BIBLIOMETRIC STUDY: LITERATURE OF SCIENTIFIC ARTICLES ON COMPETITIVENESS AND INNOVATION

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Abstract
Based on a bibliometric study of the literature of articles on competitiveness and innovation from the Elsevier Scopus scientific database, an analysis was carried out in stages, the first measuring the productivity of documents per year, productivity by authors, affiliation, country, area of knowledge, funding sponsor and lastly, productivity of journals, In the second stage, an analysis of the network and density map is done, analyzing the co-occurrences with the VOSviewer software version (1.6.19), a scientific map viewer by the authors Nees Jan van Eck and Ludo Waltman, developed by the Centre of Science and Technology Studies of the University of Leiden and the Erasmus University of Rotterdam, the productivity of documents per year shows an approximate increase in the 20th century in the productivity of documents per year, the highest productivity is by the authors Huggins, R. and Johnston; the magazines with the highest productivity of documents Sustainability Switzerland and Technological Forecasting And Social Change; the higher productivity of documents by affiliation with the Universitat Politècnica de València and Plekhanov Russian University of Economics; the productivity of more documents by country China and tenth place Colombia; the highest productivity by area of knowledge business, management and accounting followed by the area of social sciences; the highest productivity of papers by funding sponsor is National Natural Science Foundation of China followed by European Commission. In the visualization of the network and density map on the innovation and competitiveness terms, there is a high co-occurrence with a consistent threshold and a total strength of the high co-occurrence link, with an approximation of terms such as "Competition" and the term " Research and development" strongly linked to investigate these relationships.
Keywords: competitiveness, innovation, co-occurrence, bibliometrics

INTRODUCTION

It is due to innovation and results perspective of this process that facilitating agents can improve their results, therefore the company members also learn during these value acquisition phases. (Ahumada Tello y Perusquia Velasco, 2015), it must be clear that to innovate and create value it is necessary to differentiate from others, improving competitiveness by favoring specialization based on existing capabilities in the sector. (Corchuelo Martínez-Azúa y Mesías, 2017), Innovation could be the missing key because through innovation it is assumed that the company is capable of developing a fast and adaptable business (Machmud et al, 2022). Today, innovation has taken on great importance in the business sector, its application is considered essential when is necessary to achieve a business success in a competitive environment to be sustainable in the market (Salgarriaga Salazar et al., 2020), As stated (Benites Gutiérrez et al., 2023) SMEs must invest in innovation and quality of their products and services, in order to maintain a competitive condition respect to extensive and large-scale industry.

Another advantage of a successful innovation process can significantly increase a company's market participation and cash flow that can significantly contribute to the company's performance (Zhang et al., 2023). Innovation is generally characterized by changes in a complex and interrelated system between product/service, market, knowledge and society. (Corchuelo Martínez-Azúa y Sama Berrocal, 2022). This position of a holistic vision is confirmed (Shang, 2022) by stating that integrated innovation is a process in which the innovating subject optimizes and reorganizes the elements to form an organic whole with multiple functions and adaptability to evolution. For innovation to occur, according to Diamond Model for competitiveness, companies need a variety of conditions such as human resources, physical resources, knowledge resources, capital resources and infrastructure. (Rambe y Khaola, 2023). Through sustainable innovation, organizations can invent and offer innovative products or services that directly contribute to achieving sustainable development. (Adomako y Nguyen, 2023). To conduct business in a today's globalized environment, innovation, behavior and information are becoming increasingly important constructs to consider. (Abubakar et al., 2022) Innovation can also be considered as a discipline, something that can be practiced through the logistic industry and develop through investigation. (Nour, 2022).

Innovation and knowledge have a direct relationship taking into account that knowledge has the capacity to be transformed into products that break the status quo, alluding to the creative destruction concept by leaving the linearity of traditional Walsarian economic theory, that according to Schumpeter, is not able to think about the changes that the economic system produces, (Schumpeter, 1997, P2). Innovation becomes study object with the concept of open innovation to improve the process with participation of interest groups of organizations dedicated to the industry to create knowledge and improve skills that allow it to be more competitive in a globalized world. (Juchniewicz M and Grzybowska B, 2015) for which going deeper into relationships produced by open innovation and absorptive capacity in innovation performance, finding that open innovation positively influences innovation performance for product and market innovation. (Toth j and Ferto I, 2017).

