Review of Research on Management Innovation and Innovation Management: A Bibliometric Analysis

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Abstract

Much research regarding innovation management (IM) and management innovation (MI) were used interchangeably, even though both terms referred to two different meanings. This, in turn, causes obscurity in an attempt to clearly understand the essence of each term. This study is carried out with the objective to map the development of the research of IM and MI over the years simultaneously and separately using systematic search and bibliometric analysis. Our results discover that the publication for both terms increased over the years. Our general results show that most encountered keywords are mostly different for both terms. However, it then discovered that the terms 'knowledge management', which is associated with 'organizational learning', appeared in the top 5 most encountered keywords for both terms. This finding opens up new insights that deserve deeper investigation regarding the grand concept and its mechanism of action in the future.

Keywords: innovation; innovation management; management innovation; bibliometric.

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Introduction

In the ever-changing business environment, innovation is critical at both the individual and organizational levels (Salam et al., 2020). In the past previous years, the terms innovation and management seem to have obtained much consideration for their significance for the development of an organization and competitive advantage. However, innovation is a broad term that is frequently mingled with other meanings. The multiple interpretations of the term innovation may be related to different study goals, but it could also be attributable to the nature of the multidisciplinary field of innovation management (IM) and management innovation (MI) research (Lorenz, 2010).

Historically speaking, the term IM is also based on some of the principles of Schumpeter's concept of creative destruction. IM is a system for collecting and organizing innovative ideas, which may then be integrated into the organizational structure if executed correctly (El-Sholkamy & Fischbach, 2019). Essentially, IM is much more than simply applying business and management disciplines through innovation (Tidd & Bessant, 2018). Innovation is critical to achieving business survival yet making an organization inventive is not easy. According to van der Duin and Ortt (2020), managers may assist in the decision of how to apply a portfolio of IM techniques by assessing contextual aspects such as culture, industry, and company, which is then referred to as Contextual Innovation Management. Hence, IM requires a specific and strategic approach in order to implement strategic changes for improvement (Matriano, 2021).

The essence of innovation is to create value or deliver greater value to customers (Lee & Lim, 2018a). The journey of innovation then discovers a new type of innovation, i.e MI, which in essence referred to the changes or new practices or processes or structures adopted to the current management or managerial system (Le Roy et al., 2018). Thus, Birkinshaw et al. (2008) put terms such as administrative innovation, organizational innovation, or managerial innovation, that have nothing to do with technological innovation, under the term of MI.

As reflected in the definition, MI offers a way to develop or improve competitive advantage (Kraśnicka et al., 2018; Le Roy et al., 2018). This opens a whole new chapter on the journey of innovation. Along the way, many organizations have adopted MI to boost their competitiveness. MIs are substantially novel solutions, in the sense that they have not yet been implemented in a specific company and they can be adapted or developed exclusively to satisfy the needs of a certain company (Kraśnicka et al., 2018). This points to the organic role of the innovation ecosystem at the heart of the organization (Lee & Lim, 2018c).

Referring to the above explanation, IM and MI are referred to as two different terms. Nevertheless, many researchers and academicians seem to ignore the facts of the overlapping use of the terms IM and MI in many research. This, in turn, results in the creation of ambiguity regarding the differences and functions of the two. Thus, we argue that it is needed to map the development of the research of IM and MI that has been done over the years simultaneously yet separately. Hence, we can compare the development of the two using the technique of bibliometric analysis.

Definition of Research Question

To achieve the objective of the study, we try to answer the research question of how have publications on IM and MI evolved over the years? This question is to determine how the number of publications

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related to IM and MI has varied in terms of the top publications with the most number of citations, its journal sources, and keyword occurrences development. It is expected to find some relation between the published works.

