Chapter 54

Training of startups within the technological park of missions: Application production of concepts related to Innovation and Intellectual Property

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1 INTRODUCTION

The search for knowledge already studied can generate a new bottleneck with the research developed, related to supporting new research projects or collaborating with results resulting from this research. For this, the use of bibliometry was performed, this method allowed associating the technology with scientific information, covering the triple helix, innovation, and startups.

When it comes to startups its origin comes from the term used in English without official translation, but its concept is a group of people working and/or initiating an innovative idea, being a scalable business in an environment of great uncertainties and volatility. Therefore, it is necessary to introduce this research to address ways to fill this uncertainty gap efficiently and help startups develop.

This study aims to collect statistical data and analyze them to then support the creation of an application on concepts of intellectual property, and to provide support for companies to disseminate the concepts developed in the project. To this end, research addressing bibliometry, triple helix, and identified as the university in conjunction with the government and the company can work together for continuous development through the creation of an ecosystem for innovation and entrepreneurship. It also brings concepts of innovation, because startups are driven by the motivation of growth by bringing an innovative approach to the market, still, of a phase in the contemporaneity of the current innovative market, presenting implementations, trends, and models of innovations.

The methodology applied was a theoretical-practical investigative model. Already the approach is quantitative. As for the research, it was approached in an explanatory way and aims to observe and identify factors that determine or contribute to the occurrence of phenomena. Broadening the knowledge of reality,

because it explains the reason for the "why" of things. When used in the natural sciences, it requires the use of the method experimental; already the social sciences require the use of the observational method.

It is note point that this project does not only include qualitative research, since it addresses fundamental theories, and management, however, is

integrated into scientific initiation (PROBIC-EM), and for this reason, this project has a scientific and pedagogical technical character. Thus, this work has a huge contribution to the formation of the future Brazilian researcher.

2 THEORETICAL FRAMEWORK

For the development of the research project, in this Scholarship Work Plan (PTB), some steps were necessary. The first was the literature review to understand the main concepts involved in the research.

First, each term addressed separately is described, and after involving them to form the agenda indicated in this project. In this context, bibliometry, startups, innovation, and triple helix are pointed out. These concepts are of paramount importance for readers to understand the design of the research.

Paul Orlet 1934 coined the term "bibliometry". However, the term came to become popular only after the publication of the article Statistical bibliography: in the bibliography interim by Alna Pritchard (1969). This term in its essence is a quantitative study where it provides information with the application of statistical and mathematical analyses. The purpose of bibliometry is to produce a piece of new knowledge with a view to future research or interventions, studies of this segment follow a method based on the laws of Lotka, Bradford, and Zipf (FONSECA, 1986).

Concerning the Law of Lotka or Law of the Reverse Squares, formulated in 1926, it evaluates the scientific productivity of the author and verifies the impact of it in a certain area of knowledge. Lotka's Law, $yx= 6/p^2$ where "yx" is the frequency of publishing a certain number of works and "a" is a constant value for each scientific field(ARAÚJO, 2006). The Bradford Law, which was formulated in 1934, has the scientific literature and identifies the most relevant journals that give the greatest flow to the theme stipulated in specific. Zipf's law also known as the Law of Minimum Effort, is formulated in the year 1949, and its author George Kingsley Zipf where it was published in his work Human Behaviour and the Principle of Least-Effort: introduction to human ecology, in this publication it is described that zip's law describes the relation between words and estimates the most recurrent themes related to a field of knowledge. According to Franca (2012) and Chueke, Amatucci (2015) the most used words indicate the subject of the document, but the importance of bibliometry is in the analysis of citations or references included in the publications, which show links between publications and evidence researchers/authors and institution.

The emergence of startups in Brazil began at the time known as the internet bubble, in the mid-1990s, the occurrence occurred because of the emergence of several entrepreneurs in search of financing

for sustainable projects and high profitability, the event had a major relevance in the area of technology. For Gitahy (2017) startups are companies in the initial period with, an innovative base, which can have very low maintenance costs, grow rapidly, and generate increased profits. Startup in its concept is defined by a group of people looking for a repeatable and scalable business model, working in conditions of extreme uncertainty" (GITAHY, 2017, online).