Innovation and their types can be applied to different industries, for instance, the energetic industry (Wang F y Zhang Z, 2022) analyze the relationship between energy consumption and urbanization, proposing the challenge of reducing energy consumption without affecting the economic growth of nations through technologies innovation, reflects on ways to reliably measure resource consumption so that public politics can be created to minimize the climate impact derived from consumption (Razzaq A et al., 2021) and invites to develop technological innovations in order to economic growth does not depend on fossil energy and instead, move towards renewable energies that mitigate the impact of the carbon footprint (Feng B, 2022). Food industry develops the concept of food economy based on cooperation and collaboration between producers and consumers making that the line becomes thinner through processes of building trust and social capital mediated by the use of ICT (Spillare S, Paltrinieri R y Marciante L, 2018). Food industry plays an important role in commerce and its dynamism, where a bet is made to the creation of productive chains and clusters that allow small agricultural entrepreneurs to be more competitive by facilitating production processes, and looking for innovations that facilitate putting the sector in the regional and city perspective, demystifying the concept of ruralist that surrounds it. (Blay-Palmer A y Donald B, 2006).

The competence is approached from different structural aspects, mainly related to productivity characteristics of their companies and to region qualities where technological aspects have gained significant relevance (Sánchez-Gutierrez et al., 2019, as cited in Ríos-Flores, 2023), the rise of technological advances and innovations has led to the development of health, climate, education, transportation and the economy that can gain competitive advantages and promote quality of life in different cities. (Qui et al., 2023), however, as investment in technological innovation increases, the uncertainty, risks, and challenges that companies faces also increases. (Zhang y Aumeboonsuke, 2022) from another perspective, taking advantage of technological innovation can reduce costs or generate new opportunities. (Böttcher, 2022).

The competitiveness of a nation is determined by the competitiveness of its business fabric and the way that companies manage social and environmental impact outside their value chain is likely to become a key driver of competitiveness. (Padilla-Lozano y Collazzo, 2022), the management of

competitiveness at the level of the socioeconomic system is a set of measures to improve the product, the search for new channels for its sale, and the improvement of post sale service. (Kopytko et al., 2022).

Companies constantly should learn and absorb external technologies for their use, transform that external technologies in their main competitive advantage and create better conditions in order to the new products adapted to the market, thus promoting digital innovation. (Wang y Li, 2023). Innovation conserves their competitive potential for companies that invest in it, but the gap between 'innovators' and 'prudents' entrepreneurs has widened with a longer time taken for new products innovation to spread. (Sgroi, 2022).

All individuals in an economy approach competitiveness as a challenge, considering it an essential condition for efficiency and standing out in a given market, whether local, national or international. (Vîrjan et al., 2023), Competitive is an issue that is mandatory for companies, regardless of their size; small or large companies, have to strengthen their competitiveness. (Machmud et al., 2022).

METHODOLOGY

According to the bibliometric study of competitiveness and innovation it was planned in two stages, first stage based on literature study for bibliometric study of competitiveness and innovation in Scopues Elsevier, whose query: KEY (innovation AND competitiveness) AND (LIMIT-TO (LANGUAGE, "English") OR LIMIT-TO (LANGUAGE, "Spanish")) AND (LIMIT-TO (DOCTYPE, "ar")), innovation and competitiveness documents are abstracted from Spanish and English languages with the document type article, below is an analysis of documents productivity per year, documents productivity by authors, documents productivity by journals indexed in Scopus, document productivity by author affiliation, document productivity by country, document productivity by knowledge area, document productivity per fundind sponsor. In the second stage, analysis of the network map and density map analyzing the co-occurrences with the VOSviewer software version (1.6.19), a scientific map viewer by authors Nees Jan Van Eck and Ludo Waltman, sponsored and developed by the Center for Science and Technology Studies at Leiden University and Erasmus University Rotterdam. Which have investigated disagreement of the scientific literature (Lamers et al., 2016; Wout et al., 2021). In past decades, research revolved around consensus and disagreement evidenced in citation networks (Bruggeman et al., 2012; Shwed and Bearman, 2012); based on the count of terms or keywords (Bertin et al., 2016). And information related to citation types (Catalini et al., 2015; Chen et al., 2018; Nicholson et al., 2021); Disagreement being an axis of scientific progress (Sarewitz, 2011). It is worth clarifying the lack of studies to determine how to measure consensus and disagreement in the scientific literature.

