

DRIVING BUSINESS GROWTH: UNVEILING THE POWER OF INNOVATION MANAGEMENT THROUGH BIBLIOMETRIC ANALYSIS

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Abstract

Research background: Every business activity involves the business environment. The faster rate of technology development has an impact on innovation management roles within the company as well as innovation approach methods. For these reasons, it is necessary to analyze innovation management in individual countries because it includes decisions made and actions done in relation to creating and implementing an innovation strategy. Every business operates in a certain atmosphere that is dynamic and has a constant impact on the business. Therefore, it is important to analyze and predict the development of the business environment.

Purpose: The aim of this paper is to specify and identify the development of scientific articles dealing with innovation management and processes that are closely related to the topic of innovation.

Research methodology: Within this study, through quantitative-mathematical bibliometric analysis, the prevalence of innovation and innovation management in scientific articles is analyzed.

Results: The results of the research point to the fact that dealing with innovation management and innovation processes in the corporate environment has its importance not only in the present, but also in the past because authors' pointed out in their scientific studies the need for continuous progress, namely in a linear course with the development of science.

Novelty: The examination of innovations is frequently a complex phenomenon that needs to be investigated within the particulars of a given country, which is one of the study's limits. The amount

of money spent overall on research and development (R&D) and the level of support for innovation vary per nation. The added value of the study consists in a comprehensive analysis of scientific articles dealing with the topic of innovations, their development and importance in business processes.

Keywords: innovation management, innovations, bibliometric analysis

JEL classification: F63, O30, O31

Introduction

Living in an era of significant and swift change is evident from experiences in everyday personal, economic, and organizational contexts. The process of innovation is being drastically altered by the emergence of big data, the Internet of Things, artificial intelligence, and other technologies (Bartoloni et al., 2021). Innovation management is the process of overseeing an organization's innovation strategy from the earliest stage of ideation to the last, effective implementation. It comprises choices made, and actions taken in connection with developing and putting into practice an innovation strategy (Tirmizi et al., 2020). There are many definitions of innovation that are used in business, academia, and the creation of products and services, among other domains. The capacity for innovative and creative problem-solving is embodied by invention, often known as inventiveness or ingenuity. Since invention is the fundamental driving force behind all innovation, it is essential to the discipline of innovation management. A useful instrument for guaranteeing the execution of particular innovations and their successful alignment with the main objective of meeting the needs of interested entities is innovation management and the complicated management of innovation processes in business organizations (Tohidi, Jabbari, 2012; Magnanini et al., 2023). One of an organization's most vital goals should be innovation, which plays a crucial part in the growth and coordination of the market. Innovations can be applied to any field, including work execution techniques, management strategies, and product development (Somale, 2021; Agustia et al., 2022). Innovation processes should be established appropriately and efficiently in every organization, from the point of inception to the point of execution (Peschl, 2023). The organization gains insight into its strengths and weaknesses and can better position itself for future market opportunities by conducting analyses of the effects of innovations, whether they manifest as

impacts on business performance or as innovation performance (Navas, 2018; Anderson et al., 2014).

The paper is divided as follows: The significance of innovation in the business environment is discussed in the introduction section. The literature review section discusses and summarizes the value of innovation, particularly in light of the modern, globally interconnected world. This section also presents definitions of different types of innovations, their connections, and their importance in the management of effective business processes. The Data and Methods section presents data selection and uses a bibliometric analysis. In the results section, the individual outputs provided by the bibliometric analysis are described. The discussion section compares the results of the study with other studies that dealt with the topic of innovation management and its development within scientific databases. The conclusion part describes a summary of crucial findings and future challenges and limitations that directly affect the study.

