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VISUAL MAPPING AND BIBLIOMETRIC ANALYSIS OF PUBLICATIONS ON GLOBAL COMPETITIVENESS

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Muhittin Adıgüzel, İstanbul Ticaret Üniversitesi İşletme Fakültesi İktisat Bölümü'nde Dr. Öğr. Üyesi'dir. Uzmanlık alanları olan makro iktisat ve uluslararası iktisat alanlarında ders vermekte olup küreselleşme ve küresel rekabet gücü konularında çalışmalar yapmaktadır.

Selçuk Nam, Sakarya Üniversitesi Adapazarı Meslek Yüksekokulu Mülkiyet Koruma ve Güvenlik Bölümü' nde Dr. Öğr. Üyesi'dir. Araştırma ilgi alanları; organizasyon teorileri, yönetim ve strateji, örgütsel davranış ve insan kaynakları yönetimidir.

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Abstract

One of the primary goals of a country is to increase the real income of its people in convenient free market conditions and the long run. Global competitiveness is also related to the ability to produce goods and services following the standards of international markets.

Objective: The main purpose of this research is to reveal and make the bibliometric analysis of the publications, researchers, related institutions, countries and their connections published in the field of global competitiveness between 1991-2021 through visual mapping.

Method: The current data of the research were collected from the publications indexed in the Web of Science database in January 2022. We analyzed the data according to inclusion and exclusion criteria of 613 articles published in 426 journals. In the research, we made common word analysis of key concepts, citation analysis, common citation analysis, institution/university analysis, and country analysis of publications on "global competitiveness."

Findings: The findings determined that those working on the concept of global competitiveness discussed the basic assumptions of global competitiveness and the basic concepts in this field together. Another finding is that the interest in global competitiveness is increasing day by day, and the interest in the subject is relatively higher in developing and developed countries.

Originality: Co-author and citation analyses show that researchers from different universities and countries have a working culture. In addition, the interest shown in the issue of global competitiveness shows that scientific institutions have an important place in the development of global thought.

Keywords: Global Competitiveness, Bibliometric Analysis, Visual Mapping, Co-citation Analysis, Co-word Analysis

JEL Classification: F63, O19

KÜRESEL REKABET GÜCÜ KONUSUNDAKİ YAYINLARIN GÖRSEL HARİTALANDIRILMASI VE BİBLİYOMETRİK ANALİZİ

Özet

Bir ülkenin temel amaçlarından biri, uygun serbest piyasa koşullarında ve uzun vadede halkının reel gelirini artırmaktır. Küresel rekabet gücü aynı zamanda uluslararası piyasaların standartlarını takip ederek mal ve hizmet üretme yeteneği ile de ilgilidir.

Amaç: Bu araştırmanın temel amacı, 1991-2021 yılları arasında küresel rekabet gücü alanındaki yayınların, araştırmacıların, ilgili kurumların, ülkelerin ve bunların bağlantılarının görsel haritalama yoluyla ortaya çıkarılması ve bibliyometrik analizinin yapılmasıdır.

Yöntem: Araştırmanın güncel verileri, Ocak 2022' de Web of Science veri tabanında indekslenen yayınlardan toplanmıştır. Veriler, 426 dergide yayınlanan 613 makalenin dahil edilme ve hariç tutulma kriterlerine göre analiz edilmiştir. Araştırmada "küresel rekabet gücü" konulu yayınlardaki anahtar kavramların ortak kelime analizi, atıf analizi, ortak atıf analizi ve ülke/kurum analizi yapılmıştır.

Bulgular: Bulgular, küresel rekabet edebilirlik kavramı üzerinde çalışanların, küresel rekabet edebilirliğin temel varsayımlarını ve bu alandaki temel kavramları birlikte tartıştıklarını belirlemiştir. Diğer bir bulgu ise küresel rekabet gücüne olan ilginin her geçen gün arttığı ve bu ilginin göreli olarak gelişmiş ülkelerde daha yüksek olduğudur.

Özgünlük: Ortak yazar ve atıf analizleri, farklı üniversitelerden ve ülkelerden araştırmacıların ortak çalışma kültürüne sahip olduğunu göstermektedir. Ayrıca küresel rekabet edebilirlik konusuna gösterilen ilgi, küresel düşüncenin gelişmesinde bilimsel kurumların önemli bir yere sahip olduğunu göstermektedir.

Anahtar Kelimeler: Küresel Rekabet Gücü, Bibliyometrik Analiz, Görsel Haritalama, Ortak Atıf Analizi, Ortak Kelime Analizi

JEL Sınıflandırması: F63, O19

INTRODUCTION

Although various methods have been developed to quantify scientific publications, which have an important role in developing and disseminating science, the most preferred method is bibliometric analysis. In bibliometric research, web-based research is carried out in various sample sizes. While some of these cover a relatively small sample, some may cover a very large area (Laengle et al., 2017; Merigo et al., 2017). Recently, the increase in accessing rich data from databases such as Wosveawer and Scopus increases the possibility of indexing Web information, cataloging, accessing metadata, link analysis, and visual mapping. The increased opportunity to see how the studied area has evolved and made suggestions based on factual data increases the importance of bibliometric research (Law & Cheung, 2008; Tang, Liao & Su, 2018). This has recently contributed to the spread of bibliometric research. Semantic networks, web ontology, Webometry, Cybermetry, Web Intelligence (WI), Web Competitive Intelligence (WCI) and Web mining and new technologies of Web services allow visual mapping and reveal the general view of the area examined bibliometric analysis.

With the increase in the number of scientific publications and ease of access, the availability of databases and various software to provide appropriate infrastructure for certain statistical studies increases the validity and reliability of bibliometric research. This situation is also very useful in guiding researchers to see how the literature has evolved (Cobo et al., 2011). In this study, we aimed to make a bibliometric analysis covering the period of 1991-2021 better understand the current structure of the global competitiveness literature. The fact that 1439 researchers, 849 different institutions and 77 different countries showed interest in the subject of global competitiveness in the period under review shows the importance given to the concept of global competitiveness. The increase in the interest in question and the publications and citations to publications is one of the important motivational tools that guide the emergence of this research.

We benefited from VOSviewer software and the clustering-based network inference algorithm running in this software. Bibliometric research allows comparisons between countries, institutions, theories, approaches and models on various subjects and to see the general trend in the field. Bibliometric researchers aim to see the citation analysis, co-citation analysis, the efficiency of individuals, institutions or countries, and the trends of publications such as books and articles in a certain period (Koehler, 2001:120). This study aims to test the validity of the basic assumptions of the concept of global competitiveness. For this purpose, the general trend of the literature on global competitiveness between the years 1991-2021 was tried to be revealed.

