



Research article

Organizational learning and innovation: A bibliometric analysis and future research agenda

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ABSTRACT

Organizational learning and innovation research have received increasing attention from researchers in recent years. However, there is a need to understand the research development of this topic and its trends. Therefore, this study aims to provide a comprehensive view of this field by conducting a bibliometric analysis of 773 research articles published over the past 41 years. The study identifies the journals, researchers, countries, institutions, and references in terms of productivity, citations, co-citations, common keywords, and their developments over three periods using the VOS viewer software. The results show a strong connection between organizational learning and organizational innovation. The number of publications related to organizational learning and innovation has continuously increased. The United States of America (USA) ranked first, contributing 21.86 % of the total publications. Additionally, the "Universidad de Granada" has been ranked first in overall publication output (16 publications, 2.07 %). The focus of researchers in this field has expanded to include different and new topics such as innovation performance and ambidexterity. The results of this paper may help academics and practitioners better understand research development trends and hotspots in the field of organizational learning and innovation and provide a comprehensive view of future research.

1. Introduction

In the face of rapid changes, organizations must be able to constantly renew and adapt their knowledge to maintain their competitive advantages [1,2]. The literature has highlighted the role of organizational learning in this renewal [3]. This is because learning is critical to company success and facilitates the development of new products and processes [4]. Organizational learning is a process that occurs over time; the past influences the present and the future through knowledge acquisition and performance improvement [5,6]. However, researchers have defined organizational learning differently [7,8]. Nevertheless, there is a combined theme in organizational learning definitions: an organization can change and adjust for future success by learning [9]. Organizational learning is a process through which companies can develop new knowledge and insights from the shared experiences of people, influence behaviors, and improve the company's capabilities [10,11]. When employees share their knowledge with the organization, it generates new and shared insights, and innovation occurs [12]. In a nutshell, organizational learning facilitates the creation, acquisition, transfer, and use of new knowledge to improve organizational innovation [13].

Organizational innovation is developing advanced new services or products and successfully bringing those goods or services to

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market [14]. In general, organizational innovation refers to creating or adopting a new idea or behavior [15,16], which aims to create a new opportunity or satisfy an existing one and contribute to the organization’s effectiveness and competitiveness [17]. Over the past years, organizational learning and innovation have received widespread attention from scholars. The notion that organizational learning is inextricably related to innovation became well-established at the end of the 1990s [18–20]. Many empirical studies also support the relationship between organizational learning and innovation [21–23]. Many authors agree on the positive relationship between organizational learning and innovation in the for-profit sector [23–25]. In addition, organizational learning and innovation are important for a company’s survival and effective performance [26]. Therefore, there is a need to gain comprehensive knowledge about organizational learning and innovation. Specifically, we wonder to what extent organizational learning and organizational innovation are related; what are the trends of publications in this field; who are the most influential authors, countries, institutions, and sources in this field; and what are future research directions and agendas in this field.

To the best of our knowledge, no bibliometric study has discussed this topic. In order to address this research gap and answer the questions mentioned above, an in-depth analysis was conducted using the bibliometric method of studies related to organizational learning and innovation. This research is the first to simultaneously conduct a bibliometric study on organizational learning and innovation. Therefore, this paper aims to analyze authors, sources, institutions, references, and author keywords by conducting a bibliometric analysis of the literature on organizational learning and innovation, including citation and co-citation analysis. We will identify the most-cited papers and authors in the field and analyze their content to identify the key themes and trends that are emerging. By identifying the key themes and trends in this field, as well as the future research directions and agenda, we provide broad and clear insights into increasing knowledge for researchers, policymakers, and practitioners. To achieve the goal of our research, VOS viewer software was used to create, visualize, and analyze bibliometric networks and conduct related analyses.

The rest of the sections of this article are organized as follows: The "Methodology" section includes details of the data collected, the analysis tools used, and the research framework. The second section was "results and discussion"; a descriptive and bibliometric analysis will be presented. Mainly, the results reached by relevant analyses that will serve as answers to the above research questions will be discussed. In the fourth section, we will review the study’s limitations, recommendations for future research, and implications. Finally, in the "conclusion" section, we will show the main findings of the research.

2. Methodology

2.1. Data collected

We collected the data for this research from the Scopus database because Scopus is one of the largest databases in the world, offering broader coverage compared with other databases, such as the "Web of Science (WoS)" [27,28]. Scopus is also the largest database of abstracts and citations of peer-reviewed research publications in various fields [29]. Additionally, Scopus covers more than 20,000 peer-reviewed journals, featuring those published by several publishers, such as Elsevier, Springer, Emerald, Taylor & Francis,

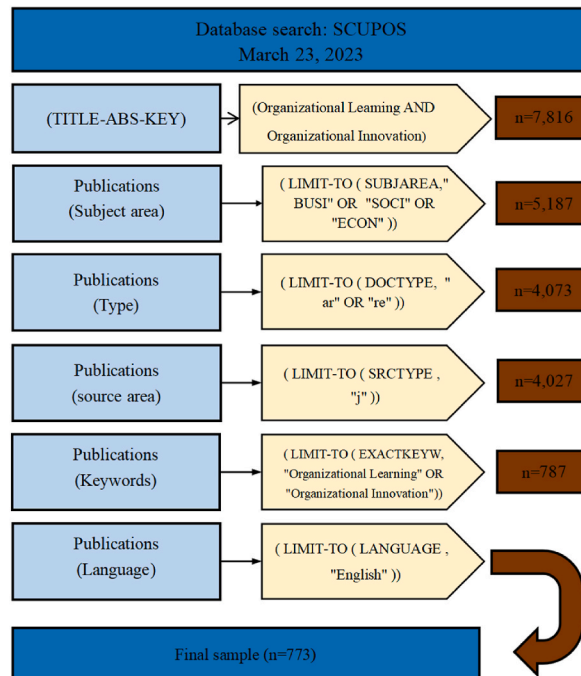


Fig. 1. The protocol of the study.

Inderscience, and Informs [30]. Furthermore, the Scopus database is ideal for analyzing any discipline because it manages bibliographic references and quantifies the associated citations [31]. Scopus was equipped with smart tools that are useful for the basic visualization and literature’s statistical analysis, so it can also offer a comprehensive record of all literature’s necessary information in research information systems (RIS) format, enabling the import-into and analysis by tools of bibliometric software [32]. So, the Scopus database was selected to search for relevant publications. We searched for the following terms: ("organizational learning" and "organizational innovation") in March 2023. Then, we were limited to articles and reviews written in English; conference abstracts and books were excluded. An outline of the relevant article selection process in this study is presented in Fig. 1. We obtained 773 articles published between 1982 and March 2023 that are valid for bibliometric analysis.

2.2. Data analysis

Bibliometric measurements are a statistical method that can quantitatively analyze research papers through mathematical methods, providing knowledge from a body of studies and interpreting the development, distribution, and research in a specific field [32–34]. Bibliometric analysis has been used to assess relationships between authors, institutions, journals, or countries and measure the impact of research and linkages, including citations and keywords used [35,36]. Citation analysis is a powerful approach for detecting research development that can also refer to influential journals, articles, and authors in the field [37].

VOS viewer is a bibliometric analysis program developed by Leiden Nees University scientists Jan van Eck and Ludo Waltman for knowledge mapping [38]. VOS viewer is widely used in bibliometric analysis, particularly in thematic, mapping, and cluster analysis [39]. Using the VOS viewer, researchers can analyze various bibliometric networks comprising publications, authors, journals, institutions, or countries [40]. Thus, researchers find a different cluster of closely related items, indicated by the same colour as the cluster. The larger the item, the higher its importance and popularity [41].

2.3. Research framework

Based on the Scopus database, organizational learning and innovation data are retrieved and pre-processed to analyze the hotspots, authors, co-relationships, co-citations, future research trends, knowledge networks, etc. The research framework adopted in this paper is shown in Fig. 2.

3. Results and discussion

3.1. Descriptive analysis

3.1.1. Yearly trends

We obtained 773 published documents related to organizational learning and innovation. The first article in our sample was published in 1982 and investigated organizational adaptations to environmental jolt, and this study suggested that environmental jolt can provide organizational learning and change opportunities [42]. This publication was published in "Administrative Science

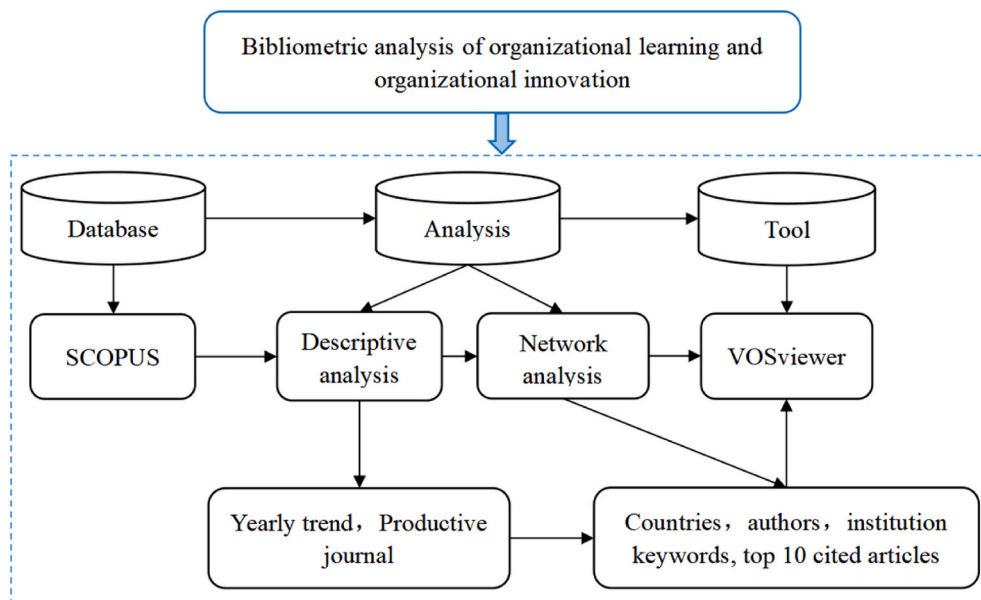


Fig. 2. The research framework of the study.

