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Bibliometric Analysis of Innovation Capabilities in the Services Sector (2001-2017)

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Abstract: In order to carry out this study in a preliminary phase, a bibliometric review was carried out on the innovation capacities in the services sector which allowed to establish the state of the art and the most relevant research carried out on this area of study in the last years, this inquiry allowed to recognize that the year in which more studies have been carried out regarding this area has been the year 2013 and that the most cited and referenced researchers are Bessant and Ackeman. In addition, it was possible to identify that the country that more related publications has had has been the USA. Together with this investigation, we performed an analysis of the most used words and most cited reserachers to know the networks of bibliographical information that are most consulted. This was done through the visual bibliometric analyzer VosViewer in which the networks of reserachers where the most cited are Bernede and Garrido, Perez and Suri who are evidenced as the center of the information network and the most used terms are: innovation in service, improvement, development, education and competitive advantage for the development of this research.

Key words: Innovation capabilities, services sector, bibliometric review, education, innovation

INTRODUCTION

In order to carry out this research, a bibliometric revision was initially carried out in databases related to the related research areas. The bases used were: Scopus and Redalyc in order to carry out an exploration that allowed to know the current state of the investigations related to: innovation capabilities and services sector and in this way to approach the most cited and referenced studies the area to be addressed during the research in response to current needs on the subject. From this review, it was possible to establish basic criteria referring to the most used concepts.

Within the analysis, it was found that innovation in the services sector has been modified but in general it has been focused on technological innovation and social networks for reserachers like Amui *et al*. (2017) is defined as "The ability of a company to make sustainability more dynamic and integrated with strategies, transforming it into a business asset". On the other hand the services sector can be interpreted as public or private services and from there the difference in the way to approach the innovation and its possibilities.

MATERIALS AND METHODS

This study was based on the results obtained after a bibliometric review which allowed to delimit the studies, scope and research that have had more relevance in the last years on the area of innovation capacities in the services sector. This blibliometric review was performed in the Scopus Dialnet and Redalyc database and was guided under the following path: (Titl-eabs-key (service and sector) and title-abs-key (capabilities and innovation)) and (LIMIT-TO (PUBYEAR, 2017) OR LIMIT-TO (PUBYEAR, 2016) OR LIMIT-TO (PUBYEAR, 2015) OR LIMIT-TO (PUBYEAR, 2014) OR LIMIT-TO (PUBYEAR, 2013) OR LIMIT-TO (PUBYEAR, 2012) OR LIMIT-TO (PUBYEAR, 2011) OR LIMIT-TO (PUBYEAR, 2010) OR LIMIT-TO (PUBYEAR, 2009) OR LIMIT-TO (PUBYEAR, 2008) OR LIMIT-TO (PUBYEAR, 2007) OR LIMIT-TO (PUBYEAR, 2006) OR LIMIT-TO (PUBYEAR, 2005) OR LIMIT-TO (PUBYEAR, 2004) OR LIMIT-TO (PUBYEAR, 2003) OR LIMIT-TO (PUBYEAR, 2002) OR LIMIT-TO (PUBYEAR, 2001) OR LIMIT-TO (PUBYEAR, 2000).

This allowed to delimit the search according to the identification of the field of study among which were: international business, political sciences, economics, economics, business administration, technology, business management among others also, delimited the period to be analyzed between 2000 and 2017 since this period of time allows to know the most recent studies. This also allowed to select the sources of information and thus to establish the search criteria that after a debug of results yielded 332 articles.

On the other hand, a study of reserachers and key words was carried out, based on the bibliometric analysis VosViewer which allows to make a study with visual results on the main articles and investigations found,

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throwing maps of networks which allow visualizing the content of the analysis carried out in a practical and effective way.

RESULTS AND DISCUSSION

Bibliometric review: From the bibliometric review carried out in the Scopus database: 332 articles were found which showed the following results. Figure 1 shows the years in which more research has been done over the last four, being in 2013 where more studies were carried out on innovation capacities and services sector.