Bibliometric Analysis

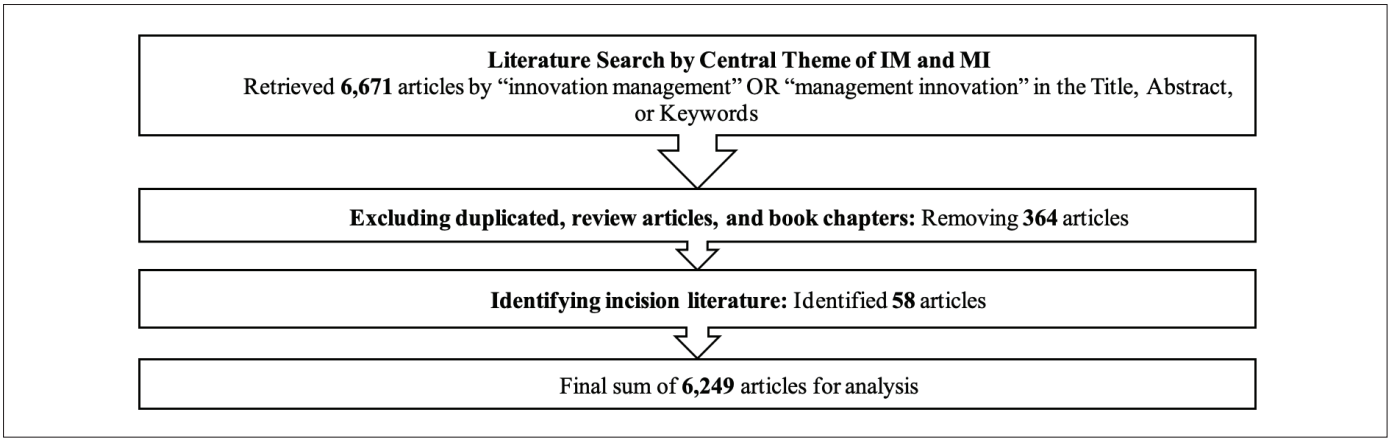
Literature reviews are essential in academic research since they consolidate existing knowledge and assess the state of a field (Linnenluecke et al., 2020). Synthesizing prior research findings is one of the most important tasks for progressing an area of study (Schmidt, 2008; Zupic & Čater, 2015). This study differs from previous bibliometric studies for two reasons. First, this study analyzes the subject phenomenon over a 30-year period, allowing for the detection of characteristics that have not been detected in previous studies. It also highlights the progression of the subthemes during this period. *Second*, this research is not limited to a particular geographical area. Unlike bibliometric studies that examine research in specific locations, this article examines IM and MI research globally.

Design and Execution of the Research

The methodology used for this study is a systematic search and bibliometric analysis. This is an endeavor to map the development of IM and MI over the previous research done by many researchers and academicians. The data of this bibliometric analysis study was gathered in November 2022 using the Scopus database for 1960 until 2022 time slots. The main search keyword of this bibliometric analysis work was research papers published in journals comprising 'innovation management' and 'management innovation' in their titles, abstracts, and keywords. The Scopus database was chosen because it combats predatory publishing and guarantees the integrity of the scholarly record. By employing this option, the efficiency and effectiveness of the research workflow improved.

According to our data, the oldest research article found is from 1967 and the latest research articles found are from 2022. We get the result of 6,671 articles, of which 5,794 articles are from IM search and 877 articles are from MI search. In the next step of our analysis, we clear out our data set from duplicates and added phrases in our query string to make sure there were no review articles or book chapters in our analysis. Last, we make sure only articles in English were included in the analysis. After that, we found 137 articles were duplicates, so those articles were left out of the analysis. Furthermore, we found that 227 articles are possibly not related to our bibliometric study, so those articles were also left out of the analysis. We also identified that 58 articles are the intersection of the two search results, meaning they appeared in both search results. Therefore, a total of 6,249 articles, which consist of 5,456 articles on IM and 855 articles on MI, were used in the final data analysis. The process of data collection and limitations of the study is provided in Figure 1.

Figure 1. Overview of data collection of research articles



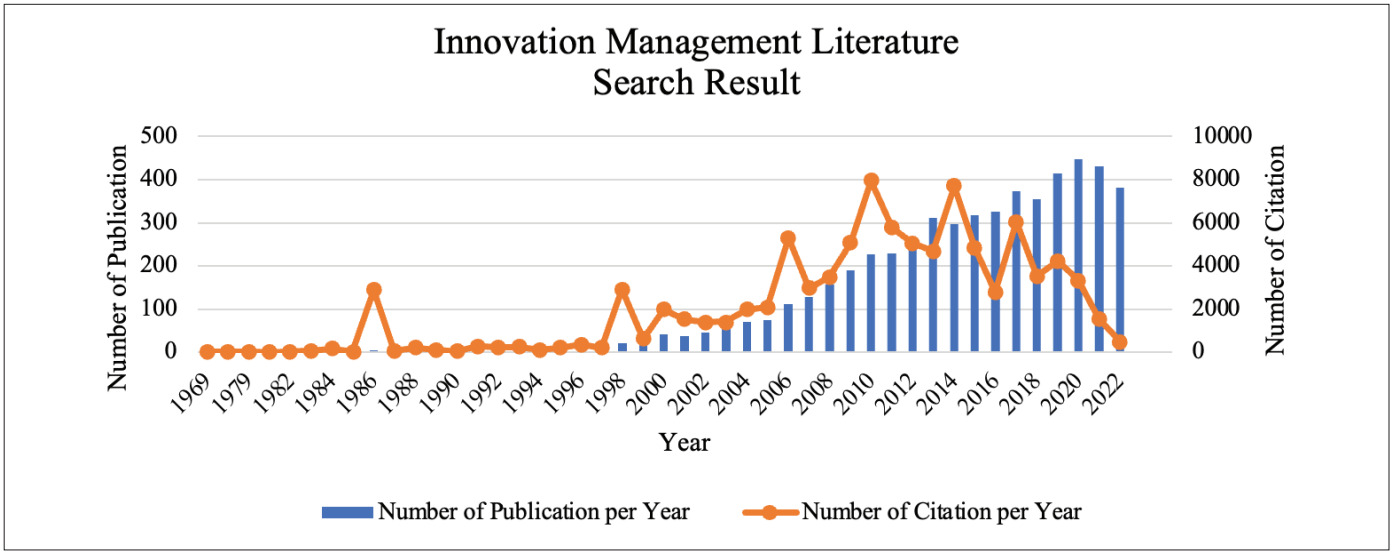
To optimize the analysis and point out the real difference in the development of IM and MI research, we try our best to categorize every research into its respective category, i.e IM or MI. Therefore, a number of studies analyzed here are quite different to the other bibliometric analysis research on IM or MI that combine those two terms into one. After the process of selecting the articles, the analysis then moves to the next stage, i.e retrieving network data using Mendeley and mapping the data using VOSviewer.