RESULTS

According to the bibliometric study of competitiveness and Innovation in Scopus Elsevier, compiled from the terms Competitiveness and innovation, limited to the English and Spanish language and with the document type articles published in Scopus whose formula is: KEY (innovation AND competitiveness) AND (LIMIT- TO (LANGUAGE , "English") OR LIMIT-TO (LANGUAGE , "Spanish")) AND (LIMIT-TO (DOCTYPE , "ar")), one thousand eight hundred sixty-eight (1868) documents were collected, which were analyzed : 1) Productivity of documents per year in innovation and competitiveness in Scopus Elsevier; 2) Productivity of documents by Authors of the topic innovation and competitiveness; 3) Productivity of documents, innovation and competitiveness by journals indexed in Scopus Elsevier; 4) Productivity of innovation and competitiveness documents by Affiliation of the authors; 5) Productivity of innovation and competitiveness documents by country; 6) Productivity of innovation and competitiveness documents by knowledge area; 7) Productivity of innovation and competitiveness documents by funding sponsor; in the second stage network map and density map analysis with the VOSviewer software version 1.6.19, a scientific map viewer by the authors Nees Jan van Eck and Ludo Waltman, and sponsored and developed by the Center for Science and Technology Studies of Leiden University and Erasmus University Rotterdam.

According to the competitiveness and innovation analysis of document productivity in Scopus Elsevier, below, 1,868 documents were collected from the proposed equation where from the year 1985, and the highest productivity in the year 2020 with 178 documents, the author with the highest productivity is Huggins , R. with 9 documents, the Sustainability Switzerland journal with 149 documents has the highest document productivity by journals indexed in Scopus Elsevier, the Universitat Politècnica de València with 24 documents has the highest document productivity by Affiliation, the country of China with 219 documents has the highest productivity of innovation and competitiveness documents by countries, the Business, Management and Accounting area with 826 documents has the highest Productivity of documents by knowledge area, The sponsor National Natural Science Foundation of China with 49 documents has the highest Productivity of documents per funding sponsor. According to the productivity of documents per year in innovation and competitiveness in Scopus Elsevier.

Figure 1. Documents per year in innovation and competitiveness
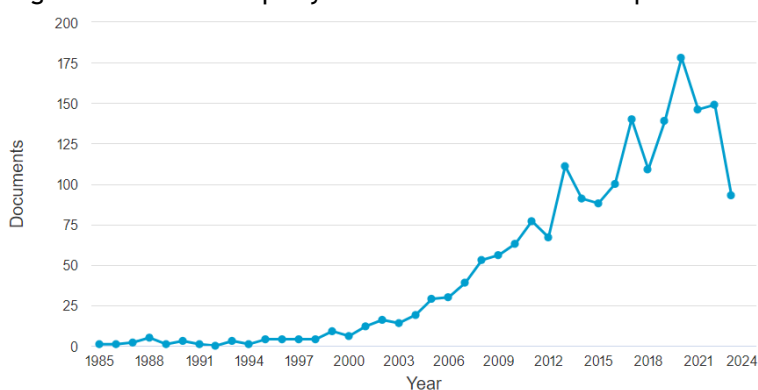
Source: own taken from Scopus Elsevier (2023)

Starting in 1985 the first document was published, showing a documents number increase since 1999, in 2014 ninety-one documents were published with a percentage of (4,87%); In 2015, eighty-eight documents were published with a percentage of (4.71%); In 2016, one hundred documents were published with a percentage of (5.35%); In 2017, one hundred and forty documents were published with a percentage of (7.49%); In 2018, one hundred and nine documents were published with a percentage of (5.84%); In 2019, one hundred and thirty-nine documents were published with a percentage of (7.44%); In 2020, one hundred and seventy-eight documents were published with a percentage of (9.53%); In 2021, one hundred and forty-six documents were published with a percentage of (7.82%); In the year 2022, one hundred and forty-nine documents were published with a percentage of (7.98%); In 2023, ninety-three documents were published with a percentage of (4.98%); until the time of consultation. Productivity of documents by Authors of the topic innovation and competitiveness.

