

## Past, Present, and Future of Technological Business Development: A Bibliometric Study

Seyyed Amir Hossein. Shobeiri<sup>1\*</sup> 

<sup>1</sup> Master's Degree in MBA, Department of Management, University of Tehran, Tehran, Iran

\* Corresponding author email address: Amirmath2003@gmail.com

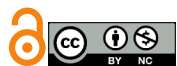
### Article Info

#### Article type:

Original Research

#### How to cite this article:

Shobeiri, S. A. H. (2024). Past, Present, and Future of Technological Business Development: A Bibliometric Study. *International Journal of Innovation Management and Organizational Behavior*, 4(3), 8-20.  
<https://doi.org/10.61838/kman.ijimob.4.3.2>



© 2024 the authors. Published by KMAN Publication Inc. (KMANPUB), Ontario, Canada. This is an open access article under the terms of the Creative Commons Attribution-NonCommercial 4.0 International (CC BY-NC 4.0) License.

### ABSTRACT

**Objective:** Business development is a capability consisting of practices and skills involved in identifying opportunities, directing, and employing resources to expand a company's value-creating activities in areas of technology or markets that are relatively new to the company, thus enabling growth. In recent years, researchers have shown an increased interest in the area of technological business development, leading to a considerable accumulation of knowledge in this field.

**Methodology:** Accordingly, the current research utilized a systematic review approach, employing the PRISMA protocol for document screening. A bibliometric review of 205 studies, from 1984 to the present, was conducted using data analysis software such as VOSviewer and R. This included performance analyses such as the analysis of the most influential journals and authors in the field of technological business development, and network analyses including co-citation of authors, co-citation of countries, and co-occurrence of terms. The findings of this research can be beneficial for researchers and policymakers in the field of technological business development.

**Findings:** The analyses indicate that the leading author in the field of technological business development, who has the most global citations in this area, is Keil. His article, titled "The impact of governance methods and the articulation of external business development activities on innovative performance," was published in 2008. Indeed, his paper is the most important and most cited in this field. In terms of the most influential journal, the analyses show that the journal *Technological Forecasting and Social Change* is the most influential in the field of technological business development. As for the most influential countries, Finland has the highest number of citations in the field of technological business development, followed by Poland, China, Korea, the Netherlands, the United Kingdom, Germany, India, the United States, and Romania.

**Conclusion:** The results of the network analysis in this study clarified that based on the co-citation patterns of researchers, a cluster core author named Theis has the most co-citations among various authors. Additionally, the co-citation analysis of countries shows that there is established collaboration between Pakistan and

Chile, Chile and China, Georgia and China, Pakistan and China, the United Kingdom and China, Macedonia and Croatia, North Macedonia and Croatia, the United Kingdom and Finland, France and India, as well as Italy and India. In the analysis of keyword co-occurrence, the results highlighted that the most frequent co-occurrences with the field of technological business development are terms such as technology, economy, strategic planning, research and development management, innovation, communities and institutions, product development, project management, small businesses, and new business development.

**Keywords:** *Business development, Technological business development, Technology, Scientometrics, Bibliometrics.*

## 1 Introduction

Businesses based on new technology, due to their high level of innovation, contribute significantly to the growth of new industries and the revitalization of existing ones. These businesses, besides being innovation and growth-oriented, have limited internal resources if they are in their nascent stages. In these companies, development is a challenging, time-consuming, and costly process (Björgum & Sørheim, 2015). The term "business development" has attracted considerable attention from many experts and specialists in the field of management and entrepreneurship. For instance, a Google search in November 2005 revealed 59,300,000 records in this field. However, if we examine the definition of "business development" in scientific databases, we realize that there is still no unified definition of this concept, and theorists have defined the term from various perspectives (Kind & zu Knyphausen-Aufseß, 2007).

The Economic Development Services Company in 2007 defined business development as an activity that leads to an increase in a company's profits, production, or potential services expansion. Davis and Sun (2006) describe business development as a capability comprising procedures and skills that, by identifying opportunities, directing, and utilizing resources, enable growth by expanding value-creating activities in technology or market areas that are relatively new to the company. According to them, the set of business development procedures typically includes processes for identifying opportunities, generating and qualifying ideas, articulating business concepts, developing products/services, commercialization, licensing, and internal or external investment or acquisition (Davis & Sun, 2006).

Some researchers consider the use of business development methods as a subset of entrepreneurial behaviors of companies and believe that business development activities can lead to an improvement in companies' innovative performance by leveraging external resources for development (Keil et al., 2008). On the other hand, the need for business development in advanced

technology companies, especially those in which information technology is a core activity, appears essential for remaining competitive. In fact, the use of information technology related to information exchange and business relationships are crucial foundations for producing the type of information that impacts business development (Lindh & Rovira Nordman, 2017). The aim of business development is to create growth through expanding existing markets or through developing new product or service markets that are new to the company. It can even be said that business development may lead to the creation of new business organizations or units within or outside the company (Davis & Sun, 2006).

If the term "technological business development" is searched in a citation database such as Scopus, it is evident that researchers have increasingly focused on this area, especially in recent years. As Chart 1, based on the output from the R software shows, there has been an annual increase in scientific studies in the field of "technological business development," indeed indicating a certain accumulation of knowledge in this area. Some researchers, like Eidhoff and Poelzl (2014), suggest that one reason for the current focus on technological business development could be found in the increasing need for growth among companies. Given the environment characterized by globalization, increased competition, and highly varied customer needs, growth has become a fundamental challenge for most companies. Moreover, many markets are saturated. Consequently, companies can no longer continue to grow within their current boundaries. Instead, they must adapt to new market needs and identify new opportunities for further business development beyond existing business sectors. There are many ways companies can implement internal and external growth to enable further development of their business. The key to unlocking potential growth opportunities lies in companies' abilities to anticipate changes in the market, foresee trends and customer needs, and derive appropriate strategic actions from these dominant conditions. By doing so, they not only compete but also

shape their competitive environments and become market-leading innovators. Thus, the ability to innovate in conjunction with developing new business sectors enables companies to capitalize on new growth opportunities. Many companies have recognized the importance of continuous growth and the challenges associated with it, and have begun to integrate new activities as business development within their organizations (Eidhoff & Poelzl, 2014).