Answer to the Research Question

Analysis of publication

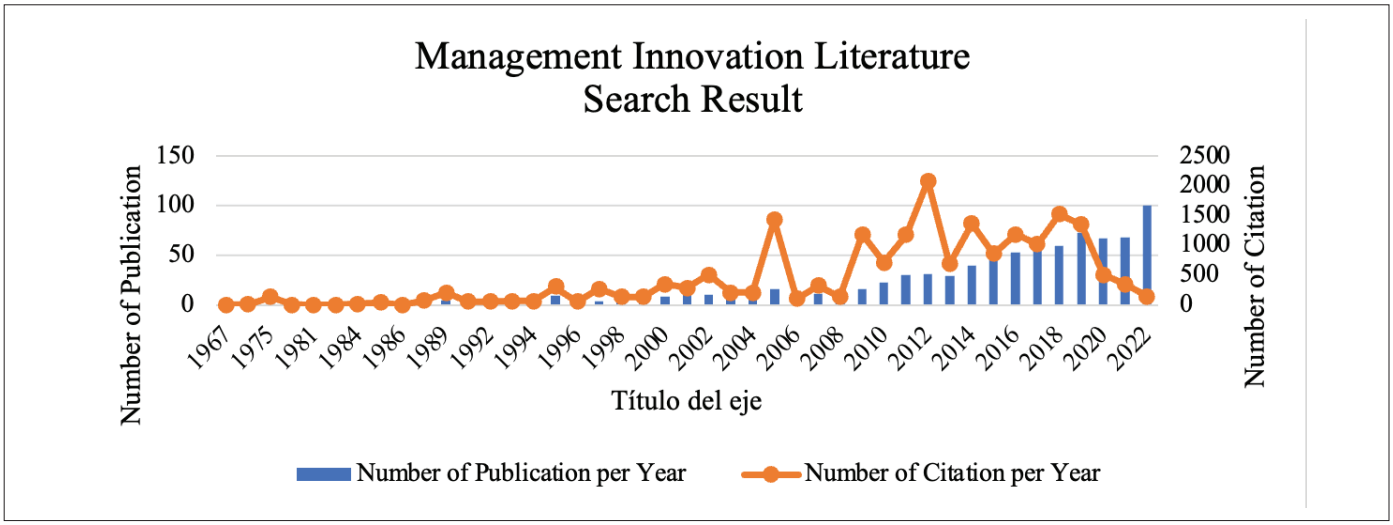
Innovation management. According to our results of this bibliometric study, in the last 43 years between 1969 to 2022, about 1,694 publications on IM are made (Figure 2).

Figure 2. Number of publication and citation of innovation management research 1969-2022



Management innovation. According to our results of this bibliometric study, in the last 45 years between 1967 to 2022, about 856 publications on MI are made (Figure 3).

Figure 3. Number of publication and citation of management innovation research 1967-2022



As we can see from the figures above, the number of publications for both terms increase respectively over the years. For IM research, the year of 2020 records the biggest number of publications. Meanwhile, for MI, the biggest number of publications are recorded in the year 2022. However, our results did not show a similar pattern in terms of the number of citations, which constantly fluctuate but varied for both terms.

Analysis of cited articles

Innovation management. In terms of the most cited articles, Table 1 below shows Top 10 most cited articles on IM over the years.

Table 1. Top 10 Most Cited Articles on Innovation Management.

