

Innovation management theory: Current trends and implementation

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Arief

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Abstract

The objective of this research is to systematically examine the trend of research references related to innovation management theory over the last ten years, from 2012 to 2022. This study will specifically look at the evolution of innovation management theory research and its application on a data-driven scale. This study used a mix method approach, combining bibliometric methods and a literature review. This study collects 51 data points from international publications with the keyword innovation management theory from 2012 to 2022, using the web scraping method and the Scopus database. According to the findings of this study, studies related to innovation management theory are dominated by several fields of study, including management, business, economics, finance, the environment, infrastructure, geography, and technology. According to the findings of this study, there are at least four major perspectives that are dominantly used in discussing this issue. Furthermore, this analysis discovers that the contexts that are frequently discussed are interdisciplinary or multidisciplinary issues. This means that when discussing an issue, a study will typically employ more than one viewpoint. The scope of the articles used, which were sourced from the SCOPUS database, is the research's limitation. In the future, the recommendations in this study can be used as hypotheses in addition to research with broader literature sources, and comprehensive and in-depth follow-up research can be conducted. The findings of this study are expected to serve as a resource for academics interested in studying innovation management.

Keywords

Innovation management, theory, implementation, systematic review, bibliometric analysis, scopus database

1. Introduction

Studies of consumer attitudes, interests, and intentions to adopt products or services dominate consumer behavior and marketing. Resistance research, which investigates why consumers do not adopt products or services, is still limited and has received little attention (Demirbag-Kaplan 2018; Heidenreich and Handrich 2015; Ma and Lee 2019a; H. Seth et al. 2020; Talke and Heidenreich 2014; Aaron van Klyton et al. 2021). Companies will always try to create attraction through various innovations, but problems will arise if consumers fail to respond to that attraction as novelty.

Nowadays, it is extremely difficult to create a completely new or never-before-created attraction. As a result, the company's innovation efforts do not always succeed in attracting customers who perceive the offer as nothing new. However, this does not imply that innovation is pointless (Ram 1987).

Successful innovation research has been widely conducted and has been enriched with various causal factors. However, the number of studies on innovation failure due to consumer resistance or rejection remains limited (Ram and Sheth 1989). Therefore, practitioners and researchers are still investigating innovation.

Diffusion of innovation is a fundamental concept in comprehending the adoption of change, particularly technology, to better understand consumer needs and interpret it as a system design that provides convenience and broad benefits. However, Rogers (1962), a pioneer of the concept of diffusion of innovation, reveals that researchers are biased in their view of innovation, with innovation always connoted as positive, useful, and

suitable for everyone. Jagdish N. Sheth and Walter H. Stellner (J. N. Seth and Stellner 1979) emphasized consumers' freedom to choose what the industry has to offer, particularly when it comes to innovation or change.

According to Seth and Stellner's research, the number of consumers who are willing to try new things (innovations) is far lower than those who prefer to stick with what they already know. This demonstrates that there is a need for research to understand the reasons for consumer rejection of a product or service innovation because it will be able to present new ideas in the world of product development and marketing, as opposed to research focused solely on innovation. According to Seth and Stellner, there are two consumer psychological factors that cause resistance to innovation: (1) the habit of what is currently being done, and (2) concerns about the risk (problem) associated with the innovation.

Both practically and theoretically, it is assumed that innovation management will always evolve with the times. In many cases, it is difficult to keep up with industry developments or changes. According to Nurjanah (2015), the development of the concept of innovation management began after World War II and was divided into four generations. The first generation was documented between the 1950s and the mid-1960s. At the time, innovation management emphasized the company's R&D in producing technology-oriented innovative products, so the innovation approach used was technological push and tended to produce radical innovation. Second, between the mid-1960s and the late 1970s. During this time, the global economy was said to be stable and heading toward prosperity, so market conditions became competitive and government involvement on the demand side became dominant. The third phase lasted from the late 1970s to the early 1990s. The innovation approach taken in this generation has combined a market pull strategy with technological push, but the focus is only on product and process innovation, so it tends to ignore company innovation (innovation organization). The fourth phase lasted from the early 1990s to the early 2000s. Advances in technology and information have made globalization the dominant factor in this period of increasing global competition.

