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SCIENTIFIC RESEARCH PROCEDURE AND METHODS USED FOR THE SUPPORT OF SCIENTIFIC ARTICLES

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Abstract

This paper addresses the issue of the state of the art where it describes the various procedures that serve researchers when conducting scientific research, where its purpose is to publicize the applied research method with which it supports all the information collected from various academic sources to address the specified topic, thus giving an approach to the tools and methods used for the realization of articles with a scientific character to have a significant impact on the various academic levels to which they are directed as well as to the scientific community itself.

Keywords: Article, Study, Research, Process.

Introduction

This section describes, step by step, the procedure that was carried out to identify the key studies that give line to the scientific contribution of this research. The literature review procedure to identify these studies, the way they were selected, the results achieved in the review, the way in which the content of the articles was reviewed and the narrative review that derives from this process are described here.

Literature review: procedure

In this research, a systematic review of the literature was carried out. This means that a structured process of approach to the literature on "strategic direction of research in higher education institutions" was carried out, based on a comprehensive search for articles in electronic databases and bibliographic tools.

Specifically, the systematic review of the literature was carried out in the tools: Google Scholar, Scopus and Web of Science. This choice was based on the fact that these tools cover most of the relevant literature in the field of study with which this research is associated. Finally, it should be noted that this review focused on theoretical and empirical contributions produced during the period between 1995 and April 2020. The choice of this period is based on the fact that, in the mid-90s, the strategic role of universities, based on their research results, began to stand out (Koschatzky & Stahlecker, 2009).

Search equation

In the aforementioned tools to search for relevant articles, an electronic search was carried out oriented by the key terms that derive from the thematic interests of this research. In addition to this, multiple combinations of the terms that relate to the phenomenon of: "strategic direction of research in higher education institution" were used. Table 1 presents the combinations of terms used in bibliographic tools. It is important to note that the equation was executed only in the English language, given the tradition that universities in developing countries have in transforming the research process into a

strategic capacity that allows them to differentiate themselves in the market.

Table 1 Combination of terms defined for the execution of the search equation

Combination of terms	
Strategic management	Scientific research in universities
Strategic	Research in universities
Strategic planning	Research in higher education
Strategic plan	Scientific research in higher education

Source: own elaboration.

Figure 1 shows how the combination of terms was applied in the bibliographic tools.

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( TITLE-ABS-KEY ( "Strategic management " OR "Strategic" OR "strategic planning" OR "strategic plan" ) AND TITLE-ABS-
KEY ( "Scientific research in universities" OR "Research in universities" OR "Research in higher education" OR "Scientific research
in higher education" ) ) AND PUBYEAR > 2009
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Figure 1. Search equation editing.

Source: Scopus, 2020.

Results of the systematic review of the literature and selection of studies

The application of the search equation resulted in 87 articles. From this total, those articles that did not have a relationship with the "strategic direction of research in Higher Education Institutions" were eliminated. Articles that address topics that deviate from the study phenomenon of this research were excluded, such as:

- Articles on strategic management in private companies.
- Articles on strategic direction in the education sector in general.
- Articles on quality management in the education sector.
- Theoretical articles on strategic management in public and private companies.
- Articles on strategic human resources management.
- Articles on innovation and research and development, which are not addressed in the framework of higher education.

Finally, the review produced a total of 18 articles that are directly related to the "strategic management of research in higher education". This means that the proportion of useful articles in the review was 20%. This relationship, as a basis for the inclusion of the selected articles, has to do with aspects such as:

- Research as a strategic capacity of Universities.
- Alignment of research efforts with thestrategic objectives of Higher Education Institutions.
- Strategic problems of Higher Education Institutions, which include problems in improving research.
- Strategic knowledge management in Higher Education Institutions.
- Aspects that affect the strategic development of research in Higher Education Institutions.
- Strategic planning of research in Higher Education Institutions.
- Strategic impact of research in the environment surrounding the University.

- Strategic alliances to strengthen research from higher education institutions.

Procedure for the analysis of articles obtained through literature review

In principle, a detailed reading of each article was carried out. Then, to shape the state of the art, three key elements were extracted from each article: the main purpose-objective, the methodology (in general terms) and its most important findings. These three elements account for the trends that, at the research level, the analyzed literature has. In addition, they allowed to construct the narrative review that derives from the systematic review of the literature, which is presented below.