No.	Authors	Titles	Year	Journal Source	TC
1.	Teece D.J.	Business models, business strategy and innovation	2010	Long Range Planning	3,815
2.	Von Hippel Eric	Lead Users: A Source of Novel Product Concepts.	1986	Management Science	2,805
3.	Chen C.C.; Greene P.G.; Crick A.	Does entrepreneurial self-efficacy distinguish entrepreneurs from managers?	1998	Journal of Business Venturing	1,566
4.	Anderson N.; Potočnik K.; Zhou J.	Innovation and Creativity in Organizations: A State-of-the-Science Review, Prospective Commentary, and Guiding Framework	2014	Journal of Management	1,547
5.	Yoo Y.; Boland R.J.; Lyytinen K.; Majchrzak A.	Organizing for innovation in the digitized world	2012	Organization Science	1,143
6.	Huizingh E.K.R.E.	Open innovation: State of the art and future perspectives	2011	Technovation	1,140
7.	West J.; Bogers M.	Leveraging external sources of innovation: A review of research on open innovation	2014	Journal of Product Innovation Management	1,110
8.	Nambisan S.; Lyytinen K.; Majchrzak A.; Song M.	Digital innovation management: Reinventing innovation management research in a digital world	2017	MIS Quarterly: Management Information Systems	953
9.	Adner R.	Ecosystem as Structure: An Actionable Construct for Strategy	2017	Journal of Management	875
10.	Adams R.; Bessant J.; Phelps R.	Innovation management measurement: A review	2006	International Journal of Management Reviews	748

Note: TC = Total Citation

Management innovation. In terms of the most cited articles, Table 2 below shows Top 10 most cited articles on MI over the years.

Table 2. Top 10 Most Cited Articles on Innovation Management.

No.	Authors	Titles	Year	Journal Source	TC
1	Darroch J.	Knowledge management, innovation and firm performance	2005	Journal of Knowledge Management	846
2	Damanpour F.; Aravind D.	Managerial Innovation: Conceptions, Processes, and Antecedents	2012	Management and Organization Review	406
3	Mol M.J.; Birkinshaw J.	The sources of management innovation: When firms introduce new management practices	2009	Journal of Business Research	402
4	Madrid-Guijarro A.; Garcia D.; Van Auken H.	Barriers to innovation among Spanish manufacturing SMEs	2009	Journal of Small Business Management	365
5	López-Nicolás C.; Meroño-Cerdán A.L.	Strategic knowledge management, innovation and performance	2011	International Journal of Information Management	353
6	Vaccaro I.G.; Jansen J.J.P.; van den Bosch F.A.J.; Volberda H.W.	Management innovation and leadership: The moderating role of organizational size	2012	Journal of Management Studies	335
7	Rotem E.; Naveh A.; Ananthakrishnan A.; Weissmann E.; Rajwan D.	Power-management architecture of the intel microarchitecture code-named Sandy Bridge	2012	IEEE Micro	322
8	Zhu Q.; Sarkis J.; Lai K.-H.	Green supply chain management innovation diffusion and its relationship to organizational improvement: An ecological modernization perspective	2012	Journal of Engineering and Technology Management - JET-M	297
9	Walker R.M.; Damanpour F.; Devece C.A.	Management innovation and organizational performance: The mediating effect of performance management	2011	Journal of Public Administration Research and Theory	281
10	Elenkov D.S.; Manev I.M.	Top management leadership and influence on innovation: The role of sociocultural context	2005	Journal of Management	246

Note: TC = Total Citation

Analysis of journals and citations

Innovation management. Table 3 showed top 10 journal on IM research publication. As shown in Table 3, Asian Journal of Technology Innovation was ranked first due to its high number of publications, yet it has a lower total number of citations than other journals in the lower rank regarding total publication on IM literature.

Table 3. Top 10 Journal on Innovation Management.

No.	Source title	Total Publication (%)	Total Citation
1	Asian Journal of Technology Innovation	101 (1.9)	801
2	International Journal of Innovation Management	100 (1.8)	2,036
3	Journal of Product Innovation Management	96 (1.8)	6,435
4	Technovation	77 (1.4)	5,720
5	International Journal of Technology Management	73 (1.3)	1,480
6	European Journal of Innovation Management	71 (1.3)	1,887
7	Technological Forecasting and Social Change	68 (1.2)	2,763
8	International Journal of Entrepreneurship and Innovation Management	61 (1.1)	393
9	IEEE Transactions on Engineering Management	60 (1.1)	832
10	R and D Management	48 (0.9)	3,031

Management innovation. Table 4 showed top 10 journal on MI research publications. As shown in Table 4, Sustainability (Switzerland) was ranked first due to its high number of publications, yet it has a lower total number of citations than other journals that recorded lower the total publication of MI literature.

Table 4. Top 10 Journal on Management Innovation.