The preceding context demonstrates how adaptive innovation management theory is applied in dealing with industrial developments or from the practical realm. As a result of the rapid changes in the company's internal and external conditions, the innovation approach differs from the previous generation, which emphasized open innovation. The context-based approach, also known as Contextual innovation, is the more ideal approach in the current era (Nurjanah 2015). Based on this phenomenon, the purpose of this study is to systematically examine research references related to Innovation management theory from 2012 to 2022. This study will look specifically at the development trend of innovation management theory research on data-driven scopes.

2. Literature review

2.1 Innovation management

Management of innovation will elevate an organization to the level of being ready to compete on a global scale (Nurjanah 2015). Meanwhile, Tidd and Bessant (2020) argue that innovation management is an activity that integrates technology, market, and organizational change in order to succeed in managing innovation, technology, and new product development. According to these arguments, innovation management can be defined as the process of managing innovation in a company or organization so that it can be used to the benefit of the company. While the innovation process is a series of activities carried out by individuals or organizations who become aware of the existence of innovation and begin to put certain ideas into practical. The innovation process can also be defined as the transformation of a deductive mindset from an idea to a physical or non-physical embodiment (Ghorbani, M., and Lames, M. 2016; Wu, C. W. 2016; Midler, C., Killen, C. P., and Kock, A. 2016).

2.2 Literature review and bibliometric analysis

The literature used in this study is based on data from Scopus publications, which are then critically analysed using a literature review approach. This method of research is a critical analysis method that is used to conduct research on specific topics, in this case innovation management theory, using various literature sources (Knopf, J. W. 2006; Randolph, J. 2009; Booth, A., Sutton, A., and Papaioannou, D. 2016). This method is widely used in fields ranging from economics to management to information technology.

Bibliometric analysis, on the other hand, is a quantitative method for analysing bibliographic data in articles/journals. This analysis is typically used to investigate references to scientific articles cited in a journal, to map a journal's scientific field, and to categorize scientific articles according to a research field. This method can be applied in sociology, humanities, communication, marketing, management, and other fields. The citation analysis approach is used in bibliometric analysis to find one article cited by another, and the co-citation analysis approach is used to find two or more articles cited by one. The words (co-words) used in a document can reveal

the concept of science contained within it. Co-word analysis is based on the co-occurrence of words or keywords in two or more documents that are used to index documents (Effendy et al. 2021).

3. Method

This study used a mix method approach, combining bibliometric methods and a literature review (see Figure 1). This analysis makes use of data from international publications with the keyword innovation management theory from 2012 to 2022 (see Figure 2), which were gathered via web scraping and sourced from the Scopus database (www.scopus.com).

