), *Strategica. Challenging the Status Quo in Management* (pp. 696- 704). Tritonic.. https://strategica-conference.ro/strategica-2018/

Pînzaru, F., Zbuchea, A. and Vițelar, A., (2018). Knowledge Transfer from Business to Public Administration in Smart City Development. In *European Conference on Knowledge Management* (pp. 700-XXV). Academic Conferences International Limited.

Zupic, I., & Cater, T. (2015). Bibliometric methods in management and organization. *Organizational Research Methods, 18*(3), 429-472. https://doi.org/10.1177/1094428114562629

World Economic Forum. (2016). *Digital Transformation of Industries*. https://reports.weforum.org/digital-transformation/wp-content/blogs.dir/94/mp/files/pages/files/digital-enterprise-narrative-final-january-2016.pdf