1. Literature Review

The definitions of innovation have changed during successive investigations, and there is no unequivocal approach to a uniform definition of innovation. Innovation research is important because it is an important source of competitive advantage for businesses (Spieth et al., 2025; AlMalki, Durugbo, 2023). The field of organizational innovation research began in the late 1960s, with researchers primarily focusing on innovation diffusion and centralization in organizations (Snihur, Bocken, 2022; Guidolin, Manfredi, 2023). According to the study by Benoni and Novoa (2023), methods for business innovation have become popular, but there are still research gaps about their true potential. Five key themes are identified: the creation of technological differentiation; subsequently, how innovation management methods help in the implementation of business innovation strategies; how ideas can be translated into a concept for innovation in business activity; the impact of research on innovative business; and the contribution of specific organizations and workers in the introduction of new methods in the implementation of innovative business (Robertson et al., 2023). In addition, six factors were identified that determine the effectiveness of design methods: organizational culture, resources, capabilities, industry dynamics, competition, and legislation. In this context, it is necessary to mention the concept of innovation ability. Innovative ability is the ability to develop new ideas so that innovation is created, applied, and effectively controlled in achieving company goals (Fernandez, 2023; Endres et al., 2022). In general, however, according to the authors who

have addressed the topic of innovation, it is possible to distinguish the following definitions as shown in Table 1.

Table 1. Definitions of different types of innovation

Author	Definition
Porter (1990)	The innovation process should be seen as a process using new knowledge, technologies to create new products as well as improved current products
Nelson and Rosenberg (1993)	An invention can become commercially usable and successful only after a sufficiently long time has passed since its discovery. Based on this definition, the successful dissemination of a process or product is necessary in order to be characterized as an innovation
Trommsdorff and Steinhoff (2009)	Innovation is understood as a new type of corporate subjective object (product or process), which does not just need to be invented but must be established in the internal environment, but especially in the external environment on the market
Wright (2010)	Innovation represents the successful use of new ideas to increase customer value or create wealth for society
Fayomi et al. (2019)	Technological innovation is the process by which organizations realize the design and production of goods and services that are new to them, regardless of competing entities. It is a new or improved product or process, the technological properties of which are significantly different from the previous product
Markus and Nan (2020)	Digital innovation is a continuous process that can improve the customer experience, internal systems, and business models. They are implemented using advanced technologies, including artificial intelligence (AI) and big data analysis
Kochetkov (2023)	Innovation consists not only of the development of a new product or the commercialization of inventions but also of humanitarian, social, and institutional tendencies. Due to the adoption of new products by consumers, their habits and attitudes change
Mahavarpour et al. (2023)	Service innovation emerged more than ten years ago and is considered the main source of competitive advantage between the market and firms. It now includes the use of digital and technological innovations that offer a satisfying customer experience. The main focus of any innovation should be to make the process simple and less time-consuming for customers

Source: own research.

However, innovation is a broad concept and includes a number of other definitions. A substantial number of definitions of innovation are utilized in a variety of contexts, including but not limited to the academic world, the business world, the government, and the administration of services. When it comes to investigating, analyzing, and reporting on a phenomena that is both complex and multidimensional, the innovation literature is a fragmented corpus, and researchers from a wide range of disciplinary backgrounds employ a variety of definitions (Spieth et al., 2025; Costa et al., 2023; Mendoza-Silva, 2021).

According to Eurostat (2018), “an innovation is a new or improved product or process (or combination thereof) that differs significantly from the unit’s previous products or processes and that has been made available to potential users (product) or brought into use by the unit (process)”. The development of new products, services, manufacturing processes, or business models is an example of innovative entrepreneurship. This type of entrepreneurship is essential for the growth of businesses, industries, and economies, and it is also a significant factor in determining the well-being of society (Bradley et al., 2021). The process by which novel concepts are transformed into something of value in the real world is known as innovation (Stauffer, 2015). The adoption of a new or significantly enhanced product (goods/service) or process (method/practice/relationship) is what we mean when we talk about innovation (Kline and Rosenberg, 2010). According to Waite (2013), the process of creating and implementing new processes, products, services, and methods of delivery that result in significant improvements in outcomes, efficiency, effectiveness, or quality is referred to as innovation. Innovation is essential for organizations, serving as a primary catalyst for corporate growth and long-term sustainability.