For this reason, it aims to map the trend in the global competitiveness literature through bibliometric analysis and reveal the publications' descriptive information with bibliometric analysis. Thanks to this bibliometric study on global competitiveness, visual mapping and bibliometric analysis of the current state of the literature on the concept in question are important in guiding the field's development. An important point here is that bibliometric analyzes are limited to visualizing only

quantitative-statistical data of the relevant literature. For this reason, it is important to make some inferences by interpreting the findings obtained from bibliometric analyzes in the light of the literature and with a critical perspective. We think that this research will guide the next researchers to fill the gap in the literature by showing the bibliometric findings of the related literature and showing the gaps in the field.

Bibliometric studies measure the scientific impact of journals, authors, research institutions and analyze current issues, citations of publications and researchers, patterns of scientific collaboration, interdisciplinary indicators, etc. (Laengle et al., 2018). Bibliometric research is of great importance, especially seeing how the literature has evolved (Merigo et al., 2017). Using bibliometric techniques to analyze publications' information structure and scientific characteristics on specific topics guides potential authors. Bibliometric research is also very functional in providing some reference for the future development of the journals under review. In addition, revealing the current status and trend of the publications has an important role in determining the journal's publication policy in the future (Xu et al., 2018). This bibliometric study aims to contribute to the literature by identifying the most productive authors, institutions and countries, citation analyses and co-citation analyses on global competitiveness. For this purpose, the research aimed to answer the following questions:

1. *What is the quantitative view of the articles on global competitiveness in the examined period?*
2. *Which journals published the most on global competitiveness in the period under review?*
3. *Who are the most productive and contributing authors to the global competitiveness literature in the period under review?*
4. *What is the publication performance of countries and universities in terms of global competitiveness in the examined period?*
5. *Which concepts about global competitiveness were studied the most during the period under review?*
6. *Who are the most cited authors on global competitiveness in the period under review?*
7. *What are the most commonly cited articles and journals on global competitiveness in the examined period?*
8. *Does the distribution of articles on global competitiveness in the examined period comply with the Bradford Law?*

CONCEPTUAL FRAMEWORK: COMPETITIVENESS

The concept of competition has always had central importance, especially in macroeconomic thought. The concept of competition is one of the cornerstones of economic theory and forms the core of many economic theories. Classical economics is an approach against mercantilism, which advocates state intervention in trade, that is, protectionism because free trade based on competition will have economic and social costs. A competitive free market assumption suggests that the market will have

the most favorable conditions with no outside interference (Aktaş, 2003; Krugman, 1994; Enright & Newton, 2004). As a result of this understanding, competitiveness has become popular. The concept of competitiveness in general; analyzed at the firm, industry, and country level. Firm-Level competitiveness is related to the firm's ability to innovate and create added value (Baron & Kemp, 2004; Davis & Weinstein, 2003). Industrial Competitiveness is the ability of a local firm to compete in the same industry but in different country markets. Competitiveness at the country level is the ability of a country to produce goods and services and innovate against other countries, largely due to firms and industries. Another determinant of the country's competitiveness is its capacity to produce advanced technology supported by innovations and inventions that require interaction with foreign markets (Aktan & İstiklal, 2004).

In international trade theories, competition reflects a nation's power over its international rivals in producing international goods and services under free and fair market conditions. Competitiveness also includes increasing the real incomes of a nation's citizens (Durand et al., 1998; OECD, 2000). Therefore, competitiveness is an important factor in the creation of national welfare. Competitiveness also reflects the level at which goods and services have some comparative advantage. Although Porter has developed different approaches such as Porter's five powers and the diamond model to measure competitive advantage (Porter, 1990; Sim et al., 2003), empirical research continues in many areas to develop measures that better measure the competitiveness of each industry (Bess, 2006; Guan et al., 2006; Zanakis & Becerra-Fernandez, 2005). Concepts and analyses related to competitiveness are of great importance in showing the field's main evolutionary trend.

Global competitiveness and its measurement

The World Economic Forum (WEF), the Organization for Economic Cooperation and Development (OECD) and the International Institute for Management Development (IMD) see global competitiveness as market success resulting in a country's overall welfare increase. The World Economic Forum defines competitiveness as a level of productivity that will encompass all institutions, policies and production factors that will ensure sustainable growth in a country. According to OECD, global competitiveness is the ability of a country to produce products that can compete with foreign countries by increasing its real national income in free-market conditions (Wang et al., 2004; Fisher & Kakkar, 2004). With the increasing level of global competition globally, it is one of the powerful tools to gain a competitive advantage. The Global competitiveness of countries is concentrated in certain sectors, and this shows that no country has the same advantages in terms of competitiveness in all sectors. When evaluated in terms of global competitiveness, transaction costs are an important factor in trade products between countries. One of the other important factors in determining global competitiveness is labor productivity. This situation shows that it is impossible to equalize international factor prices and some countries have competitive advantages in terms of global competitiveness.

Economic development levels of countries are measured in terms of different types of development, namely factor-based development, productivity-based development, and innovation-based development. However, determining countries' global competitiveness is not as easy as stated here. For this purpose, some standards have been developed to determine global competitiveness. The global competitiveness index (GCI) is generally accepted in measuring the competitiveness of countries. GCI measures the global competitiveness of countries over twelve parameters. Twelve basic components and three basic factors formed by complementary data are used to calculate the index. GCI's first basic factor is the "Basic Needs" parameter. This parameter; consists of data on institutions, infrastructure, macroeconomic environment, health and basic education. The second is "Productivity Enhancing Factors," and these factors are; It consists of a combination of data such as higher education and vocational education, the efficiency of the goods market, the efficiency of the labor market, the development of the financial market, technological readiness and the size of the market. The third factor is the level of development of the labor market and innovation and diversity factors, which include data on innovation (Ovalı, 2014).

The Global Competitiveness Index has been preparing the GCI since 2004, based on theoretical and empirical research, to determine economies' competitiveness levels. In the reports on which this index is based, data is collected from executive opinions and more than 110 parameters obtained from the open sources of the United Nations and other international organizations. Each of the variables used in the GCI represents an area that is considered an important determinant of competitiveness. In the preparation of the report, a representative sample of business leaders from their own countries is collected through the Executive Opinion Survey (World Economic Forum, 2011). In recent years, growth through productivity, the main global competitiveness variable, has started to gain more importance. Today, developed economies prefer to increase their global competitiveness by increasing productivity through better existing factors and resources (World Economic Forum, 2007).