Quarterly" and is cited 1088 times. Fig. 3 shows the annual trend of published articles, where we note that the number of publications discussing organizational learning and innovation is constantly increasing, especially in the past few years, reaching its peak in 2020 with 75 studies. This increase in research indicates that academic interest in organizational learning and innovation has increased significantly in the past two years [43,44]. Moreover, other author [45] suggested that recently, there has been a great deal of academic and practitioner interest in the concept of creativity and innovation in organizations. On the other hand, according to other authors [23,46], globalization, changes in the economy and the environment of a diverse workforce, and the use of information technology made organizations seek to learn as a competitive advantage and continuous innovation to ensure their organizational survival. Organizational learning and innovation are essential for increasing market share and giving firms a competitive advantage [47] (see Fig. 4).

Overall, the increase in studies on organizational learning and innovation reflects the growing interest in understanding how organizations can foster innovation through learning and create a culture of innovation that supports long-term success.

3.1.2. Source analysis

The findings showed that 773 articles were published across 341 journals. Table 1 shows the top 10 journals that have published the most papers on organizational learning and innovation. Notably, 10 journals belong to 6 publishers and 4 countries. Inderscience and Elsevier are the major players in organizational learning and innovation, with 88 publications representing 11.38 % of the total articles. In addition, the top 10 journals published 161 articles out of 773 articles, representing approximately 21 % of the total articles. The most productive journal is the "International Journal of Innovation and Learning," with 29 articles, representing nearly 4 % of the total articles; it belongs to the publisher Inderscience, followed by the "International Journal of Technology Management," which also belongs to the publisher Inderscience, with 19 articles, followed by the Learning Organization journal, one of the most prominent magazines in this field, which belongs to the publisher Emerald with 17 articles. The journal "Management Science" (Cite Score, 7.7) published the most cited paper, with 2053 citations [48].

Interestingly, the journal "Technological Forecasting and Social Change" recorded the highest Cite Score of 13.7 in 2021 despite ranking eighth in publication volume. Following this, "Strategic Management Journal" and "Journal of Knowledge Management" were positioned second and third for the highest Cite Score and tenth and fourth, respectively, in publication volume. These details are presented in Table 1. The journal's analysis reveals that the topic of organizational learning and innovation is widely recognized and accepted by experts and researchers in management domains.

Table 2 shows the publications of the 10 most productive journals by yearly trend between 1993 and 2023. For example, the "International Journal of Innovation and Learning" and the "International Journal of Technology Management" had the largest total number of publications between 1993 and 2023. The International Journal of Innovation and Learning's first article on this subject was in 2004 by some authors [59]. The findings of this study show that personal mastery, organizational learning, innovation ability, and organizational performance are highly correlated in both innovative and adaptive organizations. The period between 2001 and 2015 saw a significant increase in publications in this journal. We also note that there has been a decline in the number of publications in recent years. Followed by the International Journal of Technology Management, which saw a steady increase in publications until 2010, but a decrease in the number of publications in 2011–2015, with a complete absence in 2016–2023. Its first published paper was on this topic in 1996 [60]. In the third rank is the Learning Organization journal, whose publications peaked in 2016–2023. Interestingly, the first publication of this journal was in 1999 [61]; at the same time, it was the most cited article among this journal's publications on this sample, with 56 citations. This paper aims to bridge the gap about how organizational structure may contribute to organizational learning through theoretical discussion to synthesize those two concepts.

Conversely, it is observed that certain journals, such as Organization Science and Strategic Management Journal, have sustained high productivity over the specified period, reflecting their standing as leading journals in their respective fields. The variations in productivity over time might be attributed to shifts in the research landscape or the emergence of new trends.

3.1.3. Productive countries

The number of studies from a given country reflects that country's research strength in that area to a certain extent [62]. The results of the analysis show that 773 documents were published in 67 countries and regions. Articles related to organizational learning and innovation are mainly concentrated in the 10 most productive countries, where we note that the first 10 countries have a total number of publications of 584, representing 75.55 % of the total publications (as shown in Table 3). We also note that the first five countries—the USA, the UK, China, Spain, and the Netherlands—are the main players in this field. They have published over 50 % of the documents, indicating their critical role in advancing studies on organizational learning and innovation. Moreover, the research contributions from Taiwan, Australia, Canada, Germany, and France are also significant in this field. The USA stands out as the most productive country, with 169 articles constituting about 22 % of the total articles in this sample. It is followed by the UK and China, contributing 11.25 % and 9.70 % of the total articles, respectively. Although Spain ranks fourth with 50 publications (6.47 %), its institute, Universidad de Granada, leads with 16 articles. The remaining countries each contributed less than 5 % to the total number of publications. It is important to note that "China" here refers solely to mainland China, with documents from Taiwan or Hong Kong being excluded and analyzed separately. (Note: "China" here refers solely to mainland China, with papers from Taiwan or Hong Kong being excluded and analyzed separately.)

By analyzing the yearly trends of study output from the 10 most productive countries, we note that the USA is a pioneer in research on this subject (see Table 4), as the earliest study in the USA on this subject was conducted in 1988 [63], which occupied the second rank, having first published the first publication in this sample in 1993 [64]. Notably, the USA and China have produced the highest number of research papers in recent years, specifically between 2010 and 2023, with 71 and 113 publications, respectively.

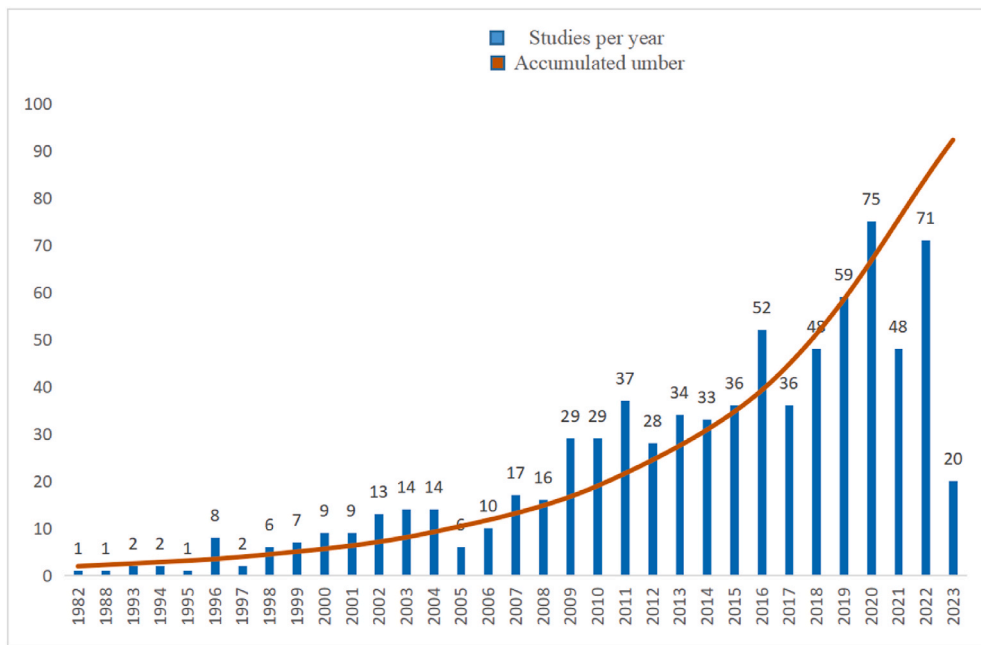


Fig. 3. Illustrates the evolution of publications by years.

