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Disclosure of Strategic Managers' Factotum: Behavioral Incentives of Innovative Business

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Abstract: Many kinds of research has suggested that innovation is positively linked to business performance and that it acts as an intermediary between organizational variables and financial performance measured by earnings achieved. Researchers worldwide have paid great attention to identifying and exploiting the main drivers of innovation management, which has led to many research articles that have adopted different approaches and identified several factors that are related to innovation. Nevertheless, there is some ambiguity about the critical behavioral factors for innovation. Therefore, this study aims to identify behavioral incentives, or key factors, that impact business innovation and financial stability, mainly in the field of strategic management, and to reveal the latest trend in corporate innovation policy by using bibliographic mapping. The purpose is to precisely define specific incentives that can influence the overall productivity and profitability of a business, and this list of innovation factors can be of benefit to a strategic manager in introducing or supporting innovative activities. The analysis is preceded by an in-depth study of publications from the Web of Science and Scopus databases and based on the VOS Viewer method (which is a mapping and clustering program for network data), the available keywords are analyzed, and then a list of incentives in strategic innovation is compiled.

Keywords: bibliometric analysis; business innovation; strategic and financial management; earnings; innovation factor

JEL Classification: M21; O16; O31; O32

1. Introduction

Undoubtedly, innovation is one of the most critical strategic and operational levels that is available to managers to create a competitive advantage. Wang (2018) suggested that there is a severe discrepancy between what the companies would like to achieve and what they gain from their investment in innovation. Conventional performance measurement approaches have had little impact on innovation management so far. Therefore, we analyzed some of the more relevant issues that many experts are dealing with innovation at the level of specification of individual factors. Above all, researchers have paid great attention to the identification and leveraging of key innovation management incentives at the enterprise level, leading to many research articles that have adopted different approaches and identified several factors that are related to innovation. Despite the vast amount of literature, there is a discrepancy in the identification of the critical factors of innovation and their implementation in an innovative culture within an enterprise (which is portrayed in the literature review), and it is therefore essential to address this issue.

The main aim of this paper was to reveal the latest trend in corporate innovation policy by using bibliographic mapping and to produce visual representations of mutual relations among all units of interest (e.g., key factors, keywords, and journals). The bibliographic mapping was focused on particular articles in selected journals that had been published in the reputable databases the Web of Science and Scopus, and it subsequently examined their significance concerning innovations in the company and identifies critical factors of innovation.

The purpose of this analysis was to highlight the importance of the determination of these factors and current trends that may affect the business, managerial, and especially, financial decisions.

Factors can be considered as interconnected networks that interact and work together to create value for an organization, which means that a missing factor can disrupt the system of interconnections and its functioning, thus hampering innovation (Lim et al. 2018). Analysis at individual levels, such as individual, team, and organizational, allows for the identification of innovation factors. Businesses have been relying on innovation for many years because it stimulates growth and sustainability. Innovations help companies to extend the development of new products or services as a result of new business opportunities (Wu et al. 2015). Without creating new products or services, it is difficult for businesses to maintain growth and stay ahead of their competitors (Schumpeter 1983). At the same time, an overview of the resources that are used by the company explains how the company develops its competitive advantage by the innovation capacity (Coff 1997). The resource-based view argues that a sustainable competitive advantage results from a unique set of resources that competitors cannot mimic (Barney 1991; Coff 1997; Rouse and Daellenbach 2002).

Innovation is an integral part of business. If innovation is not managed, it will be a big challenge for businesses to maintain a competitive edge and stay on the market. The economic success of companies depends on the innovation of their products and services (Tidd et al. 2013). They need to identify their innovative capabilities before they start participating in the management of innovation activities. It is vital that companies can measure their innovativeness, because something that is not measured cannot be controlled (Rejeb et al. 2008). By measuring innovation skills, businesses can change their business strategy (Cordero 1990). If the measurement is done correctly, companies can understand their current position and identify areas that need to be improved to expand future innovation activities (O'Regan et al. 2006).

A competitive environment creates an environment for companies that need new innovative products and services to succeed in the market. The importance of innovation has therefore been increasingly considered in business research, and the leadership styles of top managers are considered to be one of the most important factors that influence the creative behavior of employees and the innovative capacity of organizations (Jung et al. 2016). Innovation management is considered one of the most challenging aspects of current leaders (Oke et al. 2009). It includes not only the creative act of forming new ideas but also the targeted transformation of these ideas into useful products and services (Mumford et al. 2008).

The study consists of four parts. In the introduction, the importance and significance of the knowledge of the critical factors of innovation are mentioned, and then we analyze, in detail, the theoretical approaches of the innovation management. The third section depicts the methods that were used in the research paper, such as the VOS Viewer (a software tool for analyzing and visualizing scientific literature) and the analysis of the selected journals. The outcomes of the investigation and the detailed study are available in a list of innovative factors in the Results section. In the Discussion section, the possibilities of using processed data are portrayed.

1.1. Literature Review

Every business that wants to be successful in the long run needs an innovation management system so that it is not left to chance. Innovation management creates structures and framework conditions so that innovation potential can be systematically identified, and then ideas can be designed and successfully implemented. Managing innovation is necessary for determining the factors that

ensure innovation at each level in a company. Identifying key innovation factors at individual, team and organizational levels is an important goal, and a large number of articles from the Web of Science and Scopus databases were analyzed to identify them.

1.1.1. Individual Level

Several researchers have identified the individual level as one of the most important areas for innovation (Hammond et al. 2011; Anderson et al. 2004). Hammond et al. (2011) explored the impact of individual differences, motivation, and working qualities on workplace innovations within an individual level. Their meta-analysis showed that creative personality, openness, the complexity of work, autonomy, and role expectations have strong correlations with individual innovation. Intrinsic motivation, self-sufficiency, and creativity are positively linked to individual innovation.

Anderson et al. (2004) used a similar approach, suggesting that individual innovation requires a person to be capable (e.g., has some cognitive skills and personality characteristics) and willing (e.g., motivated and experienced) to be innovative (Giebels et al. 2016; Orth and Volmer 2017). Additionally, job characteristics such as autonomy and job requirements determine whether an individual will be involved in innovative behavior; that is, some individuals will leave the organization if they are dissatisfied, and others will try to change the situation (Schepers et al. 2016).

Additionally, the impact of psychological capital on innovative performance and stress is also essential. These issues were addressed by Abbas and Raja (2015), and their results showed that psychological capital is positively linked to innovative work performance and contrary to work-related stress. People with psychological capital were rated to show more innovative behavior, generate more support, and implement new ideas at their workplace. Bharadwaj and Menon (2000) also believed that individual creativity refers to the various activities that individual employees do to strengthen their ability to develop something meaningful and new to the working environment. In this respect, however, the responsibility of the organization introduces formal approaches, tools, and resources to promote creative behavior within the organization. Therefore, they concluded that the highest level of innovation performance was based on a combination of individual and organizational mechanisms of creativity.

Glynn (1996) stated that innovation is impossible in the absence of creative geniuses who initiate innovative processes and intelligent organizational systems that recognize and promote viable innovation. Internal motivation is seen as a necessity for creativity and innovation, and it is likely to have a stronger effect than external motivation. Motivational variables are necessary to have creative and original ideas and to apply them to organizational needs and challenges.