After its emergence, it is noted that interest in startups is growing both for entrepreneurs, and for angel investors and Kohler (2016) states that they are the ones who are leading the big innovations and replacing technologies and business models in the market. It was also noted that with the arrival of the covid-19 pandemic unemployment had a significant increase, which also drives innovative entrepreneurs to take a boost and take on the market with a startup initiative to leverage their assets exponentially in a short period.

Innovation is the most studied concept of literature, with this, it brings more than one concept to the theme, a common point between theories, homogeneously is the exploration of new ideas successfully. One of the most studied concepts is Schumpeter (1934) where he describes that innovation refers to new combinations of existing resources to produce new products, or old products more efficiently, or to access new markets. One of the differential and that drive startups is their project innovations, and therefore have very large leverage, because they bring to the market something innovative, being a product or service. Companies consolidated in the market also seek to be always innovating in their processes, and products, among other sectors, because the existing competition is in a constant evolution of innovation. It is noted that in recent studies, the ability to innovate is linked to the use of knowledge and skills as a form of learning, but also that of the orientation for the market always aiming to obtain a competitive advantage. (ANDRADE, FILHO and SILVA, 2019).

Etzkowikz and Leydesdorff (1996) propose a new model to describe and characterize the relationship between university, industry, and government called the Triple Hélice. This theory shows how to integrate science, technology, and economic development in a uniform contrast to the linear model.

Since 1996, the theory has been developed and exerts substantial influence in the field of innovation studies (JACOB, 2006). This is increasingly used to describe the connection of the main agents that started from development projects in qual aims at the production of socially relevant knowledge in universities and transfer of this knowledge to society, technological innovation in companies, and the participation of governments in the innovation process (DAGNINO, 2003; FOGELBERG; THORPENBERG, 2012). The

Collaboration between the three authors that are part of the triple helix can bring benefits such as identifying new routes of technologies easily, and new businesses, thus ensuring the renewal of companies and industries through innovative use of theory with practice working together for a common goal.

In the triple helix, the function of economic development is the responsibility of the university and other production environments to add to its primary teaching and research activities, the entrepreneurial impetus, going on: a) to foster the creation of new companies, often spinoffs of academic research; b) to

transfer the research results for the industry, through hybrid mechanisms, and; c) to outline a movement of approximation to industry and government to align efforts and resources in cooperative projects (PIRES; TEIXEIRA, ISALSO. HASTENREITER SON, 2012).

The government can be seen as a funding body of innovative ideas using different measures to encourage its local, regional, and national public, this member acts as a way of intermediation between the public sector of the private to the realization of bureaucratic and legal parties.

The role of industry is to finance and support associations dedicated to the study of innovations, also the training of people, in addition, benefits from the alliance because the development study can be applied in the company thus bringing an improvement, one of the implementations for example, is through the R&D program.

Bringing to a current context it is possible to analyze changes in the roles of the propellers as their evolution, the university was focused on passing on the knowledge, as the development of the helix had the role of economic development. Universities are assuming the role of the (productive) industry when they act as the main players in the process of knowledge production (Etzkowitz; Leydesdorff, 2000).

Therefore, there is no defined role for each propeller, since the overlap of action representing an increase in the flexibility of the propellers, by consequiência, results in an impact directly on innovation.