Globalization, heightened competitiveness, rapid technology advancement, and other swiftly evolving environmental factors pose additional challenges to organizations’ innovation management. Although innovation is essential for maintaining a competitive edge and fostering future growth, various innovation concepts and methodologies contribute to the heightened complexity of innovation management (Brand et al., 2021; Marion, Fixson, 2021). Innovation management is a methodical approach to the planning, administration, and control of innovation processes within organizations. Its objective is to enhance the enterprise’s competitiveness and performance by effectively converting novel concepts and ideas into commercially successful products, services, or processes. According to Di Vaio et al. (2021), innovation management is a comprehensive system of knowledge that enables the effective management of the innovation activities of enterprises. This system encompasses all scientific, technological, organizational, financial, and business processes that contribute to the successful implementation of innovations. Innovation management encompasses a variety of activities, including the identification of opportunities for innovation, the development of new products or services, the enhancement of existing processes, and the implementation of new technologies. The efficient utilization of resources to attain established objectives, as well as the encouragement of creativity and collaboration among employees, are also significant components (Bigliardi et al., 2021; Kafetzopoulos et al., 2021). Innovation management encompasses the essential competencies of a director or leader in any organization, as it

enables organizations to achieve profitability and growth. In general, it can be argued that innovation management is the process of developing and executing a work plan with the objective of transforming inventions into successful innovations. Additionally, innovations can be regarded as inventions that have undergone modifications. By transforming innovations into a sustainable competitive advantage, they can generate additional value for their consumers (Dahlander, Gann, 2010).

According to Stratone (2023), human capital is a crucial element in innovation performance since employees' experience, knowledge, and abilities are essential in the ever evolving and fast-paced company environment. Making the best financial decisions involves giving careful thought to the capital structure, which is a complicated issue (Gajdosikova et al., 2023). An equally complex process must also be distinguished within the framework of the introduction of new innovations in enterprises. Companies are utilizing the phenomenon of digital transformation to increase the efficiency of their operations. Businesses, individuals, legislators, and other groups must all adopt this strategy (Civelek et al., 2023). Artificial intelligence must become more and more integrated into businesses and their innovation processes (Dabija, Vătămănescu, 2023). Globalization has made production more flexible to satisfy market demands, which increases data-driven competitiveness. This objective might be accomplished by integrating Industry 4.0 technology and autonomous production systems into organizational value chains and product design processes (Nagy et al., 2023). The skills and expertise of an employer's workers will determine their competitiveness in the knowledge-based economy of the future. Knowledge is therefore more valuable than cash, real estate, and labour (Barbier, Tengeh, 2023). Throughout human history, the concept of knowledge has been interpreted in a variety of ways due to its complicated semantics. With the advent of the knowledge economy and knowledge management, knowledge became a strategic resource for organizations, and its interpretation deviates from the corporate philosophy (Bratianu, 2023; Susanto, 2023). The business environment for small and medium-sized enterprises (SMEs) has undergone a significant transformation considering Industry 4.0 and the new aspects of Industry 5.0. The dynamic, technologically driven environment in which SMEs operate today offers previously unheard-of opportunities as well as difficulties (Lewandowska et al., 2023). It is evident that Industry 4.0 technologies – including blockchain, cloud computing, artificial intelligence, digital platforms, additive manufacturing, and Big Data analytics (Turek et al., 2023). The industrial sector is under growing pressure to raise customer satisfaction, cut expenses, and increase production. The industry now has more chances to address these difficulties thanks to the introduction of the Internet of Things (Frajtova Michalikova, 2023).