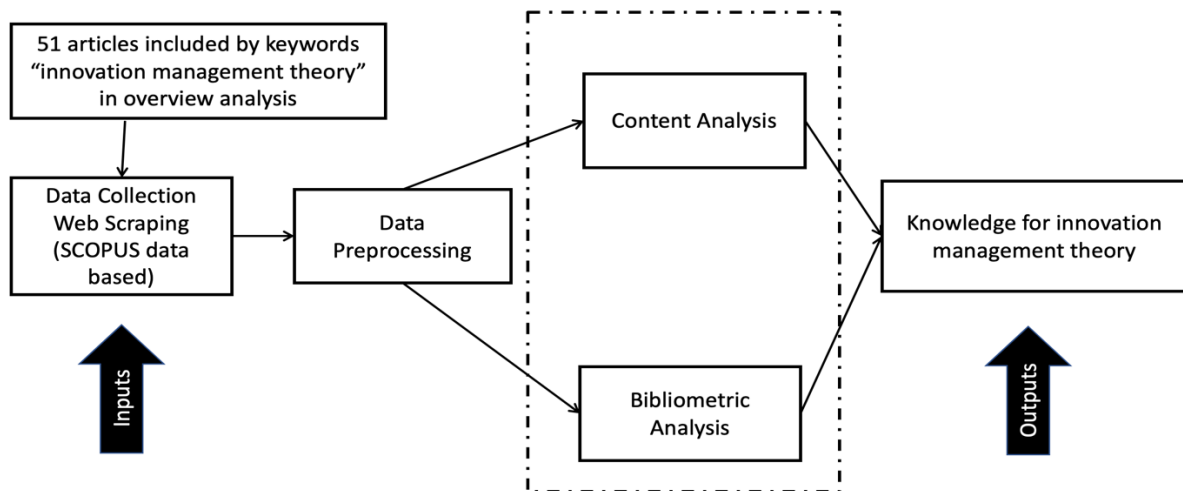


Figure1. Literature review and bibliometric flow chart. Source: The author's own study, 2022

Litmaps was also used to analyze data on the number of publications per year, journals containing articles, authors, and subjects. Furthermore, VOS viewer software is used to analyze the development trend of international publications, which is followed by qualitative content analysis. VOS viewer is bibliometric network construction and visualization software. Individual journals, researchers, or publications, for example, can be included in these networks, which can be built on citations, bibliographic aggregations, co-citing, or co-authoring relationships. VOS viewer also includes text mining functionality for creating and visualizing co-occurring networks of key terms from scientific literature.

4. Result and discussion

4.1 Corpus profile

Figure 2 depicts the number of articles used in this study in accordance with the context. According to the review, studies related to innovation management theory grew steadily from 2012 to 2022. Despite the fact that its popularity has not been as widespread as that of other topics. However, the distribution trend indicates that this topic is beginning to attract the attention of academics and researchers from various fields. Although there was a 60 percent decrease from 2012 to 2013, or from three articles in 2012 to one in 2013. This trend, however, increased again in 2014, with three articles, or by 60%. Meanwhile, in 2015, there was a 60 percent increase to a total of 5 articles. The following year, the increase was 80 percent, or a total of 9 articles. The decline continued in 2017 and 2018, with only 5 and 4 articles published in each year. Meanwhile, the number of 5 and 6 articles per year in 2019 and 2020 can be said to have plateaued. The year 2021 can be considered the most productive, along with 2016, when the number of articles in this context reached nine. In 2022, however, because this data was collected at the beginning of the year, only 1 article was discovered. Even though it appears to be fluctuating, research trends in this field are generally stable. The figure below depicts the distribution of literature on the topic of innovation management theory.

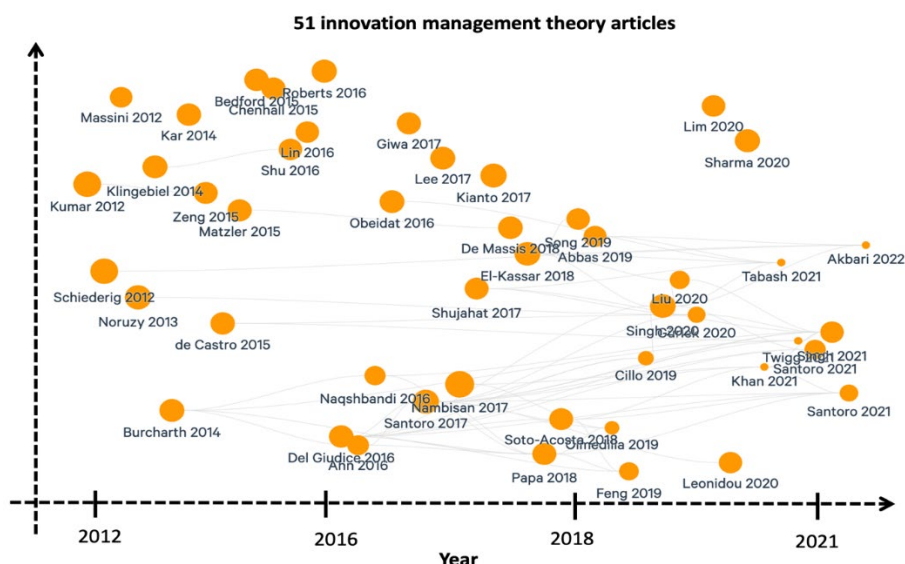


Figure 2. Distribution trend of scientific literature innovation management theory for the period 2012-2022.
Source: The author’s own study, 2021