3 FINDINGS

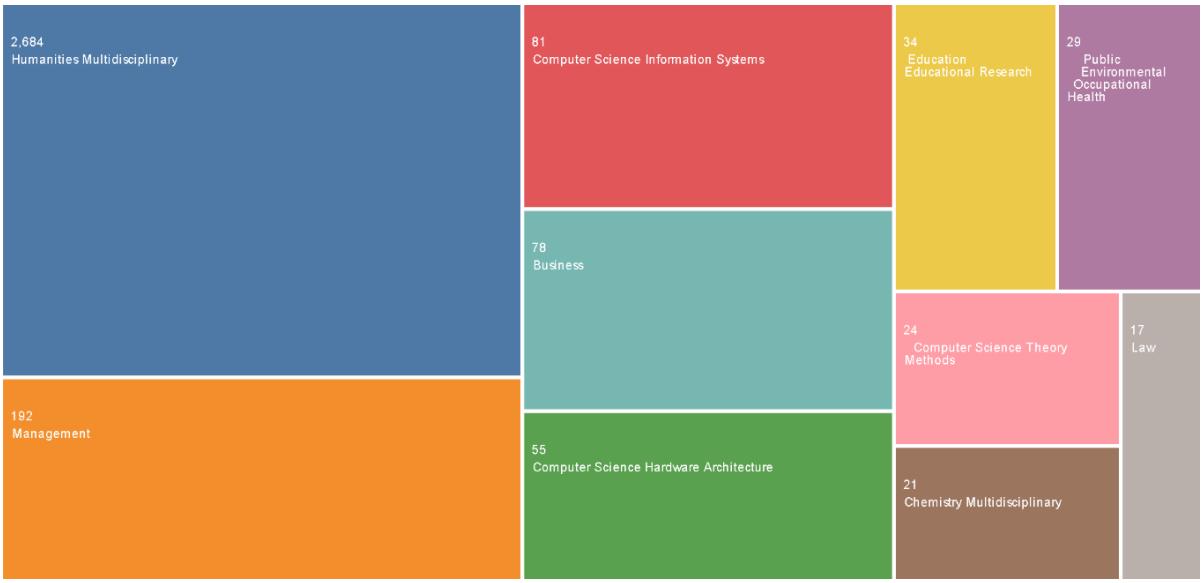
The research identified bottlenecks through the searches performed by the Web of Science tool, identifying relevant points with the topics addressed being, triple helix, innovation, and startups, These results are explanatory points and significant data that are relevant to the themes studied and also to support d the creation of the application content that will be developed based on this research. We note through the results that there are documents proposed by authors from other areas of knowledge, such as economics and human arts. It is perceitary important of selecting databases that provide research in different areas, thus, the Web of Science tool, because the fact that it presents a significant database in terms of aggregating relevant journals and productions, also allows extraction of data by the platform offers, which facilitates the identification of the most expressive articles in each particular subject investigated.

For the application of the theory of searches of bibliometry, some search terms are used in practice, this search is performed through keywords and article titles. In Portuguese, or (((((((("innovation)) OR (("startups)) or (("triple helix")))) was used, in which we obtained 3,386 publications in the WoS database.

The following shows the results obtained from the study conducted using the descriptors, language, and database mentioned. Due to the standardization on the site, we chose to use graphs in the tree map model and bars of the WoS data.

The following as shown in graph 1, occurrences were searched for the relevance of the searched themes, using the keywords mentioned previously as search. The number of expressive themes gave a total of 10, the most relevant is Humanities Multidisciplinary with 2,685 publications.