2. Data and Methods

After considering articles on innovation in organizations at different levels, with an emphasis on keywords related to innovation management, innovation in services, and innovation in product production, this study aimed to synthesize findings made over the past decades using a bibliometric approach, the so-called bibliometric analysis, which was the main research method of this study. The main goal of this study is to find out how comprehensively the issue of innovation in production, in services, and in innovation management is mapped within the scientific database. Searching for connections between individual authors, keywords, and countries in which scientific articles deal with this issue, as well as mapping in which categories of research the theme of innovation is most represented.

Bibliometric analysis is a quantitative method used to study and analyze publications and citations. It is a scientific discipline dealing with the measurement and quantitative analysis of documents conveying scientific knowledge. To achieve the main goal of the study, we used the basic methods of synthesis, analysis, induction, deduction, and comparison. The use of information and communication technologies has increased interest in bibliometric research because it allows for processing huge amounts of data and creating sophisticated scientific maps that are commonly used to display results (Durana et al., 2022). The first step in any bibliometric study is to decide on an appropriate database to use to retrieve relevant documents. Historical trends in certain scientific fields can be explored using publications, bibliographic citations, and references. This makes it possible to reveal often unknown connections between different scientific fields, authors, or topics and to illustrate these connections. On the other hand, we can use bibliometric techniques to determine the most current areas of scientific research or the speed with which they become obsolete (Van Eck et al., 2010). The creation of a data set for the study using bibliometric analysis begins with publications that were specifically focused on the field of innovation management or innovation in the business environment from its inception to the present (1968–2023). This time horizon is essential to accurately determining the latest trends in this area. As part of the research, scientific articles and conferences related to the issue of innovation management in the business environment were accepted, while we considered only the scientific database of the Web of Science (WoS) articles.

VOSviewer is a software tool for creating and visualizing bibliometric maps. For example, these maps may include scientific journals, research, or individual publications and may be created based on citations, bibliographic links, or co-authorship relationships. VOSviewer was used to create bibliometric maps based on the frequencies of co-occurrence of keywords

and phrases, using all of the considered articles that were retrieved from scientific journals. In visualizations, items are represented by their label and, by default, also by a ring. The color of an item is determined by the cluster to which the item belongs. The lines between items represent links. The more prominent the line, the stronger the relationship between the items. There are two standard weight attributes, referred to as the link attribute and the total link strength attribute (Van Eck, Waltman, 2020). Different colors are used to identify clusters of terms; the same color means that terms in a cluster are more closely related than terms in different clusters. An item can belong to only one cluster. Items can have different attributes. The investigation was conducted using articles that were found in the Web of Science (WoS) database, yielding intriguing results.

3. Results

The capacity of businesses, policymakers, and researchers to foster and implement innovations is a determining factor in their ability to adapt to evolving market conditions and ensure sustainable development. A treemap visualization (Figure 1) of scientific publications identifies the primary research domains relevant to innovation studies. The most significant segment is attributed to Management (39.17%), which underscores the strategic, operational, and leadership aspects of innovation within organizations. The subsequent segment, Business (23.93%), underscores the significance of entrepreneurship, market adaptation, and business model transformation in fostering innovation. Economics (approximately 7.0%) is also a significant field that investigates the macroeconomic and microeconomic implications of innovation, including its impact on productivity, employment, and economic growth. The concentration of Industrial Engineering and Operations Research and Management Science %) is on process optimization, technological advancements, and efficiency enhancements in innovation-driven industries.

Sustainability and environmental concerns have garnered significant attention in recent years. The increasing significance of eco-innovation and sustainable development is underscored by the disciplines of Environmental Sciences (approximately 5%), Environmental Studies (approximately 6%), and Green Sustainable Science and Technology (4.3%). This change represents the growing need for innovations that address global environmental challenges, promote circular economy models, and enhance resource efficiency.