1.1.2. Team Level

Though many creative proposals come from an individual level, new ideas are generally implemented by working groups. Researchers have identified several team-level factors related to innovation in organizations. However, there are some variations in the extent and direction of the effects of these variables and the state of the literature on innovation at the team level, which is chaotic (Hülsheger et al. 2009). Nevertheless, some key variables have been described as necessary in most literature, such as factors that are related to the creation of an open and secure environment that allows for autonomy and proactive behavior. This case usually occurs in the socio-cultural context of a relatively lower power distance culture, where confidence can be more natural among stakeholders (Elenkov and Manev 2005).

Between globalized competition and shortened life cycles on the one hand and new opportunities on the other, businesses are increasingly confronted with the challenge of optimizing their innovation processes. While the implementation of approaches (such as open innovation and team collaboration) leads to desired success (Petkovska 2015; Tjosvold and Tjosvold 2015), empirical results show that under challenging phases (such as problem analysis and future scenario generation) team motivation can be maintained at a high level (Hahn et al. 2017). Teambuilding presents a variety of exercises that

include the belief that the team or organization supports teamwork, evaluates different views, and promotes risk-taking (Thayer et al. 2018).

Hemlin et al. (2008) addressed the creative knowledge environment in their study and explained that creative potential is expressed by different degrees depending on the context in which the group operates. They further argued that an innovative environment tends to emphasize diversity, flexible boundaries, collaboration, and teamwork, and it conveys a sense of collective pride and faith amongst employees.

Anderson et al. (2004) argued in their meta-analysis of team-level innovation predictors that team process variables (such as vision, innovation support, internal/external communication and cohesion) have a strong positive impact on innovation. The size of the team shows a positive relationship to team innovation, and, more significantly, it brings more knowledge and skills; however, at the same time, it shows a slightly negative relationship to individual innovations as a tendency to engage in social wasting time in larger teams. Anderson et al. (2004) found that team composition (heterogeneity) is of paramount importance because resources (knowledge, skills, abilities) to be innovative depend on variables such as diversity of knowledge and experience within team members. Thus, the creation of working groups or business units stimulates the process of collective learning and competence development by physical and non-physical interactions between organizational members. This fact also applies to the interaction between groups, and it is therefore essential to avoid intercontinental and in-house barriers as they can act as barriers to communication and stimulate internal culture as competitive rather than cooperative (Pitt and Clarke 1999).

Innovations and possibilities for management were discussed by Siddiq et al. (2016), and they used a brainstorming approach that brought together a group of experienced employees with a shared understanding of specific challenges to have open and creative conversations and find solutions to the problems. Similar issues were addressed by Paulus et al. (2016) and van Wulfen (2016).

1.1.3. Organizational Level

Organizational innovation is probably the most comprehensive level of analysis (Anderson et al. 2004). Various factors, such as individual characteristics (e.g., CEO openness) or organizational characteristics (e.g., market share, structure, culture, level of formalization, and environment) play an essential role. Hammond et al. (2011) noted that contextual influences are equally important for the stage of designing ideas as well as for the implementation phase. Positive atmosphere, sufficient resources, supervisor support, and the quality of leadership replacement are positively linked to innovative performance.

Three components of the organizational work environment were addressed by Amabile (1996) and include all the factors in businesses that have been identified as necessary for creativity and innovation. First, corporate motivation for innovation involves the absence of elements that can undermine creativity, e.g., political problems, destructive criticism, competition within the organization, strict control by senior management, and a surplus of formal structures and practices. Another component that is important for innovation promoting is the resource that includes everything that an organization has to support its work in the innovation target area. It may consist of many elements, such as sufficient time to produce new jobs, people with the necessary expertise, funding, material resources, systems and workflows, relevant information, and training. The last component includes the level of the organization as a whole and the level of individual departments and projects. Management is found to facilitate innovation by allowing for freedom or autonomy, linking individuals with work tasks (based on abilities and interests). It provides work supervision (precise planning and feedback, excellent communication between supervisor, and working group and support) and creates productive workgroups that represent a diversity of skills and knowledge.

Innovation communication plays a crucial role in ensuring integration in the various departments responsible for managing internal and external interests throughout the innovation process (Bruhn and Ahlers 2017). Looking at innovation and communication, the meaning and reality that are the prerequisites for news are based on communication relations between businesses and their internal and

external stakeholders (Patsch and Zerfass 2013). Innovations are also influenced by how conflicts are resolved. It turns out that the common evolution of subsequent problems and their solutions provokes the emergence and development of radical innovations.

Companies have a strong incentive to find innovative solutions to outstanding issues to achieve a competitive advantage in the markets (Coccia 2017). Sharing knowledge is another crucial factor for innovation.

Wang and Wang (2012) emphasized that knowledge sharing not only has a positive effect on performance but also influences innovation, which in turn contributes to the continuous performance. Spanish researchers, who tested the impact of different knowledge-sharing mechanisms on innovation capabilities and the effect of innovation capacity on business performance, were also dealing with a similar issue. The results obtained showed that knowledge sharing is a vital issue for strengthening innovation capacity (Sáenz et al. 2012).

The innovation system is failing due to structural problems, blocking its formation and spreading (Jung et al. 2016). To overcome such systemic failures, it is necessary to address the shortcomings of the existing system and create a new system and structure in which innovation actors can accelerate innovation. The study of Kratzer et al. (2017) was based on the fact that there is a common understanding that innovation is driven by people who are at the core of innovation activity in every business.

Integration processes that contribute to the integration of innovation capabilities are essential; however, the unity of purpose is also an important factor as it definitely has a strong effect of creating meaningful work for individuals with a mission to the organization as an entity (Denison and Mishra 1995). The ability to connect people from different backgrounds, disciplines, cultures, and generations is a matter of importance if enterprises want to meet their objectives (Ibarra and Hansen 2011). Adler et al. (2011) believed that it is a matter of combining a sense of shared intent with a supportive structure where businesses mobilize all workers, knowledge, talents, and expertise to promote innovation and efficiency.

The key to managers is also to align the implementation of the plan with the type of target (Earley 2015). Management by objectives (MBO) is a performance management approach that strikes a balance between employee goals and organizational goals. By increasing engagement, managers have the opportunity to focus on new ideas and innovations that contribute to the development and goals of organizations (Kearney and Berman 2018).

According to Foroudi et al. (2016) to understand the impact of innovation ability, we need to take into account the experience of customers and how they perceive a business, regardless of whether they have built a reputation and loyalty.

Innovation supports the need for constant change and renewal, which can affect all areas of business. A change often persists and requires appropriate incentives and rewards to support the necessary innovation (Hosking and Anderson 2018; Chapman and Hewitt-Dundas 2018).

Corporate culture-shared values, beliefs and behavior play an important role in shaping an innovative environment. Innovation performance can also depend on these factors, and it can be assumed that some differences in innovation activity and innovation results can be explained by differences in organizational culture (Kaasa 2016). This indicates a critical trend that shapes their innovative performance in terms of creating new ideas, knowledge, and skills (Halim et al. 2015).

