



Management of Training and Development of Innovative Potential of Companies

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ABSTRACT

Previous research has analyzed bibliometric approaches with the theme of innovative management, the relationship between open innovations and innovative potential, identifying the level of innovative potential of companies, artificial intelligence, and robotics in the development of the economy. In addition, researches have explored the modeling of the development mechanism of employees' intelligent innovation potential, the disclosure of innovation potential in complex environments, economic competitiveness, environment-friendly innovation, business sustainability and development, research and development, and the adaptability of innovative companies. However, there is a lack of research that analyzes the research structure of potential innovators using bibliometric analysis. The present paper aims to analyze the innovative potential of companies using bibliometric analysis.

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1. Introduction

One of the fields that has seen an extraordinary expansion in the last decades is the field of innovation process development. This is especially visible on a global scale, where innovative potential has one of the fastest growth rates. Its growth has been influenced by various factors, such as the increase in the number of material, financial, technical, and technological resources, human capital, intellectual capabilities, and market demands [6]. In recent years, innovative companies are some of the fastest growing businesses both in Romania and in other countries of the world [5]. In line with this, various countries have started to offer degree programs and education in the field of innovations, as well as to develop degree programs and training programs at both undergraduate and postgraduate levels. The role of education and training programs in the given field is essential to ensure that the workforce in the innovative industry has the necessary knowledge and skills to manage the processes and investments made in innovations. With this growth, many researchers have been interested in conducting studies on various aspects in the field of innovative potential development. Innovation has become an increasingly popular area of interest among economists for more than three decades. Therefore, research in this area will continue to develop in the future.

2. Exploring innovation: a bibliometric analysis of Web of Science publications

Bibliometric analysis is an innovative methodology that aims to quantitatively analyze a collection of scientific publications or works, such as journals, books, conference proceedings, and so on [7]. Bibliometric network analysis can help to identify collaborations between authors or institutions, relationships between different research themes, to identify groups of researchers working on the same theme, as well as to find possible bridges between different research themes. Therefore, the current study fills this gap and uses bibliometric networks to investigate the scientific publications of the potential innovator [1]. The aim is to analyze the bibliometrics of all publications in the Web of Science about innovative potential. Researchers integrate two bibliometric techniques, including co-citation and co-word analysis, to develop scientific maps while providing insight into the evolution of innovation literature [4].

The author used VOSviewer version 1.6.20 software to develop the citation analysis and conjoint analysis. The most popular software tools for creating graphical maps for objects of interest are VOSviewer statistical calculations. Further visualization of the literature on the potential innovator is possible using bibliometric analysis, which also allows observation of research topic trends and co-citation units and co-word analysis [3].

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The Web of Science database allows searches of collections of articles, books, editorial content, book chapters, notes, and letters in English. The keyword [(TITLE-ABS-KEY ("Innovation potential"))] was examined in the Web of Science database in publications published before July 2024, an initial search yielded 419262 publications. Filter by subject was then selected management citations yielding 11991 publications. Article titles and abstracts were carefully screened for keyword relevance. Consequently, 11991 publications were retained in the next round.

There are three stages in the data analysis process, they are: i) Descriptive statistics are provided to demonstrate information about the number of relevant papers published annually and the geographic distribution of selected publications; ii) Using VOSviewer software, a co-citation network was created and presented for the topic of potential innovator; and iii) All keywords from all selected publications are classified into a co-citation research theme using co-word analysis. For recommendations of potential future research directions regarding innovative potential will be viewed by VOSviewer software. The author bases his suggestions for the direction or focus of further research on the emergence of new keywords [2].

3. The results of the bibliometric analysis of the innovative potential of the companies

The annual trend in the number of publications from 1983 to 2023 is shown in Figure 1. From 1983, there was no significant increase in the number of published materials on innovative potential until around 2005, after which we see a significant rise in publications on innovative potential innovative, cited subject in the field of management. The average number of publications per year is 335.97, which indicates that the academic community pays great attention to the innovation potential. The year 2022 recorded the most published papers, namely 997 papers.