Figure 2 shows that research on innovation management theory continues to be a popular topic among academics. At least as evidenced by a consistent distribution year after year. However, based on the network of articles, it is clear that no researchers or articles dominate the scope of research related to innovation management theory. Nodes or circle illustrations in each article are fairly uniform in size, though some appear larger than others but are not significant. Some references have a relationship or cite each other, demonstrating the relationship between the articles. This relationship demonstrates that this scope is discussed on a regular basis. This correlation is critical for an issue in order for it to be studied thoroughly and integrated from various perspectives or fields of science.

4.2 The current trend of innovation management theory research

Furthermore, the content of the articles or references used will be examined, particularly in terms of title and context. During this phase, the entire literature will be treated as a text or corpus, which will be analyzed and classified based on topic and context. This review employs DTM as the output of the text mining process, which is visualized and analyzed qualitatively using VOS viewer.

4.3 The latest journal in the scope of innovation management theory

Based on Scopus data, 51 publications were obtained based on search results for the keyword innovation management theory with the categories of article title, abstract, and keywords from 2012 to 2022. The Journal of Business Research, Journal of Creating Value, European Management Review, and Boletin Tecnico/Technical Bulletin have the most publications, with each publishing up to two articles referencing innovation management theory. Table 1 displays research on the development of innovation management theory published in the four most prestigious journals.

Table 1. Top 4 latest journals in the scope of innovation management theory for the period 2012-2022.
Source: The author’s own study, 2022

No.	Journal	Number of articles
1	Journal of Business Research	2
2	Journal of Creating Value	2
3	European Management Review	2
4	Boletin Tecnico/Technical Bulletin	2

Table 1 shows that the majority of the journals that discuss the issue of innovation management theory extensively are journals with a background or scope in business management and even engineering. According to the data, there is no dominant journal or publisher that discusses the topic of innovation management theory. This means that research in this area is still dispersed across different journals or publishers. The findings of this review are

intriguing in that innovation management, whether in theory or in practice, is frequently discussed through various scientific backgrounds.

4.4 Comprehensive network analysis of innovation management theory research

During this session, all articles will be bibliographically analyzed using the VOS viewer tool. The network and density of articles will be visualized in this analysis. Figure 3 shows that the development map of the innovation management theory topic area from 2012 to 2022 can be divided into 12 clusters based on co-word analysis.

Cluster 1 is colored red and contains 22 topic items such as action, actor network theory, bridging contemporary trends, business performance, collaborative innovation, conceptual contribution, design theory perspective, empirical analysis, founder management, from description, fuzzy set qualitative comparative, innovation management, invention phase, knowledge, management innovation, minitruck introduction, planned behavior, practice, project, responsible research, and technological innovation. Cluster 2 is shown in green, and it contains 20 topic items such as business service, challenge, complexity theory perspective, construction, creative management, customer relationship management theory, geography, innovation, intelligent, high-speed, railway, knowledge management theory, ma theory, management, modern organization, offshoring, operation management, organizational, property service enterprise, research, solid waste management industry, and sys The blue cluster 3 includes 13 topic items such as barrier, diffusion, disease management information system, driver, foundation, higher education, Indonesian start, innovation theory, service management adoption, lesson, management system feature implementation, prevalence, and use. Cluster 4 is yellow, and it contains ten topic items such as collaboration, evolutionary theory, learner, learning, learning management system, natural resource management, perception, role, teaching, and stakeholder understanding.