METHOD

Research Design

Bibliometric analysis is a research method used to visualize the research area's general view and group researchers, articles, journals, keywords, and institutions. Bibliographic data from scientific studies is collected, processed, and analyzed quantitatively in bibliometric analysis. In these analyzes, in addition to general descriptive statistics, more sophisticated analyzes that reveal the intellectual structure of the field, such as citation analyzes, co-citation analyzes, keyword networks and collaboration networks, are used (Zupic & Cater 2015: Cobo et al., 2011; Verbeek et al., 2002; Liu et al., 2015). The bibliometric method is widely used in the literature to reveal the development of a particular subject or field and to explore the intellectual structure (Donthu et al., 2021; Verma & Gustafsson, 2020). The bibliometric method is used to analyze parameters such as the year the articles were published, author, institution, country, keywords, study titles, citation numbers (Zupic & Cater,

2015; Yılmaz, 2017:66; Öztürk, 2021). The difference of the bibliometric method from the literature review because it focuses on evaluating the structure of a particular research area and allows seeing how the publications show a trend in the period under review (Block & Fisch, 2020; Al & Soydal, 2012).

The Bibliometrics method is also preferred because it is convenient to see the development of a discipline in a certain period, its conceptual structures, research results in the discipline and to make meta-analyses. Another technique used to study a particular area is visual mapping. This technique contributes to creating a mind map by presenting the structure of a particular research area with the help of visual maps. Visual maps, which provide the visual presentation of bibliometric data, show performance measures and see the key concepts in a discipline and their interactions with each other (Cobo et al., 2011: 1383).

Data Collection

In bibliometric research, the literature review is done according to key concepts, determination of databases and articles, inclusion and exclusion criteria (Block & Fisch 2020). This research conducted a systematic literature search in WoS databases to identify scientific articles published on global competitiveness according to certain key concepts (Table 1). We conducted a topic query that included all possible naming forms for global competitiveness articles. The study preferred the WoS database because it contains sufficient data for bibliometric analyses in social sciences. Another reason for choosing this database is that it contains the appropriate file type (Cobo et al., 2011; Zupic & Cater 2015). These advantages provide significant convenience in obtaining data, transferring them to the program and performing analysis. We used the inclusion and exclusion criteria shown in Table 2 to exclude publications not considered validated information in the study (Block et al., 2019).

Bibliometric Analysis of Data

As a method, in bibliometric analysis, firstly, the keywords should be determined. Secondly, the search should be done with the keywords determined in the database to be searched, and in the last stage, the bibliographic data set obtained as a result of the scan should be analyzed (Ruhanen et al., 2015; Fahimnia et al., 2015). In the research, we performed the conceptual analysis of 613 articles published in 426 journals, which were determined according to the exclusion and inclusion criteria from 974 articles on global competitiveness, and bibliometric analyzes by extracting the connections between the concepts through visual mapping (Riffe et al., 2014; Barringer et al., 2005; Higuchi, 2016). To present a comprehensive analysis of the global competitiveness domain, we first performed a performance analysis that provides a descriptive overview of the global competitiveness domain based on data from the Web of Science database.

In the data analysis process, we analyzed the number of articles in which key concepts related to global competitiveness were mentioned, the institutions and countries that use these concepts the

most, researchers publishing on the subject, and the most cited publications from these publications. In addition, the distribution of the publications produced by years, the number of citations, the institutions that contributed the most to these publications and the prominent researchers were determined. In the research, 613 data were scanned in the Web of Science (WoS) database as Social Sciences Citation Index (SSCI), Science Citation Index Expanded (SCI-Expanded), Arts and Humanities Citation Index (A&HCI) and Emerging Social Citation Index (ESCI). We reviewed the article. In addition, we analyzed 1439 researchers, 849 different institutions and 77 different countries with bibliometric techniques. We used the VOSviewer software and the clustering-based network inference algorithm running in this software (Waltman et al., 2010; Van Eck & Waltman, 2009). We determined the bibliometric analysis and general trends of publications with data analysis programs that offer different visual maps in the analyzes (Hudson, 1996; Zupic & Cater, 2015). This study used the VOSviewer and Bibliometrix (R-tool) program to visualize the data set, offering advanced and valid techniques (Block & Fisch 2020).

Table 1. Keywords

("global competitiveness") OR ("global competitiveness factor*") OR ("global competitiveness indicator*") OR ("global competitiveness index") OR ("global competitiveness analysis") OR ("global competitiveness approach") OR ("global competitiveness report*") OR ("global competitiveness industry") OR ("global competitiveness initiative") OR ("global competitiveness innovation") OR ("global competitiveness strateg*")

After identifying appropriate databases, we searched for relevant publications using the keywords and Boolean operators shown in Table 1. We conducted a topic query covering all possible naming forms related to the theory to ensure that all articles accurately and fully represent the global competitiveness field are included. As a result of searching for the relevant keywords in Table 1 in the title, abstract or keywords, we identified 974 studies between 1991 and 2021. Then, we performed scanning and filtering for 974 studies.

Tablo 2. Inclusion and Exclusion Criteria

Inclusion criteria	Exclusion criteria
• Articles in business, management and economics, • Research and review articles, • Keywords, Index (SSCI, SCI-Expanded, and ESCI) Language (English), • Year (1991-2021)	• Book, book chapter, papers, index other than SSCI, SCI-Expanded and ESCI • WoS categories and research areas not related to global competitiveness indicators

We included only publications business, management, economics, and English-language articles in the analysis. We excluded conference papers because they are not peer-reviewed, the quality of the information may vary, and they are in the gray literature. We have excluded book chapters not based on empirical information and articles with less scientific rigor. After all the filtering processes, we further filtered the remaining articles to ensure that the selected articles were within the scope of global competitiveness. After the initial filtering, we manually evaluated the titles, abstracts and

keywords of the 642 articles found. In this process, we eliminated 29 articles as they were not in the scope of the research and included 613 articles in the analysis process.

FINDINGS

Descriptive statistics

Descriptive analysis, diagnostic analysis, predictive analysis, and some prescriptive analyses were carried out to transform the raw data into usable information. This framework summarized and visualized historical data during the descriptive analysis process. In the diagnostic analysis phase, we sought answers to the questions we asked with the findings obtained from the data. We examined what happened and why the current situation occurred at this stage. For this purpose, we tried to discover relationships between variables. In the third stage, we tried to make projections for the future with predictive analysis. We tried to predict the possible outcomes according to the trends based on the findings obtained from the data with predictive analysis. Finally, we aimed to contribute to the field, practice and method by making various suggestions according to the research results with the prescriptive analysis approach.