Figure 2. Documents by authors of the topic innovation and competitiveness
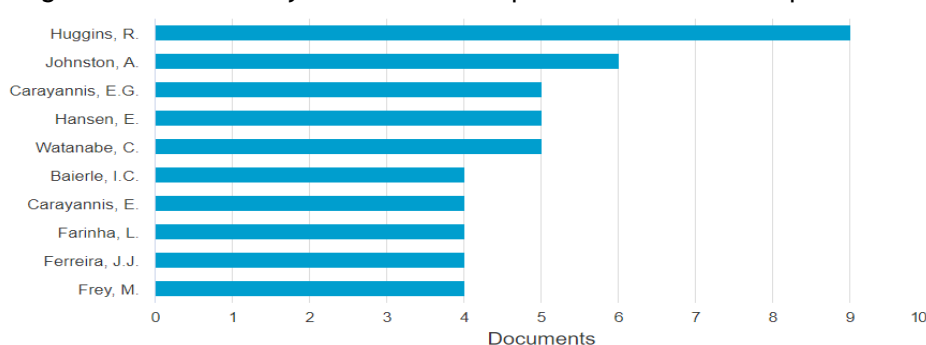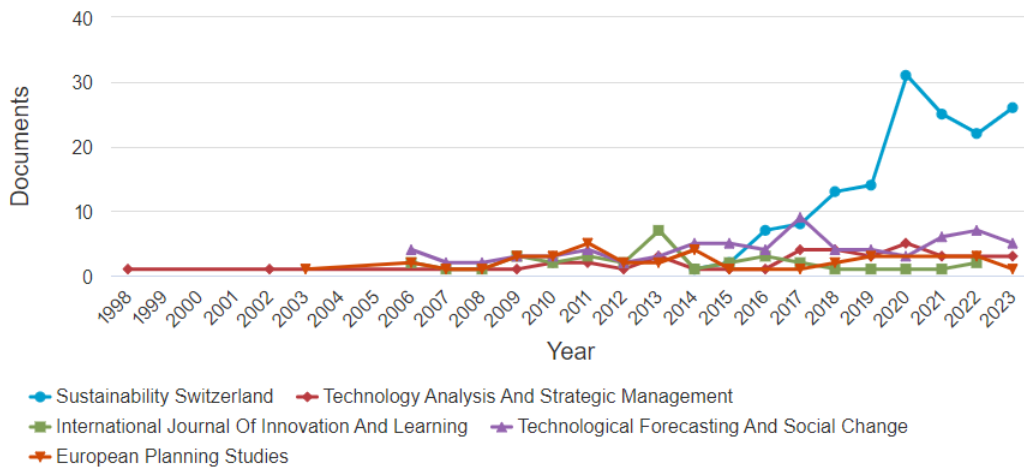

Source: own taken from Scopus Elsevier (2023)

The Top-10 of productivity of documents by authors of the topic of innovation and competitiveness. Author Huggins, R. published nine papers; author Johnston, A. published six papers; the author Carayannis, E.G. published five documents; author Hansen, E. published five papers; the author Watanabe, C. published five documents; the author Baierle, I.C. published four documents; the author Carayannis, published E. four documents; the author Farinha, L. published four documents; the author Ferreira, J.J. published four documents; the author Frey, M. published four documents; of the topic innovation and competitiveness according to the Scopus Elsevier Database. Below is the productivity of documents, innovation and competitiveness in journals indexed by Scopus Elsevier.
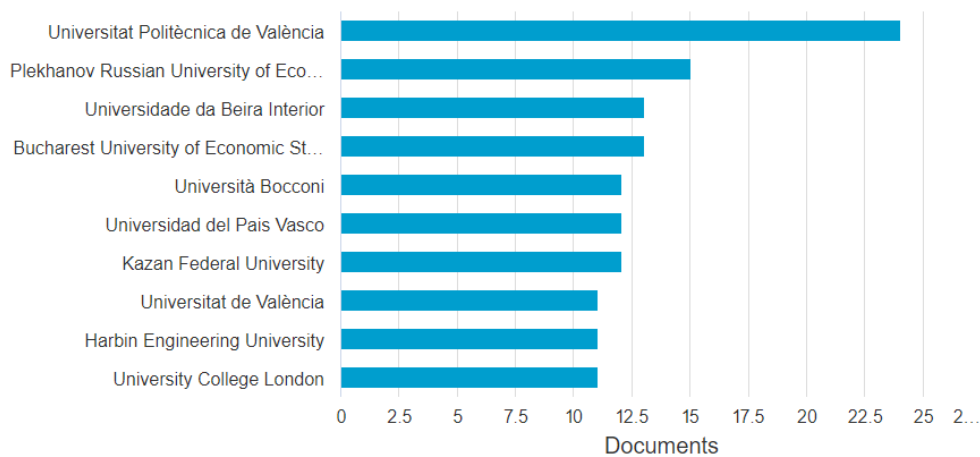
Figure 3. Innovation and competitiveness documents in Scopus Elsevier indexed journals

Source: own taken from Scopus Elsevier (2023)

Below, the top-5 of the Productivity of innovation and competitiveness documents in journals indexed by Scopus Elsevier, the Sustainability Switzerland Journal with one hundred and forty-nine documents, with a CiteScore of 5.8, an SJR of 0.664 and a SNIP of 1.198; the Technological Forecasting And Social Change Journal with seventy-five documents, with a CiteScore of 17.2, an SJR of 2,644 and a SNIP of 3,008; the Technology Analysis And Strategic Management Magazine forty-one documents, with a CiteScore of 7.1, an SJR of 0.774 and a SNIP of 1.229; the European Planning Studies Journal with thirty-five documents, with a CiteScore of 7.0, an SJR of 1,057 and a SNIP of 1,477; the International Journal Of Innovation And Learning with thirty-five documents, with a CiteScore of 1.4, an SJR of 0.226 and a SNIP of 0.394. Below is the productivity of innovation and competitiveness documents by Author Affiliation.