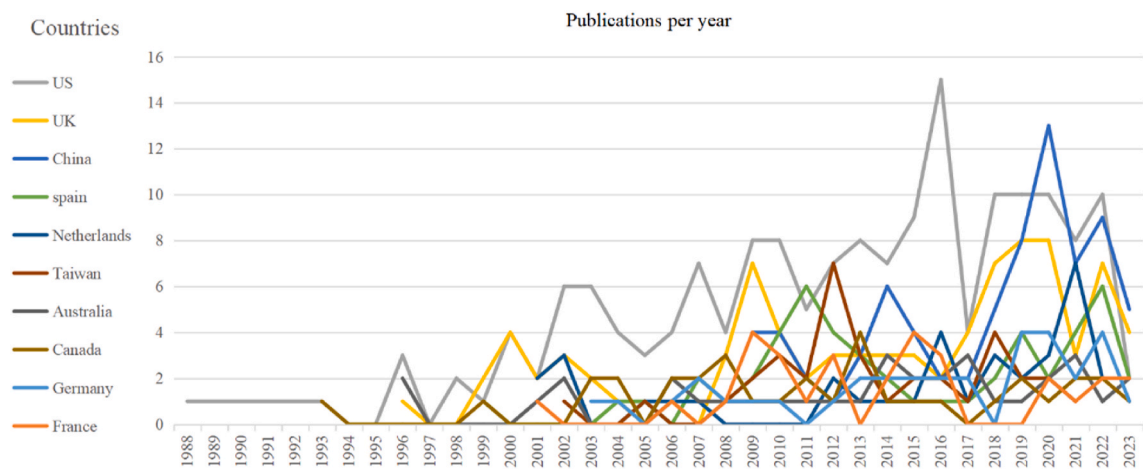


Fig. 4. The trends of publications in the top 10 productive countries per year.

Particularly, China’s contribution to international research has grown rapidly in recent years, ranking second only to the USA. This surge aligns with China’s escalating investments and strategies in science and technology and its ambition to become a global leader in research and innovation [65]. This growth is also influenced by the Chinese government’s policy encouragement in fostering an innovative society in recent years [66], along with the institutional pressures on Chinese manufacturers to adopt environmentally-focused organizational learning practices [67].

Moreover, for the past half-century, the USA has been a global leader in science and technology and has a significant economy; data from the OECD¹ indicate a marked increase in investment in research and development in the USA between 1994 and 2000 [68], with the USA being the largest market for biotechnology worldwide [69]. The research output from the UK has consistently remained high, ranking second in total publication output, although it appears to have decreased in recent years. It is important to note that this graph merely represents the volume of research outputs and does not account for factors such as the quality or impact of the research. Nevertheless, it provides a useful perspective on the trends in research output across various countries.

¹ Organization for Economic Co-operation and Development.

Table 1
Top 10 most productive sources.

Source/Journal	TNP ^a	TC ^b 2021	Cite Score 2021	Reference of the most cited document	Time cited 2022	Publisher	Country
International Journal of Innovation and Learning	29	295	1.5	Kretschmer et al. [49]	3	Inderscience	UK ^c
International Journal of Technology Management	19	370	2.2	Ebolor et al. [50]	6	Inderscience	UK
Learning Organization	17	758	4.6	Subramanian and Suresh [51]	4	Emerald	UK
Journal of Knowledge Management	15	4759	11.6	Chin et al. [52]	37	Emerald	UK
Source/Journal	TNP ^d	TC ^e 2021	Cite Score 2021	Reference of the most cited document	Time cited 2022	Publisher	Country
Organization Science	15	1726	6.2	Cameron et al. [53]	33	INFORMS	US
Journal of Business Research	14	30303	11.2	Pan et al. [54]	111	Elsevier	US
Sustainability Switzerland	14	181699	5	Samour et al. [55]	71	MDPI	Switzerland
Technological Forecasting and Social Change	14	25247	13.7	Shahzad et al. [56]	101	Elsevier	US
Research Policy	12	8894	14	Mealy and Teytelboym [57]	98	Elsevier	Netherlands
Strategic Management Journal	12	5334	13.2	Kretschmer et al. [58]	69	Wiley	UK

^a Total number of publications.

^b Total of citation.

^c United Kingdom.

^d Total number of publications.

^e Total of citation.

Table 2
The top 10 publishing journals per yearly trend.

Source/Journal	1993–2000	2001–2005	2006–2010	2011–2015	2016–2023	Total
International Journal of Innovation and Learning	–	2	6	14	7	29
International Journal of Technology Management	3	6	7	3	–	19
Learning Organization	3	1	–	2	11	17
Journal of Knowledge Management	1	2	–	3	9	15
Organization Science	2	2	2	5	4	15
Journal of Business Research	–	1	1	3	9	14
Sustainability Switzerland	–	–	–	–	14	14
Technological Forecasting and Social Change	–	–	–	4	10	14
Research Policy	–	1	4	–	7	12
Strategic Management Journal	1	3	1	1	6	12
Total	10	18	21	35	77	161

Table 3
The top 10 productive countries.

Country/Region	TNP	R ^a (%)	The most prolific academic institutions	TPI ^b
USA	169	21.86	University of Minnesota Twin Cities	7
UK	87	11.25	University of Nottingham	7
China	75	9.70	Xi'an Jiao Tong University	7
Spain	50	6.47	Universidad de Granada	16
Netherlands	35	4.53	Universiteit Twente	6
Taiwan	35	4.53	National Taipei University of Technology	5
Australia	34	4.40	Western Sydney University	5
Canada	34	4.40	Western University	5
Germany	34	4.40	Universitätsklinikum Mannheim	2
France	31	4.01	Grenoble Ecole de Management	3

^a Percentage of the total number of publications.

^b TPI: Total publications of institutions.

3.1.4. Analysis of productive institutions

Regarding high-throughput institutions, 773 articles were published in 160 different research institutions. The results of the analysis in Table 4, indicate that the "Universidad de Granada" is the leading institution in terms of the number of publications discussing organizational learning and innovation, with 16 publications, about 2.07 % of the total publications, which indicates that it

Table 4
The top 10 institutions contributing and publications producing.

NO	Institution	Country	TNP	PC ^a (%)
1	Universidad de Granada	Spain	16	2.07
2	Xi'an Jiao Tong University	China	7	0.91
3	University of Minnesota Twin Cities	USA	7	0.91
4	Nottingham University Business School	UK	7	0.91
5	Universitat de València	Spain	7	0.91
6	University of Nottingham	UK	7	0.91
7	Aalborg University	Denmark	7	0.91
8	Universidad de Murcia	Spain	6	0.78
9	Universidad Jaume I	Spain	6	0.78
10	Zhejiang University	China	6	0.78

^a Percentage contribution.

occupies a leading position in this research field in Spain. followed by the Chinese research institution "Xi'an Jiao Tong University," with 7 publications discussing organizational learning and innovation, accounting for (0.91 %) of the total publications. Then, the USA institution "University of Minnesota Twin Cities," with 7 publications, accounted for (0.91 %). The "University of Nottingham" in Spain, "Nottingham University Business School" in the UK, and "Aalborg University" in Denmark, respectively, also contributed to several publications in this field of research (as illustrated in Table 4).

Moreover, we can notice that the top 10 research institutions are mostly concentrated in developed countries, with only one developing country (China). In addition, by continental distribution, the European continent had the largest number of publications (56), accounting for 7.24 % of total publications, followed by Asia (represented by China) with 14 publications (about 2 % of the total) and North America (represented by the USA) with 7 publications. It is worth noting that there is a significant lack of interest in this area of research from academic institutions in other parts of the world.

3.2. Network analysis

3.2.1. The author's network analysis

Table 5 displays the top 10 authors based on co-citation. "March J. G." from "Stanford University" (USA) was the only author co-cited exceeding 500 times, followed by the authors from "Hitotsubashi University" (Japan), "The University of Pennsylvania" (USA), and "Carnegie Mellon University" (USA), each of whom was co-cited more than 300 times (see Fig. 5, which displays the density visualization of authors by citations). These authors have made significant contributions to the field, as evidenced by the high number of citations, as many other scholars have cited, referenced, and recognized their work, indicating its importance and influence on this topic. Their contributions are likely to have played a critical role in advancing understanding and facilitating further research in this area. On the other hand, we note that 9 of the highest contributing authors in this field belong to American universities, and this embodies the importance of the role played by the USA in actively contributing to research and knowledge production in the academic aspect of the fields of research.

3.2.2. References analysis

Table 6 displays the top 10 references by co-citation. Only one reference, March [70], was co-cited over 80 times. Additionally, two other references were cited almost 50 times [10,71]. Notably, there are 3 references out of the top 10 co-cited references published in Organization Science.

The most frequently co-cited reference of "March J.G." was "Exploration and Exploitation in Organizational Learning," which discusses the balance between exploring new possibilities and exploiting old certainties in organizational learning. It suggests that organizations must balance exploration and exploitation in their learning processes for long-term success. The paper also assesses the possibility of specific regulatory practices mitigating this trend [70]. We performed a follow-up on the authors listed in the top 10

Table 5
The top 10 authors by co-citation.

No	Author	Institution	Country	Citations	Links	TLs ^a	cluster
1	March J.G.	Stanford University	USA	511	992	39815	3
2	Nonaka I.	Hitotsubashi University	Japan	383	987	23874	4
3	Levinthal D.A.	University of Pennsylvania	USA	317	991	25985	3
4	Argote L.	Carnegie Mellon University	USA	305	972	25747	3
5	Argyris C.	Harvard University	USA	289	942	13124	4
6	Tushman M.L.	Harvard University	USA	249	976	20657	2
7	Teece D.J.	University of California	USA	224	986	18755	5
8	Damanpour F.	Rutgers University	USA	219	972	17947	1
9	Cohen W.M.	Duke University	USA	212	988	16065	2
10	Winter S.G.	Wharton School of the University of Pennsylvania	USA	204	963	16334	3

^a Total link strength.