No.	Journal Source	Total Publication (%)	Total Citation
1	Sustainability (Switzerland)	16 (1.9)	248
2	Journal of Cleaner Production	14 (1.6)	1,079
3	Journal of Business Research	10 (1.2)	792
4	Organization Studies	8 (0.9)	740
5	Journal of Coastal Research	8 (0.9)	6
6	European Management Review	7 (0.8)	283
7	Journal of Intelligent and Fuzzy Systems	7 (0.8)	17
8	Journal of Knowledge Management	6 (0.7)	1,078
9	Business Process Management Journal	6 (0.7)	140
10	Journal of Organizational Change Management	6 (0.7)	107

Analysis of authors keywords

Innovation management. According to the analysis results of VOSviewer, there are 10,522 keywords in the IM literature from 1969 to 2022; 8,274 of which appeared only once, accounting for 78.6%. The number of keywords that appeared twice and three times are 2,248 and 1,180 respectively, and the frequency of keywords that appeared at least 10 times is 236 or 2.24%. Following Wen et al. (2022) to select at least 10 occurrences and 100 most frequent co-occurrences, we set the analysis to 100 the most frequent keywords, which appeared to have minimum 17 times of appearances number. These 100 keywords have 2,830 links with each other, while the total link strength reaches 9,828 and formed 8 clusters. The network visualization of IM literature from 1969 to 2022 is shown in Figure 4.

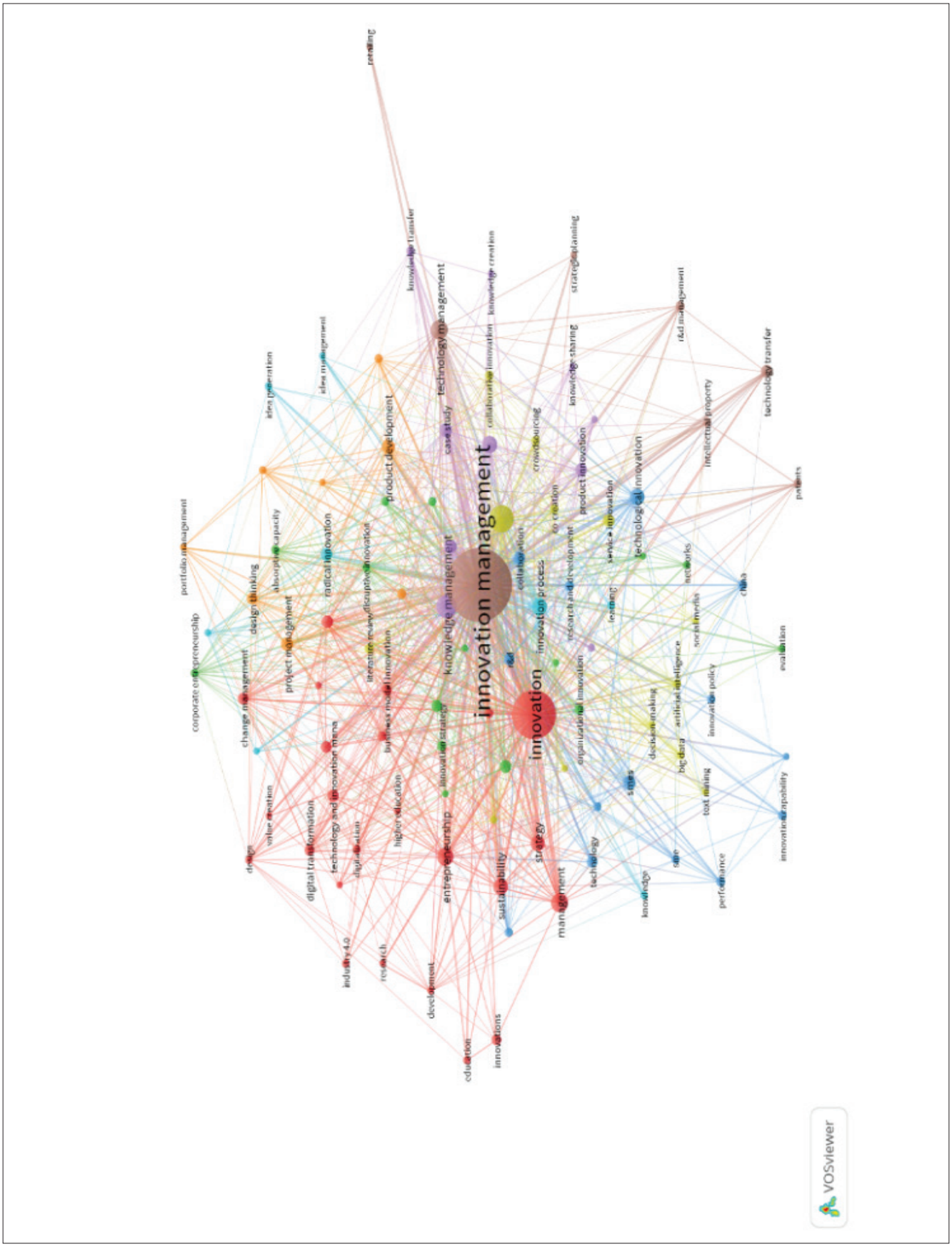


Figure 4. Snapshot of the bibliometric map on innovation management representing authors' keywords co-occurrences (n=100) in network visualization mode.