Figure 4. The Top-10 documents by affiliation in Scopus

Source: own taken from Scopus Elsevier (2023)

Below is the Top-10 by affiliation of innovation and competitiveness documents in Scopus, with a total of 160 entities in which the Universitat Politècnica de València is in first place with twenty-four documents, which represents a percentage of (2, 48%) of publications in Scopus; follows the affiliation of Plekhanov Russian University of Economics with fifteen documents with a percentage of (1.55%); the affiliation of the Universidade da Beira Interior with thirteen documents and a percentage of (1.34%); the affiliation of Bucharest University of Economic Studies with thirteen documents with a percentage of (1.34%) of the total documents published; the affiliation of the Università Bocconi with twelve documents with a percentage of (1.24%); the affiliation of the University of the Basque Country with twelve documents in Scopus with a percentage of (1.24%); the affiliation of Kazan Federal University with twelve published documents with a percentage of (1.24%); the affiliation of Universitat de València with eleven documents published with a percentage of (1.14%); the affiliation of Harbin Engineering University with eleven published papers with a percentage of (1.14%); and in tenth place the affiliation of University College London with eleven documents with a percentage of (1.14%). Below is the productivity of innovation and competitiveness documents by country.

Figure 5. Innovation and competitiveness documents by country or territory
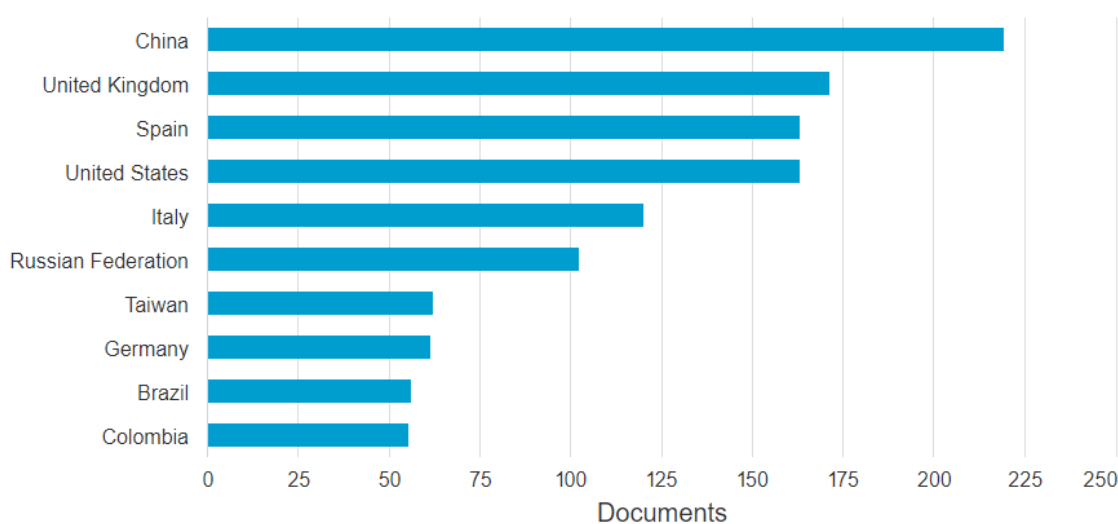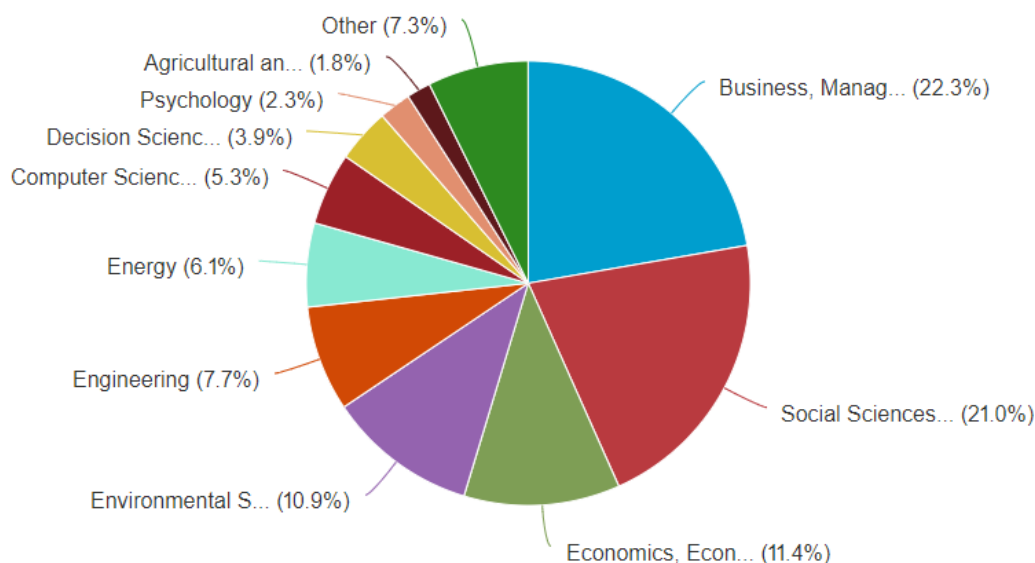