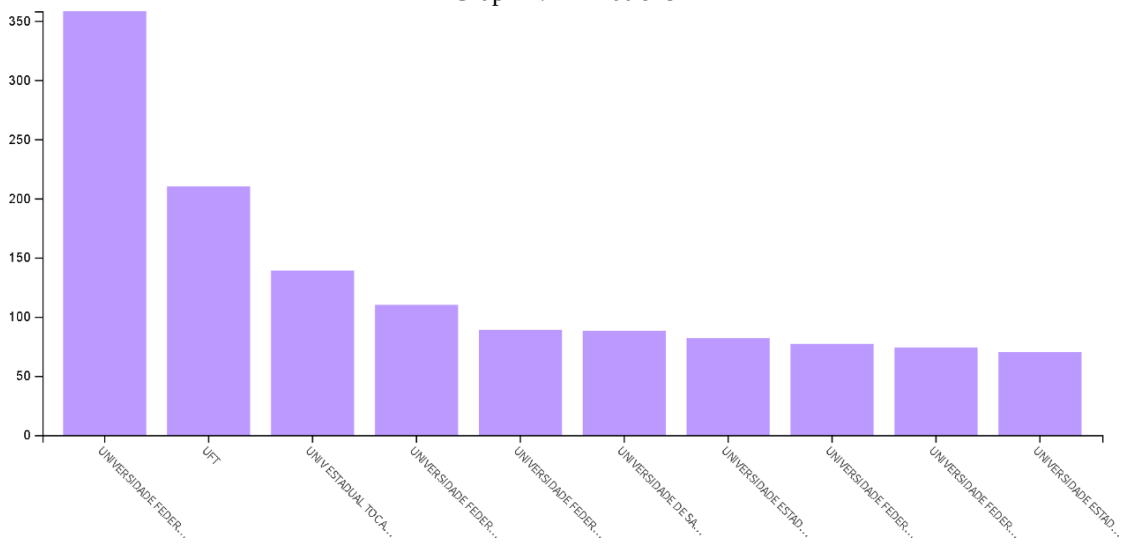
Graph 1: Themes



Source: Web of Science Research

Graph 2 expresses which affiliation has the greatest impact on the publications found in the Web of Science database, related to 358 documents, the Federal University of Tocantins stands out among the others, and with less relevance among the selected ones is the State University of Campinas with 70 related works. Thus, we can observe that largely the UFT is involved in the selected criteria.

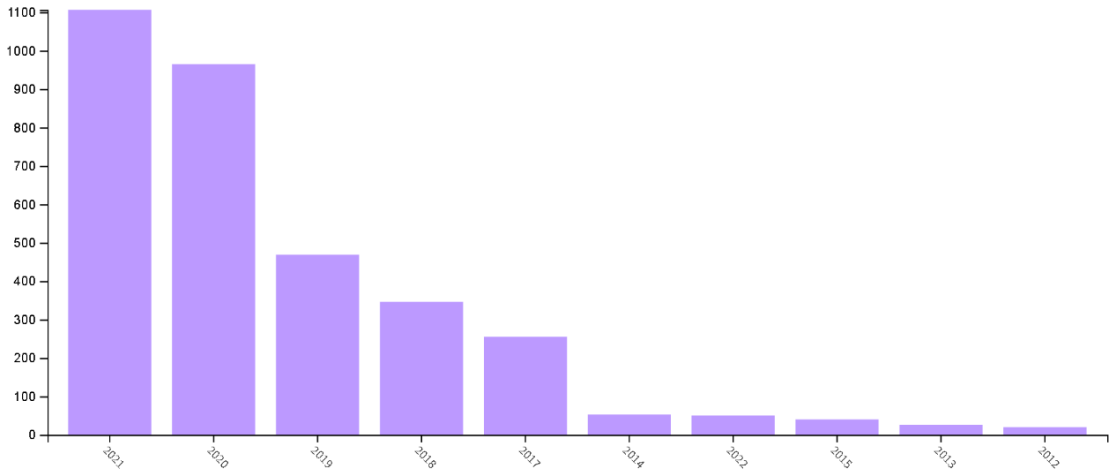
Graph 2: Affiliations



Source: Web of Science Research

Graph 3 shows the result of the WoS database about the number of documents per year with the terms in the Portuguese language. The chart shows an increasing result over previous years, meaning that each year filtered themes are being further searched, also increasing the number of publications and the WoS database.