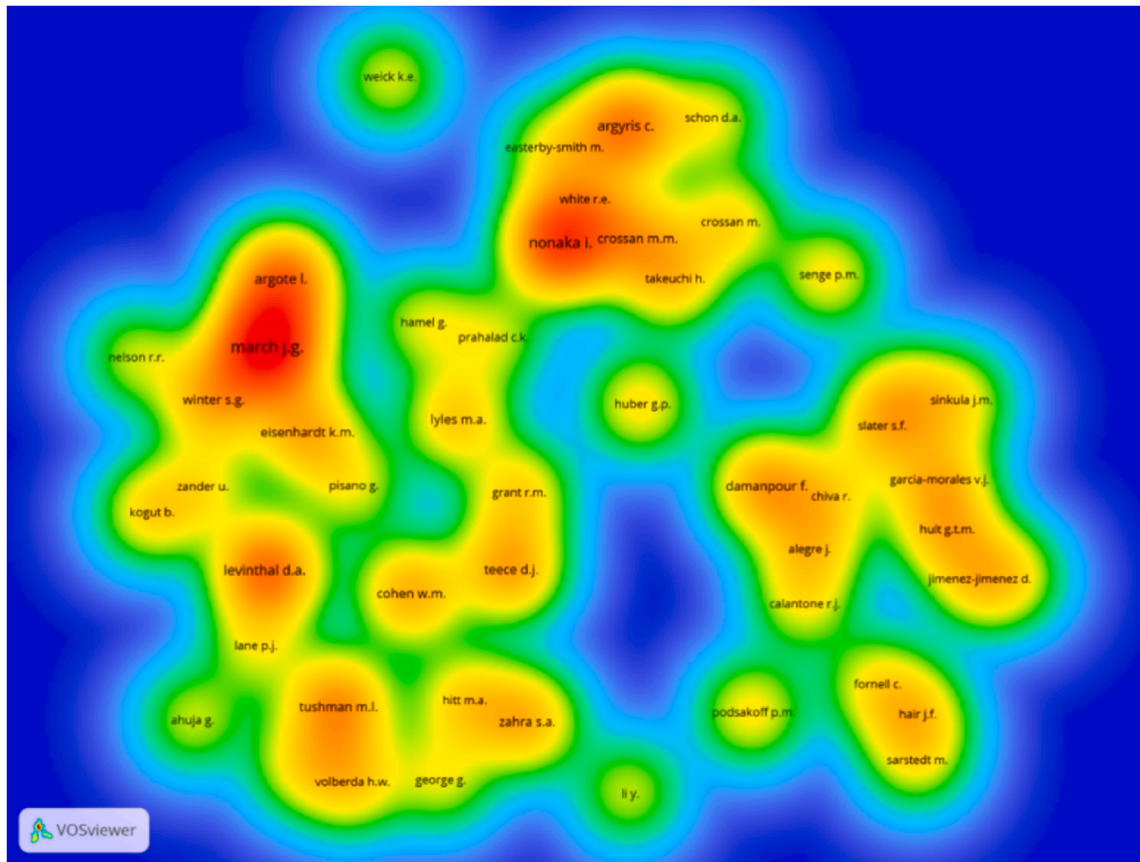


Fig. 5. Author’s density visualization.

Table 6
The top 10 co-cited references.

NO	Reference	Author	Journal	Links	TLs	Citations	Cluster
1	"Exploration and Exploitation in Organizational Learning" [70]	March J.G.	Organization science	357	1109	84	3
2	"Absorptive Capacity: A New Perspective on Learning and Innovation" [71]	Cohen W.M. and Levinthal D.A.	Administrative science quarterly	325	806	67	3
3	"Innovation, Organizational Learning, and Performance" [10]	Jimenez-Jimenez D. and Sanz-Valle r.,	Journal of Business Research	256	614	53	2
4	"Organizational Learning: The Contributing Processes and the Literatures" [74]	Huber G.P.	Organization science	274	607	48	4
5	"An Organizational Learning Framework: From Intuition to Institution" [75]	Crossan M.M., Lane H. W., and White R.E.	Academy of Management Review	255	533	43	4
6	"Evaluating Structural Equation Models with Unobservable Variables and Measurement Error" [76]	Fornell C. and Larcker D. F.	Journal of Marketing Research	231	475	42	2
7	"Dynamic Capabilities and Strategic Management" [73]	Teece D.J. and Pisano G., Shuen A.	Strategic Management Journal	303	670	42	3
8	"A dynamic theory of organizational knowledge creation" [12]	Nonaka I.	Organization Science	255	493	38	4
9	"Organizational learning" [77]	Levitt B. and March J.G.	Annual Review of Sociology	202	368	36	1
10	"Market Orientation and the Learning Organization" [78]	Slater S.F. and Narver J. C.	Journal of Marketing	256	529	32	5

co-cited references (shown in Table 5). The author had direct academic cooperation with other authors from other universities [72], and [71].

Four references among the top 10 co-citation references have been published by the listed top 10 co-citation authors. These [12,70, 71,73] references were published in Organization Science. And among them is one of the most common references by the author [70].

He was the second most cited author (383). Following by Ref. [71], who was the third most cited author and the owner of the second most co-cited published, the paper discusses the concept of absorptive capacity, which refers to a firm’s ability to recognize and apply new external information to innovate. The results suggest that an increase in the relevance of knowledge has a more positive effect on research and development intensity when the targeted quality of knowledge is lower.

Cluster analysis is a powerful statistical tool and technique that aggregates similar data points so that points in the same cluster are more similar than points in other clusters [79]. According to the cluster analysis, the top 10 references are divided into three groups of distinct references cited together, as a certain number of references were found within each group. Specifically, there were 4 references in cluster 1 (red cluster), including authors [12,70,77], and [75]. The other 4 references belonging to cluster 2 (green cluster) were [74, 76,78], and [10]. The last two references in cluster 3 (blue cluster) were [71,73], as shown in Fig. 6.

3.2.3. Keyword analysis

The frequency analysis of the top 10 common keywords, except for organizational learning and innovation, shows 8 items, as shown in Table 7 and Fig. 7.

Below are the possible reasons 8 keyword topics became common in research on organizational learning and innovation during the interest period. Knowledge management is one of the most important conditions for an organization’s competitiveness in the business environment of the present day [80], where organizations take it as a strategic resource that enables them to outperform their competitors and become more innovative and effective [79–84].

Absorptive capacity is essentially a facet of organizational learning, suggesting a reciprocal relationship between the two [71,85]. Other authors [86] suggested that absorptive capacity is a precursor to organizational learning. Consequently, there is a notable correlation between absorptive capacity and organizational innovation [87]. Since absorptive capacity also relies on the stability and robustness of organizational learning [88], knowledge sharing and absorptive capacity are pivotal for fostering [89,90]. Innovation Performance From an organizational learning perspective, tangible outputs across cognitive abilities enhance innovative performance [91]. Therefore, innovation often results from assimilating knowledge across various organizational departments, such as research and design [92].

Transformational leadership promotes organizational learning by increasing the stimulation of thought and instilling drive and self-confidence in individuals within the organization [93]. Thus, transformational leadership is the most important factor in the development of organizational learning in companies [94]. Moreover, other studies showed a positive relationship between "transformational leadership and organizational innovation." [71,95]. Other study, indicated that many transformational leadership features are relevant to corporate innovation [96].

Organizational performance is defined as the organization’s ability to use its resources efficiently and produce outputs that align with its objectives and are relevant to its users [97]. The theory of resources and capabilities underscores that the capabilities,

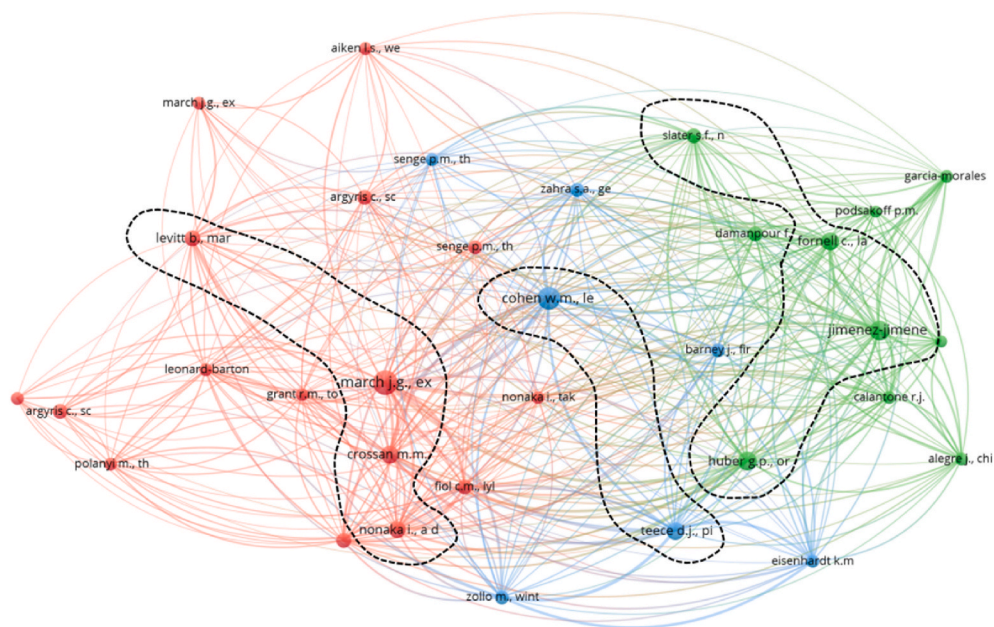


Fig. 6. References’ density visualization.