RQ1: What is the quantitative view of publications on global competitiveness in the period under review?

The vast majority (591 articles, 96%) of the 613 articles obtained after all filtering processes were research articles, and 22 (4%) were review articles. These numbers show that researchers concentrate on empirical studies. At the same time, it was determined that the studies' annual improvement rate between 1991-2021 was 14.87%. There are 168 studies included in the analysis from 1991 to after the 2008 global economic crisis. In addition, the number of studies conducted from this period to the end of 2021 is 445. The fact that 72% of all studies carried out took place after the 2008 global economic crisis shows that the global economic crisis is a driving force for studies in the field of global Competitiveness (Figure 1).

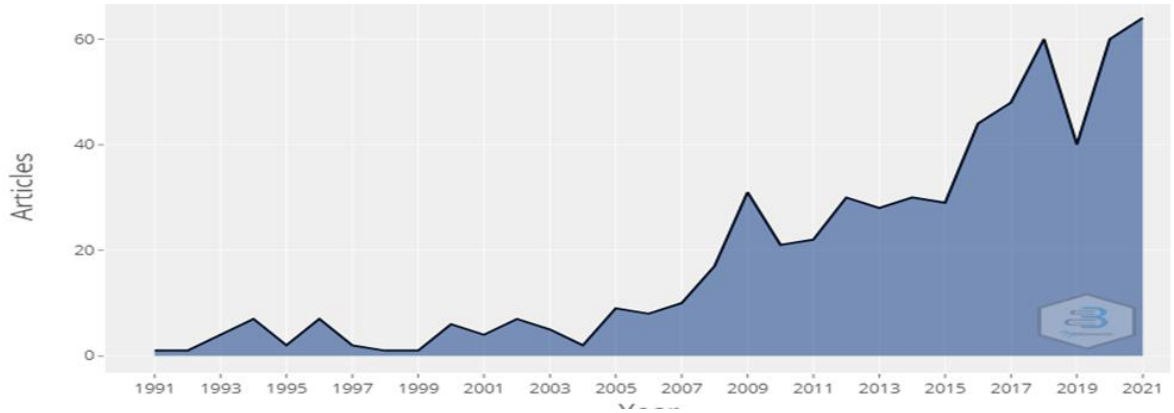

Figure 1. Articles Per Year.
Notes: Evolution of the number of articles over the years since 1991. Articles published until December 2021 were included. The figure is based on a sample of N = 613 articles. Source: Own elaboration

RQ2: Which journals published the most on global competitiveness in the period under review?

The journals with four or more publications in the field of global competitiveness, the impact factors of the journals in 2020 and their total citations are shown in Table 3. Accordingly, 116 (19%) of 613 articles published in 426 journals were published by 20 journals given in Table 3. Competitiveness Review is the most productive journal with 22 articles. Sustainability follows this journal with nine articles and the Financial and Credit Activity journal with eight articles. The first three journals account for 6.3% of the total articles.

Table 3. Most Productive Sources

Sources	Number of articles	IF/JIF*	Total citations
Competitiveness Review	22	2.45	141
Sustainability	9	3.25	72
Financial and Credit Activity	8	0.16*	67
Journal of Competitiveness	6	4.72	80
Marketing and Management of Innovations	6	0.28*	6
World Economy and International Relations	6	0.25*	15
Economic Research-Ekonomska Istrazivanja	5	3.03	84
Higher Education	5	4.63	235
Journal of Cleaner Production	5	9.29	220
Baltic Journal of Economic Studies	4	0.15*	3
Globalization Societies and Education	4	1.37	51
Higher Education Policy	4	2.62	59
İnternational Journal of Educational Management	4	0,37*	79
İnternational Journal of Technology Management	4	1.66	28
Journal of Asian Finance Economics and Business	4	0,91*	16
Journal of Higher Education Policy and Management	4	2.12	105
Risus-Journal in Innovation and Sustainability	4	0,07*	1
Technological Forecasting and Social Change	4	8.39	76
Technology in Society	4	4.19	29
Technovation	4	6.60	300

Note 1: IF: Impact factor JIF: Journal Citation Indicator. Note 2: Citation counts of the journals were obtained by using VOSviewer software. Citations are based on the Web of Science database as of December 2021. Journals' impact factor and Journal Citation Indicator for 2020 were taken from their website and Clarivate Analytics

As seen in Table 3, Competitiveness Review is the journal that publishes the most (22 articles) on the key concepts researched. The journal's impact factor is also 2.45, and the journal received a total of 141 citations. The other most productive journal is Sustainability, with nine articles. The total number

of citations to the journal is 72. The number of journals contributing to the field with only one article in the period under review is 329.

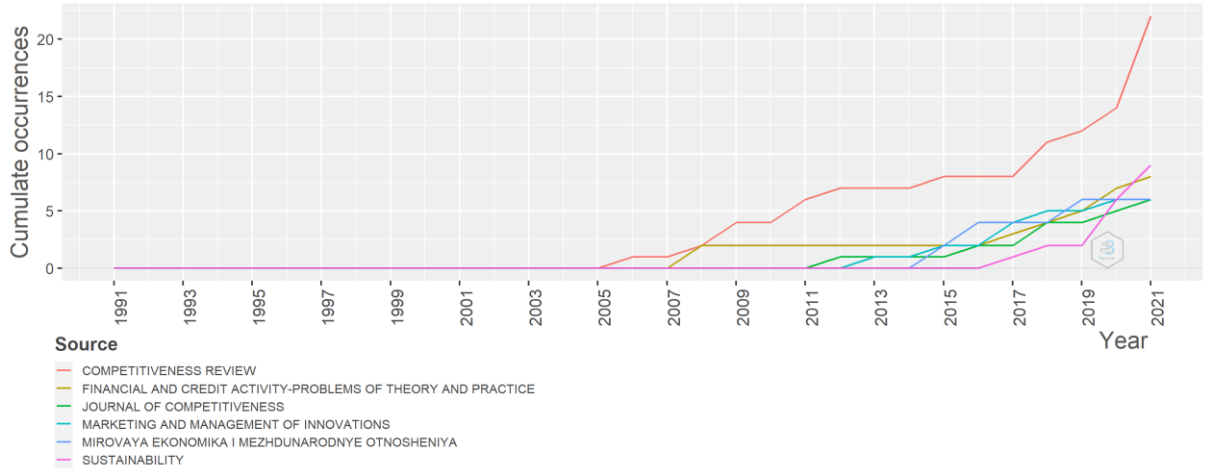

Figure 2. Graph of Publication Numbers of the Top Six Most Prolific Journals.