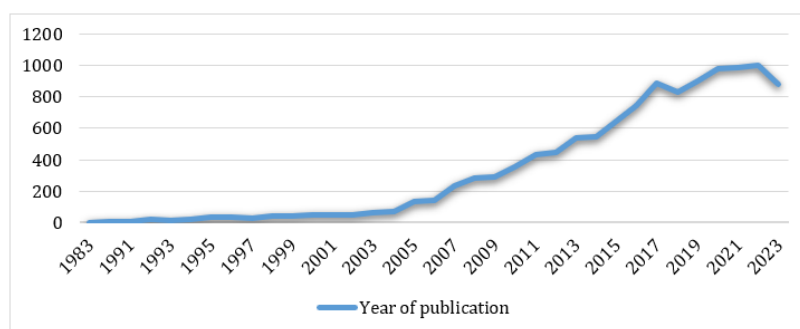


Figure 1. Total publication trend from 1983 to 2023

Source: drafted by the author based on Web of Science data

Given the observed upward trajectory of the number of publications, it can be reasonably inferred that the field of innovative potential research is poised for sustained growth and will continue to thrive in the coming years. The US and UK are among the nations with an abundance of research on innovative potential, according to the statistics on the geographical area of publication, as seen in Figure 2. This is understandable given that these two nations are some of the leaders in development of innovation potential. The remaining nations are mostly in China, Germany, Spain, and Italy.

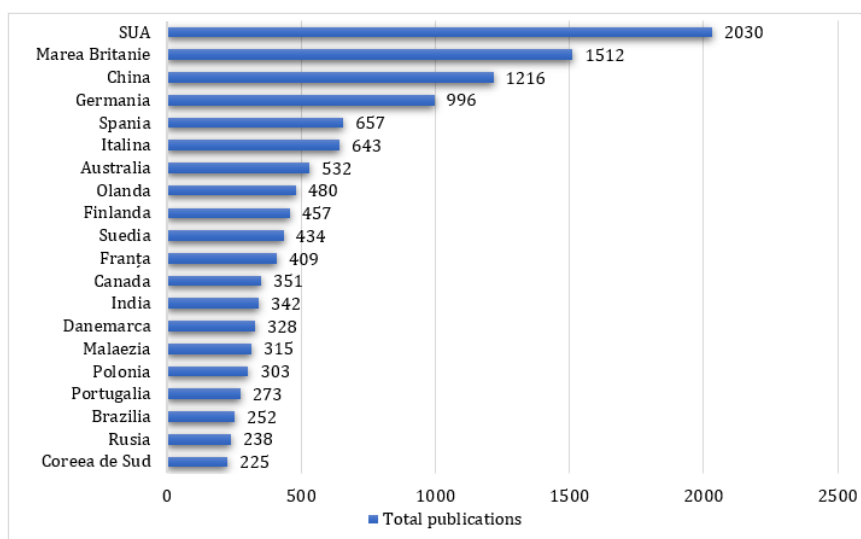


Figure 2. Top 20 countries where research on innovative potential has been published

Source: drafted by the author based on Web of Science data

Figure 2. presents a ranking of the top 20 countries based on the number of publications related to research in the field of innovative potential. The US tops the list with 2,030 publications, indicating a significant focus on the subject in academic circles in the country. It is closely followed by the United Kingdom with 1512 publications and China with 1216, highlighting a substantial presence of research activity in these countries as well. Germany, Spain, Italy, and Austria also have notable contributions in the field with a variable number of publications, ranging from 996 to 532. The Netherlands, Finland, Sweden, and France are next in the ranking, with over 400 publications each, highlighting the global interest in studying innovative potential in various geographic regions. Among the remaining 9 countries in the ranking affiliated with authors producing articles on innovative potential research are Canada, India, Denmark, Malaysia, Poland, Portugal, Brazil, Russia, and South Korea. Figure 2. provides insights into the distribution of research efforts in this specialized field of study.

Based on the results of the bibliometric analysis performed with the help of the VOSviewer software, a terminological map was generated that displays the existing connections between the keywords and expressions used in the publications [8]. The resulting map allows us to identify the main clusters where publications dedicated to the development of innovative potential by companies can be distributed. Overall, based on keyword coincidence analysis, six clusters were identified in the study, as shown in Figure 3. 11991 documents with 2702 keywords from the years 1983 to 2024 were examined to examine possible research topics about innovative potential. Co-word networks are created using the VOSviewer program. Co-citation analysis was then used by the author to identify key words and group themes. Further study directions are based on the frequency of keywords during the observation period and the emergence of new keywords.