Over the years, we have witnessed an increase in the number of articles and scientific documents in the field of technological business development. This growth and accumulation of knowledge underscore the necessity of conducting a study with a systematic literature review approach using bibliometric methods to identify gaps in this field, uncover trends in studies, and elucidate performance and network patterns.

## 2 Methods and Materials

Bibliometrics, also known as scientometrics, is a common and comprehensive strategy for examining and analyzing a vast array of empirical data. Using this strategy, analysts are capable of identifying gaps and improving various research across different time periods. This strategy serves as a complement to meta-analysis, where a smaller review of past archives is presented using measurable indicators. In these studies, which form part of a rigorous thought process about writing, the researcher carries out their research effectively and in alignment with specific steps.

In the current study, initially, the analyst chose the topic and context for reflection. Accordingly, using the publish or perish software, the framework and boundaries of the issue were defined, and subsequently, the growth and

accumulation of knowledge in the field of "technological business development" led to the identification of gaps and shortcomings in previous research for conducting a study with a scientometric approach. Following the identification of the problem, the objectives must be examined from both functional or descriptive aspects, and network analysis of the documents. The research objectives are then outlined.

### 2.1 First Category: Functional or Descriptive Objectives

First Objective: Identify the most influential author in the field of technological business development.

Second Objective: Identify the most influential journal in the field of technological business development.

Third Objective: Identify the most influential country in the field of technological business development.

Fourth Objective: Identify the most influential study in the field of technological business development.

### 2.2 Second Category: Network Analysis Objectives

Fifth Objective: Identify co-citation patterns in the field of technological business development.

Sixth Objective: Identify co-occurrence patterns of keywords in the field of technological business development.

In the next stage, the strategy or roadmap for the current research has been drawn. In designing the strategy, attention was paid to several important aspects including objectives, research resources, and the tools and procedures of research. In this research, the Scopus citation database and its documents were chosen for analysis. Furthermore, the search procedures and criteria are shown according to [Table 1](#).

**Table 1**

#### *Search Procedures and Strategies*

Description	Criteria
Scopus	Citation database
"BUSINESS DEVELOPMENT" AND "TECHNOLOGY", "DEVELOPMENT OF TECHNOLOGICAL BUSINESSES"	Keywords and search command
Journal articles and reviews	Document type
Title, abstract, and keywords	Search area
1984-2023	Search time range
English citation sections	Language

In the following steps, the software best suited to meet the research objectives was selected. Initially, the "publish or perish" software was used to review the research area and develop the theoretical foundations of the study.

Subsequently, the powerful analytical software R and VOSviewer were used to address the descriptive and performance objectives as well as the network analysis goals. It is important to note that the relevant documents

were searched on October 11, 2023, and data related to the analysis were collected. After collecting the data in the Scopus citation database, the documents were screened using the PRISMA protocol. Initially, duplicate studies were identified and removed from the analysis basket. Then, studies that were anonymous were eliminated. In the third stage, studies that did not have an English version were discarded, and finally, studies irrelevant in terms of content, title, etc., were removed. In the end, 205 documents were selected for analysis after screening.

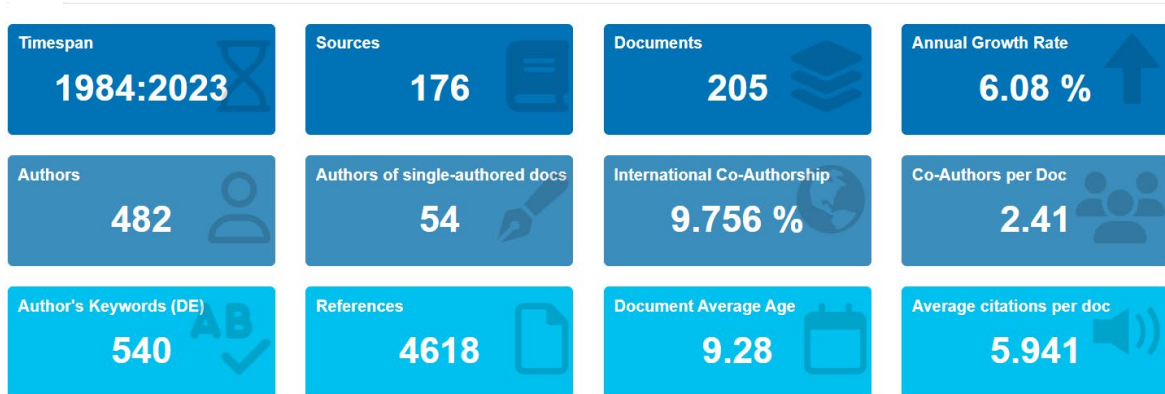
### 3 Findings and Results

After entering the data into the R software, an initial overview of the bibliometric information was examined. The output of [Figure 1](#) shows that, in the time period from 1984

to 2023, a total of 205 documents were analyzed, which were published by 176 different journals. Additionally, the analyses indicate that the annual growth rate of scientific output in the field of technological business development is 6.08%. Furthermore, 482 authors have published these documents, with 54 of them having authored these documents individually. Additionally, the software output shows that the rate of international collaborations in the field of technological business development is 9.75%, and the average collaboration rate per document is 2.41. The software output also reveals that authors and researchers in the field of technological business development have used 540 different keywords to categorize their 4618 studies, with the average age of these articles since publication being 9.28 years and the average number of citations per article being 5.941.