Table 7
The most common 10 keywords.

NO	Keyword	cluster	Links	TLs	Occurrences
1	Organizational Learning	2	70	710	489
2	Knowledge Management	7	42	185	84
3	Organizational Innovation	4	26	93	49
4	Absorptive Capacity	3	24	60	29
5	Innovation Performance	1	16	47	27
6	Transformational Leadership	6	21	51	23
7	Organizational Performance	4	19	54	22
8	Leadership	2	20	46	21
9	Dynamic Capabilities	1	16	48	20
10	Exploitation	3	11	54	18

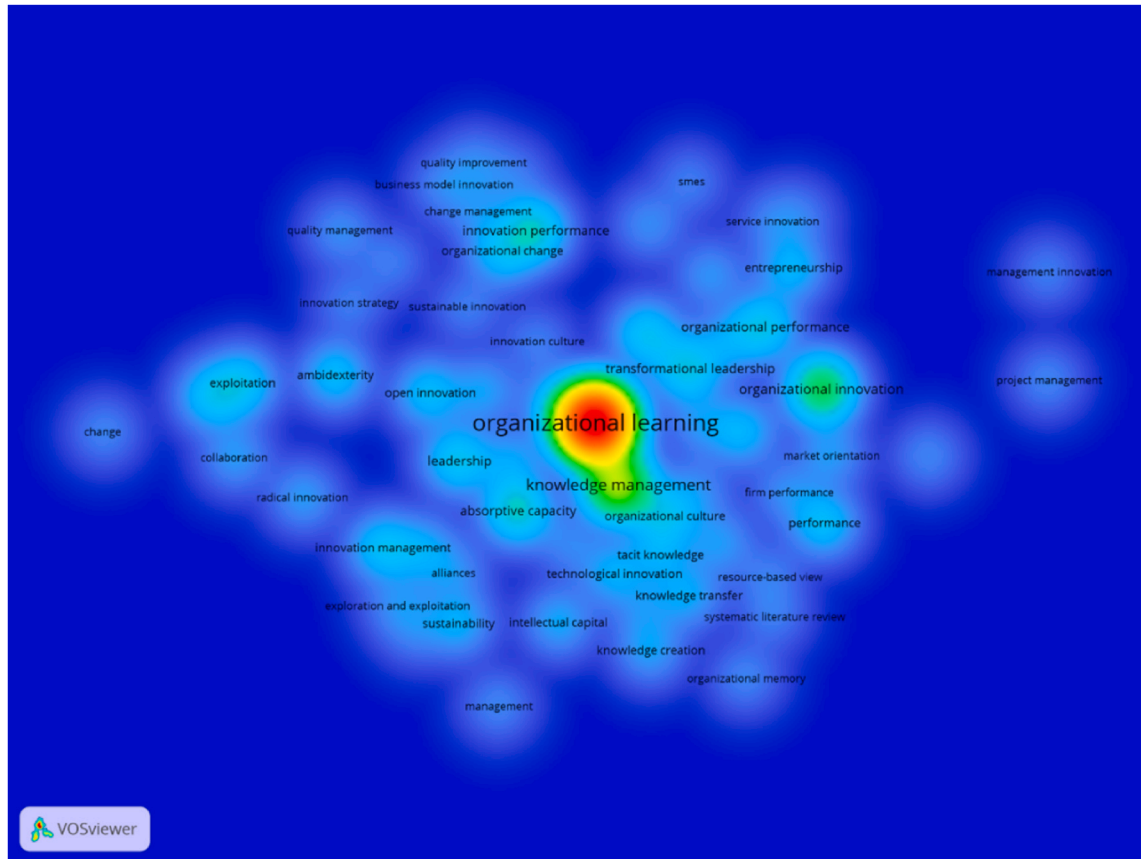


Fig. 7. The keywords' density visualization.

resources, and technologies necessary for adopting innovation make external imitation more challenging and enable companies to sustain their competitive advantages and achieve greater organizational performance [98,99]. Similarly, firms exhibiting broader, deeper, and quicker organizational learning tend to have higher performance levels [23]. Consequently, a positive correlation exists between organizational learning and innovation and organizational performance, as evidenced in empirical studies among selected manufacturing companies in Lagos metropolis, Nigeria [100].

Leadership is integral to organizing learning and is a building block for reinforcing learning [101]. The excellent and effective leadership is the key to organizational learning [102]. Leadership is essential to fostering innovation, group learning, and organizational innovation [103,104].

Dynamic capabilities are a significant factor in the innovation and competitiveness of the organization [105]. It is also the key to building the capacity of organizational innovation to enhance creativity and performance [106]. In addition, organizational learning is a way to integrate dynamic capabilities into the company's internal operations [107]. As dynamic capabilities become more prominent through the learning process that generates new knowledge [108].

Exploitation is an organizational learning activity to deepen existing knowledge [109]. Exploitation is the knowledge to

continuously improve, modify, refine, and incrementally change existing products, processes, and services [110,111]. Therefore, exploitation is interpreted as exploitative learning and incremental innovation [112]. Exploitative strategies through organizational innovation can stimulate the firm’s ability to innovate technologically [113].

We can conclude that the eight most frequently repeated keywords correlate with organizational learning and innovation; Fig. 8 shows this correlation. Irrespective of the existence of a direct or indirect relationship between these terms.

Keywords refer to essential words or concepts representing hotbeds of research and theoretical backgrounds for an academic study [114]. Analysis of the author’s keywords can provide insight into research trends, revealing areas of interest for the researcher [115]. In scientific sources, the keywords are very important for understanding research patterns and the general direction of research focus, which helps identify the research gap [116]. Therefore, we conducted a keyword co-occurrence analysis to systematically identify the links between different topics in three specific periods (1982–2001, 2002–2012, and 2013–2023). The analysis of keyword findings indicates that the conceptual evolution of research topics by clusters comprising keywords’ nodes is connected (as shown in Fig. 7). Table 8 displays each cluster’s keywords’ co-frequencies, links, and TIs. In this study, the keywords’ co-occurrence is vital to allowing visibility of papers on present and past research issues. The node size denotes the high occurrence of the items, while the thick connection line shows the close relationship among the items [117]. The larger the circles, the higher the occurrence of the keywords, and the thicker the links between the two keywords [118], the more co-occurrence they have [117].

In phase I (1982–2001), we defined a minimum number of occurrences of the keyword (2) to generate a keyword’s concurrent network, where we got 10 items in 2 clusters (Fig. 9). The magnitude difference between keywords illustrates their relative TIs values (Table 8). It should be noted that “organizational learning” has TIs of 18 and 9 links, while “organizational innovation” has TIs of 3 and 2 links. Organizational learning and innovation are directly related, as shown in Fig. 9a. Many studies discussed organizational learning and innovation topics in the first phase (1982–2001). For example, one study conducted discussed the importance of innovation in the product development process and how learning can be absorbed and applied to improve innovation processes [119]. In addition, organizational learning and innovation contribute to promoting, developing, and improving the professional experience in the industry [120]. The effects of national innovation systems on organizational learning by companies and how this affects the industrial structure [121] expand the notion of organizational learning to encompass the ramifications of institutional and economic structures that affect the firm’s potential to gain new competencies [122]. Generally, the studies in the first phase covered various topics, primarily focusing on organizational learning and innovation.

In Phase II (2006–2012; Fig. 10), a minimum number of occurrences (4) was defined, and we got 26 keywords contained in 4 clusters, as shown in Table 8. The evolution of organizational learning and innovation research from 33 to 2 to 125 and 18 co-occurrences, respectively. The “organizational learning and innovation” keywords reached 24 and 9 links, with TIs 101 and 29, respectively. We note the high importance of “organizational learning” from other keywords, including organizational innovation, which reflects that “organizational learning” still dominates during the second phase. Accordingly, other study indicated that although researchers recognized the importance of innovation, organizations should focus on organizational learning to enhance their ability to innovate [123]. In addition, it is showed the importance of organizational learning for innovation performance [124,125]. Therefore, we note that organizational learning is a precedent for innovation. On the other hand, we found that the studies in the second phase dealt with many different topics. For example, the connection between organizational culture and knowledge acquisition, organizational learning and organizational innovation [126], the most important factors driving entrepreneurship [127], intellectual capital and knowledge management [128], and the importance of organizational learning and learning organizations in managing sustainable development [129] highlights the need for organizations to learn continuously and adapt to changing environmental and social conditions to achieve sustainability.