(Figure 3)

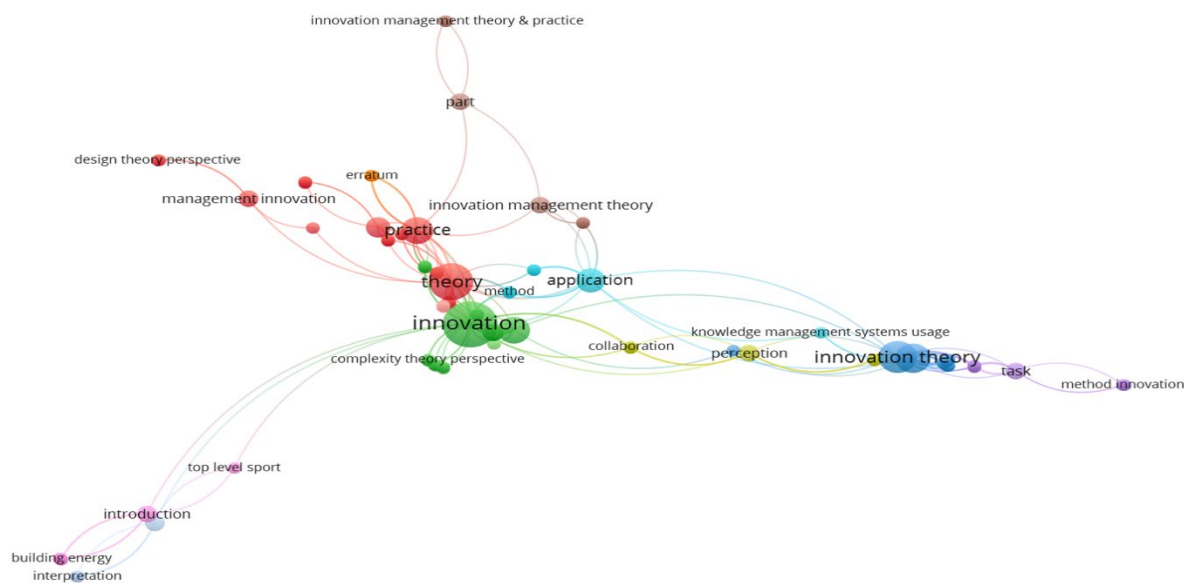


Figure 3. Text network analysis of innovation management theory research.

Source: The author's own study, 2022

Cluster 5 is purple, and it contains nine topic items: emergency care service, eye, method innovation, modern management theory, nurses' perception, pain management protocol, research object, rogers, and task. Cluster 6 is light blue and includes eight topic items such as agricultural innovation platform, application, developmental management, entrepreneurship, improved irrigation scheme management, knowledge management system usage, method, and southern Africa. Cluster 7 is orange, and it contains seven topic items: erroratum, forward, future, journal, new knowledge, innovation theory, and product innovation management. Cluster 8 is pink, and it contains seven topic items: decision support, innovation management theory, innovation management theory & practice, new fourth generation, parts, transportation infrastructure, and triz.

Cluster 9 is purple, and it contains six topic items: building energy, conflict, environment management system innovation, introduction, top level sport, and triz theory. Cluster 10 is pink and contains five topic items: behavioral effect, deviance, deviation, lens, and management control. Cluster 11 is green, and it contains five topic items: management control, finding, global entrepreneurship, mra sem, and qca theory creation. Cluster 12

is light blue in color and contains five topic items: internet financing, interpretation, management theory, managerial innovation, and perspective.

Figure 4 depicts the network analysis results, which revealed that the correlation between nodes was divided into eight network clusters. Inner cores are clusters with a high frequency of occurrence of nodes and heavy edges. This cluster represents a visual representation of the most frequently discussed issues in the field of innovation management theory. An outer core, on the other hand, is a cluster with a low frequency of node occurrence and a small edge weight. This cluster represents the issues that have received the least attention in the literature on innovation management theory.

This review also demonstrates that the weights of nodes and edges in the inner core network vary, as indicated by the size scale of circles and connecting lines. The greater the weight or degree, the thicker the line connecting the two nodes and the larger the circle. Nodes and edges on a large scale are issues that are frequently discussed and are the essence of the topic of innovation management theory. This visualization is emphasized by labeling each node, as indicated by the identity token. These tokens or nodes represent issues that have received a lot of attention in the literature.

According to the definition, innovation management is a combination of innovation process management and change management. This concept is typically linked to a company's products, business processes, and innovations (Miller, W. L. 2015; Miller, W. L. 2016). As a result, the above network analysis visualization is contextually related to the application or implementation of innovation management theory. As a result, some of the nodes that appear are terms that are commonly used in the context of innovation management theory.