**Figure 1**

*Main bibliometric data overview; sourced from R software*



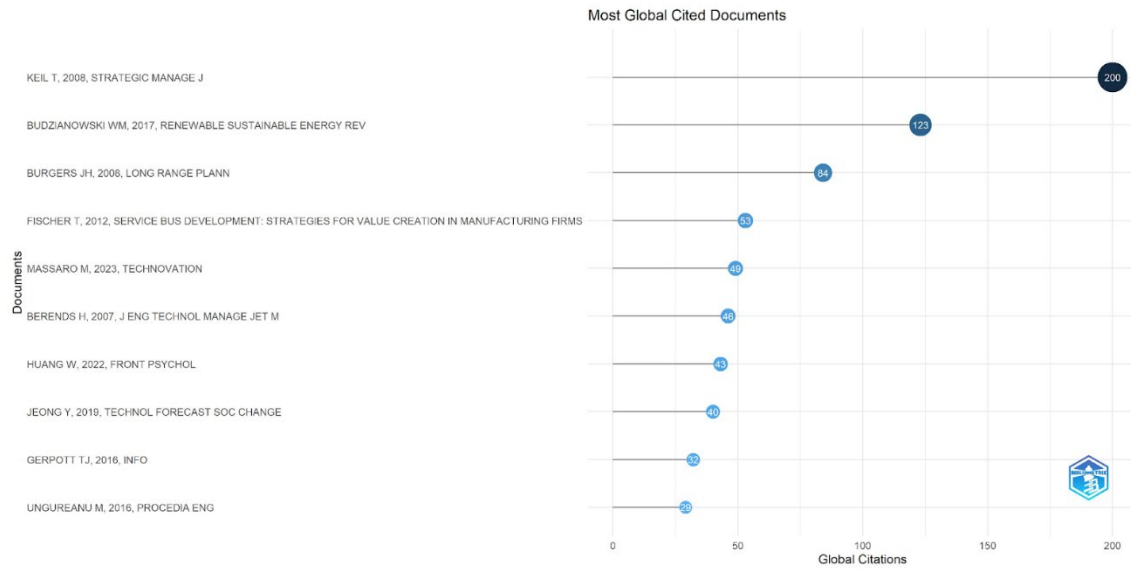
#### 3.1 Performance Analysis of Documents

The first objective of the current research is to identify the most influential author in the field of technological business development. According to Han et al. (2020), one of the

most important analyses in studies that employ a bibliometric approach is to examine authors who have had the most significant impact in the specified scientific field. [Figure 2](#) shows the authors with the most citations in the field of technological business development based on the number of citations.

**Figure 2**

*Authors with the most citations according to R software output*



As Figure 2 shows, the article by Keil, written in 2008 and titled "The impact of governance methods and the articulation of external business development activities on innovative performance," has received the most citations and is indeed the most influential document in the field of

business development. Additionally, the R software output indicates that the average number of citations to articles in the field of technological business development was higher in 2022 (Figure 3).

**Figure 3**

*Average number of citations per article by year according to R software output*

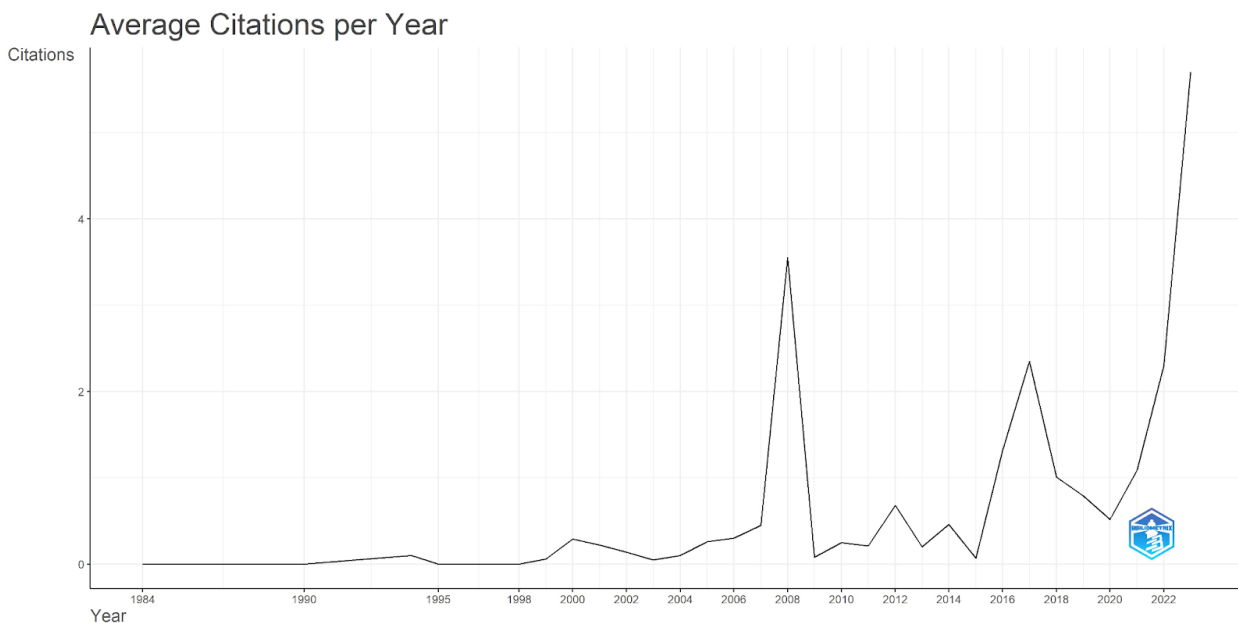
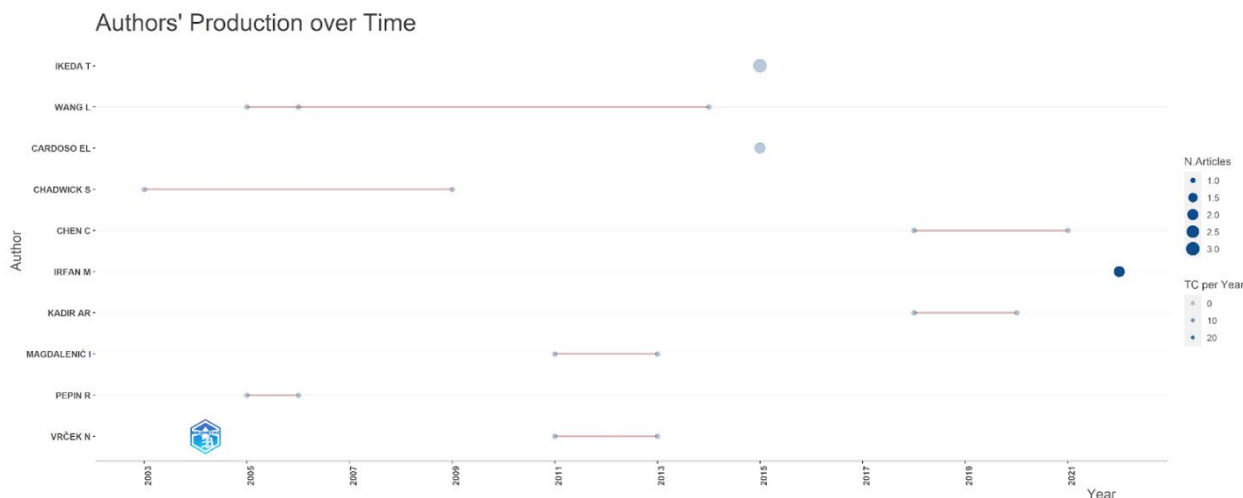


Figure 4 shows authors who have published the most documents in the field of technological business development. In this figure, the larger and more vibrant the

circles, the more documents the particular author has published. As shown, Ikeda has the highest number of published documents.