In the third phase (2013–2023; Fig. 11), we also defined the minimum number of occurrences of the keyword (4), and we got 59 items in 6 clusters, as shown in Table 8. Organizational learning emerged as the most frequent keyword with 330 occurrences, while organizational innovation ranked third with 28 occurrences, and knowledge management secured the second position with 47 occurrences. Although organizational innovation was the main theme of our research, it held the third rank across the three phases, as

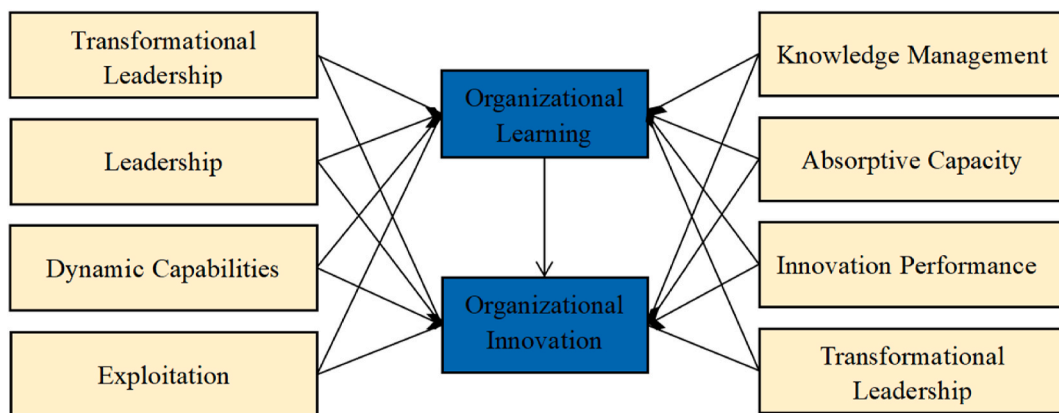


Fig. 8. The relationship between the (8) most frequently repeated keywords and organizational learning and innovation.

Table 8
Author keyword according to clusters.

Period	Cluster	Co-occurrences	Link	TLs	Author keyword
Period I: 1982–2001	Cluster 1 (red colour)	33	9	18	Organizational learning
		3	1	3	Organizational change
		2	2	3	Competences
		2	1	2	Culture
		2	2	3	Human resource management
	Cluster 2 (green colour)	2	2	2	Object-oriented programming
		2	2	2	Sociotechnical systems
		3	3	6	Knowledge management
		2	2	4	Intellectual capital
		2	2	3	Organizational innovation
Period II: 2002–2012	Cluster 1 (red colour)	125	24	101	Organizational learning
		34	11	32	Knowledge management
		7	5	9	Dynamic capabilities
		6	6	10	Knowledge transfer
		6	4	8	Product innovation
		5	4	5	Entrepreneurship
		5	2	2	Innovation performance
		5	3	5	Innovativeness
		5	1	3	New product development
		5	5	9	Organizational culture
		4	5	8	Absorptive capacity
		4	3	6	Alliances
		4	3	5	Intellectual capital
		4	5	8	Knowledge acquisition
		4	4	6	Open innovation
4	3	4	Product development		
Period	Cluster	Co-occurrences	Link	TLs	Author keyword
Period II: 2002–2012	Cluster 2 (green colour)	18	9	29	Organizational innovation
		8	7	17	organizational performance
		6	4	11	transformational leadership
		5	6	9	learning organizations
		4	4	4	sustainable development
	Cluster 3 (blue colour)	8	5	10	Performance
		4	3	5	Competitive advantage
		4	5	7	Tacit knowledge
		4	3	5	Innovation management
		4	2	2	Knowledge
Period III: 2013–2023	Cluster 1 (red colour)	330	58	358	Organizational learning
		13	7	18	Knowledge sharing
		13	13	26	Organizational culture
		12	10	21	Innovation management
		11	8	11	Technological innovation
		10	5	13	Sustainability
		7	7	12	Collaboration
		7	6	10	Knowledge creation
		5	5	7	Competitive advantage
		5	5	10	Creativity
		5	5	8	Intellectual capital
		5	4	6	Tacit knowledge
		4	8	10	Corporate social responsibility
		4	6	7	Dynamic capability
		4	5	8	Exploration and exploitation
4	1	2	Governance		
Cluster 2 (green colour)	22	17	40	Innovation performance	
	17	17	30	Transformational leadership	
	13	12	25	Organizational performance	
	9	4	9	Performance	
	7	7	13	Market orientation	
	6	10	16	Firm performance	
	5	8	15	Innovation culture	
	5	5	7	Innovativeness	
	4	4	4	Crowdsourcing	
	4	3	3	Entrepreneurial orientation	
	4	3	6	Learning organization	
	4	5	12	Pharmaceutical industry	
	4	4	6	SMEs	
	4	4	6	Knowledge management	
	Cluster 3 (blue colour)	47	23	72	Knowledge management

(continued on next page)

Table 8 (continued)

Period	Cluster	Co-occurrences	Link	TLS	Author keyword
		17	14	29	Leadership
		13	15	31	Dynamic capabilities
		9	7	15	Entrepreneurship
		5	2	5	Knowledge transfer
		5	5	7	SME
Period	Cluster	Co-occurrences	Link	TLS	Author keyword
Period III: 2013–2023	Cluster 3 (blue colour)	4	6	11	Business performance
		4	3	7	Circular economy
		4	3	5	Management
		4	3	5	Service innovation
	Cluster 4 (yellow colour)	4	2	4	Sustainable innovation
		16	14	37	Ambidexterity
		12	12	18	Open innovation
		11	8	17	Organizational change
		6	5	8	Business model innovation
		5	2	6	Quality improvement
		4	6	11	Exploitative learning
	Cluster 5 (purple colour)	4	6	11	Exploratory learning
		24	13	32	Absorptive capacity
		16	6	38	Exploitation
		15	6	37	Exploration
		7	7	12	Radical innovation
		6	4	6	Knowledge
		5	6	8	New product development
	Cluster 6 (light blue colour)	4	8	10	Political ties
		28	17	49	Organizational innovation
		5	2	4	Management innovation
		5	4	5	Quality management
		4	5	7	Higher learning
		4	2	4	Project management

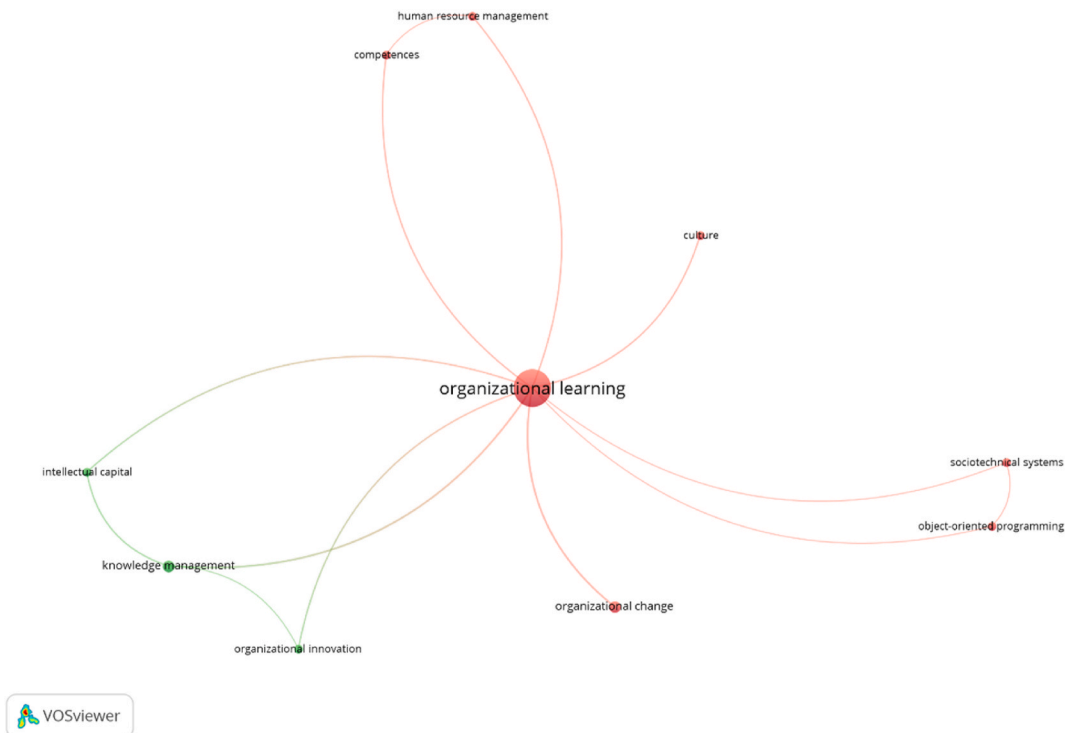


Fig. 9. The map of keyword analysis during the period 1982–2001.