Recently, profound technological changes and more significant customer demand have suddenly increased electronic service innovations. Innovation can be seen as the acceptance and spread of something new in a given context. E-commerce is also an innovation when it is introduced into a new emerging market environment or when a new class of user industries adopts it. Several global forces encourage the adoption of e-commerce, such as global competition, trade liberalization and ever-increasing advances in IT and internet (Hanna 2016). Recently, the increase in the use of e-commerce services has catalyzed the innovative development of robots for use in warehouses (Bogue 2016). Moreover, innovation in electronic services has had a positive impact on value creation (Chuang and Lin 2015).

To achieve a competitive advantage, it is often necessary to listen to and understand what customers say about their products and services (Kwon and Hong 2015; Hoornaert et al. 2017). The current social media analysis frameworks do not provide benchmarks that allow businesses to compare the sense of customer on social networks to quickly understand where a company is taking its actions correctly and where it must be improved (He et al. 2015). Benchmarking is seen as one of the basic techniques for identifying and evaluating competition information (Bogetoft 2013). The continuous implementation of this method should provide a range of valuable information about the competition, its strategic intentions, and financial results. The offered services or products of the competitor, or their costs, operating processes, used technology, and quality procedures can be compared. In terms of quality, Antunes et al. (2017) dealt with the relationship between innovation and overall quality management. Their study suggested that companies that adopt process innovation strategies are improving their performance, both operationally and financially, while product innovation only improves organizations' financial performance. Total quality management (TQM) procedures have also been found to support the definition of innovative product and process strategies. By using benchmarking in the area of business cost management, a category of cost benchmarking was created, and it is one of the necessary cost management tools that is applied in practice (Rolstadås 2013). Moreover, the appropriate process steps of the best-in-group company have been identified for these cost items. The goal is to reveal the potential for improvement (Popesko 2009).

The results of recent analyzes have suggested that internal learning mechanisms and external information exchange do not always work symbiotically. The new findings provide exciting results for (managing) innovation processes and supply chain relationships. Berghman et al. (2012) addressed these issues and, based on their analysis, detected that information from suppliers also has an essential impact on innovation and performance, so mutual collaboration is important.

Information systems are the main business asset in terms of the benefits they provide and their costs. Therefore, organizations must plan in a long-time horizon on how to acquire information systems and services that support business initiatives and the innovation process (Bruce et al. 2014). At the same time, companies must respond to emerging opportunities. Wilfredo Bohorquez Lopez and Esteves (2013) dealt with improving their knowledge-gathering and allocation process where businesses should configure internal and external networks to support the reorganization of their classic structures.

Over the past decade, sustainable innovation has taken a prominent position in many corporate agendas and is also one of the crucial factors of innovation at the organizational level (Dangelico et al. 2017). In general, sustainable innovation can be defined as innovation that must consider environmental and social issues, as well as the needs of future generations. Though sustainable innovation brings new opportunities for societies, it is much more complex, requiring some organizational skills to address upcoming challenges (Ketata et al. 2015). The innovation of eco-products is increasingly crucial for policy makers, companies, and society in general. As a result, the number of studies on the development of organic products has significantly increased in recent years, which has necessitated the analysis and synthesis of the effects of these studies (e.g., Dangelico 2016). Global companies such as Tesla, Ikea, Unilever, Nike, Toyota and Whole Foods generated at least $1 billion in revenue from products or services that are sustainable (Williams 2015). All these indications suggest that eco-product innovation is one of the significant shifts in our times, requiring attention and research to support managers and firms interested in selling "green products" (Kotler 2011; Slotegraaf 2012). According to Arundel and Kemp (2009), research into eco-innovation and data collection should not be limited to environmentally-oriented innovations but should include all products, processes, and organizational innovations with environmental benefits.

Another factor is the competence base, which includes employee appraisal based on their performance as individuals or groups, employee behavior following corporate values, and changes that the enterprise implements as part of its innovative philosophy. Performance evaluation is critical to the effective management of human capital, and employee appraisal helps develop individuals,

improves organizational performance and contributes to business goals (Ahmed et al. 2013). It is also essential to include the job and the adequacy of the post (Venkataramani et al. 2016). The performance of individuals against organizational goals determines whether an organization meets its goals. The fundamental objectives of performance evaluation are twofold: firstly to reward employees for achieving the organization's objectives, and secondly to determine which targets are not met and to develop action plans to ensure their achievement in the future (Islam and bin Mohd Rasad 2006). It is also vital that employees are familiar with and adopt the objectives and values of the business, and that their activities and behavior are consistent with the benefits of the company (Noe et al. 2017). Businesses are facing increasing demands for change, but they are often so challenging that they face considerable resistance. Changing organizational structure supports the development of a reflective approach to organizational change and provides an overview of why it may be challenging to maintain the dynamics of change processes (Alvesson and Sveningsson 2016).

The authors found strong evidence that employee-friendly and mentoring-friendly companies achieve greater innovation success, especially in sectors where innovation is more challenging to achieve. Additionally, employee-friendly companies have also been more inclined to maintain R&D investment. These findings are consistent with the view that an employee-friendly workplace helps develop tolerance towards failure, which promotes innovation engagement (Chen et al. 2016).

At the organizational level in the context of innovation, it is also essential to make decisions about launching new products, as these are sophisticated and risky efforts that companies must continually carry out. The launch of new products and their impact was addressed by Gielens (2012). The timing of the company deciding to launch a new product is also important (Araman and Caldentey 2016). The right timing and use of the opportunity were addressed by Klingebiel and Joseph (2016), who stressed that combining the right timing with the possible occurrence enables a company to earn the highest profits. They applied this theory in the framework of strategic analysis of mobile phones. It is vital to set up and manage teams when introducing and developing new products (Sivasubramaniam et al. 2012). Additionally, prototyping is an essential activity in most new product development processes. Whether the goal is to explore new opportunities or to improve existing solutions, prototyping can be a valuable tool (Elverum et al. 2016). If a company wants to start selling a new product or service successfully, it is essential to exclusively focus on the target groups. These may be customers who are now buying something similar and appreciate the additional features that are offered by the new product or service. That is why it is crucial to consider customer needs in the process of a new product development and thus to engage the customer in the creation process and to create a suitable strategy (Li and Atuahene-Gima 2001). Many companies lack a clearly worded and well-informed product innovation and technology strategy. Such an approach is necessary and is closely linked to a positive impact on product innovation (Cooper and Edgett 2010). According to Cui and Wu (2016), there are three forms of customer engagement in innovation: customer participation as an information source, customer engagement as co-creators, and customer participation as an innovator. They propose that these three forms of customer engagement use different ways of using customer knowledge and are therefore otherwise influenced by the nature of customer knowledge, the company's knowledge management strategy, and the organizational support for knowledge management implementation.

The issue of intellectual property rights is becoming increasingly important, especially for innovative companies seeking international growth that leads to a growing need for intellectual property research. However, it is not known how contemporary research responds to this new need (Acemoglu and Akcigit 2012). Therefore, Candelin-Palmqvist et al. (2012) found out how intellectual property research was developed in innovation management literature, and they identified current trends.

Additionally, it is crucial that the company has a plan to promote established innovations. Social media platforms provide an increasingly popular way for individuals to share content online. Though

it brings undoubted social benefits, including the content ability to spontaneously broadcast creates an ideal environment for reputation, it also brings the spread of misleading information (Webb et al. 2016).

It is also essential to follow competition tactics. There are several ways to find out the competition strategy. Turner (2012), for example, mentioned the use of "mystery shopping" in their publications—the concept of mysterious shopping.