Figure 4

Authors with the most scientific outputs in the field of technological business development based on R software output



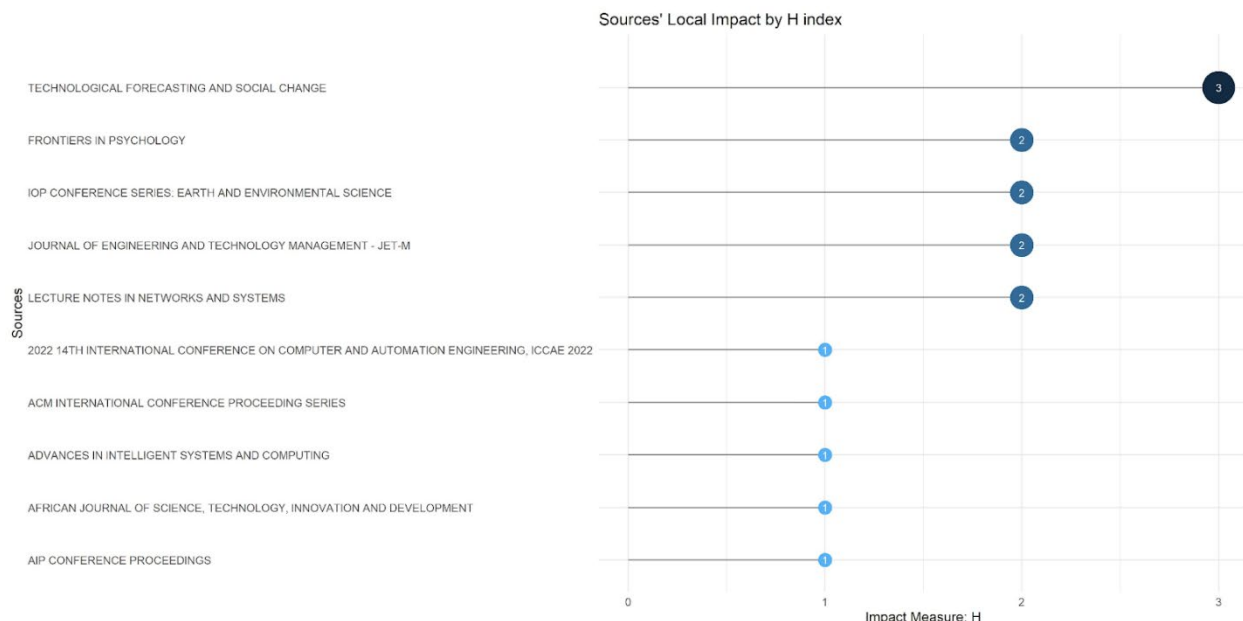
3.2 Performance Analysis of Journals

As shown in the main document data overview in Figure 1, 205 studies were published in 176 journals, and these journals, which had the most significant impact (citations) in

terms of scientific output, are specified in Table 2. Figure 5 shows the ten most influential journals that have published scientific outputs in the field of technological business development. As this figure indicates, the journal Technological Forecasting and Social Change is the most influential in this area.

Figure 5

Influential journals in the field of technological business development based on R software output



3.3 Performance Analysis of Countries

Figure 6 shows the countries that have the most citations for documents published in the field of technological

business development. As indicated, documents published in Finland have received the most citations in this field. Following Finland, with some difference, are Poland, China, Korea, the Netherlands, the United Kingdom, Germany, India, the United States, and Romania.



Figure 6

Countries with the most citations according to R software output

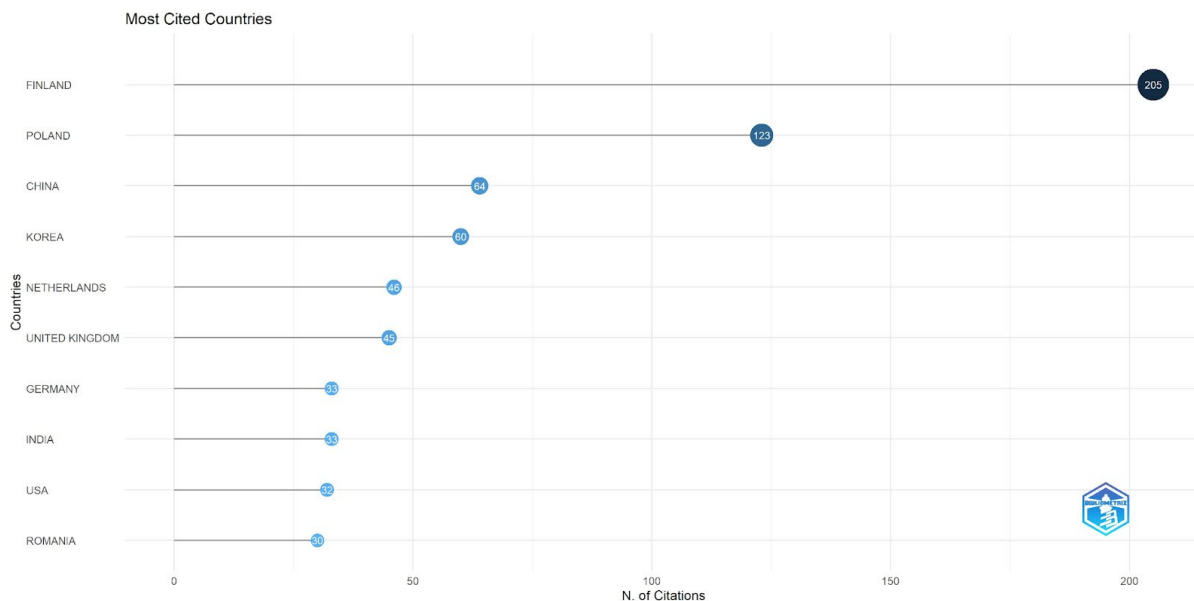


Figure 7 and Figure 8 show the software output for countries that have the most scientific outputs in the field of technological business development. As the figures show,

the United States has the most scientific outputs, followed by China, Indonesia, Finland, Japan, Ukraine, India, Sweden, South Korea, and the United Kingdom.