The VOS viewer tool also provides density-based analysis visualization. This means that based on the color density in the visualization area, this illustration will make it easier to identify the contexts that are most frequently studied.

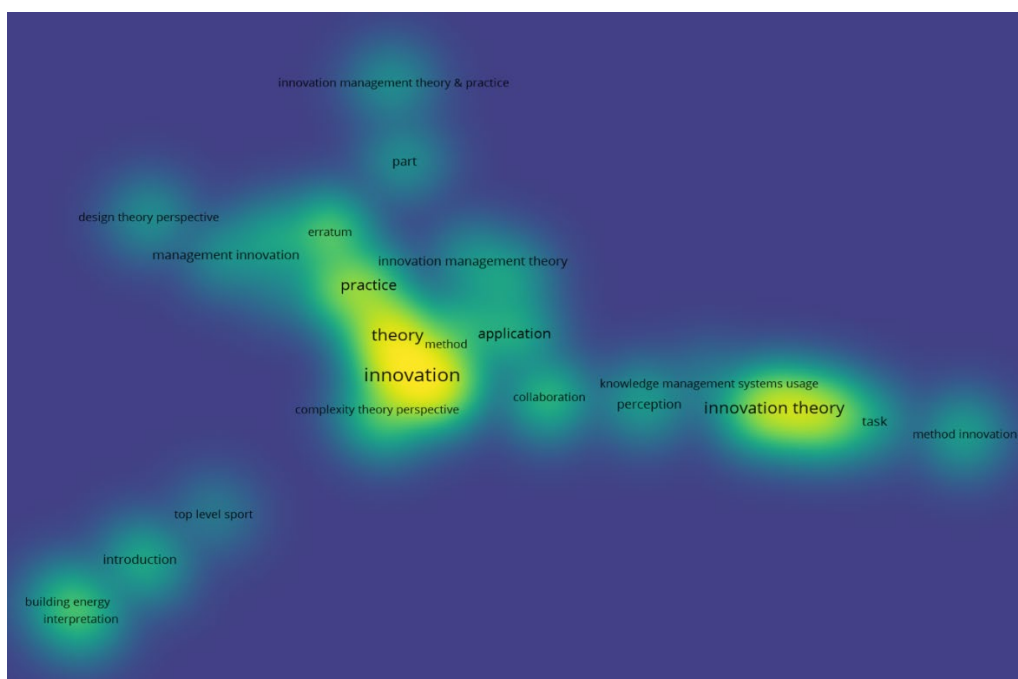


Figure 4. Density analysis of innovation management theory research.

Source: The author's own study, 2022

The review provides some critical information that can be classified into at least four major issues. First, based on the research location, it is noteworthy that the majority of the countries that have served as research sites over the last ten years are developing countries in southern Africa and Indonesia (Sipahutar, R. J., Hidayanto, A. N., Rahardja, U., & Phusavat, K. 2020; Van Rooyen, A. F., Ramshaw, P., Moyo, M., Stirzaker, R., & Bjornlund, H. 2017). Meanwhile, based on the research approach used, the results of data analysis show that the majority of the research employs an empirical study approach and a case study. Although some studies are more theoretical in nature, such as the development and design of theories (Böhl, D., Hoffmann, D., and Ahlemann, F., 2016; Lenfle,

S., Le Masson, P., and Weil, B., 2016). Comparative analysis and causal relationships are two examples of research methods used. In this field, descriptive qualitative methods are still the most used approach (Ma, C. A., Xiao, R., Chang, H. Y., and Song, G. R., 2022). Although quantitative methods, particularly the SEM, MRA, and QCA methods, are still widely used.