Figure 2 shows the research production that has been carried out according to the research areas, being business administration with 42.4% and social sciences with 37.6% which more research and studies related to the area have had. Figure 3 shows that the countries where most research is done with respect to innovation and the service sector where the country that has published the most is the United States.

Figure 4 shows a graph that indicates which have been the most referenced reserachers and which have done the most research in innovation and services sector being Bessant. J and Ackeman, M. most frequently cited. In addition, a study of reserachers and key words was carried out by means of VosViewer which is a tool for the construction and visualization of bibliometric networks that can include all kinds of bases of analysis of relation between reserachers and keywords which allows to know and understand the research networks that have been identified in the study area.

To understand the images it is necessary to understand that the importance or relevance goes from greater to lesser of the tones warmer to the colder ones, being the red one that more importance has culminating

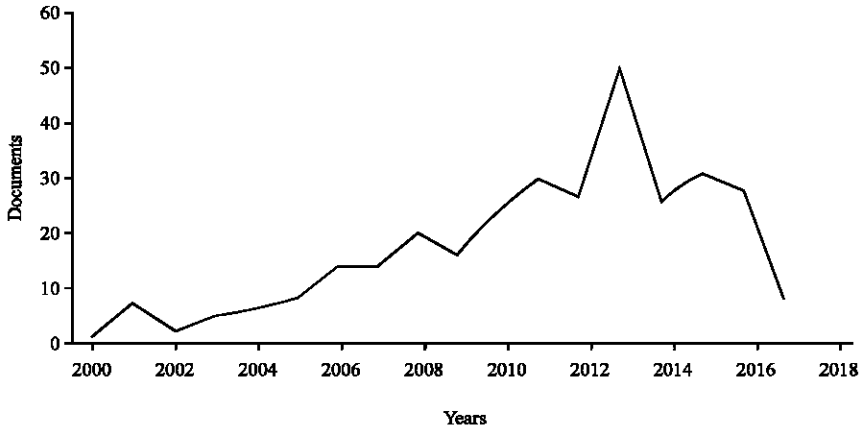

Fig. 1: Search by years (2000-2017)