Figure 7

Scientific outputs of countries over time based on R software output

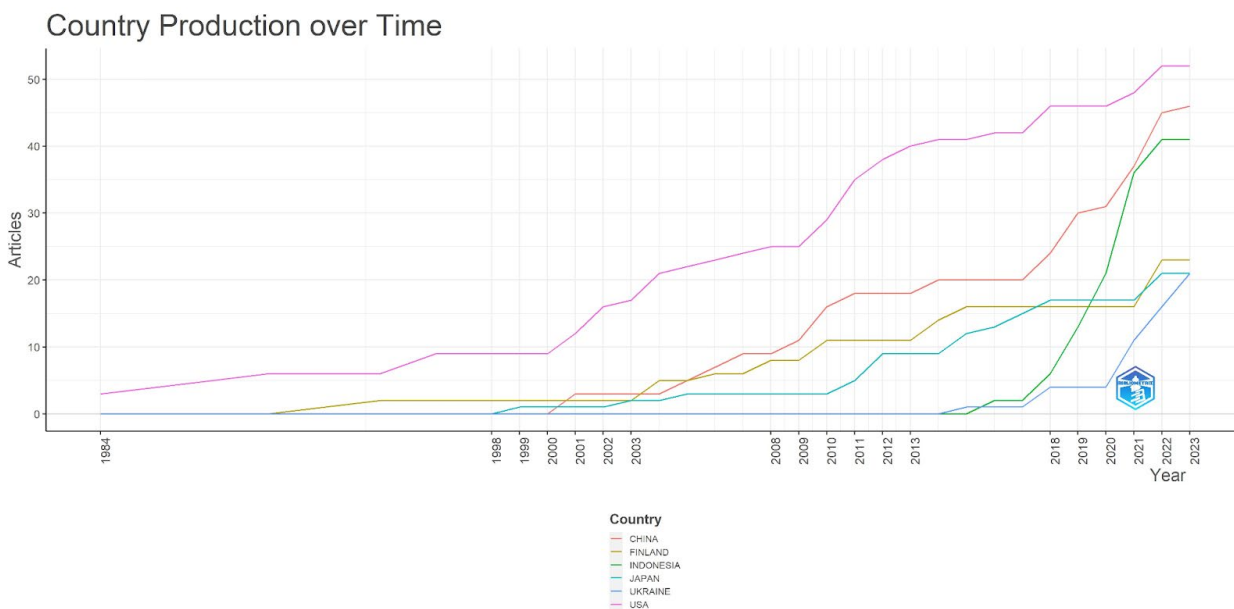
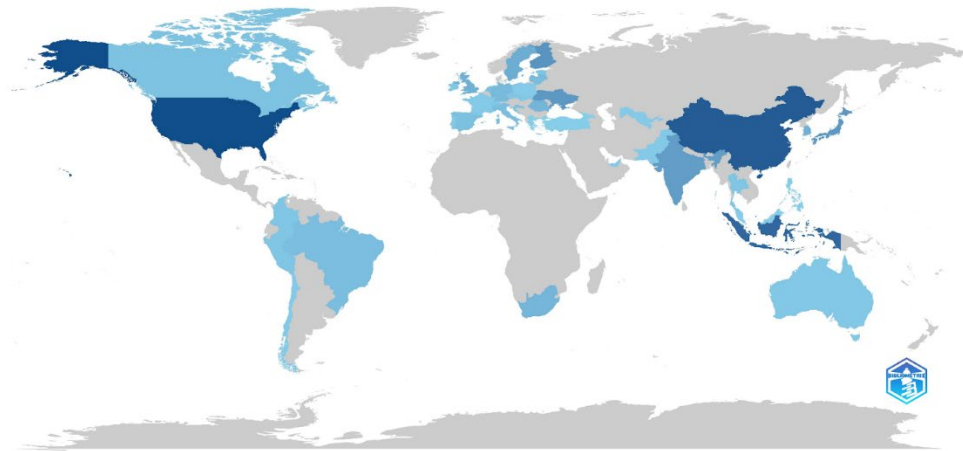


Figure 8

Map of countries with the most scientific outputs based on R software output

Country Scientific Production



3.4 Network Analysis

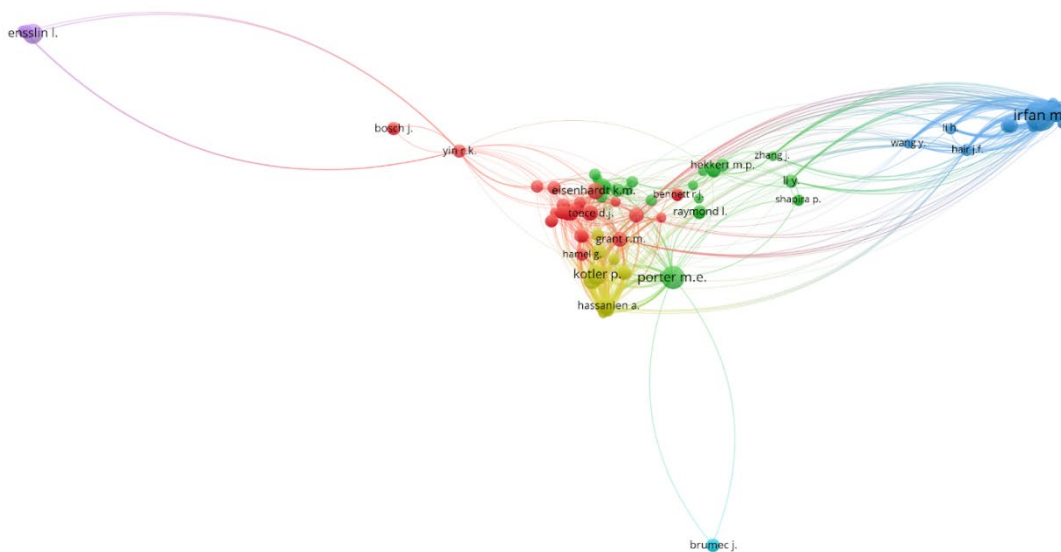
For the network analysis in the current research, co-citation networks of authors, co-citation networks of countries, and co-occurrence networks of keywords were examined to achieve the research objectives, which will be analyzed further.