Figure 3. shows a network of keywords from 1983 to 2024, with the minimum number of keyword occurrences being fifteen. The size of the bubble indicates how often a term appears, and the thickness of the line between two keywords indicates how often one term appears relative to another.

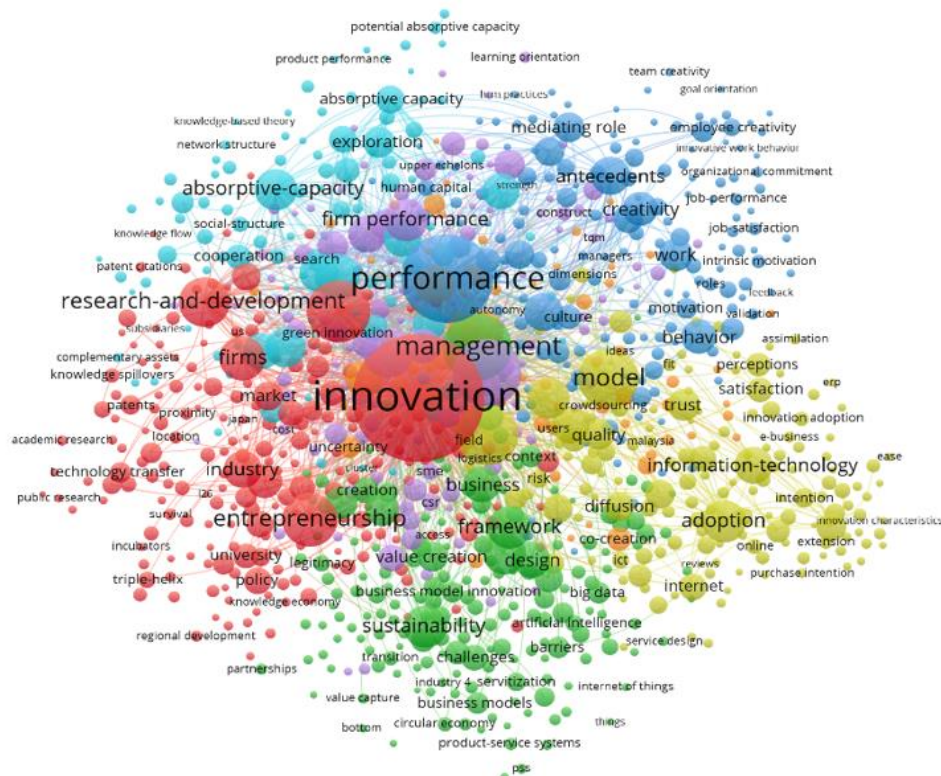


Figure 3. Keyword network analysis of innovative potential research using VOSviewer thematic visualization

Source: drafted by the author based on Web of Science data

Cluster 1 (red color). The first cluster is presented as innovative potential research focused on different aspects of innovation characteristics, including empirical study and quantitative analysis using questionnaires. It is the largest cluster, involving 27372 article links and with a total of 4162 occurrences. This group connected several keywords of which we mention only the most important – innovation, entrepreneurship, industry, research and development, university, technology transfer, firms, and market.

Cluster 2 (dark blue color). The second cluster includes the research of innovative potential regarding another aspect of it, namely performance. The set combines several keywords such as performance, diversity, work, motivation, culture, leadership, and media role. This cluster is associated with 15378 related articles and received 1969 occurrences.

Cluster 3 (purple color). The third cluster focuses on the application of management related to innovative potential. This cluster combines keywords of which the main ones are management, firm performance, business, governance, implementation, green innovation, value. This cluster contains 8480 related articles with 1138 occurrences, all published between 1983 and 2024.

Cluster 4 (light blue color). The fourth cluster provides a framework for knowledge innovation. This cluster brings together main keywords – knowledge, absorbed-capacity, exploration, search, cooperation, social structure, dynamic capabilities, innovative products, knowledge transfer, perspectives, and networks. This cluster involves 7323 article links that have a total of 950 occurrences.

Cluster 5 (yellow color). The fifth cluster focuses on transformation through innovative potential development models. This cluster links main keywords, namely model, adaptation, information technologies, quality, trust, innovative adaptation, perception, e-business. This group contains 6358 related articles related to 898 occurrences.