When the aims and scopes of the journals given in Figure 2, which have the most intensive studies in the field, are examined in detail, it is seen that the journals that mostly accept empirical articles have a higher share.

RQ3: Who are the most productive and contributing authors to the global competitiveness literature during the period under review?

A total of 1439 authors contributed to 613 articles constituting the sample. Table 4 shows the authors who contributed two or more articles. Mok K. H. is the most prolific author in publications, with 14 articles.

Table 4. The Most Prolific Authors

Authors	No of articles
Mok k. H.	14
Ferreira J. J.	5
Inaba K.	4
Lı J.	4
Cabinova v.	3
Chou C. P.	3
Danilova E. A.	3
Jackson D.	3
Lee C.S.	3
Onuferova E.	3
Abdul-rahim A.S.	2
Ahmed A.	2
Alsaleh M.	2
Bach M.P.	2
Baierle I.C.	2
Balyer A.	2
Barrichello A.	2
Baumann C.	2

Borel T.	2
Chan C. F.	2

Note: Authors who contributed to 2 or more articles are included in the table. Citations are based on the Web of Science database as of December 2021.

Considering whether the articles have single or multiple authors, the number of documents with a single author is 174 (28%). More than one researcher wrote 72% of the articles. This ratio shows a strong tendency to work together among researchers in the field. The eclectic nature of global competitiveness, which includes different disciplines such as enabling environment (corporate structure, infrastructure, technology), human capital (health, skills), markets (product, workforce, finance) and innovation ecosystem, can be considered as an element that increases the tendency to work together.

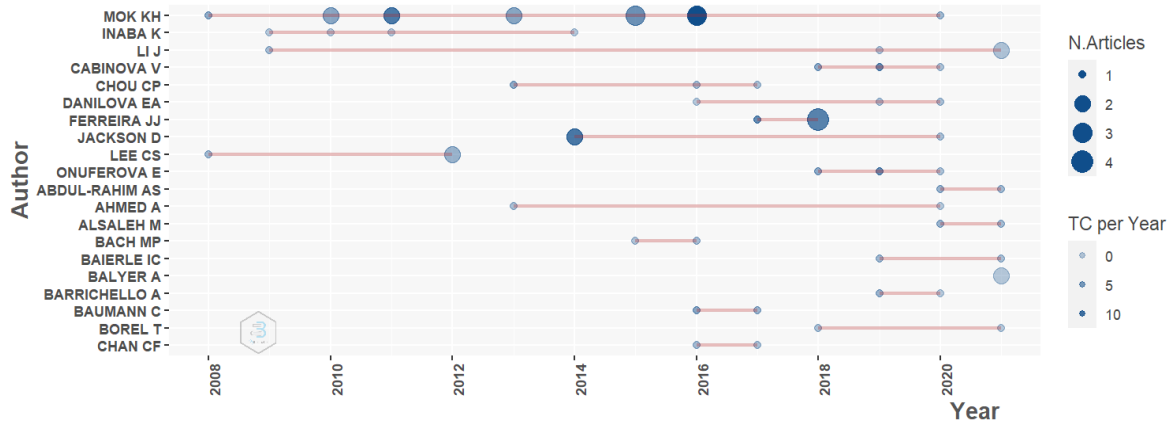

Figure 3. Distribution of Articles Produced by the Top 20 Most Productive Authors Over Time

RQ4: Question: What is the publication performance of countries and universities in terms of global competitiveness in the period under review?

The 613 articles examined were produced by researchers working at 814 different universities. Researchers at 674 of these universities contributed with only one study. Table 5 shows the most productive universities contributing three or more articles to global competitiveness by the number of articles. The Education University of Hong Kong is the university that contributed the most with eight articles. When universities are evaluated in their citation performance, California University has the highest contribution to the field with 4554 citations.

Table 5. Most Productive Universities

Affiliations	No of articles	Total citations
Education University of Hong Kong	8	249
Sumy State University	6	33
Lingnan University	5	110
Macquarie University	5	278
Natl Chengchi University	5	51
Texas A&M University	5	103
Tomsk State University	5	6
University Hong Kong	5	91
Edith Cowan University	4	101

Harvard University	4	280
Nanyang Technol University	4	33
Open University	4	35
University of California	4	4554
University Presov	4	47
University Pretoria	4	4
University Sao Paulo	4	147
Yamaguchi University	4	-
Istanbul Tech University	4	26
Beijing Normal University	3	1
City University Hong Kong	3	232

Note: Universities that contributed to the field with five or more articles are included. Citations are based on the Web of Science database as of December 2021. Citation counts were obtained by using VOSviewer software.

Researchers from 77 different countries wrote the 613 articles included in the analysis. Table 6 shows the most productive countries contributing to global competitiveness by the number of articles and total citations. The most active countries are the United States of America with 102 articles, China with 60 articles, and Russia with 47 articles. The UK follows these with 37 articles and Australia with 30 articles. Approximately 50% of the 613 articles (303 articles) were produced by researchers from the first five countries from 77 countries contributing to the field. These figures are important as they show that economic development is not independent of scientific progress.

Table 6. Most Productive Countries

Country	Number of article	Citations
USA	102	6764
China	60	1042
Russia	47	150
England	37	516
Australia	30	666
Taiwan	27	455
Ukraine	27	118
South Africa	23	138
South Korea	22	316
Spain	22	126
Brazil	20	171
Canada	19	1363
India	18	258
Turkey	16	170
Germany	13	159
Malaysia	13	101
Poland	13	56
France	11	1098
Portugal	11	217

Note: Countries that contributed to the field with 11 and more articles are included. Citations are based on the Web of Science database as of December 2021. Citation counts were obtained by using VOSviewer software.

Bibliometric Analysis

In this part of the research, the interactions and structural connections between the research components on global competitiveness are evaluated. The purpose of this is to reveal the most used keywords, the most cited articles and journal networks. Classification and visualization processes are generally used in bibliometric studies. In the analysis process, similarity matrices and relationships between items are calculated. In this process, they commonly use software such as Pajek, BibExcel, SciMat VOSviewer, Bibliometrix R Package. This study used BibExcel, Bibliometrics and VOSviewer as bibliometric software. Images of relationships and similarities were presented (Aria & Cccrullo, 2017; Van Eck & Waltman, 2010).

RQ5: Which concepts on global competitiveness were studied the most during the period under review?