Third, in terms of context or research scope, studies related to management, business, economics, finance, environment, infrastructure, geography, and technology predominate. Fourth, according to the review's findings, frequently raised issues include actor network theory, business performance, collaborative innovation, innovation management (Ghorbani, M., and Lames, M., 2016; Wu, C. W. 2016; Midler, C., Killen, C. P., and Kock, A. 2016), responsible research, technology management, business service, creative management, customer relationship management, intelligent, railway, modern organization, offshoring, operation management, property service enterprise, solid waste management industry, collaboration, learning management system, natural resources management, perception, role, emergency care service, nurses' perception, pain management protocol, agricultural innovation platform, application, entrepreneurship, improved irrigation scheme management, management systems usage, transport infrastructure, building energy, conflict, environment management system innovation, top level sport, and internet financing.

This study confirms that the visualizations that appear in network analysis are representations of issues that are frequently discussed based on the topics that are frequently researched. However, this review does not argue that low frequency is a minor issue. On the other hand, perhaps these issues (the outer core) are under-researched areas of study or approaches that are rarely used. This cluster may require additional attention in future research.

This study formulates comprehensively and systematically the clusters of knowledge that are frequently used to support studies related to innovation management theory, based on the contextual framing of network analysis and supported by various innovation management theory literature. The findings of the analysis are shown below.

Table 2. Perspectives and variables on the concept of Innovation management.
Source: The author's own study, 2022

Main Concept	Innovation management theory			
Perspective	Management	Business, economics, and finance	Environment and geography	Infrastructure and technology
Variable	Collaborative innovation, innovation management, creative management, customer relationship management, intelligent, modern organization, operation management, collaboration, and learning management system.	Business performance, business service, property service enterprise, entrepreneurship, and top-level sport.	Solid waste management industry, natural resources management, agricultural innovation platform, improved irrigation scheme management, management systems usage, and environment management system innovation.	Technology management, railway, application, transport infrastructure, building energy, and internet financing.

Table 2 shows that the review discovered at least four major perspectives that were commonly used when discussing innovation management. However, this does not imply that no other perspectives are used in addition to these findings. Of course, many unexplored perspectives remain unexplored because they are not dominant perspectives. Furthermore, this analysis discovers that the contexts that are frequently discussed are interdisciplinary or multidisciplinary issues. This means that when discussing an issue, a study will typically employ more than one viewpoint. One example is how the issue of internet financing in innovation management is approached from both a financial and technological standpoint.

5. Conclusion

Based on the findings and discussion of this study, it is concluded that the highest growth development in the topic field of innovation management theory occurred in 2021 and 2016, with a total of 9 articles, from 2012 to 2022. Furthermore, the review reveals that most of the journals that discuss the issue of innovation management theory extensively are business management journals. According to the findings of this study, there is no dominant

journal or publisher that discusses the topic of innovation management theory. This means that research in this area is still dispersed across different journals or publishers. Furthermore, development maps are classified into 12 clusters based on co-occurrence and keywords. This review, on the other hand, abstracts research trends in innovation management theory into four major issues. To begin with, the research locations for the last ten years have been several developing countries in southern Africa and Indonesia. Meanwhile, based on the research approach used, the results of data analysis show that most of the research employs an empirical study approach and a case study. Although some studies are more theoretical in nature, such as the development and design of theories. Comparative analysis and causal relationships are two examples of research methods used. In this field, descriptive qualitative methods are still the most used approach. Although quantitative methods, particularly the SEM, MRA, and QCA methods, are still widely used. Third, in terms of context or research scope, studies related to management, business, economics, finance, environment, infrastructure, geography, and technology predominate. Finally, this study discovers that at least four major perspectives are dominantly used when discussing innovation management. However, this does not imply that no other perspectives are used in addition to these findings. Of course, many unexplored perspectives remain unexplored because they are not dominant perspectives. Furthermore, this analysis discovers that the contexts that are frequently discussed are interdisciplinary or multidisciplinary issues. This means that when discussing an issue, a study will typically employ more than one viewpoint. The scope of the articles used, which were sourced from the SCOPUS database, is the research's limitation. In the future, it is strongly advised to conduct research using a broader literature source. Furthermore, the findings of this study can be used as hypotheses, and comprehensive and systematic follow-up research is being conducted. The findings of this study are expected to serve as a resource for academics interested in studying innovation management.

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