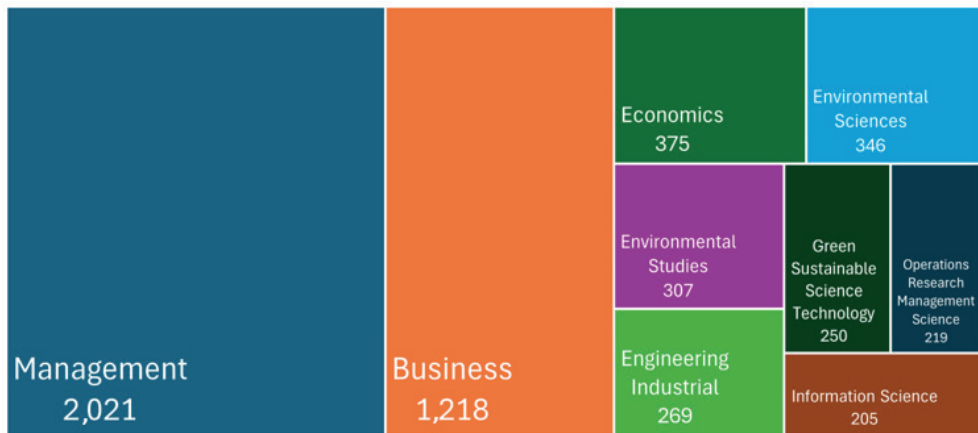


Figure 1. The number of scientific articles published in the Web of Science

Source: own research.

Innovation is frequently the outcome of international collaboration, with countries that have a greater number of research connections generating more innovation. The visualization of collaborative scientific networks can be directly linked to innovation research, as it shows how countries are connected in the field of scientific collaboration. Figure 2 presents the cooperation between individual countries. The articles were taken from the WoS database and analyzed for nations where at least ten documents had been published. Out of all 147 countries in the data set, only 76 countries published at least 10 documents. According to the bibliometric map, six different clusters were formed. Compared to all of the analyzed countries, the strongest publication link (35.14) is between the USA and Germany, where innovation, innovative management, and innovative growth play a significant role in economic development.

The most patents and technological innovations are also found in the largest research centers (China, USA, England, and Germany), indicating a direct correlation between scientific production and innovation output. This network's dominance by China may suggest a significant investment in research and development, as evidenced by its accelerated innovation growth, particularly in the areas of technology, artificial intelligence, and eco-innovation. The United States, as well as countries like England and Germany, have been at the forefront of innovation for a long time. Additionally, their robust academic connections suggest that there are effective connections between science and industry. The connections between Spain and Latin America may indicate a potential exchange of knowledge in the field of social and environmental innovation, as Latin America becomes more involved in the circular economy and sustainable solutions.