3.4.1 Co-citation Network of Authors

Figure 9 shows the co-citation network of authors in the field of technological business development. Out of the 205 studies selected for analysis, documents were chosen that had at least one co-citation among authors in this field. As this figure shows, the co-citation network of authors consists of 6 clusters, indicated by six colors, with 99 nodes and 932 links.

Figure 9

Co-citation network of authors in the field of technological business development based on VOSviewer software output





3.4.2 Co-citation Network of Countries

Figure 10 and Table 2 display the co-citation network of various countries that have published documents in the field

of technological business development. In Figure 10, countries with at least one collaborative document are shown on the map. As evident from the table, China and Pakistan have the most collaborative documents in this field, with two documents each.

Figure 10

Map of country collaborations in the field of technological business development based on R software output

Country Collaboration Map

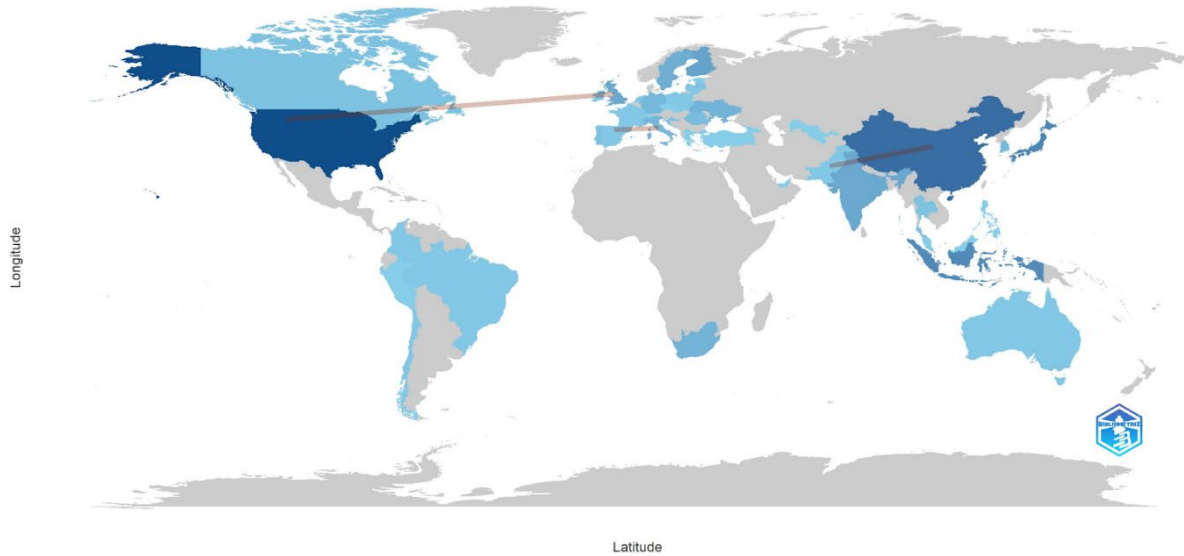


Table 2

International Collaborations based on R software output

Frequency	Destination Country	Origin Country
1	Pakistan	Chile
1	Chile	China
1	Georgia	China
2	Pakistan	China
1	United Kingdom	China
1	North Macedonia	Croatia
1	United Kingdom	Finland
1	France	India
1	Italy	India

3.4.3 Co-occurrence Network of Keywords

In the co-occurrence network of keywords, from 205 studies, documents were selected that had at least two coinciding keywords. The co-occurrence network of these keywords is shown in Figure 11. As this figure demonstrates, the network consists of 12 clusters, indicated by 12 colors,

with 205 items or nodes and 1891 links. The analysis shows that the most frequent co-occurring keywords with technological business development include technology, economy, strategic planning, research and development management, innovation, communities and institutions, product development, project management, small businesses, and new business development. Table 3 lists these co-occurring keywords from most to least frequent.

Figure 11

Co-occurrence network of research keywords based on VOSviewer software output

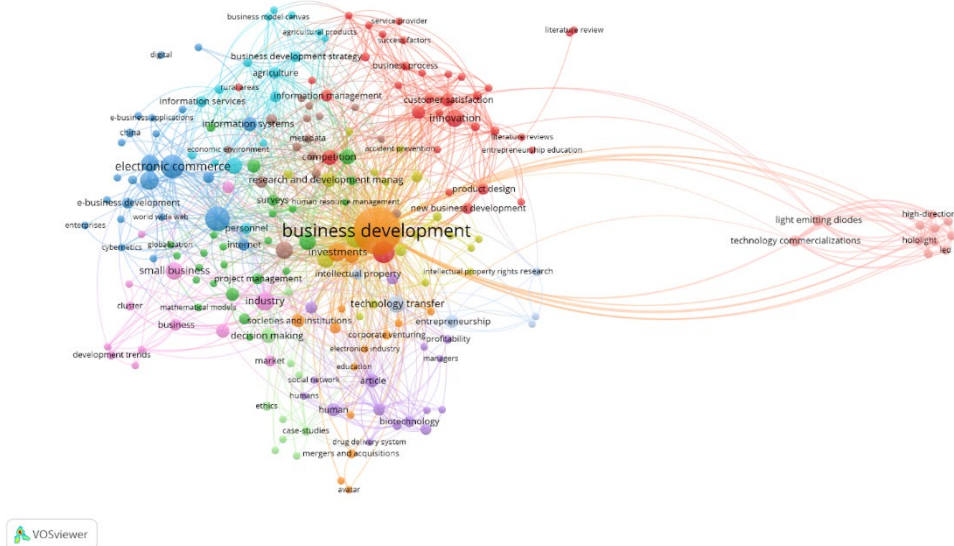


Table 3

Closest co-occurring keywords in clusters based on R software output

Closeness	Distance	Cluster	Node
0.011235955	102.8710717	1	Technology
0.00990099	1.812425119	1	Economy
0.010869565	54.76791622	1	Strategic Planning
0.00990099	17.39746587	1	Research and Development Management
0.009803922	0	1	Innovation
0.010309278	12.13305454	1	Communities and Institutions
0.007246377	0	1	Product Development
0.0078125	0.278846154	1	Project Management
0.009433962	0	1	Small Businesses
0.00729927	0	1	New Business Development
0.016949153	851.7214845	2	Business Development
0.011235955	44.10787167	2	Commerce
0.010309278	20.7820624	2	Investment
0.010638298	6.261814181	2	Marketing
0.01010101	2.175588631	2	Competition
0.010204082	18.17856795	2	Decision Making
0.010416667	8.990001878	2	Planning
0.009803922	10.47646494	2	Sustainable Development
0.009345794	0	2	Technology Transfer
0.01	12.49835931	2	Information Systems
0.009803922	1.459627329	2	Sales
0.009803922	7.786389695	2	Customer Satisfaction
0.00952381	0	2	Agriculture
0.009433962	0	2	Information Management
0.00952381	0	2	Regional Planning
0.007407407	1.064027149	2	Surveying
0.009615385	0.45	2	Business Development Strategy
0.00952381	0	2	Cost
0.009615385	0	2	Data Mining