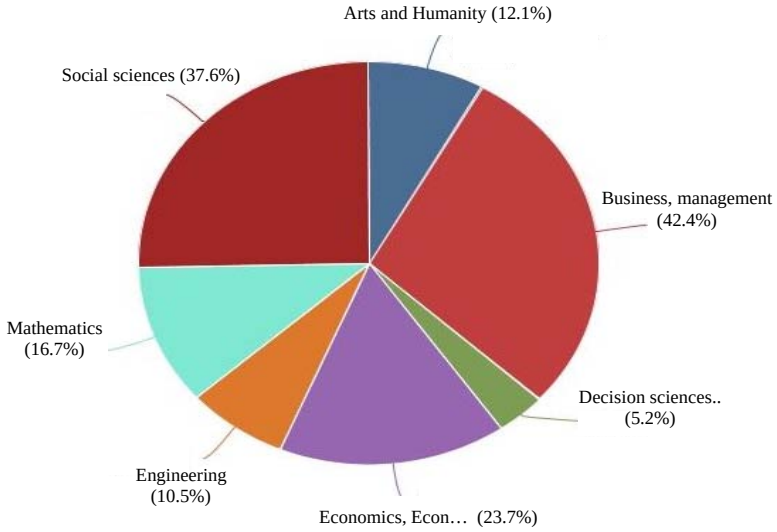

Fig. 2: Analysis by research area

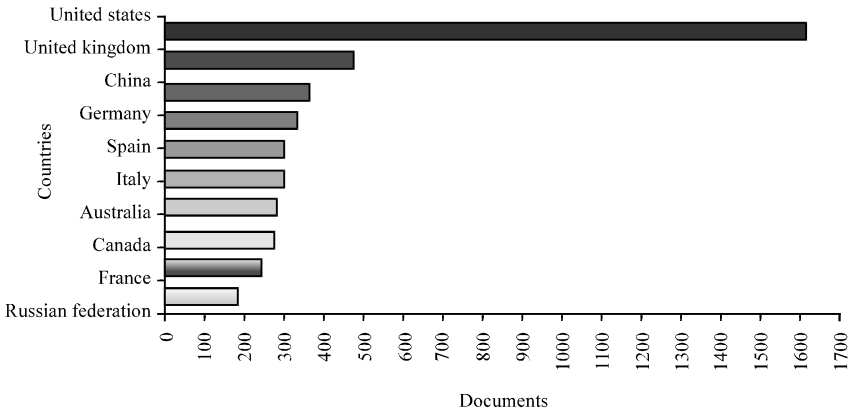

Fig. 3: Analysis by country

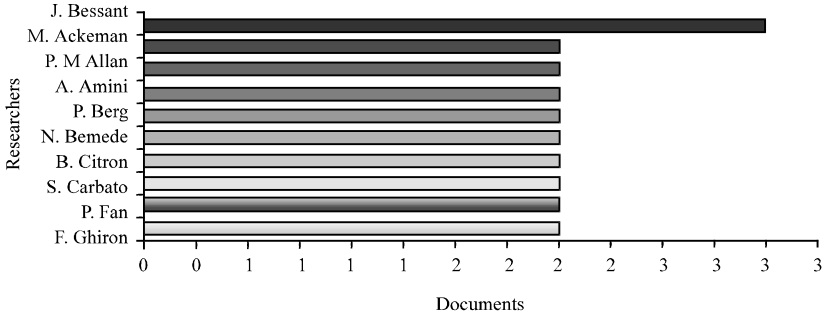

Fig. 4: Analysis by reseracher

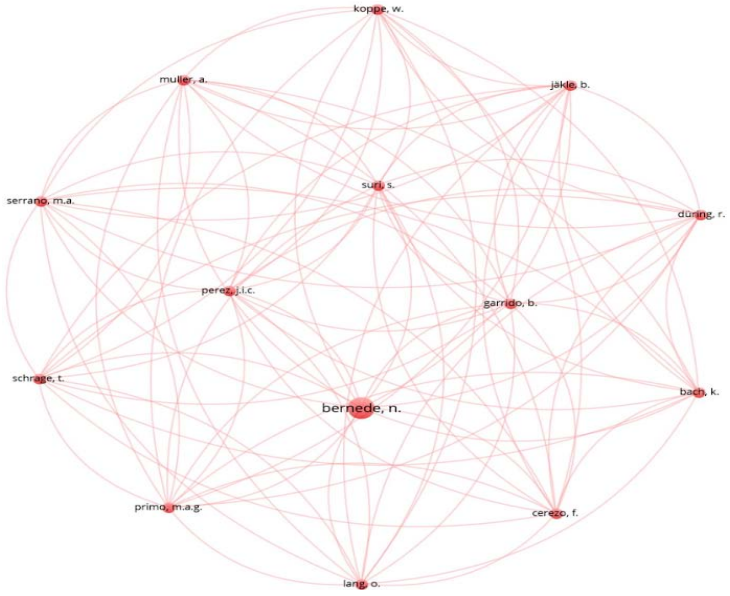

Fig. 5: Represents the reserachers who have written and carried out research in the last 4 years

with the blue one of the less relevance, it is also important to understand that the lines between the thicker means a larger network of information and finally, the greater the circumference of the word or the reseracher the greater the preeminence. This software yielded the following results. Figure 5 represents the reserachers who have written and

carried out research in the last 4 years on the service sector and innovation, it is evident that Bernede, Garrido, Perez and Suri are the most referenced researchers, however, the researcher who find themselves at their disposal make up the information network that is interconnected which means that they constantly make publications together.

It is also important to denote the networks that exist between the researcher since this allows to visualize who related research and who have had relevant studies in conjunction with other reserachers. Figure 6 shows the most used words in Abstrac of the consulted documents, among which are communication networks in a large conglomeration of words in which the most relevant ones have to the innovation theme in the services sector are: Innovation in service, improvement, development, education and competitive advantage which gave bases for the development of this research (Table 1).