Source: own taken from Scopus Elsevier (2023)

Next, the productivity of innovation and competitiveness documents by country is evidenced, in the top-10 of first is China with the highest number of publications and in tenth is Colombia, in that order of ideas the country China with the highest productivity has two hundred and nineteen documents; the country United Kingdom with a productivity of one hundred and seventy-one documents; the country Spain with a productivity of one hundred and sixty-three documents published in Scopus; the country United States with a productivity of one hundred and sixty-three published documents; the country Italy with a productivity of one hundred and twenty documents; the country Russian Federation with a productivity of one hundred and two documents; the country Taiwan with a productivity of sixty-two documents; the country Germany with a productivity of sixty-one documents; the country Brazil with a productivity of fifty-six documents; In tenth place is the country Colombia with a productivity of fifty-five innovation and competitiveness documents published in Scopus articles. Below is the productivity of innovation and competitiveness documents by area of knowledge.
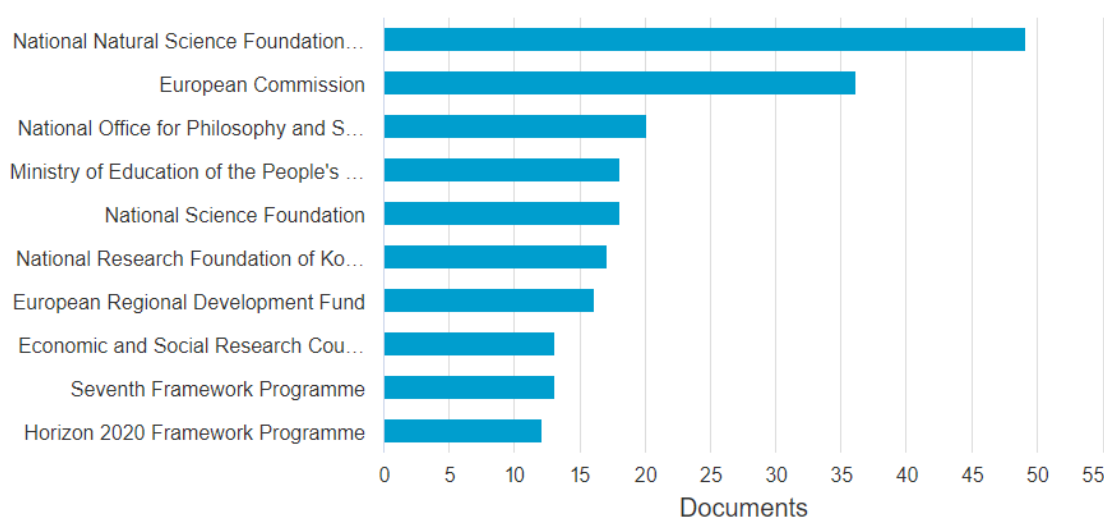
Figure 6. Innovation and competitiveness documents by area of knowledge

Source: own taken from Scopus Elsevier (2023)