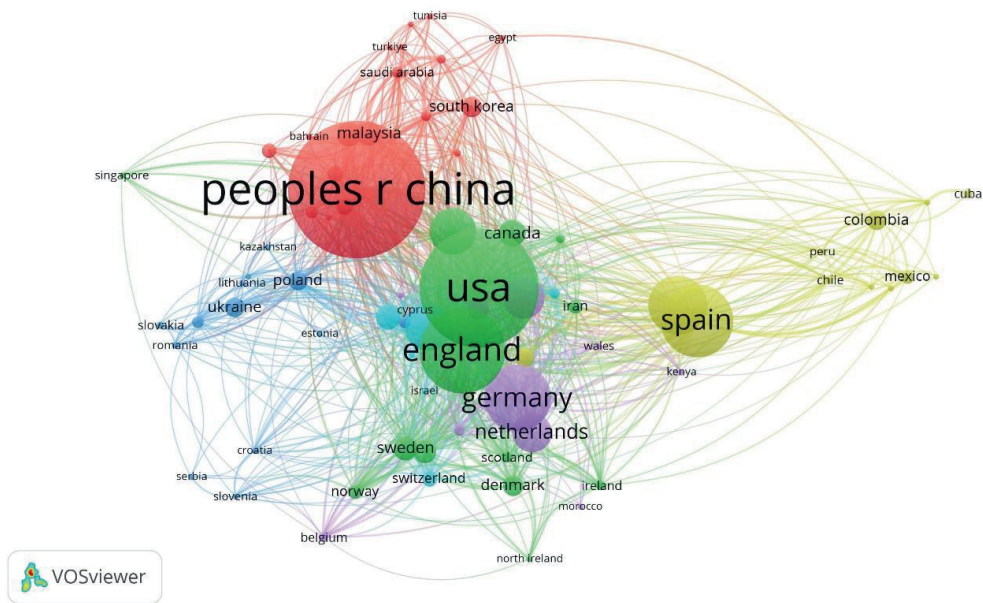


Figure 2. Bibliometric map of countries

Source: own research.

Figure 3 is focused on keywords that are closely related to the issues of innovation management and innovation in business entities. Out of 13,302 keywords, 70 met the limit of the minimum number of occurrences of the keyword, which was set at 10. In this instance, four clusters are recorded. Group 1 (red) provides an overview of terms including innovation, strategy, performance, business innovation model, sustainability that are associated with the issue of innovation management. The blue cluster includes organizational innovation, business, product, and the concept of knowledge management which is increasingly used in today's world. This is mainly because the role of knowledge has been highlighted. The cluster highlighted in green deals with firm performance, product innovation, dynamic capabilities, market orientation and more. The khaki color indicates a cluster that includes exploration, networks, open innovation and research-and-development.

The terms “performance” and “innovation” are shown to have a significant connection, which suggests that effective inventions have a direct influence on the performance of businesses. The concepts of “management” and “business model innovation” highlight the significance of business models in the process of putting ideas into action. “Sustainability” and “green innovation” signify the increasing significance of ecological advancements. “Networks”

and “open innovation” highlight the significance of collaborations between enterprises and research institutions in fostering new inventions.

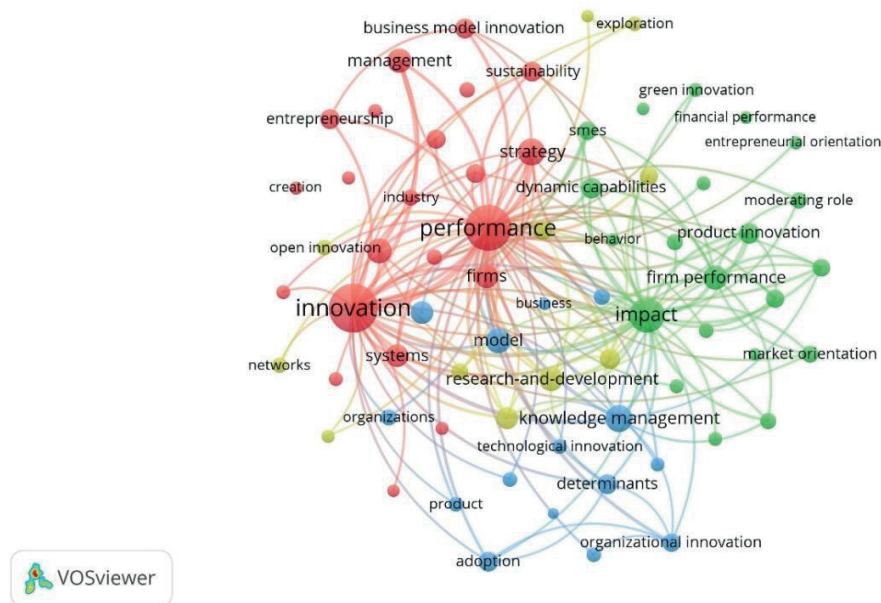


Figure 3. Bibliometric map of keywords

Source: own research.