0.009615385	0	2	Finance
0.009615385	0.175914994	2	Knowledge Management
0.00990099	0.733607487	2	Product Design
0.009615385	0	2	Quality Control
0.011111111	99.53469086	3	Information Technology
0.011363636	41.18333081	3	E-commerce
0.01010101	8.521063605	3	Industry
0.008064516	0.86144124	3	E-business
0.01010101	1.85112184	3	Industrial Economy
0.009708738	0	3	Economic and Social Effects
0.01010101	0.315740741	3	Risk Assessment
0.01010101	3.79699079	3	Internet
0.008064516	0.972473605	3	Information Services
0.007246377	0	3	Personnel
0.009708738	3.995285664	3	Small and Medium Enterprises

Figure 12 displays a thematic map of keywords in the field of technological business development. This chart is divided into four quadrants based on the density of topics (density) and their relative importance (centrality). The first quadrant (upper right) contains topics that are both well-developed and important for the structure of the research field, known as driver topics. The second quadrant (upper left) includes niche topics that are smaller and less numerous

compared to the main research areas. The third quadrant (lower right) contains fundamental and basic topics in the field of technological business development that have the most papers. Additionally, the fourth quadrant (lower left) includes emerging topics in the field of technological business development that are relatively new (Kare & Jin, 2022).

Figure 12

Thematic map of keywords in the field of technological business development based on R software output

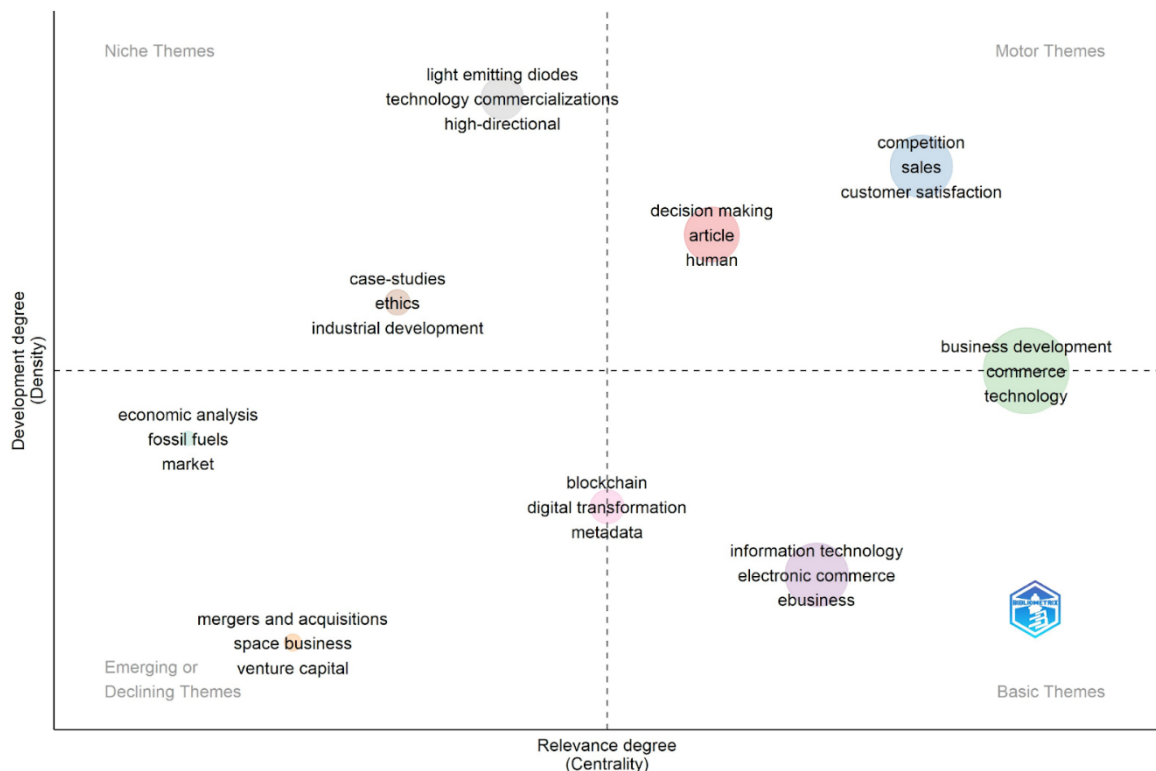


Figure 13 shows the trend of topics in the field of technological business development by year and also by the quantity, indicated by the size of the circles. As this chart