The top-10 areas of knowledge with the highest productivity of innovation and competitiveness documents in Scopus Elsevier, the area of business, management and accounting has eight hundred and twenty-six documents with a percentage of (22.3%); The area of social sciences has seven hundred and eighty documents with a percentage of (21.0%); The area of economics, econometrics and finance has four hundred and twenty one documents with a percentage of (11.4%); The area of environmental sciences has four hundred and five documents with a percentage of (10.9%); The engineering area has two hundred and eighty-five documents with a percentage of (7.7%); and the energy area has two hundred and twenty six documents with a percentage of (6.1%); the computer science area has one hundred ninety-five documents with a percentage of (5.3%); The area of decision sciences has one hundred and forty-six documents with a percentage of (3.9%); The area of psychology has eighty-six documents with a percentage of (2.3%); the area of agricultural and biological sciences has sixty-five documents with a percentage of (1.8%); and other areas with a percentage of (7.3%). Below is the productivity of innovation and competitiveness documents by funding sponsor.
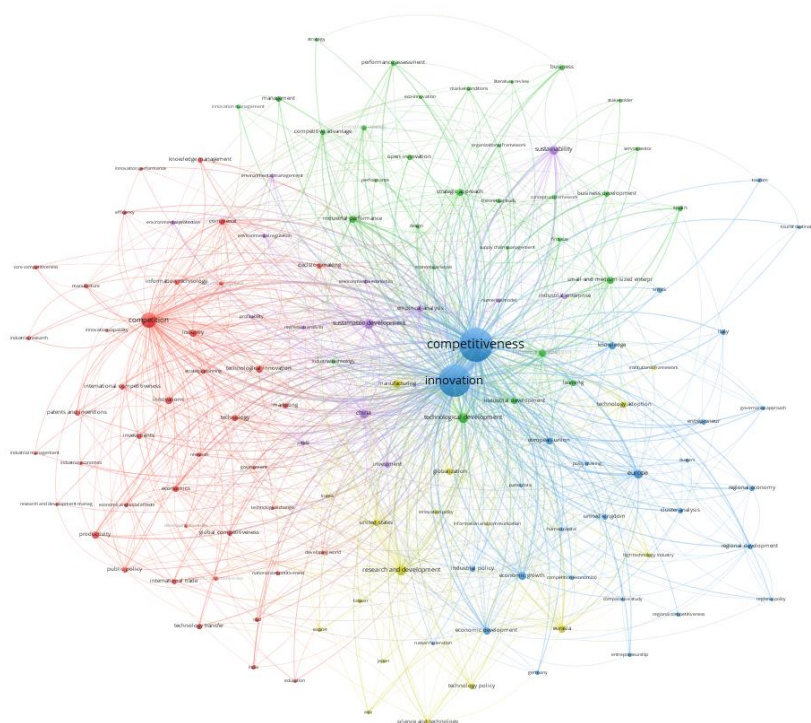
Figure 7. Innovation and competitiveness documents by funding sponsor

Source: own taken from Scopus Elsevier (2023)

Below is the Top-10 funding sponsors on the topic of innovation and competitiveness according to Scopus Elsevier, where the biggest sponsor is the National Natural Science Foundation of China with forty-nine documents published in Scopus Elsevier; In second place is the funding sponsor European Commission with thirty-six published documents; funding sponsor National Office for Philosophy and Social Sciences with twenty published papers; funding sponsor Ministry of Education of the People's Republic of China with eighteen published documents; funding sponsor National Science Foundation with eighteen published documents; funding sponsor National Research Foundation of Korea with seventeen published documents; the funding sponsor European Regional Development Fund with sixteen published documents; funding sponsor Economic and Social Research Council with thirteen published documents; funding sponsor Seventh Framework Program with thirteen published documents; the funding sponsor Horizon 2020 Framework Program with twelve published documents. Next, the second stage where it is described by the network and density maps with the VOSviewer software version 1.6.19, whose authors are Nees Jan and Waltman, from the University of Leiden and the Erasmus University of Rotterdam, which visualizes the bibliometric data of the terms of innovation and competitiveness, based on query data in Scopus Elsevier.