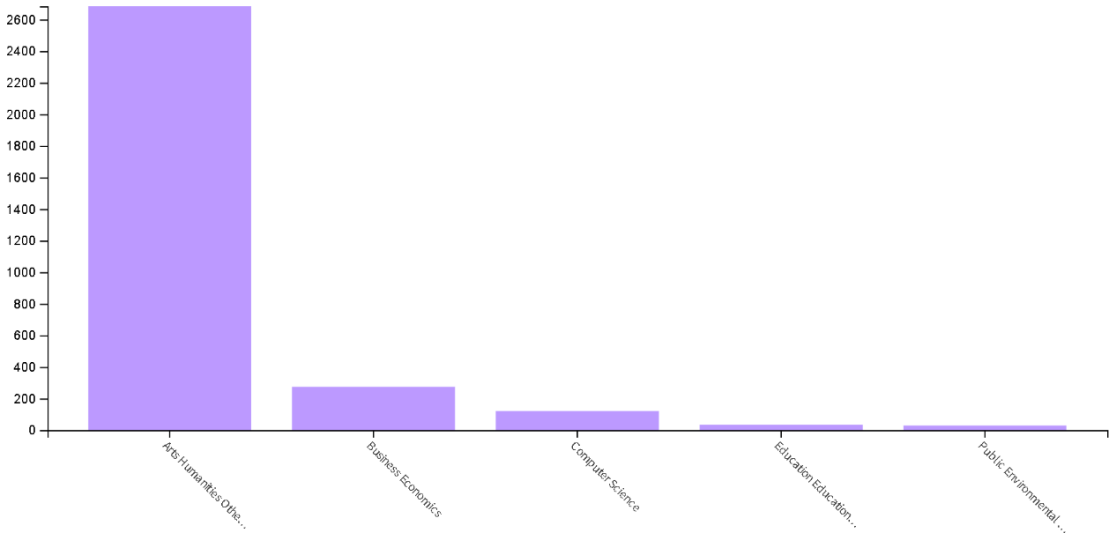
Figure 3: Year of publications



Source: Web of Science Research

Graph 4 shows in which area has inserted the researcher the study on the topics, the great highlight is in the area of Arts Humanities Other Topics with the impact of 2,685 publications, representing more than half of the total result.

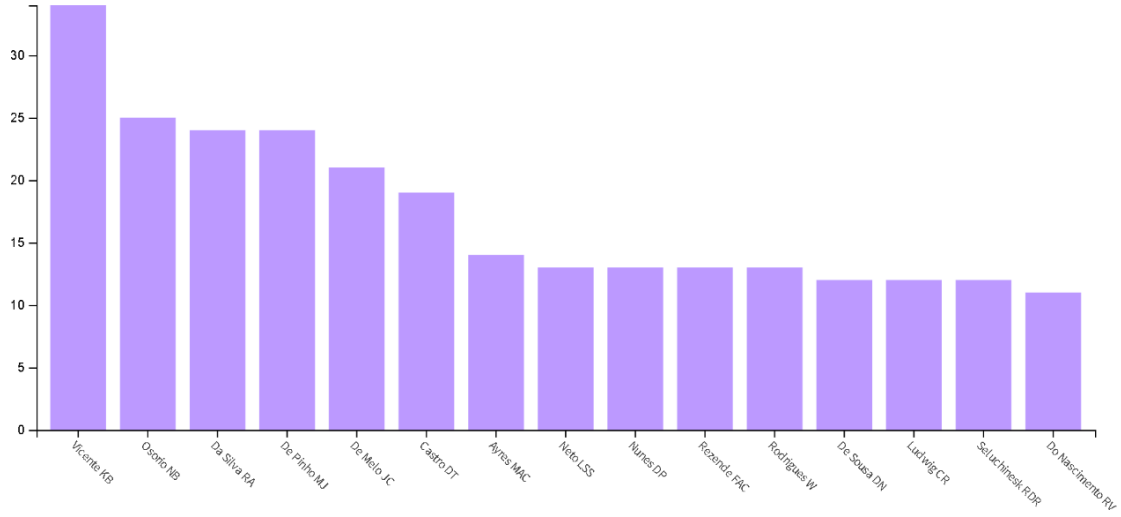
Graph 4: Research área



Source: Research in Web of Science

Regarding relevant authors used in the WoS data, graph 5 shows that the author Vicente KB was the most significant among the works, with citations in 34 works, followed by Osorio NB with 25 findings. The others maintained similar expressive numbers ranging from 24 to 13.