Bibliometric analysis results show that the term 'innovation management' has a number of appearances of 1,828 and total link strength reaches 2,049. Apparently, 'innovation management' is the most frequently encountered keyword, followed by 'innovation', 'open innovation', and 'knowledge management' with the occurrences of 809, 253, and 168 times, respectively. We also noticed that some terms related to business and organization, i.e business model innovation (39 occurrences), organizational innovation (37 occurrences), and collaborative innovation (31 occurrences), were used to refer to IM.

Management innovation. According to the analysis results of VOSviewer, there are 2,483 keywords in the MI literature from 1967 to 2022; 2,159 of which appeared only once, accounting for 86.9%. The number of keywords that appeared twice and three times are 324 and 142 respectively, and the frequency of keywords that appeared at least 10 times is only 17 or 0.68%. We also set the analysis to 100 the most frequent keywords, and the closest setting is at least 4 times of appearances with 95 being the most frequent keywords. These keywords have 842 links with each other, while the total link strength reaches 1,404 and formed 11 clusters. Whereas network visualization of IM literature from 1967 to 2022 are shown in Figure 5.

The analysis results show that the term 'management innovation' appears 158 times and the total link strength reaches 177, making it the most frequently encountered keyword. It was then followed by 'innovation' with 122 appearances and a total link strength of 156 and 'knowledge management' with 37 appearances and a total link strength of 65. We also noticed that some terms related to management and organization, i.e innovation management (18 appearances), organizational change (13 occurrences), and organizational innovation (12 occurrences), became the terms to refer to MI as well.