The rapid and accurate identification of consumer requirements and the systematic assessment of product quality are essential for success in developing a new product, especially for fast-moving consumer goods (Yang et al. 2012). Therefore, the elimination of the information or knowledge deficit is the primary task of the successful implementation of the innovation process (Loučanová 2014).

In general, businesses are perceived as learning processes generating new knowledge or transforming established knowledge (Phang et al. 2008). Some scientists suggested that organizational learning will not only result in organizational innovation but also lead to a sustainable competitive advantage (Chang et al. 2008; Sinkula et al. 1997; Stata 1989). In the last two decades, TQM has also been seen as a management practice that provides organizations with better performance (Feng et al. 2006; Carlos Pinho 2008).

Many researchers are concerned with identifying attributes for applying knowledge management in innovation (Donate and Sánchez de Pablo 2015; Alegre et al. 2013; Durst and Runar Edvardsson 2012). They have further detailed the nature of the knowledge management task in innovation as well as its value offer. Innovation depends on the availability of knowledge and therefore needs to be analyzed, identified, and managed to ensure successful innovation (Jensen et al. 2016).

As with tangible assets, intangible assets such as innovations and brands need to be protected, thus achieving optimum use in business. However, on the other hand, it is essential to address the possibilities of commercialization. As the number of new products developed by new technologies are increasing, the importance of commercializing new technologies has become crucial for manufacturers to successfully deliver valuable new products and services on the market (Cho and Lee 2013).

In the case of implementing an idea that seems to be unsuccessful over time, there should be some degree of tolerance in the business (McDonald 2018). Risking is not natural for everyone. If an enterprise prefers a more stable, less risky situation, it should make an effort to change this attitude. The work of the 21st century requires leaders and leaders to be innovators and beneficiaries of risk (Nanda and Rhodes-Kropf 2016).

2. Materials and Methods

Currently, interest in bibliometric research is growing thanks to information and communication technologies that allow for the processing large amounts of data while providing the means to visualize the results comprehensibly and sophistically, usually in the form of science maps. The knowledge of bibliometrics is gradually becoming part of decision-making processes, and it also helps to identify new trends, and this information can also be useful for scientists themselves in their research activities (De Bellis 2009). Based on publications, bibliographic references, and citations, it is possible to explore historical developments in specific science areas and often uncover hidden relationships between disciplines, authors, and topics and visualize their interrelations. On the other hand, we can use bibliometric methods to identify the most recent issues of scientific research or the speed of their obsolescence. The first step of this study was the formation of the data set considering the publications focused on the innovation in the last 5 years (2014–2018)—this most recent time horizon was crucial for the correct determination of the latest trends. There was a need to find those sources in which the most important studies and research in the innovation were published. Several institutions are involved in assessing the importance of scientific journals. Among the most significant are the Web of Science and Scopus. Scopus uses the SCImago Journal Rank indicator (SJR indicator). It is a scientific journal ranking (SJR) measure of the scientific impact of a journal and calculates the prestige of the journal by using the number of journal articles citations and their importance. A variant to the SJR indicator is the impact factor used in Thomson Reuters. The impact factor refers to data from the

Web of Science database, and the difference between them is that when calculating the impact factor, it considers two years ratio, while the SJR puts it into a three-year ratio. The SJR is a measure of the scientific impact of journals that corresponds to the number of citations that are accepted by the journal, as well as the significance or prestige of the journals from which the citation originates. The higher the values of the SJR, the more prestigious the journal (Scimago Journal & Country Rank). Identifying the most relevant databases, the second step was to consider the main scientific publications—results analysis by treemaps where the development of studies was analyzed considering different aspects, e.g., categories, document type, source title, and authors. (the results analysis by treemaps is available in the Web of Science database). By analyzing the results by the source title, we were able to identify the most significant journals focusing on the innovations:

- IEEE Transactions on Engineering Management.
- Technovation.
- Technological Forecasting and Social Change.
- R&D Management.
- Research Policy.
- Journal of Product Innovation Management.

This group of journals was first analyzed by Linton and Thongpapanl (2004) and Biemans et al. (2007), then by Thongpapanl (2012), and followed by Sarin et al. (2018a, 2018b).

Thirdly, for each paper (focused on the innovation) from the identified significant journals, the following information was found: authors, title, name of the journal, citation details (volume, issue, and page numbers), abstract, keywords, and a record of cited references (Garcia-Machado 2018). All the data were used in the bibliometric analysis to form maps and figures in the results section of this paper. Together, almost 3000 papers (most cited articles) focused on innovation were analyzed in the given period; they were identified by using a computer analysis (Van Eck et al. 2010): 1552 in the journal Technological Forecasting and Social Change, 252 in the R&D Management journal, 741 in the Research Police journal, and 350 in the Journal of Product Innovation Management.

All considered articles were downloaded from the journals, and, finally, the VOS Viewer was used to produce the term/bibliometric maps based on the co-occurrence frequencies of terms, which are a commonly used measure of the relatedness of terms. Van Eck et al. (2010) claimed that the VOS Viewer is especially useful for displaying large bibliometric maps in an easy-to-interpret way. Thus, the interpretation of the map is crucial to understand the results. VOS Viewer is a software tool for creating maps based on network data and for visualizing and exploring these maps. VOS Viewer can be used to construct networks of scientific publications, scientific journals, researchers, research organizations, countries, keywords, or terms. Items in these networks can be connected by co-authorship, co-occurrence, citation, bibliographic coupling, or co-citation links (Van Eck and Waltman 2020). When working with co-authorship, citation, or bibliographic coupling links, the citations attribute indicates the number of citations that were received by a document or the total number of citations that were received by all documents published by a source, an author, an organization, or a country. When working with co-citation links, the citations attribute indicates the number of citations that were made to a cited reference, a cited source, or a cited author. When working with keywords, the occurrences attribute indicates the number of documents in which a keyword occurs (Van Eck and Waltman 2020).

Items may have various attributes in VOS Viewer. If items are assigned to clusters, cluster numbers are an example of an attribute. Special importance is the weight. These attributes are represented by numerical values. Weight attributes are restricted to non-negative values (Van Eck and Waltman 2020). The higher the weight of the factor, the larger the label and the circle of the item; the stronger the relationship between the terms, the smaller the distance between them in the map. In the visualization of a map, items with a higher weight are shown more prominently than items with a lower weight. There are two standard weight attributes, referred to as the links attribute and the total link strength

attribute. For a given item, the links and total link strength attributes indicate, respectively, the number of links of an item with other items and the total strength of the links of an item with other items (Van Eck and Waltman 2020). Different colors are used to determine the clusters of the terms—the same color means that terms within the cluster are more closely related than terms in different clusters. An item may belong to one cluster only. Items may have various attributes in VOS Viewer. In the network visualization, items are represented by their label and, by default, also by a circle. The color of an item is determined by the cluster to which the item belongs. Lines between items represent links.

We used the map creating based on bibliographic data and the normalization method Association strength was used. If this option is selected, the association strength method is used for normalizing the strength of the links between items (Van Eck and Waltman 2020). Resolution was used for clustering. This parameter determines the level of detail of the clustering that is produced by the VOS clustering technique. The parameter must have a non-negative value. The higher the value of the parameter, the larger the number of clusters produced by the VOS clustering technique. In our cases, the minimum number of a keyword occurrences to be selected for the analysis was the occurrence of 25 times. The keywords with the greatest total link strength were selected and verified.