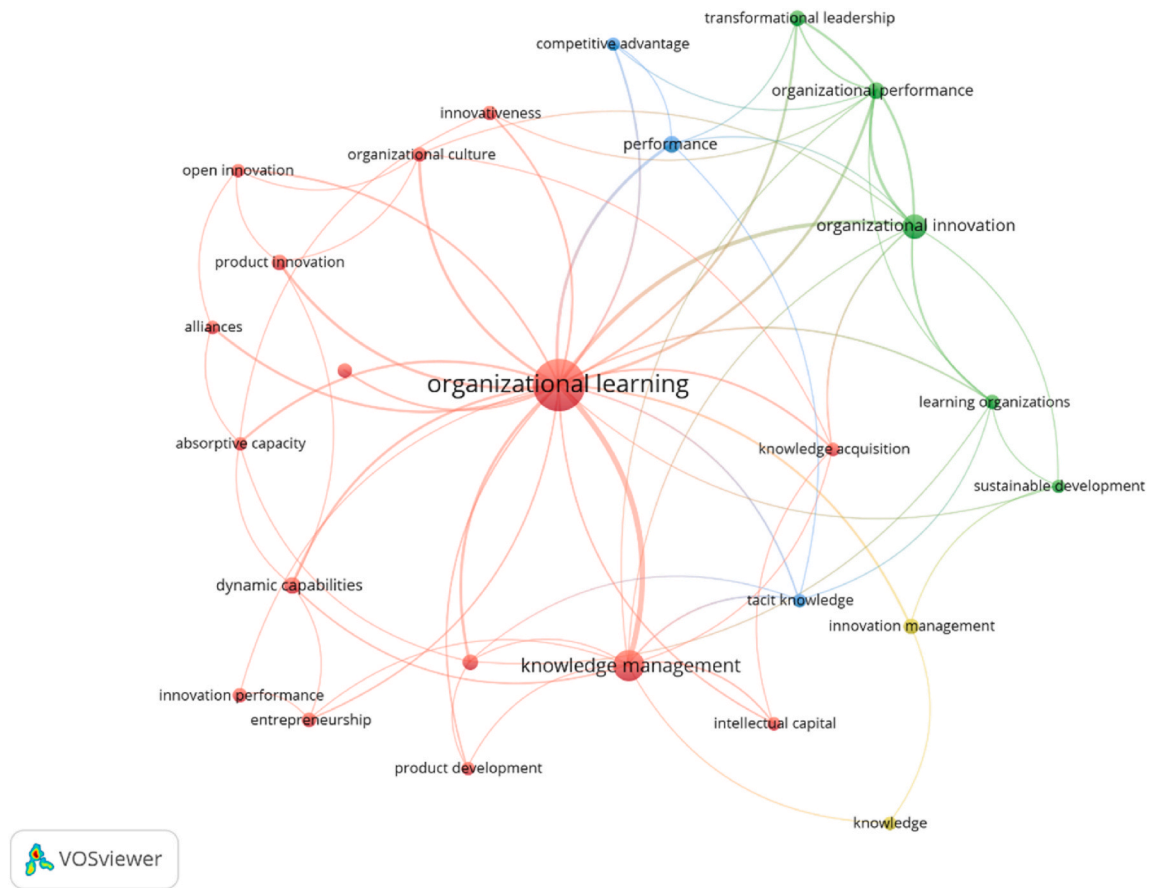


Fig. 10. The map of keyword analysis during the period 2002–2012.

knowledge management consistently occupied the second rank with 84 occurrences (as seen in Fig. 7). In addition, this phase saw increasing areas of study as terms appeared, such as innovation performance, ambidexterity, technological innovation, firm performance, and business model innovation. The analysis reveals developing areas of study over time.

3.2.4. Top 10 cited articles

Focusing on the content of the papers is very important [130]. So, content analysis should be performed on some of the articles referred to for a deeper understanding of those influencing parts. A highly cited article means that the article has been read critically, providing deep thinking on a significant subject and embodying enormous effect. Therefore, we have performed a content analysis of the top 10 most cited articles.

Table 9 shows the top 10 most-cited papers. The total number of citations for the 708 publications was 35,555 times, with a median of approximately 46 citations for each article. Noteworthy, 65 articles published between 2002 and March 2023 still have not received any citations, which may acquire citations in the future [131]. And 51 articles received only one citation. The top 10 publications were cited 7902 times, representing 22.22 % of the overall citations, emphasizing the key role of these articles in this topic. The article published by Jansen et al. [48] was the most cited publication, with 2039 citations between 2006 and March 2023. This study contributes to a deeper comprehension of how organizations facilitate the coordination of exploratory and exploitative innovation in different environmental conditions. It is worth noting that this study was not published in one of the top 10 journals listed. The research titled "The dynamics of product innovation and firm competencies," published by Danneels [132], was in the second rank in terms of citations, with 1441 citations, followed by Ahuja and Lampert [133] articles titled "Entrepreneurship in the large corporation: a longitudinal study of how established firms create breakthrough inventions" with 1427 citations, as shown in Table 9. Interestingly, 9 out of the authors of the top 10 cited research papers are from the top 10 contributing countries to this subject, including 6 authors from the USA and Spain, which reflects the highly h-index of the USA and Spain. The 10 articles focused directly and indirectly on organizational learning and innovation in addition to their association with other factors, and this shows us that organizational learning and innovation are continuously related to new issues and approaches.

On the other hand, we note that 7 of the articles included in the list are published in the top 10 journals, 6 of which are published in the "Journal of Business Research" and "Strategic Management Journal," and this reflects the great contribution of the authors in this field via the results of their research, which is influential in the academic community. Moreover, we note that the 10 articles were

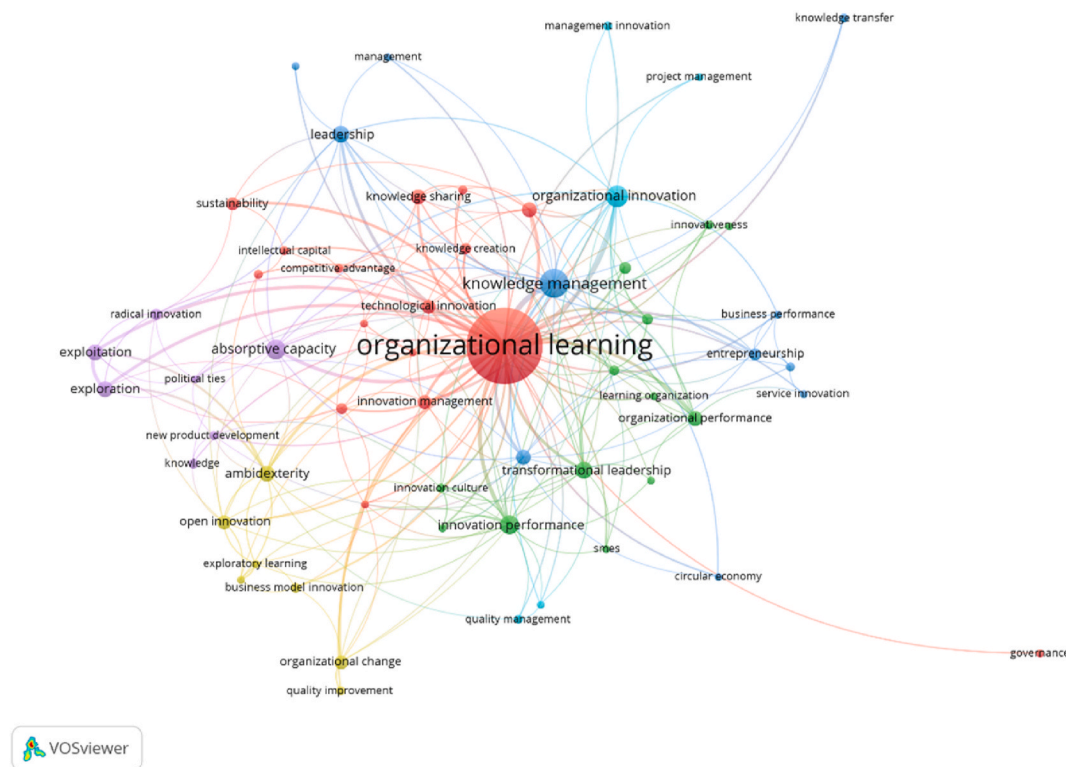


Fig. 11. The map of keyword analysis during the period 2013–2023.

published in the first quarter (Q1) journals, according to the "Scimago Journal Rank (SJR)," which indicates the quality of this academic work and the importance of this topic. In general, the reason for the influence of these articles among researchers may be that they were conducted in countries with high economies, in addition to the fact that these articles were published a long time ago [134].

The information in the "Method" section of Table 9 shows that surveys are the most used method for collecting data, including online surveys, questionnaires, etc. The 10 top articles used different statistical methods and analyses. ML and SEM were the most common methods for measuring the complex relationship between variables. In terms of theory, only two papers explicitly presented the theoretical framework. One paper used the Organizational Learning Theory, which proposes that organizational learning is the process through which organizational knowledge is enhanced [135]. It's a multilevel phenomenon that includes individual, group, organizational, and even population levels of analysis [136]. The Organizational Learning Theory emphasizes the need for organizational learning so that organizations can adapt to the changing environment [137]. The study used organizational learning theory to obtain a dynamic, path-based view of product innovation and company development [132]. The other study used the theory of recombinant invention to explain how well-established companies create fundamental technological breakthroughs.