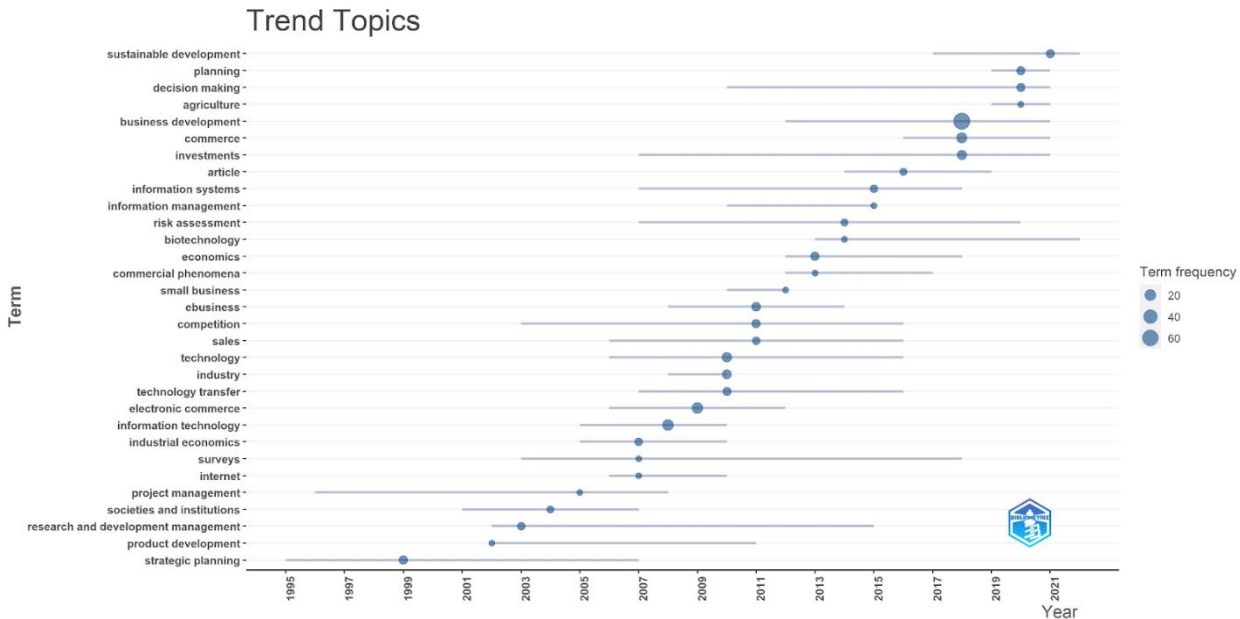
illustrates, from 1999 onwards, topics such as strategic planning, product development, research and development management, communities and institutions, project

management, the internet and survey and industrial economics in 2007, information technology in 2008, e-commerce in 2009, technology transfer, industry, and technology in 2010, sales, competition, e-business in 2011, small businesses in 2012, business phenomena and economy in 2013, biotechnology and risk assessment in 2014,

information management, information systems in 2015, papers in 2016, investment, trade and business development in 2017, agriculture, decision-making and planning in 2019, and sustainable development in 2021 have shown the most co-occurrence with the field of technological business development.

Figure 13

Trend of topics related to the field of technological business development based on R software output



4 Discussion and Conclusion

The current research, employing a systematic review approach, aimed at descriptive and performance analysis as well as network analysis of documents published in the field of technological business development. To this end, the publish or perish software initially determined the framework and scope of the published documents in this field, and the Scopus citation database was chosen for further data collection. Using a search strategy, 275 documents were collected, which were then screened using the PRISMA protocol. Ultimately, after screening, 205 studies remained in the research analysis basket. These documents were then analyzed using VOSviewer and R software to adequately address the six primary research objectives.

The analyses indicate that the leading author in the field of technological business development, who has the most global citations in this area, is Keil. His article, titled "The impact of governance methods and the articulation of external business development activities on innovative performance," was published in 2008. Indeed, his paper is

the most important and most cited in this field. In terms of the most influential journal, the analyses show that the journal Technological Forecasting and Social Change is the most influential in the field of technological business development. As for the most influential countries, Finland has the highest number of citations in the field of technological business development, followed by Poland, China, Korea, the Netherlands, the United Kingdom, Germany, India, the United States, and Romania.

The results of the network analysis in this study clarified that based on the co-citation patterns of researchers, a cluster core author named Theis has the most co-citations among various authors. Additionally, the co-citation analysis of countries shows that there is established collaboration between Pakistan and Chile, Chile and China, Georgia and China, Pakistan and China, the United Kingdom and China, Macedonia and Croatia, North Macedonia and Croatia, the United Kingdom and Finland, France and India, as well as Italy and India. In the analysis of keyword co-occurrence, the results highlighted that the most frequent co-occurrences with the field of technological business development are terms such as technology, economy, strategic planning,

research and development management, innovation, communities and institutions, product development, project management, small businesses, and new business development.

Like many other studies, the present research faced limitations in its execution. Given that the study adopted a bibliometric and scientometric approach and the researcher dealt with a large volume of data, the high number of documents did not allow for reading and analyzing each one individually; the researcher only analyzed them based on the PRISMA protocol. Furthermore, only the Scopus citation database was used for data analysis in this study, which might result in the loss of some information. Therefore, it is recommended that future researchers use other citation databases such as Web of Science and other studies with a systematic literature review approach like meta-analysis and meta-synthesis to gain a richer understanding in the field of technological business development.

#### Authors' Contributions

All authors have contributed significantly to the research process and the development of the manuscript.

#### Declaration

In order to correct and improve the academic writing of our paper, we have used the language model ChatGPT.

#### Transparency Statement

Data are available for research purposes upon reasonable request to the corresponding author.

#### Acknowledgments

We would like to express our gratitude to all individuals helped us to do the project.

#### Declaration of Interest

The authors report no conflict of interest.

#### Funding

According to the authors, this article has no financial support.

#### Ethical Considerations

In this research, ethical standards including obtaining informed consent, ensuring privacy and confidentiality were observed.

#### References

- Bjørgum, Ø., & Sørheim, R. (2015). The funding of new technology firms in a pre-commercial industry – the role of smart capital. *Technology Analysis & Strategic Management*, 27(3), 249-266. <https://doi.org/10.1080/09537325.2014.971002>
- Davis, C. H., & Sun, E. (2006). Business Development Capabilities in Information Technology SMEs in a Regional Economy: An Exploratory Study. *The Journal of Technology Transfer*, 31(1), 145-161. <https://doi.org/10.1007/s10961-005-5027-1>
- Eidhoff, A. T., & Poelzl, J. (2014). Business development: What's behind the name. *International Journal of Economic Practices and Theories*, 4(5), 835-844. <https://citeseerx.ist.psu.edu/document?repid=rep1&type=pdf&doi=a86eeade8fd40486985c463418d54c26fba3c271>
- Keil, T., Maula, M., Schildt, H., & Zahra, S. A. (2008). The effect of governance modes and relatedness of external business development activities on innovative performance. *Strategic management journal*, 29(8), 895-907. <https://doi.org/10.1002/smj.672>
- Kind, S., & zu Knyphausen-Aufseß, D. (2007). What is "Business Development"? — The Case of Biotechnology. *Schmalenbach Business Review*, 59(2), 176-199. <https://doi.org/10.1007/BF03396747>
- Lindh, C., & Rovira Nordman, E. (2017). Information technology and performance in industrial business relationships: the mediating effect of business development. *Journal of Business & Industrial Marketing*, 32(7), 998-1008. <https://doi.org/10.1108/JBIM-12-2016-0282>