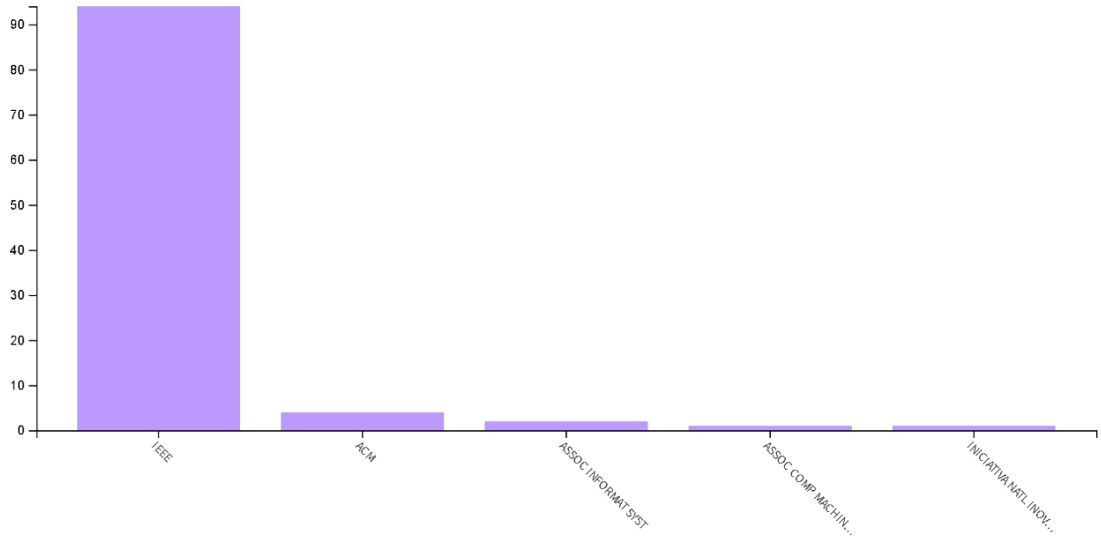
Figure 5: Authors used in publications



Source: Web of Science Research

About the research group that stands out, we have the IEEE, as graph 6 demonstrates, the Institute of Electrical and Electrotechnical Engineers (IEEE) contains 94 publications, the other groups brought results between 4 and 1 publication only.

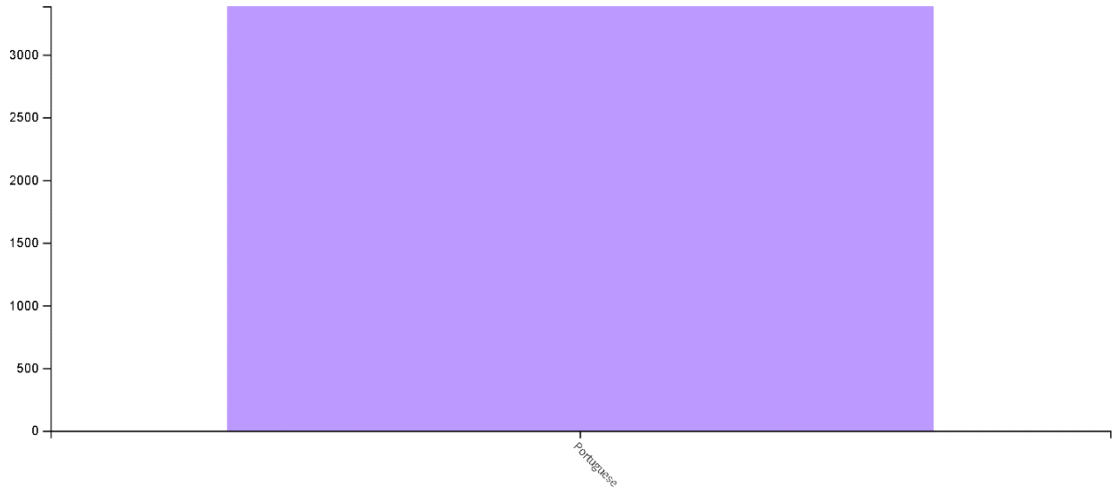
Gráfico 6: Research group



Source: Web of Science Research

Graph 7 expresses the exact number of documents in the Portuguese language, being 3,391, but the research is demonstrating only results in the Portuguese language which its purpose is, but it highlights the existence of more results in languages also in the WoS database.