Figure 4 shows the most frequently used keywords among the 1975 keywords used in 613 articles. The red areas in the figure show the most frequently used words, the yellow areas show the less used words, and the green and blue areas show the least used words. The size of the letters also indicates the frequency of use. The most frequently used keyword is innovation, with 76 iterations. This is followed by the keyword's competitiveness with 66 words, global competitiveness with 43 words, global competitiveness index with 24 words, entrepreneurship with 22 words and higher education with 19 words. Here, it shows that innovation is an important competitive advantage factor in global competitiveness.

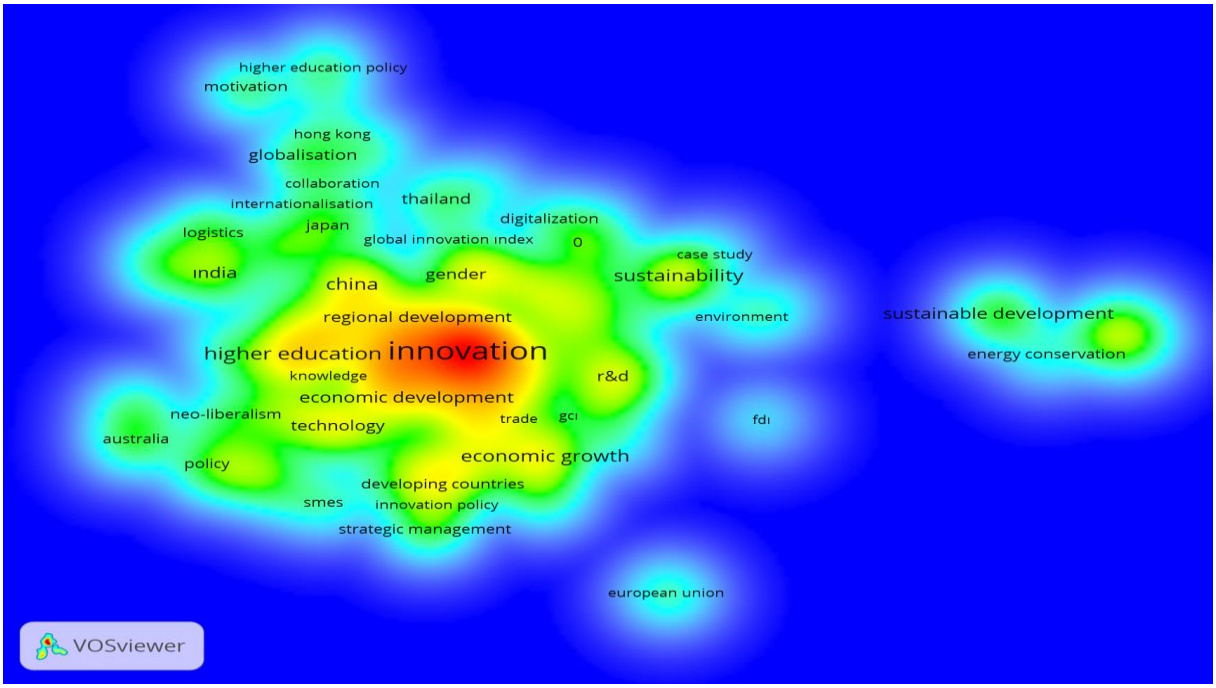

Figure 4. Most Frequently Used Keywords in the Digital Global Competitiveness Field.
Notes: Created by using BibExcel and VOSviewer based on a sample of N = 613 articles.

Relationship networks and the total link strength of the words used in the keywords of the articles are shown in Figure 5. The size of the circles represents the total association frequency of the words (total

connection strength) according to the use of each word with other words, and the lines between the two circles represent the relationship networks of the words with each other. The position of the words in Figure 5 shows how centered or peripheral they are in the network of relationships.

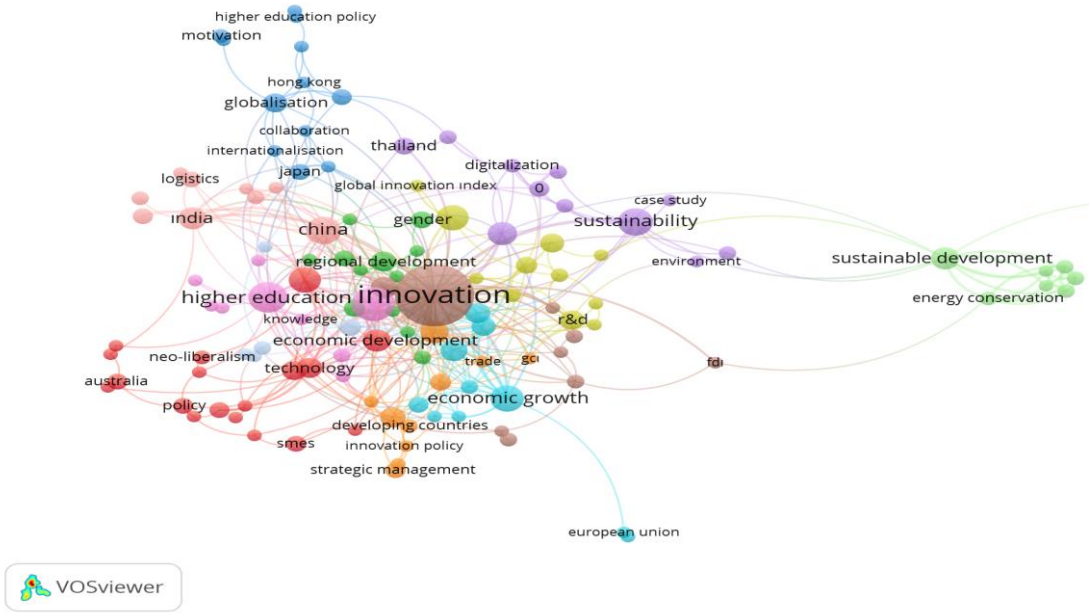

Figure 5. Relationship Networks and Total Link Strengths of the Keywords. Notes: Created by using

RQ6: Who are the most cited authors on global competitiveness in the period under review?

Since a study must be cited at least 20 times by 613 articles in the citation analysis, the minimum threshold is determined as 20 citations. The 105 cited articles cited here meet this criterion. Figure 6 shows the most-cited researchers and publications in Web of Science citations. Accordingly, Cabinova, V., Gavurova, V., Farinha, L., and Gomes, G. are the most cited researchers.