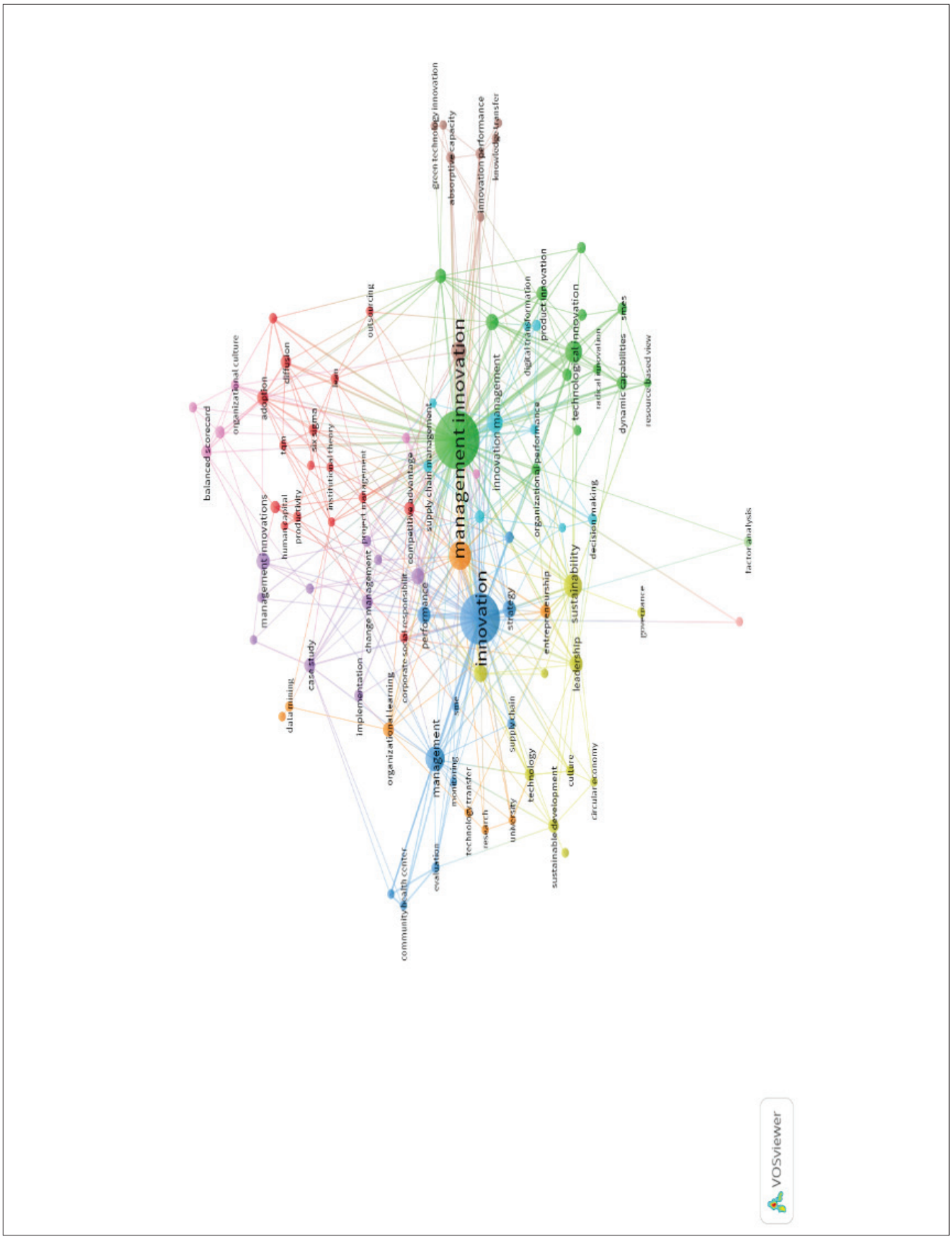


Figure 5. Snapshot of the bibliometric map on management innovation representing authors' keywords co-occurrences (n=95) network visualization mode.

Innovation management and management innovation. To specifically compare the results of both terms, we then analyzed the intersection results of the search. As stated earlier, 58 literature documents appear in both IM and MI search results. These literature documents have 216 keywords to analyze. For this, we did not determine any specific number as a minimum number of keyword appearances while analyzing the data of IM and MI literature in VOSviewer. However, we got a notification that the largest set of connected items consists of 142 keywords. Thus, the analysis was then carried out to map these 142 keywords. The results indicate that these keywords have 1,002 links with each other, with the total link strength reaching 1,032 and forming 19 clusters. 'Innovation management', 'innovation', 'management innovation', and 'sustainability' are keywords that occurred 18, 9, 6, and 5 times, respectively. The visualization for the results is shown in Figure 6.