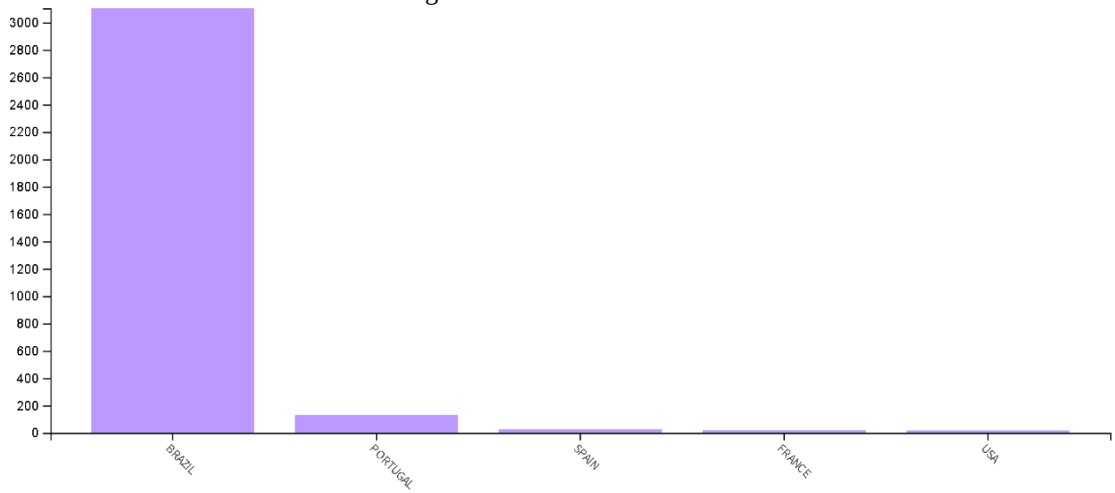
Figure 7: Language used in searches



Source: Web of Science Research

Following graph 8 expresses the list of documents published by each country in Portuguese, Brazil stands out with 3,108 documents, following Portugal with 132, this result is because it is its mother tongue used as a criterion of search in the database, but countries such as Spain, France, and the United States also have publications as well as others, but numbers are not relevant until the current period.

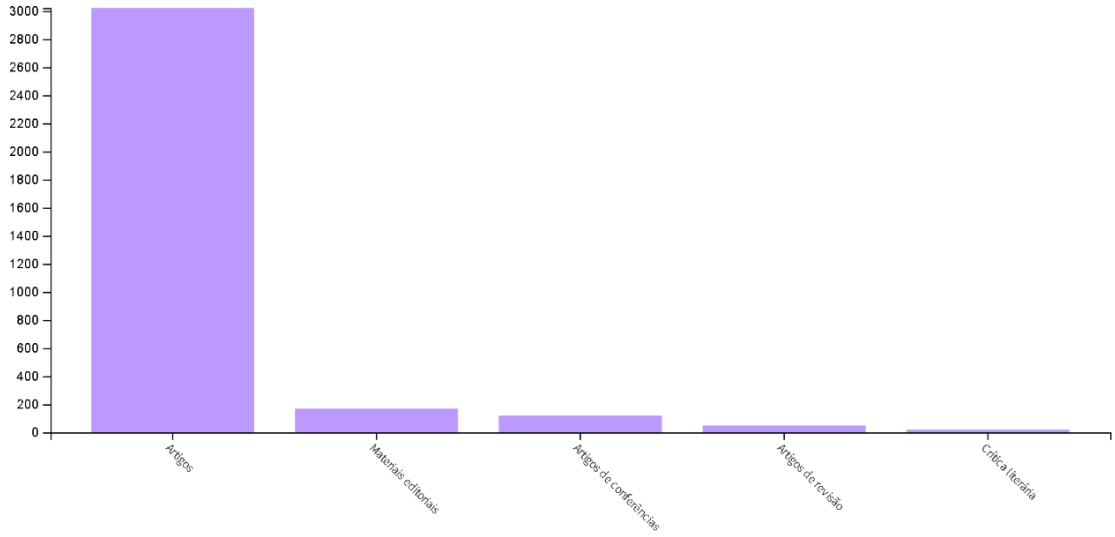
Figure 8: Candidate countries



Source: Web of Science Research

Graph 9 refers to the types of documents found, among them are articles with 3,025 documents following editorial materials with 170 and lecture articles with 119 publications. It is noted that the theme researched most of it takes place in articles.

Figure 9: Types of published documents



Source: Web of Science Research

4 CONCLUSION

The triple helix is essential for the expansion of a company's R&D because this venture will analyze the selected theme and conduct a strategic survey based on the information collected, but the academics engaged in the project will delve even deeper into the theme and study innovative updates of the niche, thus improving the company's strategy even more, the government will be present as an orgã the conciliating incentive is triple helix for its operation. (AMOROs; FUENTES; GUERRERO, 2021). The authors Örberg and Lundberg (2021) report in their research that companies develop their structures and innovation together with an improvement of market investment through the university facilitating knowledge. Thus, it confirms the operation of the triple helix applied in theory and practice.