As asserted by Heersmink et al. (2011), VOS Viewer is an excellent tool for the formation of maps of authors and journals based on co-citation data or keywords.

3. Results

To identify critical factors, the VOS Viewer was used to show their occurrence from innovation-oriented journals. In this part, we performed the bibliometric analysis with the help of the VOS Viewer tool. By using this approach, it was possible to find out the degree of linking of articles with its authors from different countries, citations, the number of documents, the occurrence of keywords, citation map from various databases, as the program allowed us to process data from the Web of Science, Scopus, PubMed, RIS and Crossref JSON databases.

Figure 1 shows the network visualization of the keywords from the IEEE Transactions on Engineering Management Journal. We decided to analyze the keywords to use this information to identify innovation-related factors.

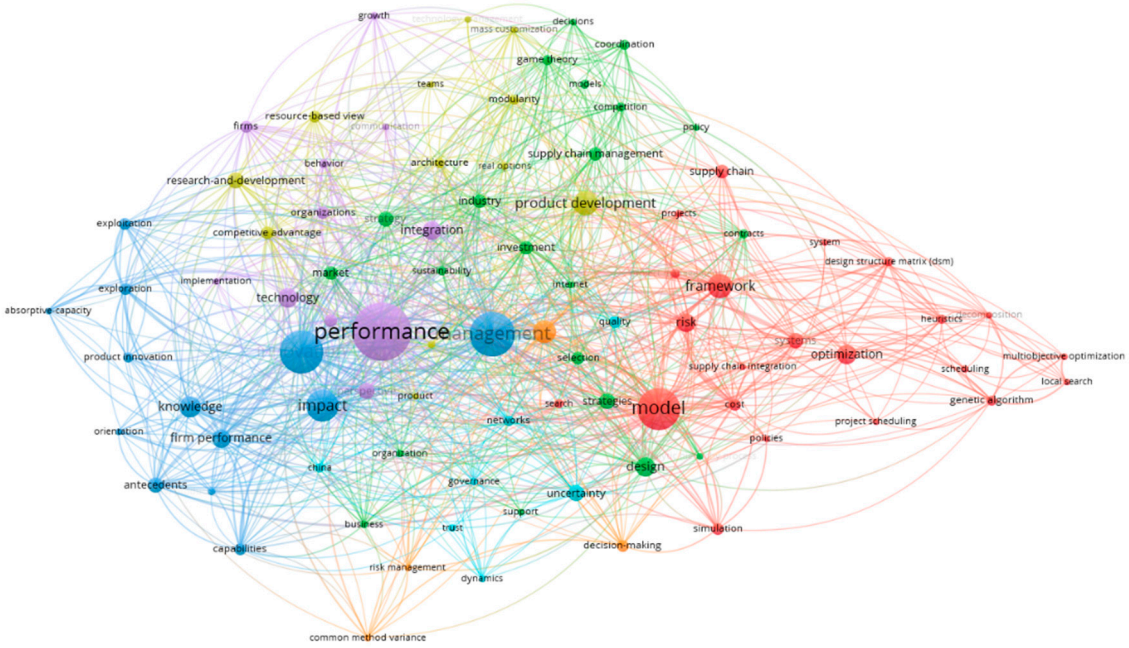

Figure 1. VOS Viewer: keywords from the IEEE Transactions on Engineering Management Journal. There were seven clusters detected in this journal; the total number of keywords was 90.

A total number of seven clusters were identified in the IEEE Transactions on Engineering Management Journal (See Figure 1). In the first cluster, there were 22 keywords, including optimization, project management, risk, simulation, and policies. The second cluster included 21 items such as competition, markets, and sustainability. The third cluster contained 13 keywords (exploration, capabilities, knowledge, product innovation, etc.). The fourth cluster contained 12 keywords (teams, flexibility mass customization, modularity, etc.) The fifth cluster contained 11 keywords (communication, growth, implementation, organization, performance, success, etc.). The next sixth cluster included seven keywords (China, networks, quality, and trust). The last cluster contained only four items (common method variance, decision-making, information, and risk management).

The total number of clusters in the Technovation Journal was six (Figure 2). In the first one, there were 23 items (competitive advantage, exploration, market, integration, R&D, etc.). There were 17 keywords in the second cluster (institutions, enterprises, patent, policy, investment, etc.), and the next cluster also included 17 items, such as industry, product, radical innovation, and adoption. The fourth cluster contained 15 items, including networks, evolution, design, and biotechnology. The fifth cluster comprised 14 items (future, performance, start-ups, etc.). The last cluster contained 14 items, such as discovery, business, communities, and creation.

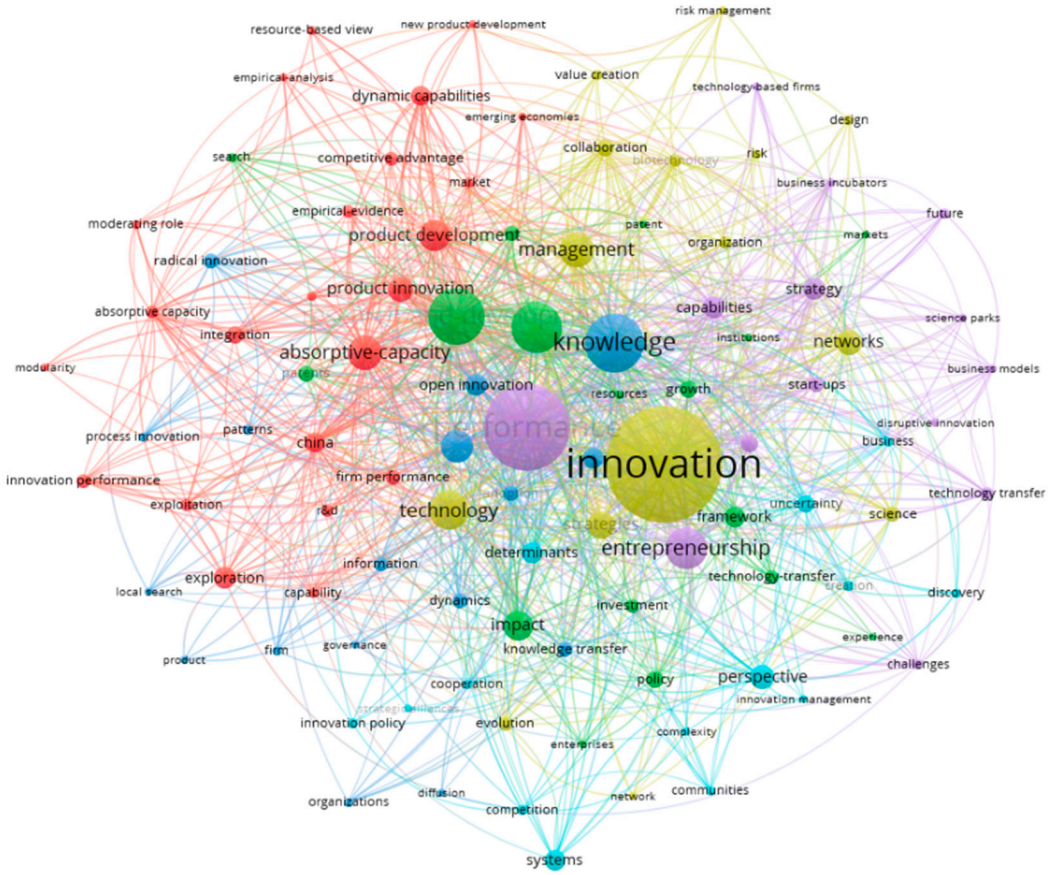

Figure 2. VOS Viewer: keywords from the Technovation Journal. There were six clusters detected in this journal; the total number of keywords was 100.