Narrative review

This section presents the narrative review that resulted from the process of systematic review of the literature. Contributions to the literature on "strategic management of research in Higher Education Institutions" are presented in a chronological order.

Taylor and Karr (1999), in their article, present a qualitative approach study in which they interpret interviews conducted with 9 universities with a research orientation. This was intended to better understand the strategic problems faced by these institutions and how they should do risk management to achieve excellence. The researchers found that efficacy and excellence must go far beyond restrictive strategic planning, especially when it comes to research. As a recommendation, which results from the study, Taylor and Karr suggest that a holistic view of strategic management in universities should be chosen, including the direction given to research. This arises because the strategic direction of universities overlooks problems of the environment that could be solved through research, if the latter is raised from a strategic direction.

Ziegel and Zervos (2002) present a taxonomy of strategic alliances to promote research, involving universities, for-profit and non-profit organizations and government agencies. Based on this taxonomy, the researchers analyze whether partnerships generate a positive impact on the financial performance of the organizations that participate in them. However, they found that assessing the strategic impact of strategic alliances is not possible, given that it is a complex process that requires the collection and processing of data from various dimensions of analysis. From the perspective of the University women, Ziegel and Zervos emphasize that implementing a strategic direction of research must be based on choosing the right alliance.

Castellanos, Rodríguez and Ranguelov (2004) identified in their study the types of knowledge that act as a support for intellectual capital in a sample of public universities in Spain. Thus, according to the strategic objectives of the universities investigated, the types of knowledge are identified. This process was carried out through in-depth interviews with the managers and research leaders of the universities under study. As a result of the study, it was found that public universities in Spain carry out a process of strategic direction of research, which affects the improvement of their intellectual capital and, therefore, their competitive advantages.

Atkinson and Blanpied (2008), in their study, illustrate the development and evolution of American research universities. In particular, the researchers argue that they are a recent innovation, which were affected between the 1940s and 1950s by the low state funding for the development of research projects. However, the authors found that, by 1970, the federal government increased financial support for universities, which was key in the flourishing of American university research. Likewise, this support in turn led to a decrease in support per U.S. industry. Finally, the authors, in their analysis, found that, strategically, the growth of American research was a result of cooperation between universities and industry. In general, the authors point out that this cooperation is an essential variable for a university institution to be at the forefront in the process of knowledge generation.

Serrano (2011), theoretically, states in his article that the conditions of globalization of the new millennium affect the redefinition of the research strategy of universities. However, the author states that universities do not have well-designed research strategies, so they are usually very limited. Therefore, in the article the author describes how to design strategies for research according to the key actors involved. Basically, Serrano argues that

universities, to be leaders in research, must strategically improve their ability to attract researchers, improve infrastructure and make alliances with other organizations. In this sense, the author suggests that the way to strategically direct research in universities should follow the paradigm of resources and capabilities. Serrano argues that this consists of directing the research of universities according to the strengths of their researchers and research programs.

Marimón (2012) conducted a study on improving the impact of extension and research on higher education in medical schools in Cuba. Through a qualitative research approach, it was found that both areas are key in creating competitive advantages for Universities. The results of the research, obtained by Marimón, warn of the importance of continuing with the development of scientific research from a strategic perspective, since it is what allows a Higher Education Institution to generate resources from the extension.

Arveson (2012), in his research, notes that universities and scientific research laboratories are more often faced with densely structured challenges, such as climate change, healthcare, and solutions to improve the performance of organizations. Faced with these challenges, research must be oriented from a strategic perspective, if it is to generate an impact on society. This is why Arverson suggests that universities should make use of conceptual tools such as strategic maps to establish how research efforts will be aligned with the strategic purposes of such institutions. Under this approach, it is possible to create visible and measurable strategies for research processes. In short, strategic mapping helps research leaders make strategic decisions and implement them successfully.

Reddy, Xie and Tang (2016) made a comparison of educational performance between universities in India and China. Within the comparison process, the research capacity of these universities was added. The researchers found that universities in both countries have established research as a process that has strategic objectives. The comparison was based on a bibliometric analysis process. Finally, the researchers suggest that the variables that have the greatest impact on research becoming a strategic asset of universities are: the search for funding, the realization of collaborative projects with both public and private institutions, and the definition of practices and quality standards for the development of research. An important finding of the research is that the Universities of China have research processes in place that, from a strategic point of view, surpass the Indian Universities.