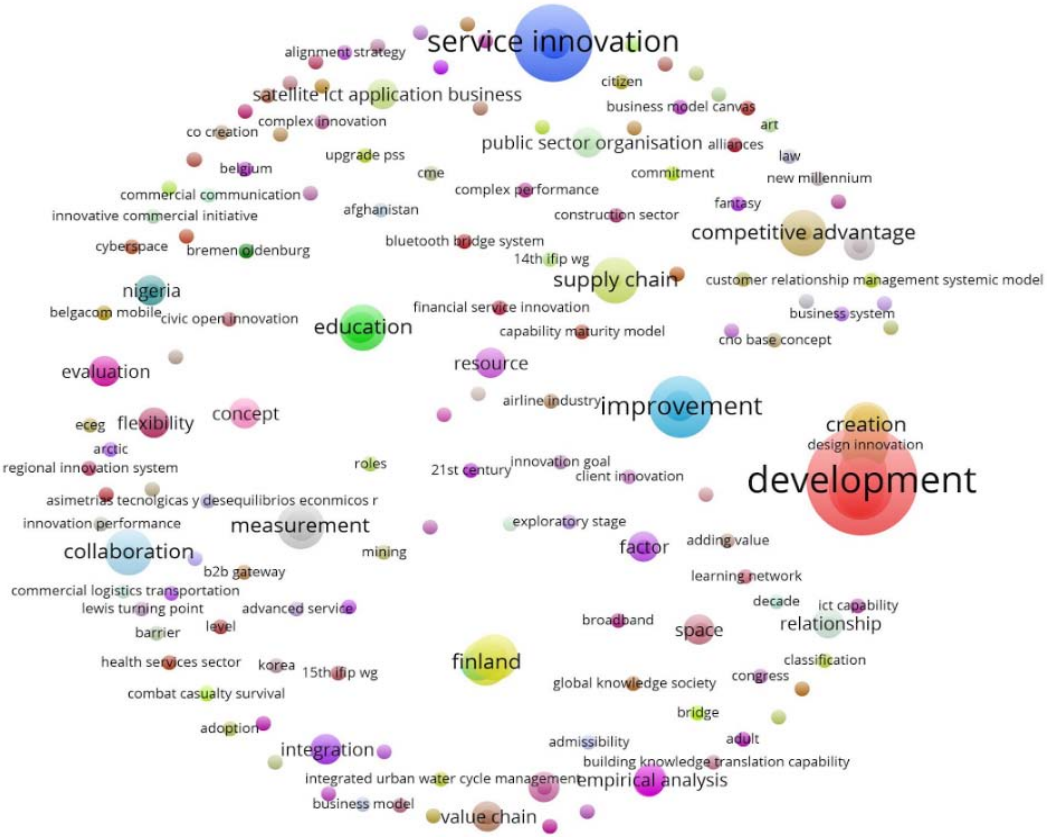

Fig. 6: Keywords

Table 1: Definition of innovation

Years	Title	Resaerchers	Definition of innovation
2017	Sustainability as a dynamic organizational systematic review and a future agenda toward a sustainable transition	Amui *et al.* (2017)	This process of adaptation is reflected through innovative practices. The objective of this research was to carry out a systematic review of the literature on dynamic capacities for capability: a sustainability. The results show that more research is needed on dynamic capacities for sustainability, especially in emerging economies in general. In summary, there are few studies that relate both issues: corporate sustainability and dynamic capabilities, so there is an opportunity to conduct future studies that seek to identify what kind of dynamic capabilities can be developed to more effectively overcome the emerging challenges of sustainability
	Promote open innovation in the public sector throughsocial media monitoring	Loukis *et al.* (2016)	Given that the direct transfer of open innovation methods from the private sector to the public sector is not possible, effective methods of "citizenship" responding to the specific needs of the public sector need to be developed and then analyzed and evaluated from different perspectives of the public sector. Political and management sciences. This document makes a double contribution in this direction: it evaluates a new method of monitoring relevant social netresearchs by government agencies, retrieving and making Advanced processing of its contents and extract from it external knowledge about specific domains of government activity or policies public interest in order to promote and support open innovation