The research brings graphically demonstrated data on three-helix, innovation, and startups so that the data collected is based on the basis and data feed for creating a future application in which relevant research results will appear to assist startups through the results already ready and analyzed with a reasoned basis. The graphs show relevant results of each theme addressed, among them, the main area of activity refers to electrical engineering, with this, it is demonstrated the need to promote more research in related areas, administration, and economic sciences. The affiliation has similar numbers, demonstrating that both are engaged in publications. It was shown that in 2012 there were few documents in the WoS database, however, this number had a significant increase each year, increasing increasingly, the expectation for 2022 is still addition, and has the possibility of later also increasing since the market is always innovating, it is increasingly necessary to carry out research and the amount of startups has increased. The author used similar results, thus highlighting only one with more relevance. Reflecting the language and research countries the large number demonstrated graphically occurs due to the mother tongue that was selected for the research, however, if we use the example of comparison with the English language the results would be opposite, leaving a gap of necessary the promotion of publications also in another language to give a highlight to the country Brazil among the others also the English language is one of the most widely used

Finally, the research fulfills its objective by bringing the data from the Web of Science according to the proposed bibliometry methods, filtering its search on the themes of innovation, triple helix, and startups. After being used through a triple helix in the development of an application and also, it can serve as the basis for another study.

5 METHODOLOGY

The methodology follows the theoretical-practical investigative model. Regarding the approach, quantitative, considering that everything can be quantifiable, which means translating in numbers the opinions and information to classify and analyze them, requiring the use of resources and statistical techniques (percentage, average, fashion, median, standard deviation, correlation coefficient) to use modeling and simulation, which is used through a model, determining how this system will respond to modifications proposed to it.

As for the research, it is explanatory and aims to observe and identify factors that determine or contribute to the occurrence of phenomena. Broadening the knowledge of reality, because it explains the reason for the "why" of things. When used in the natural sciences, it requires the use of the experimental method; in the social science requires the use of the observational method.

Furthermore, this project does not only include qualitative research, because it even brings fundamental theories, and management, but is integrated into scientific initiation (PROBIC-EM), and therefore, this project is scientific and pedagogical techniques.

For the first theoretical part of the research, the bibliographic and investigative model was used, being approached through research on sites related to the theme, search for articles in SCOPUS and Web of Science, emphasizing that the search was made by articles more cited in other articles, using the main keywords: startups, innovation, and triple prop. After the use of the articles as a bibliographic means for knowledge and interaction of the theme, thus constructing the theoretical framework. After bibliometry methods were used, they were used, lotka's law or law of the reverse squares, Bradford's law, and zipf's law, based on these, was searched in the database of the Web of Science tool that allows extract data from journals also provides analysis of results in the form of graphs, they are extracted and used the same chart model which the tool itself provides after the explanatory methodology was applied in each chart explaining them.

STORIES SUBMITTED FOR PUBLICATION

To date, the research developed in the first half of the first year has not been published.

OTHER ACTIVITIES OF INTEREST TO THE UNIVERSITY

For a better understanding of the theme, the workshop of the O20 Innovation Xperience 2019 Congress addressing the triple helix of innovation was reviewed: University, Government, and Market. Also for engagement with innovative projects, the scholarship holder attended the Shark Tank series, where he can follow the topics covered in the project, such as startups and innovation.

PROJECT UNFOLDING PERSPECTIVES

Innovation in the market is present daily, will never have a product or service represented as the most definitive innovator, because innovation is something that occurs constantly, so it is necessary to be constantly updated in the market, startups are an example of innovation where they enter the market offering products or innovative services with a different proposal in the niche. For startups and companies consolidated in the market made along its route is updated mentioned earlier, so an R&D plan in which it can be approached using the triple helix. The research will always have topics to be addressed by the constant update that the market requires, and such companies need this partnership in the triple helix, so this research should extend updating in the market and giving support through the triple helix. Also the importance of updating data through bibliometry. This research can also be used to database a future application that was described earlier and still used as a basis for other searches with the same subject.

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