Figure 4 shows how the importance of keywords associated with innovation and innovation management changes over time. It shows that the topic of innovation and innovation management did not develop only in the current period. Based on the graphic representation, it is possible to notice that the most keywords discussed in the issue of innovation management are in the period from 2016 to 2018, while the size of individual clusters also indicates the importance of individual keywords. The evolution of innovation research has advanced from fundamental technical breakthroughs (2017) to strategic management and corporate performance (2018–2019), culminating in ecological innovations and business models (2019–2020). Since 2019, green innovation and sustainability have emerged as prominent study domains, reflecting the increasing need for environmentally focused inventions. Business models and financial outcomes have emerged as significant subjects in recent years, reflecting the economic effects of innovations. Traditional topics such as “innovation,” “networks,” and “R&D” continue to have significance, however study is increasingly oriented towards their practical implementation.

The growing focus on green innovation and sustainable business models indicates that future research should persist in examining the convergence of innovation and environmental accountability. Policymakers and business leaders may use these findings to build legislative frameworks and corporate strategies that promote responsible innovation.

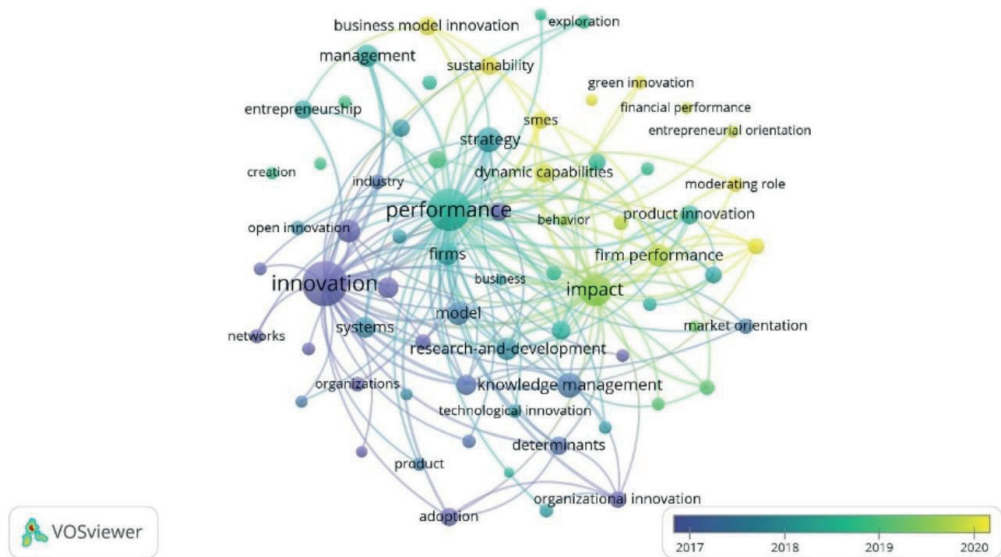


Figure 4. Time visualization of keywords

Source: own research.

The progression of innovation research indicates a shift from basic technical developments to a comprehensive strategy that integrates strategic management, business performance, and sustainability. An early study concentrated on the mechanics of innovation, but subsequent studies highlight its use in tackling modern issues including environmental sustainability and financial feasibility.

4. Discussion

The results of our research point to the fact that dealing with innovation management and innovation management in the corporate environment has importance not only at present but also in the past. In their scientific studies, the authors pointed out the need for constant progress, not only in a linear course with the development of science and scientific disciplines but also with scientific and technical progress and the massive spread of computerization and

digitization. In the past, innovation was considered rare, random, and occurring only in the most advanced economies; now it is considered essential for all countries' economies. In terms of the core literature, the two key fields of research are business management and economics followed by environmental sciences and environmental studies (Albareda, Hajikhani, 2019). The fundamental pillars of the digital innovation literature were determined to be innovation structure, innovation technology, and innovation strategy using a methodical literature study and bibliometric analysis approach (Cheng et al., 2023). Based on the analysis of cocitation and cokeywords, six primary research directions in the domain of technology and management innovation have been identified: design-manufacturing integration, innovation systems, open innovation, industrial process innovation, business model innovation, and innovation policy (Huang et al., 2019). The study's findings by Salam et al. (2020) indicate that the number of publications increased after 2008. Consequently, it is assumed that yearly publications will continue in their upward trajectory. The USA and Germany have a greater frequency of research publications, whereas the UK has robust international cooperation. Terms such as inventive activity, innovative management, comprehensive innovation management, management innovation, and innovation development are prevalent in the study of innovation management.