The next analyzed Technological Forecasting and Social Change Journal contained the highest number of articles, and the number of clusters was eight (See Figure 3). The first was a total of 112 items and included keywords such as DEA (data envelopment analysis), eco-innovation, efficiency, knowledge economy, patents, and technological innovation. The second cluster contained 106 items and included keywords such as barriers, adoption, consequences, and creative economy. The third cluster comprised 93 items such as climate change, e-government, energy policy, health, and wind energy.

In the next cluster, there were 73 items including alliances, cooperation, education, and networks. In the fifth cluster, there were 71 items such as advantage, complexity, entry, and stakeholders. The sixth cluster included 62 items (citations, discovery, imitation, intellectual property, etc.). The next cluster contained 39 items and incorporated keywords like scenario, selection, democracy, and uncertainty. The last cluster involved the least number of items at 30, among which there were items such as diversity, openness, universities, and perspective.

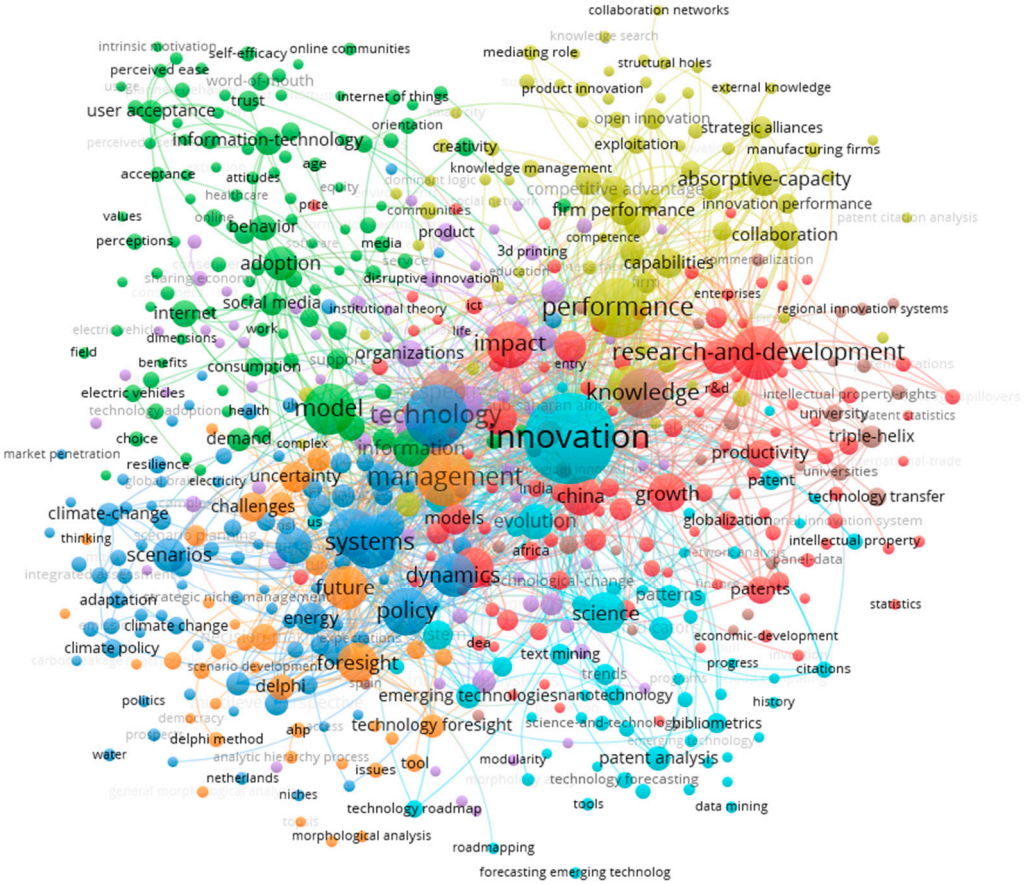

Figure 3. VOS Viewer: keywords from the Technological Forecasting and Social Change Journal. Eight clusters were detected in this journal; the total number of keywords was 586.

The Journal R&D Management keywords split into seven clusters (Figure 4). The first included 16 items, such as impact, strategy, value creation, and appropriability. The second cluster contained 14 keywords, such as evolution, indicators, and portfolio management. The third had 12 items (cooperation, model, productivity, work, etc.). There were ten keywords in the fourth and fifth clusters. In the fourth, we found challenges, networks, trusts, and uncertainty. The fifth cluster included five keywords—absorptive-capacity, competitive advantage, dynamic capabilities, product development, and resource-based view.

In the next journal (Research and Policy; see Figure 5), the keywords were grouped into eight clusters. The first cluster included 78 keywords, including career, communities, internet, mobility, and university research. There were sixty-six items included in the second cluster (adoption, globalization, environmental innovation, technological change, and others). In the third cluster, there were 52 items, such as failure, open innovation, patent, and vertical integration. The fourth cluster contained 44 keywords, including experience, government, sector patterns, and market structure. The fifth cluster comprised 34 items (firm survival, labor mobility, proximity, trade, and others). The sixth cluster included 33 keywords, including diversification, heterogeneity, market value, and specialization.

The seventh cluster contained 28 items, including patenting, invention, returns, and contracts. The last cluster included ten items, such as knowledge, design, product, and technological innovation.

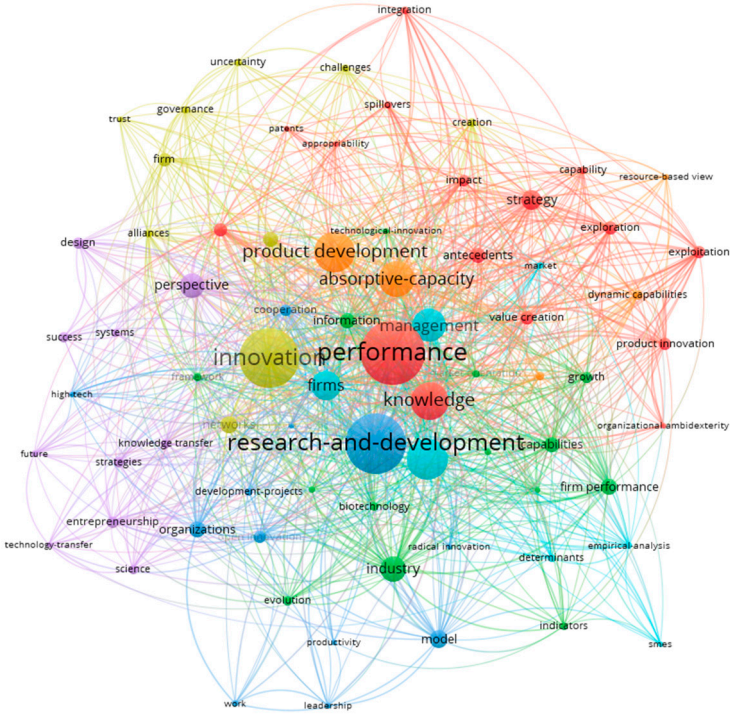

Figure 4. VOS Viewer: keywords from the R&D Management Journal. There were seven clusters detected in this journal; the total number of keywords was 74.