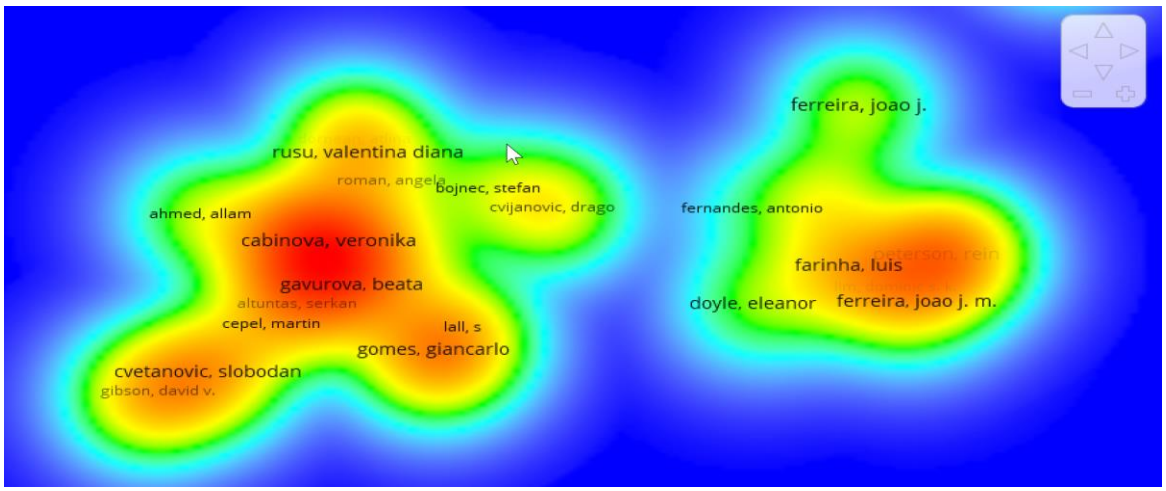

Figure 6. Most Influential Studies in the Field.
Notes: Created using VOSviewer based on a sample of N= 613 articles. Citations are based on the Web of Science database as of December 2021.

RQ7: Which are the most commonly cited articles and journals on global competitiveness in the examined period?

Co-citation analysis is the frequency with which two studies are cited together or the frequency with which two different units of analysis (study, author, journal) are cited together in the same study. Co-citation analysis uses co-citation numbers to establish similarity measures between studies, authors, and journals. Co-citation analysis allows the density of co-cited authors, studies, and relationships among journals to be determined (Vogel 2012; Zupic and Cater 2015). The minimum threshold for conducting co-citation analysis at the publication level is 20 citations. Therefore, studies in which 613 articles in the sample were cited at least 20 times were included in the co-citation analysis. In Figure 7, the size of the circles shows the total citation frequency of the studies, while the lines between the circles show how many 613 articles were cited in the two studies together. The thickness of the lines indicates the strength of the link between the two studies. Also, the circle near the center represents a central and influential position in the citation network, while the circle at the periphery represents a less influential position. According to the results of the co-citation analysis, Porter, M.E.' s 1990, The Competitive Advantage of Nations (1990), Clusters and the New Economics of Competition (1998) and Cohen WM's Absorptive Capacity: A New Perspective on Learning and Innovation (1990) are the most cited studies. Also, the thickness of the lines between the three studies shows the strength of the connection between them.

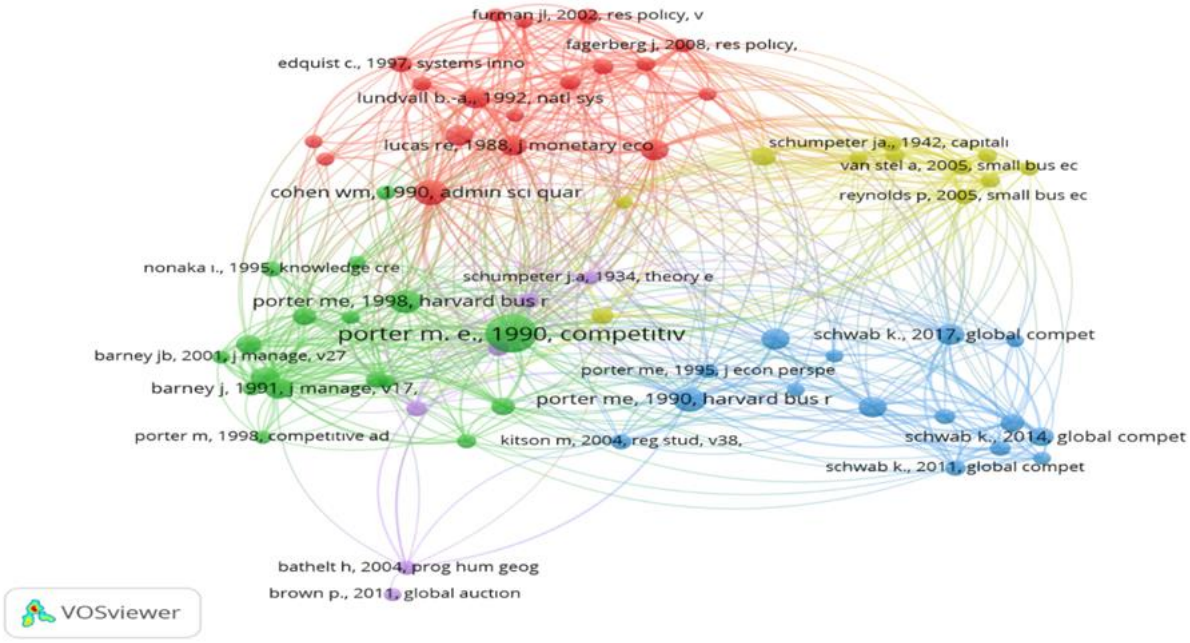

Figure 7. Co-citation Analysis at the Publication Level.
Notes: Created using VOSviewer based on a sample of N = 613 articles

As a result of the joint citation analysis carried out at the journal level, a total of 13448 common references were made to the journals containing 613 articles in the sample. The analysis set the minimum threshold to 50 as the citation. A journal must be cited at least 50 times to be included in

the analysis. In total, 119 journals meet this criterion. The density visualization of the journal-level co-citation analysis is given in Figure 8.