Duan and Deng (2016) assessed the strategic efficiency of 36 Australian universities from 3 perspectives: administrative efficiency, teaching capacity and external research impact. The authors found that universities do not understand what the process of improving their strategic efficiency looks like. Additionally, they suggest that the research process makes universities more competitive within the education sector, as long as the resources for this process are channeled appropriately.

Barbón-Pérez and Fernández-Pino (2018) Conducted a study on the harmonization of strategic practices in higher education in Ecuador through the integration of knowledge management, science, technology and innovation. The researchers argue that this strategic approach is barely introduced in the universities of Ecuador. To achieve such harmonization, universities, through their knowledge generation processes, are required to produce new opportunities that facilitate the strategic management processes of universities. Finally, the authors propose that, from the key strategic processes of universities, a strategic culture can be created regarding the generation of scientific knowledge.

Mejía-Correa, Vesga-Vinchira and Gaviria-Velásquez (2018) designed in their study a strategy for the management of scientific knowledge at the University of Antioquia, in Colombia. According to the authors, universities that emphasize research should have a strategy for managing scientific knowledge. This should allow the generation of competitive advantages and a better positioning within the fields of knowledge in which they specialize. To achieve a greater strategic impact of the research, the authors propose that three knowledge management tools should be deployed: measuring the level of maturity, identifying knowledge gaps and building knowledge maps. The results of this study

showed that knowledge management tools are key to the generation of a strategic direction of research at the university that was a case study.

Mezhouda (2019), in its article, explores the implementation of strategic research planning in Algerian university institutions, from the perspective of an integral management that allows anticipating potential changes in the environment in which these institutions operate. This exploration is carried out by the author focusing, especially, on the strategic planning of the research, which must be aligned with the strategic model of the University, its strategic objectives and key institutional projects. Mezhouda found that research planning is a key resource for universities, improving their performance and achieving their strategic goals. However, this is not an easy task, since research must have great capacity to adapt to the problems of the environment.

Castro and Ion (2019) carried out a review of the literature to set the research agenda regarding the analysis of the perceptions of the new university approach, focused on research and the consequences it produces on the professional development of academics from universities of high production in research in Spain. The authors, in the review, indicate that the current university model is defined by changes in institutional functioning, in the appearance of new structures and in the need to generate economic resources for scientific production. Thus, as a final result of the literature review, Castro and Ion affirm that this university approach, focused on research, leads to a change in the functions and autonomy of academics, which is characterized by approaching research programs from a strategic perspective.

Also as a result of the systematic literature review carried out in this study, Muneeb, Tehseen and Saeed (2020) analysed the influence of dynamic capabilities, operational capabilities, network targeting, social media and supervisory support on the research productivity of PhD students from Malaysia and the UNITED Arab Emirates. In relation to the above, the authors concluded that the aforementioned dimensions have a positive influence on the productivity of doctoral students. However, the authors stress that the influence was stronger in the Malaysian sample than in the UAE sample. Thus, as a general result, Muneeb, Tehseen and Saeed suggest that, although there is a positive influence of these characteristics on research productivity, it should be strengthened from the dynamic capacities of doctoral students in terms of improving their ability to manage knowledge. However, this finding is important, since dynamic capabilities are essential to generate changes in any activity that wants to seek novel strategic results (Teece, 2019).

From another analysis perspective, Wilkins (2020) analyzed the market segmentation process using a strategic group analysis of higher education institutions in the UAE, with a strategic approach to market and competition analysis. This process is used by higher education institutions to gain recognition and positioning. Strategically, the author analyzed the segmentation process in public and private institutions, as well as in elite and specialized institutions. By focusing on these types of institutions, Wilkins concluded that the accreditation of institutions and programmes of this type is of paramount importance in the UAE university market. Another important finding of this study is that the research carried out by these institutions also responds to the needs of the segments where they seek student enrollment, which is part of the design of their competitive strategies.

Reddy and Murty (2020) found through their study that research requires a certain environment and opportunities for it to have a strategic impact. Therefore, the authors suggest that those in charge of managing research processes should give it a strategic approach, so that university resources can be used effectively (infrastructure and processes). In this sense, Reddy and Murty that both new and experienced researchers must align their efforts with the demands of the environment, which means that they must be used by universities as strategic resources.

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