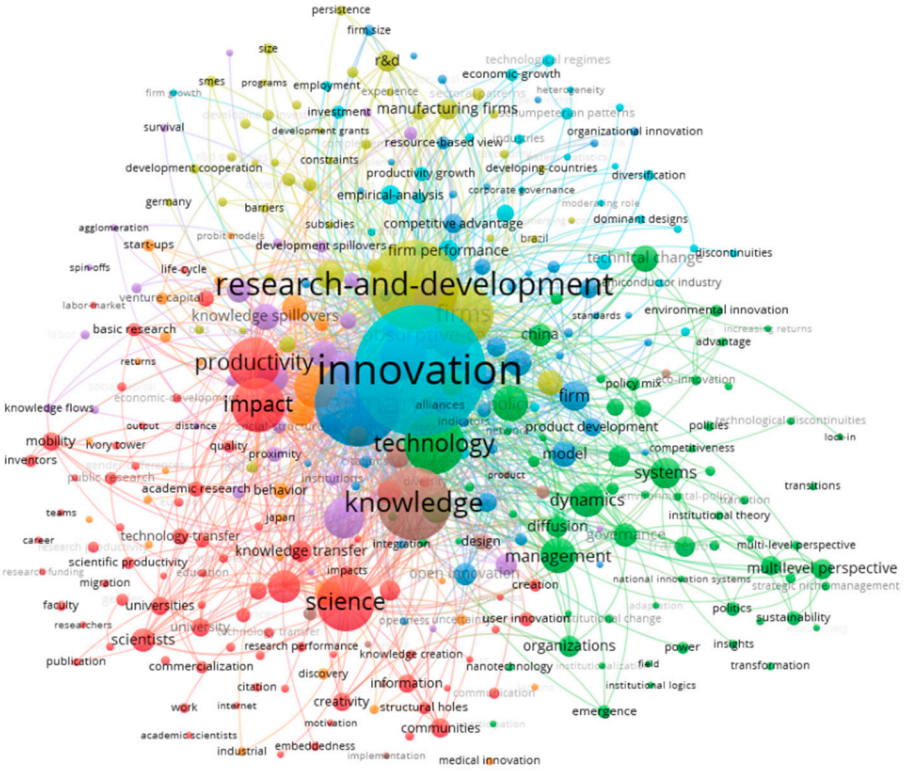

Figure 5. VOS Viewer: keywords from the Research Policy Journal. There were eight clusters detected in this journal; the total number of keywords was 345.

There were seven clusters in the Journal of Product Innovation Management (Figure 6), and the first involved 25 items, among which we could find capability, determinants, industry, and strategy. The second contained 21 items (adoption, behavior, performance, social network, etc.). The third included a total number of 20 items, and there were keywords such as customer, employee creativity, perceptions, and work-environment. In the fourth cluster, there were 16 items, including management, risk-taking, moderating role, and socioemotional wealth. The fifth cluster comprised 12 items (empirical-evidence, project, resource-based view, systems, and more). The sixth cluster including 11 items, such as benchmarking, technological innovation, strategies, and advantage. The last seventh cluster contained three keywords, namely local search, mediating roles, and organizational ambidexterity.

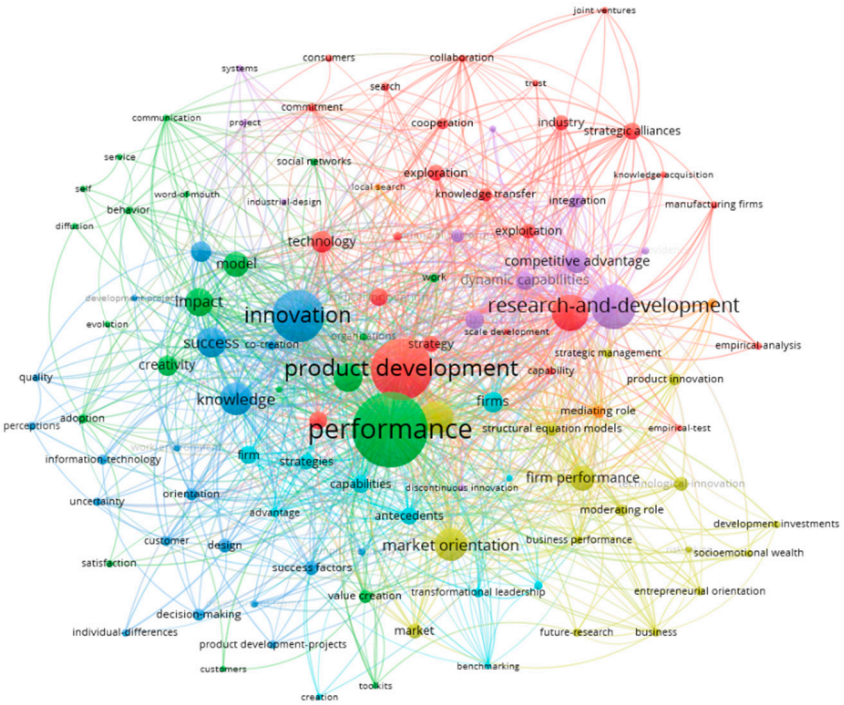

Figure 6. VOS Viewer: keywords from the Journal of Product Innovation Management. There were eight clusters detected in this journal; the total number of keywords was 345.

It can be concluded that despite the different prestige of the journals considered, measured both by the impact factor or SJR indicator, the topics of the authors concurred and the most important topics (considering the period 2014–2018) were technologies, performance, product development, knowledge and science, research and development. The way innovations have been recently managed is dramatically different compared to other past periods and reflects the changes on the global market related to the globalization of processes, the era of digitalization, and computerization. In order to stay competitive and financially sound, enterprises have had to develop incremental and disruptive innovations that are mostly associated with product development and plentiful information flows supported by the adoption of new technologies in business structures. Other important factors of smaller weights (marked by smaller circles in individual figures) are to be seen in the individual bibliometric maps.

4. Discussion

To confirm the importance of the findings in the bibliometric mapping, we tried to compile a list of factors and involved indicators that support these factors when studying other important pieces of research and discussing the relevance of the obtained results. Each indicator was confronted with key research study related to the innovative area (Table 1). Several studies, such as Linton and Thongpapanl (2004), Terziovski (2010), and Sarin et al. (2018a), helped process this section.

Table 1. Identified innovation factors.