Figure 8. Network map visualization of the terms innovation and competitiveness
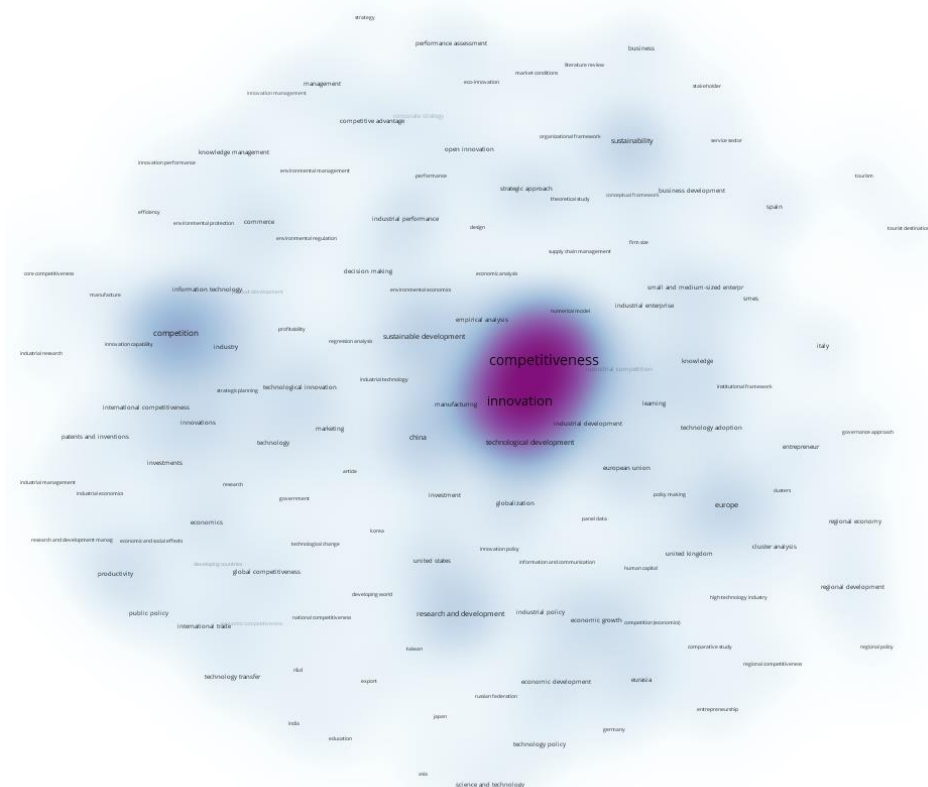

Source: Own elaboration VOSViewer search data from Scopus Elsevier (2023)

In the visualization of the network map about the terms innovation and competitiveness, a number of twenty (20) co-occurrences of keywords or terms were postulated reaching a threshold of (132), with a total strength of the co-occurrence link of (22138), the keywords with the highest total link strength were selected and the total number of keywords from which they were taken (132), with an organization of (5) clusters, (4897) connections and a total strength connection of (22138), the closer the terms are located to each other, the stronger their co-occurrence analysis relationship.

In the map visualization of the density of the words innovation and competitiveness, which are displayed using a radio button (Van Eck and Waltman, 2010), with a display scale according to the variation in the size of the low labels and maximum length of 30 and with a medium density kernel width, where each node is displayed in purple color and indicating its density.

Figure 5. Density visualization map of the terms innovation and competitiveness

Source: Own elaboration in VOSViewer data from Scopus Elsevier (2023)

The terms innovation and competitiveness are strongly linked, where the term competitiveness has a co-occurrence of (1464), located in the third cluster, with 131 connections and a total strength connection of (5873); The term innovation has a co-occurrence of (1345) located in the third cluster, with 131 connections and a total strength connection of (5740); and two terms are more closely approximated by the term Competition with a co-occurrence of (294) and a total strength connection of (1589); and the term research and development with a co-occurrence of (129) and a total strength connection of (833). These last two terms are strongly linked, making it beneficial to investigate these relationships.

CONCLUSIONS

The bibliometric study of the literature of scientific articles on competitiveness and innovation shows a great contribution to the literature, this will determine the understanding of competitiveness as an indicator that measures the development of countries and innovation mechanisms that drive competitiveness in the companies, governments, universities and R&D research and development institutions.

According to the productivity of documents per year in innovation and competitiveness in Scopus Elsevier, starting in the mid-1980s, the first document was published, visualizing an increase approximately to the 20th century in document productivity; In the productivity of documents by author is the author Huggins, R. followed by the author Johnston; In the productivity of documents in journals there is Sustainability Switzerland journal with a high CiteScore, SJR and SNIP followed by the journal Technological Forecasting And Social Change; In the productivity of documents by affiliation, first the Universitat Politècnica de València followed by the Plekhanov Russian University of Economics; In the productivity of documents by country, the country is China with the highest number of publications and in the tenth place is Colombia; in Document Productivity by area of knowledge, the area of business, management and accounting followed by the area of social sciences; The highest document productivity per funding sponsor is National Natural Science Foundation of China followed by European Commission.

In the visualization of the network map on the terms innovation and competitiveness, it was postulated with a high co-occurrence of terms reaching a consistent threshold and a total strength of the high co-occurrence link, given that the closer the terms are, the stronger their analysis relationship, with a closer approximation of terms which are the term "Competition" and the term "Research and development" where these terms are strongly linked, making it beneficial to investigate these relationships.

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