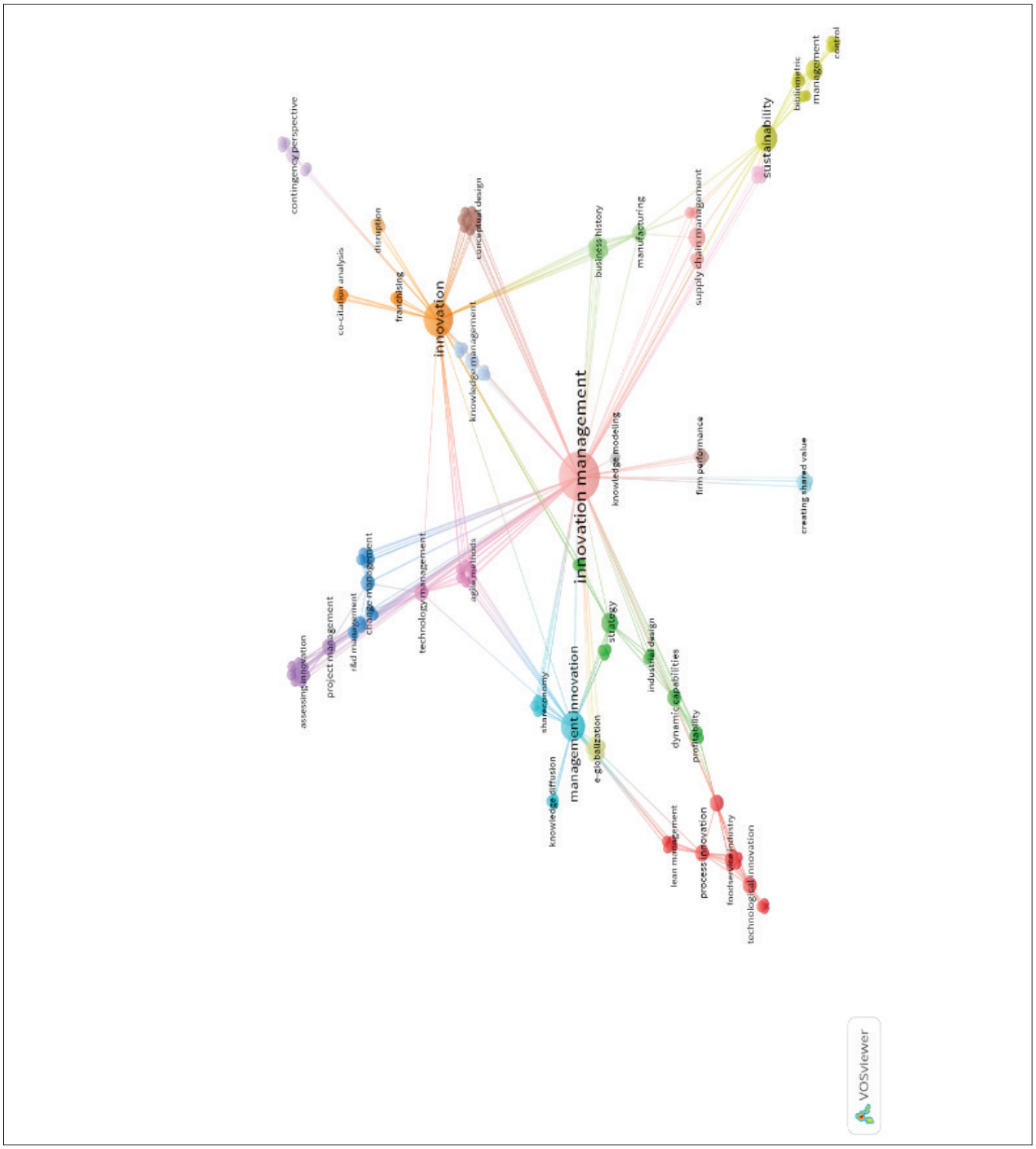


Figure 6. Snapshot of the bibliometric map on innovation management and management innovation representing authors' keywords co-occurrences (n=142) network visualization mode.

Eventually, the development in research on IM and MI leads to the evolution of organization management practices over the years all over the world. The knowledgeable fact regarding this is that as the global marketplace turns hypercompetitive, to achieve a greater good of innovation, the integration of advanced technologies, which can be referred to as IM, and new management systems, which can be referred to as MI, has become the core competitive weapon for organizations (Hervas-Oliver et al., 2018; Lee & Lim, 2018c). This means that despite the two terms being indeed different, the practicality of the two is complementary.

More Findings

While doing the analysis, we also found that the keyword 'knowledge management' and 'organizational learning' appear in all three analyses. This indicates that the concept of IM and MI actually closely related to 'knowledge' and 'learning'. Śledzik (2013) stated that "the generation of innovation no longer depends on individual personalities but involves the cooperation of many different actors". Accordingly, cognitive qualities that promote diffusion and consequently understanding of innovation are necessary (Śledzik, 2013). This is in line with Stata (1989) who argued that "the rate at which individuals and organizations learn may become the only sustainable competitive advantage, especially in knowledge-intensive industries". Supporting the arguments, Migdadi (2021) argued that organizational learning (OL) is capable to promote innovation and sustainable development in the organization, especially in a learning organization (LO). Furthermore, Migdadi (2021) also stated that "organizations need to develop a strong capability to engage in effective OL", which is then referred to as organizational learning capability (OLC). The capability in OLC is referring to the ability of the organization to implement the appropriate management practices that facilitate and encourage learning (Goh, 2003). In summary, Śledzik (2013), Stata (1989), and Migdadi (2021) openly highlight the important role of OL in innovation, particularly related to IM and MI, respectively.

Van der Panne et al. (2003) found that there are seven factors agreed upon by researchers that will enhance the innovative success of a firm, of which two are related to OL to nurture MI and IM, respectively. Those two factors are 1) a firm's culture that is dedicated to innovation and explicitly recognizes the collective nature of innovation efforts and 2) a clearly articulated innovation strategy and management style suited to that. Moreover, Brix (2019) managed to identify that OL serves to balance the activities and capacities of exploration and exploitation in an organization. In other words, OL provides ways towards the Ambidextrous Organization or Organizational Ambidexterity. These findings open up new insights that deserve deeper investigation regarding the grand concept and its mechanism of action.

Conclusion

Over the years, research on IM and MI has evolved immensely. Basically, the two offer the same blessing in the first place, which is 'changes' and 'value-added' that come from the innovation. But apparently, those two terms can be seen of originated from a different approach. In IM, rules or structure or anything means 'management' put into innovation practice to manage the innovation. Thus, we also introduced the term 'managing innovation'. Whereas the development of MI started with the intention of discovering a new type of innovation that is different from the common stream, which is non-technological. So basically, MI means to put innovation, or in the other words 'change' and 'value-added', to the management practices.

However, the development is not without inertia. As we discovered many researchers were using the term IM and MI interchangeably. This, in turn, causes obscurity in an attempt to clearly understand the essence of each term. Thus, as this paper attempts to do, we believe that it is fundamental to distinguish the two terms. Henceforth, we suggest that future research on IM and MI give distinct definitions while engaging with the two terms. Furthermore, as we close the discussion with an eye-opening fact about the potential deeper investigation in the future regarding OL's role in the IM and MI field, future research models related to the adoption of IM and MI should include OL in their development.

Declaration of Conflicting Interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship and/or publication of this article.

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