A study by Peng et al. (2021), also focusing on a bibliometric analysis of scientific articles related to innovation in enterprises, identified a knowledge framework for innovation research from 2000 to 2020 within three levels (individual, team, and organizational). The study reported that the total number of publications indicates an overall increasing trend at all three levels and the main position of research at the organizational level among these three levels. A high number of scientific articles in this field have been published in countries such as the United States of America, China, and the United Kingdom. The integration of digital technologies is the basis for the development of sustainable models in production and consumption, and innovation processes are an integral part of this process. These processes are the result of the convergence of digital technologies with various sectors, including medicine, biotechnology, agriculture, energy, education, mobility, logistics, manufacturing, and others (Kogabayev, Maziliauskas, 2017). Researchers have been interested in innovation management inside small enterprises for several years. One explanation is that innovation in SMEs occurs differently than in large corporations. Small enterprises encounter a resource constraint that diverges from that of major corporations. Effectively managing the innovation process is a significant problem for small enterprises in high-technology sectors that must innovate to survive (Dossou-Yovo, Keen, 2021; Al Naqbia et al., 2020; Boiko, 2022).

The study by the author Belanova (2021) indicates that knowledge creation, knowledge diffusion, and knowledge impact have a significant impact on innovation performance in different market economies. However, innovations in the business environment are influenced by several external factors. One such factor was the COVID-19 pandemic, which changed the world in an unprecedented way. Research and innovation have proven to be an essential part of not only the proper functioning of businesses but also of society. An increase in the number of studies on service innovation in SMEs has become a reality in academic and professional settings. The need to assimilate processes in service innovation is essential in the context of small and medium enterprises (De Oliveira Sousa, 2020).

Conclusions

Through the application of the quantitative-mathematical method (bibliometric analysis), the following information was discovered. The most scientific publications in the WoS database related to innovations, innovation management, innovations in production, and services in the subject area were recorded in the categories of Management and Business compared to all of the countries analyzed, the strongest publication link is between the USA and Germany. In Germany, this trend is also noted because the strength of the German automotive industry lies in high-quality engineering and innovation based on technological progress. The topic of innovations and innovative management did not develop only in the current period. Research on innovation reveals a transition from fundamental technological advancements to a holistic approach that encompasses strategic management, corporate performance, and sustainability. Initial research focused on the mechanics of innovation, but later studies emphasize its application in addressing contemporary challenges such as environmental sustainability and financial viability. The highest number of patents and technical breakthroughs is concentrated in the main research centers (China, the USA, England, and Germany), demonstrating an association between production and innovation output.

Among the limitations of this study is the fact that the analysis of innovations is often a complex phenomenon that must be investigated within the specifics of a given country. In each country, the support for innovation is different, and the total expenditure on research and development (R&D) is also different. Moreover, the interpretation of performance from bibliometric indicators may vary depending on the dataset and the specific composition of each dataset. As a limitation of the research, it is necessary to mention the inclusion of only one WoS scientific database. However, it is important not to compare indicators that would be obtained

using different databases. Research is carried out only within scientific databases regarding the qualitative nature of the investigated phenomena. Considering future challenges, it appears to have the potential to explore different types of innovations, especially those to which can be attributed importance in recent years – innovations in the field of a circular economy and waste management.

Almost every business is undergoing a transformation. Companies need to expand to progress and prosper. Even if companies do not want to make changes, external changes and competitive pressure are likely to force them to make significant adjustments for a variety of reasons, including the social, political, and business environment. The purpose of innovation is much deeper than just creating more value for customers and a better competitive advantage for companies.

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