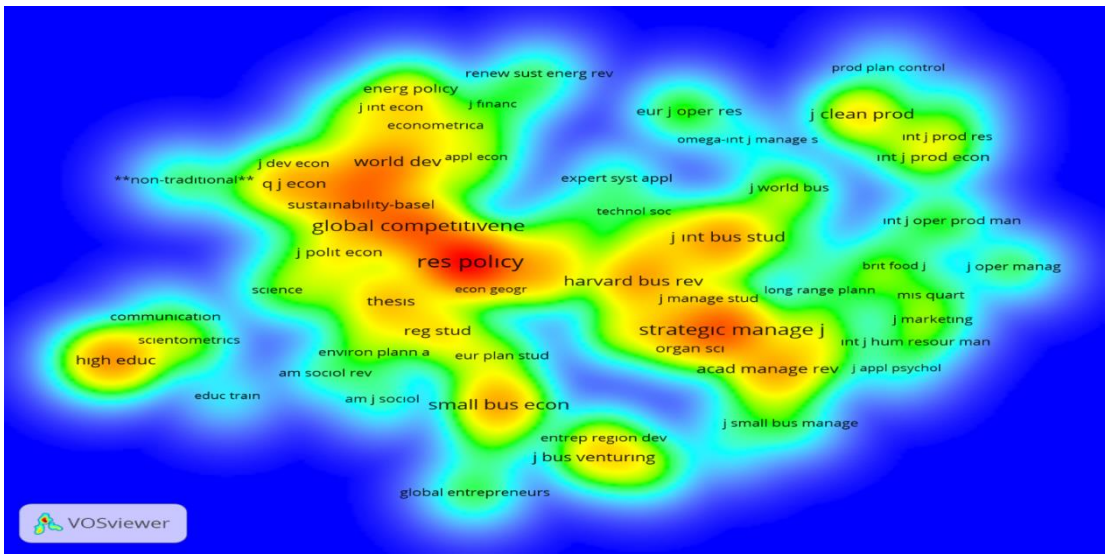

Figure 8. Co-citation Analysis at the Journal Level.
Notes: Created by using VOSviewer based on a sample of N = 613 articles (included in Web of Science)

According to the analysis results, the Research Policy journal is the most commonly cited journal with 358 citations. The other journal with a close co-citation (320) to Research Policy is the Strategic Management Journal.

RQ8: Does the distribution of global competitiveness in the period under review comply with Bradford's Law?

Bradford's Law is used in collection management to citation analysis in libraries. Bradford's Law of Scattering defines the scattering or distribution of literature on a particular subject into journals (Savanur & Hulloli, 2018). Bradford law journals in a particular field; The core journal group with few journals (1/3), the second region group with more journals, and the third region group with bulk journals (Olsgaard, 1989; Egghe & Rousseau, 1990; Garfield, 1980). The 203 articles included in the analysis fall into the first field, with 55 journals (core journals) in this study. The second region contains 32 journals (204 articles), while the third region contains 125 journals (206 articles) (Table 7).

Table 7. Distribution of Journals Based on the Bradford's Law

Zone	No of Journals	No of articles	Journal %
1	55	203	12,9
2	167	204	39,2
3	204	206	47,9
Total	426	670	100

According to Bradford's Law, the number of journals in each group should be proportional to $1:n:n^2$. The Law stipulates that the number of journals in the second and third regions will be n and n^2 times,

respectively, than in the first region. According to the ratio of the number of journals stipulated by the Law, the number of journals in the third region should be 495. As a result, it seems that the distribution of journals and citations is not compatible with Bradford's Law. The main reason why the analysis findings do not comply with Bradford's Law is that the "core journal" numbers in the first group are lower than the Bradford Law predicts.

DISCUSSION and CONCLUSION

In this research, we conducted a bibliometric analysis covering 1991-2021 to determine the general view of global competitiveness and the trend in this field. We conducted visual mapping and bibliometric analyses to identify key concepts in Global Competitiveness Theory and the publication performance of countries, universities, and researchers. Research results We have found that publications on global competitiveness have shown a steady increase in recent years. The research results helped to see the gaps in the global competitiveness literature. It can be argued that these results are guiding for future research. In addition to descriptive and exploratory bibliometric analyses, it is necessary to conduct content analysis that enables the researcher to be included in the process as an active actor to advance research in the field. The findings and recommendations of this research are limited to the general view and orientation of the field of global competitiveness.

Innovation is the main concept that comes to the forefront as a result of the analyzes carried out to provide a preview of the research area related to global competitiveness, predict future research, and reveal thematic relationships in the field. One of the most important determinants of global competitiveness is the ability of companies to produce new and different products through innovation by using complex production processes (World Economic Forum. 2011). The fourth industrial revolution, the transition to a low-carbon economy and the shocks that redesigned development policies (2008 financial crisis, corona pandemic, etc.); It attributes a central role in the concept of innovation in reducing imbalances in development and increasing competitiveness. Innovation stands out as an important parameter for increasing competitiveness and providing competitive advantage at the firm and national level. The fact that countries have high innovation capability and technology enables companies and economies to enter a sustainable economic development process and helps them to increase their competitiveness. Therefore, it is not possible to consider innovation and global competition separately. When the Global Innovation Index (BSEC), which measures the innovation competencies of countries, and the country rankings in the Global Competitiveness Report prepared by the World Economic Forum are compared, the parallels are seen. Accordingly, all countries in the top 10 of the Global Competitiveness Index are also included in the top 15 countries of the Global Innovation Index. Countries that can build more knowledge and offer better collaborative opportunities can internalize innovative ideas and create new business models, considered economic growth engines. For this reason, countries should develop international cooperation and funding

resources and expand research funds to support existing research centers (Derindag, Lambovska & Todorova, 2022).

Due to increasing globalization, the diffusion of technology and information between countries intensifies. Technological imports from technologically developing countries benefit the productivity of local companies and their adoption of technology. In this respect, countries have a causal relationship between globalization and innovation and new technologies. Differences in technology adoption between countries reflect differences in the level of globalization. In this respect, globalization; is a critical factor for technology transfer and innovation adoption. Globalization reduces technology barriers, benefits technology transfer, and pushes local firms to innovate, leading to multi-factor productivity. Countries that want to increase economic growth by increasing multi-factor productivity through innovation should be more involved in globalization processes. This will facilitate technology and knowledge transfer, increase the adoption of new technologies, globalization and development. The self-reinforcing mechanism behind globalization and technology adoption will lead policymakers and practitioners to view globalization as a source of competition and a determinant of productivity. In this respect, human capital, innovation ecosystem and dynamic environment dimensions of global competitiveness come to the fore. As a matter of fact, according to the International Institute for Management Development (IMD), the competitiveness of a country is closely related to the ability of that country to create an environment that can create a continuous increase in added value (Aktan & İstiklal, 2004). For this reason, to compete in the world markets, the competitive power is not independent of the development levels of the industries, technological levels, macroeconomic environment, infrastructure and institutional structure of that country.

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