Factor	Indicator	Study
Innovation ability	Communication	(Patsch and Zerfass 2013)
	Knowledge sharing	(Sáenz et al. 2012; Wang and Wang 2012)
	Barriers	(Jung et al. 2016; Kratzer et al. 2017)
	Unity	(Adler et al. 2011; Ibarra and Hansen 2011)
	Change implementation	(Hosking and Anderson 2018; Chapman and Hewitt-Dundas 2018; Alvesson and Sveningsson 2016)
	Culture of innovation	(Halim et al. 2015; Kaasa 2016)
	Tolerance of ineffective ideas	(McDonald 2018; Chen et al. 2016)
	Risk-taking	(García-Granero et al. 2015; McDonald 2018; Nanda and Rhodes-Kropf 2016; Thayer et al. 2018)
	MBO	(Kearney and Berman 2018)
Personality	Autonomy	(Giebels et al. 2016)
	Openness	(Orth and Volmer 2017)
	Leadership	(Elenkov and Manev 2005)
Motivation	Career growth	(Noe et al. 2017)
	Stimulating tasks	(Schepers et al. 2016)
	Evaluation of work results	(Ahmed et al. 2013; Noe et al. 2017; Islam and bin Mohd Rasad 2006)
	Influence of decision	(Luhmann 2018; Irawanto 2015)
Teamwork	Teambuilding	(Hahn et al. 2017; Petkovska 2015; Tjosvold and Tjosvold 2015)
	Brainstorming	(Siddiq et al. 2016; Paulus et al. 2016; van Wulfen 2016)
Cooperation and problem solving	Department cooperation	(Mehralian et al. 2017; Tjosvold and Tjosvold 2015; Petkovska 2015)
	Conflict solving	(Coccia 2017)
Sustainable development	Environment	(Slotegraaf 2012)
	Customer ecological requirements	(Kotler 2011)
	"Green products	(Mala and Bencikova 2018; Dangelico 2016)
	Environmental technologies	(Smith and Stirling 2018; Ketata et al. 2015)
	Environmental impact	(Arundel and Kemp 2009)
	Recycling	(Arundel and Kemp 2009)
Working characteristics	Working pressure	(Abbas and Raja 2015)
	Adequate job classification	(Venkataramani et al. 2016)
	Consulting	(Chen et al. 2016)
Cognitive abilities	Divergency	(Anderson et al. 2004)
	New ideas	(Irawanto 2015; García-Granero et al. 2015)
	Spreading new ideas	(Thayer et al. 2018)
Benchmarking	Market research	(Janoskova and Krizanova 2017; He et al. 2015)
	Product comparison	(Bogetoft 2013)
	Cost comparison	(Rolstadås 2013; Popesko 2009)
	Comparison of operational processes	(Kwon and Hong 2015)
	Technology comparison	(He et al. 2015)
	Quality comparison	(Antunes et al. 2017)
Organizational intelligence	Customer feedback	(Hoornaert et al. 2017)
	Opinions from suppliers	(Berghman et al. 2012)
	Information from literature	(Bruce et al. 2014)
	Information from the internet	(Wilfredo Bohorquez Lopez and Esteves 2013)
	Learning from employees	(Bruce et al. 2014)
E-commerce	Cooperation on the internet	(Chuang and Lin 2015)
	Presentation of products	(Hanna 2016)
	Transactions	(Hanna 2016)
	Restructuring of business model	(Bogue 2016)
	Global innovation networks	(Bogue 2016)
Knowledge management	Intern information exchange	(Alegre et al. 2013; Jensen et al. 2016; Durst and Runar Edvardsson 2012)
	Access to information	(Donate and Sánchez de Pablo 2015; du Plessis 2007)

Table 1. *Cont.*

Factor	Indicator	Study
Intellectual property	Patents	(Candelin-Palmqvist et al. 2012)
	Competitive advantage	(Candelin-Palmqvist et al. 2012)
	Auditing	(Acemoglu and Akcigit 2012)
	Promotion plan	(Webb et al. 2016)
	Competition tactics	(Turner 2012)
	Forecasting sales, preferences	(Yang et al. 2012; Loučanová 2014)
Business strategy	First on the market with new product	(Gielens 2012)
	Regularly introduced products	(Elverum et al. 2016; Li and Atuahene-Gima 2001)
	Responding to opportunities	(Suszynska 2017; Klingebiel and Joseph 2016)
	Market and financial risk	(Oláh et al. 2019; Dvorsky et al. 2018)
Commercialization	Time	(Klingebiel and Joseph 2016; Araman and Caldentey 2016; Janoskova and Kral 2015)
	Distribution control	(Aarikka-Stenroos and Sandberg 2012)
	Organizational knowledge	(Lin et al. 2015)
	Product complexity	(Cho and Lee 2013)
	Meetings	(Siddiq et al. 2016; Paulus et al. 2016)
Development of new products	New product strategy	(Cooper and Edgett 2010)
	Customer requirements	(Popescu Ljungholm 2018; Cui and Wu 2016)
	Development documentation	(Cooper and Edgett 2010)
	Foreign customer requirements	(Cui and Wu 2016)
TQM/learning organization	Creating value for customer	(Love et al. 2000)
	Customize products to customer	(Mahmood et al. 2015)
	Customer loyalty	(Foroudi et al. 2016)
	Fast response to customer needs	(Yang et al. 2012; Zizlavsky 2016)

The identification of the crucial factors of innovations both by the bibliometric analysis and the systematization of notable published papers that have focused on theoretical and practical knowledge reveal that the main factors that have been identified are mostly the same. Moreover, the factor indicators seem to correspond with factors of lower weights (having a smaller circle) that were identified in the term maps.

Despite the robust results of the analysis, there were some limitations that need to be mentioned. We only use the VOS Viewer software solution to identify the crucial factors of innovation; some studies have dealt with the identification of innovation factors by another style and method. Only six specialized journals were chosen for this research that summarized the most cited articles.

The VOS Viewer software solution is a handy tool for processing large numbers of articles and can be used in different areas. In this case, we applied it to analyze innovation factors in the most significant journals. By considering the term maps in the selected journals, product development, performance, research and development, it can be concluded that innovation technologies, knowledge and science have been the most important topics in the last five years. Additionally, the output of the research can be adopted in further research connected with the corporate practice to confirm the adequacy of constructed factors in the analysis of principal components and factor analysis, supported by Cronbach's alpha. Then, it is possible to examine the interdependence or correlation between identified innovative factors and deal with innovative efficiency by regression analysis and data envelopment analysis.

5. Conclusions

The basis for a prosperous business is a systematic and goal-directed strategic management that must, above all, be based on the innovation. Innovation processes are specific and unique tools of business activity that allow for the possibility of gaining a competitive advantage and eliminating possible risks in the financial decision making on the other. The results of the realized bibliometric mapping revealed innovative factors and involved indicators, providing information

about the most important topics in the field of innovations in the last years, i.e., corporate performance, product development, knowledge and science, research and development, and new technologies. The findings may be useful, not only for academics to choose the direction of their research in the innovation management but also for experts to improve their knowledge and develop new ideas when making all kinds of corporate decisions. Taking the constantly changing and developing environment into account, the future topics influencing the innovations could be related to the fourth industrial revolution—Industry 4.0 (including smart manufacturing, internet of things)—and also moonshot thinking, 5G revolution, kinesthetic (haptic) communication technology, and gamification (the application of a gameplay mechanism to non-game situation). Knowing the crucial factors of innovations presents the perfect start point for strategic management and to be the leader, not only the follower on the market, and to spend the corporate finance effectively. The disclosure of innovative factors helps strategic and financial managers to use them in such a way that can come up with what the market requires at the right time and place.

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