4. Limitations, future research, and implications

The scope of this research was limited in terms of the method and elements used. First, our study was limited to articles included in the Scopus database. Therefore, future studies should include other databases, such as Wiley, Google Scholar, and the WoS, as that may enable future research to investigate robustness. Secondly, this study is limited to papers written in English, which presents the potential for publication bias and overlooks significant research published in other languages. Future studies could include publications written in other languages. For example, Spain and China were among the top 10 countries contributing to this topic, as including the languages of these countries in future studies enables researchers to reach a wide range of viewpoints, insights, and results. This linguistic inclusion enhances the comprehensiveness and diversity of the study, which can lead to a more comprehensive understanding of the topics at hand. This study was limited to articles and reviews; therefore, future studies could include other document types, such as books and conference papers, to obtain different results. Finally, this study used only the "VOS viewer" for bibliometric analyses. So, future works could employ other software, such as "Cite Space" and "Gephi 0.9.2," for page ranking, modularity, and visualization of a network [143].

On the other hand, most studies in this field have been conducted in developed countries and some in developing ones. Therefore, it is essential to expand research efforts in African and Asian countries, especially those with diverse economies and cultures. The flourishing of the economy and technological advancement have led to a significant increase in competition, and many organizations and companies in both developing and developed countries continue to struggle with intensifying competition. Thus, broadening

Table 9
The top 10 cited articles.

References	TC ³	Subject	Method					Journal/SJR
			Country	Data collected	Sample	Models	Theory	
Jansen et al. [48]	2039	Organizational innovation	South Korea	Survey	204 firms	SEM	–	Management Science (Q1)
Danneels [132]	1441	Dynamics of product innovation and firm competencies.	USA	Mix	5 firms	Descriptive	Organizational learning theory	Strategic Management Journal (Q1)
Ahuja et al. [133]	1427	Breakthrough inventions	USA	Report	107 firms	ML ¹	Theory of Recombinant Invention	Strategic Management Journal (Q1)
Jiménez-Jiménez and Sanz-Valle [10]	869	Organizational learning	Spain	Questionnaire	451 firms	SEM ²	–	Journal of Business Research (Q1)
García-Morales et al. [26]	491	"Transformational Leadership, Organizational Performance, Organizational Learning, and Innovation"	Spain	Mix	168 firms	ML	–	Journal of Business Research (Q1)
Jansen et al. [138]	490	Leadership Behaviors and Organizational Learning	General	Questionnaires	394 Questionnaires	ML	–	Leadership Quarterly (Q1)
Aragón-Correa et al. [139]	367	leadership style and organizational learning	Spain	Questionnaires	408 firms	SEM	–	Industrial Marketing Management (Q1)
Weerawardena et al. [140]	278	Industry structure and Organizational Learning and Innovation, and brand performance.	Australian	Questionnaires	252 firms	Regression	–	Journal of Business Research (Q1)
Garriga et al. [141]	255	External knowledge and innovative performance	Switzerland	Survey	2141 Respondents	ML	–	Strategic Management Journal (Q1)
Bercovitz and Feldman [142]	245	Firm's innovation	Canada	Study	45 Respondents	Descriptive	–	Research Policy(Q1)

studies on this topic and how organizational learning and innovation can improve competitive advantage is important. Furthermore, concepts of sustainability and sustainable development in research and innovation in organizational learning have garnered increasing attention due to their importance in addressing pressing global challenges like climate change, resource depletion, and social inequality. Therefore, conducting more future research will be crucial to understanding the interaction between these concepts and how they can contribute to long-term sustainability in organizations and promote sustainable development goals. Future research can explore the relationship between sustainability and organizational learning. These studies might investigate how organizations develop a learning culture that embraces principles and practices of sustainability. Moreover, based on the emerging themes in the third phase, we offer several suggestions for future research, as shown in [Table 10](#).

Our studies encompass numerous implications and scientific contributions to the literature on organizational learning and innovation in several ways. Firstly, the findings enable researchers to have a comprehensive view of this field. Thus, researchers and authors may use the findings of our study to focus on less-researched and novel issues to promote a deeper adoption of organizational learning and innovation in managerial fields. Secondly, researchers might benefit from pinpointing leading authors and institutions in this domain as possible collaborators and guiding forces to enhance research. Thirdly, the findings obtained through co-citation and citation analysis provide important information on influential and prestigious publications that may be considered the foundations of this research domain. Researchers can benefit from this information in the future. Finally, the analysis allows us to identify the evolution of themes and emerging topics in this field, which are important research agendas that future researchers can address.

On the other hand, this study's findings may also benefit management researchers who wish to continue developing the current knowledge body. The study suggests that organizers, such as managers, engaged in this topic might use our research to understand the broad scope of managing organizational learning and innovation across various sectors. Secondly, after conducting the bibliometric analysis of keywords, "knowledge management" emerged as a rapidly developing theme within organizational learning and innovation. Furthermore, it offers some emerging terms that can be addressed in future works, enabling the identification of unexplored topics of interest for research in this area. Moreover, this study, through content analysis of the top 10 most cited articles, which are among the most influential papers in this field (see [Table 9](#)), offers a comprehensive overview of current research trends in organizational learning and innovation, using theoretical frameworks and a variety of methodologies across different countries and industries. This demonstrates the diversity and depth of research in these areas. Integrating existing knowledge is important for authors to provide a clearer picture of the importance of organizational learning and innovation.

5. Conclusion

This research provides a thorough bibliometric analysis of organizational learning and innovation, covering papers indexed in the Scopus database and published from 1982 to March 2023. The 773 publications on "organizational learning and organizational innovation" have been covered by 1788 authors from 160 institutions in 67 countries, published by 341 journals, and cited 35,555 times. The "International Journal of Innovation and Learning" was the most productive, contributing 3.75 % of the publications. On an international scale, the USA was the most productive country regarding publications, followed by the UK and China. It is worth noting that the most productive and contributing institutions were mainly from Spain, the UK, and China. Specifically, 8 of the most productive institutions are in the Western regions, while two are on the Chinese mainland. This indicates the great contribution made by academics from Western countries, in addition to China being the only country with the most contribution on the Asian continent.

In this research, we have performed the social network analysis (SNA) to provide a visual map to visualize collaboration and interaction between authors, keywords co-occurrence, etc. In addition to identifying the main study streams of the researchers. A keywords co-occurrence analysis was performed in three phases to identify an evaluation study on organizational learning and innovation regarding the research subjects. The key hot topics in the first phase (I) (1982–2000) were organizational learning (33 occurrences frequency), organizational innovation (2 occurrences frequency), and knowledge management (3 occurrences frequency). Although numerous studies were conducted in this phase, academics have little focused on organizational innovation. However, in the

Table 10
Areas for future research.

No	Keywords	Suggest future research
1	Innovation performance	Investigate how cultural contexts affect the adoption and effectiveness of organizational learning and its impact on innovation across different cultures with a long-term impact assessment and consider employees' views.
2	Ambidexterity	Despite the abundance of studies on ambidexterity amongst small and medium-sized enterprises (SMEs), there is very limited organizational learning ambidexterity focused on. Therefore, future research could pay specific attention to the organizational learning ambidexterity determinants; additionally, it could consider longitudinal data and adopt objective measurements, such as a company's output, particularly in measuring innovation performance [144].
3	Technological innovation	Investigate how emerging technologies like artificial intelligence, blockchain, and the Internet of Things (IoT) can be integrated into organizational learning processes to drive technological innovation.
4	Firm performance	Future studies should focus more on various fields, such as hospitality and tourism, as these are promising areas for further research. Furthermore, given the pivotal contribution of SMEs to economic development, job creation, social cohesion, and integration, it is imperative for future studies in SMEs and entrepreneurship [145].
5	Business model innovation	Future research should investigate the relationship between organizational learning and sustainable and circular business model innovation, understanding how learning processes can support sustainable innovation. Furthermore, industry-specific studies will examine how different sectors leverage organizational learning for business model innovation, particularly in rapidly evolving industries like technology, healthcare, and renewable energy.

second phase (II), the research expanded, and the researchers started focusing more on "organizational innovation," which reached a frequency of 18 occurrences.

Organizational learning is the most common keyword in the third phase (III) (2013–March 2023), which reflects the stream of key research trends that have received more interest in the past few years. Interestingly, knowledge-related themes have received more academic attention than organizational innovation. As a result, the total frequency number of knowledge management was (84), while the total frequency number of organizational innovation was (49), and this may be the reason, given that knowledge management is a system that promotes a cooperating environment for the exchange of current knowledge and creates chances for generating new knowledge through increasing performance through learning to achieve their strategic goals [146]. Managers can stimulate innovative proposals through knowledge management [147]. According to Dasgupta and Gupta [148], the ability to absorb newly acquired knowledge and integrate it with existing knowledge leads to the creation of new knowledge; it is the key to improvement and innovation.

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Data availability statement

Data will be made available on request.

CRedit authorship contribution statement

Mohammed Hael: Writing – original draft, Software, Methodology, Formal analysis, Conceptualization. **Fozi Ali Belhaj:** Writing – review & editing, Resources, Funding acquisition, Conceptualization, Writing – original draft. **Honglie Zhang:** Supervision, Writing – review & editing.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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