Cluster 6 (green color). The sixth cluster notes another side of the innovative potential, especially that related to sustainability. This cluster brings together noteworthy keywords such as sustainability, design, creation, framework, innovative business models, circular economy, artificial intelligence, big data, legitimacy, transition, and challenges. This cluster covers 3318 article links and with a total of 461 occurrences.

The VOSviewer program also allows the presentation of the display time of the terms that appear most frequently in the study. The closer to blue, the «older» the research, the closer to yellow, the more modern. Respectively Figure 4. illustrates the trends in publications over time.

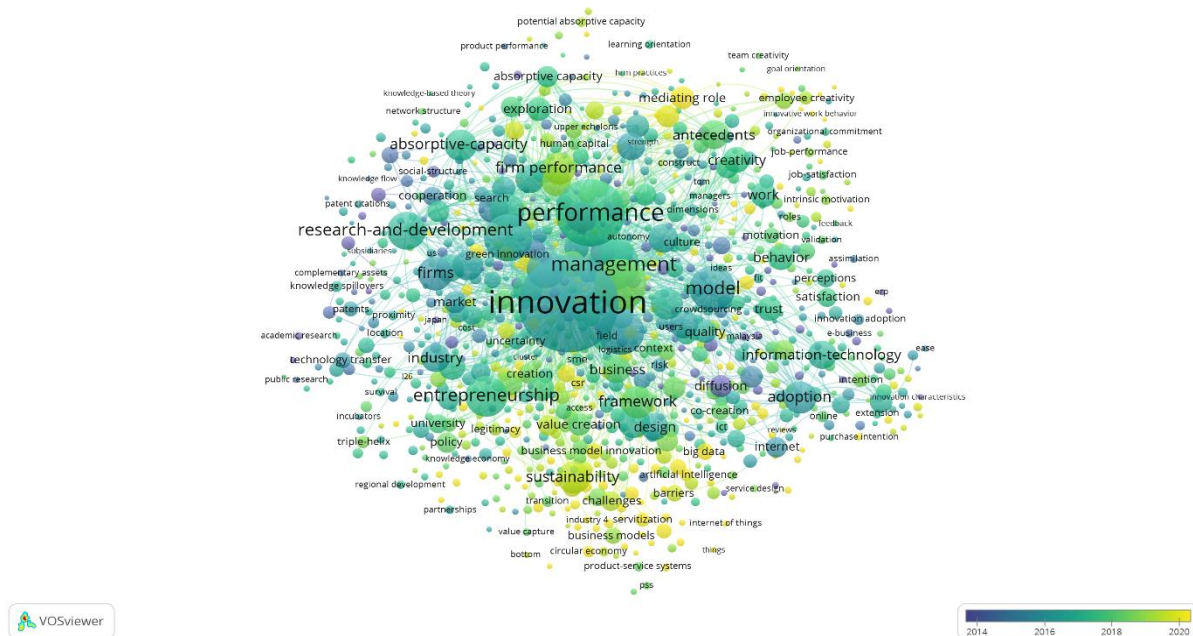


Figure 4. Visualization map of the evolution of the relationship between the main aspects of innovation potential

Source: drafted by the author based on Web of Science data

Based on the results of the bibliometric analysis in the evolutionary time dimension, it can be observed that there are five most significant stages in the development of scientific research dedicated to innovative potential.

The first stage of development was observed until 2014, the dominant key terms in researchers' publications being technology transfer, strategic alliances, product development, success, failure, biotechnology.

In the second stage, from 2014 to 2016, the focus in the research of scientists shifted to the terms innovation, knowledge, knowledge management, capabilities, industry, strategy, firms, model, globalization.

From 2016 to 2018, i.e., at the third stage of those identified, the dominant key terms were performance, research and development, collaboration, absorptive capacity, exploration, entrepreneurship, outlook, behavior, growth, trade, research, science, trust, entrepreneurial collaboration.

The fourth stage - from 2018 to 2020 - is characterized by the predominance of the terms impact, framework, business model, created value, antecedents, governance, motivation, effectiveness, creativity, education, academic entrepreneurship, opportunity identification.

The final stage, the fifth, started after 2020. The main terms in the research were media role, sharing economy, sustainability, circular economy, big data, innovative performance, commitments, digital transformation, blockchain, environmental innovation.

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