Table 1: Continue

Years	Title	Resaercher	Definition of innovation
2016	Human capital, advantage of service innovation and performance: the moderating role of dynamic and competitive environments	Prajogo and Ok (2016)	The purpose of this study is to examine the effect of human capital on the advantage of service innovation (sia) and business performance (bp) in service sector firms and how external environmental factors influence these relationships. This study used a cross business sectional survey of a random sample of Australian service firms with the company-wide analysis unit. The general findings of this study show that HC is positively related to value creation or SIA which in turn leads to income generation for companies. The results demonstrate the complementarity between resource-based theory and contingency theory as it clearly shows that the value of innovation as a firm's capacity is strengthened or weakened within a more dynamic or competitive business environment
2016	Connection of supply and demand:The role of intermediation in public procurement of innovation	Edler and Yeow (2016)	This study conceptualizes and analyzes the intermediation between supply and demand using the example of public procurement of innovation. It defines the specific needs and functions of intermediation in the different acquisition situations and describes the preconditions for effective intermediation. The document combines and contributes to the growing literature on the intermediation of innovation and the public procurement of innovation. In order to develop the conceptualization of intermediation in the process of demanding innovation, it is based on the existing, rather rudimentary conceptualization of intermediation in the innovation and management literature. The study shows how intelligent and tailored intermediation can address some of the known procedural and capacity weaknesses in the public procurement process of innovation
2016	Motivation in building innovation: business opportunities, problem solving and passion for improvement	Fang *et al.* (2016)	This study analyzes the motivations for innovation in construction by adapting to the service sector the frameresearch of the Sectorial Innovation System (SSI). Innovation in construction is similar to the services sector. Construction companies innovate to gain business opportunities, solve project-related problems and improve processes. Innovation is also motivated by committed and passionate actors within the construction company
2015	Partnerships in the financial services sector-exploring their organizational learning mechanisms	Smet *et al.*(2015)	The financial services industry is undergoing many changes, including the use of new technologies to offer new services. On the one hand, dealing with new knowledge (e.g., technological) requires an organizational capacity (i.e., absorptive capacity) and the social capital of the financial service provider also contributes to a successful acquisition of knowledge. In particular, the influences of policy and structural learning mechanisms on the components of social capital should be interesting areas for further exploration and a first measurement construct will be proposed in this concept study
2015	Change management of change: The new imperative of innovation	El-Ella *et al.*(2015)	For this research the imperative of innovation is clear: organizations (both public and private) that wish to survive and thrive need to change. Responsiveness and the application of change have become a basic capacity that organizations need to develop. This is how "change management" can help organizations in this activity. Interactive web-based technologies allow rapid mobilization and articulation of different points of view and rapid building of coalitions for action. This chapter explores the implications of this shift for our understanding and management of change and argues that just as early models for the use of advanced information technologies gave way to a much more interactive perspective, we may also need new models that Understand and research with "change management 2.0" those that reflect the rapid change and openness in the innovation landscape
2015	Positioning UK research and technology organizations as technologically oriented outside	Readman *et al.* (2015)	Research and technology of UK (RTO) organizations compete globally for engineering,technology and innovation services. Although historically associated with specific industries, UK RTOs have expanded into non-traditional markets and sectors. This study details 15 UK organizations that have unique technology and innovation capabilities across industrial boundaries
2014	Innovation objectives in software development for enterprise applications	Arnold and Shadnam (2014)	The purpose of this contribution is to discuss and communicate the areas where the technological challenges are in the software development sector. This is a kind of inventory beneficial for the academic community as it provides an account of the challenges of the industry. In addition to the benefits of knowledge management, the analysis would also help to leverage research and development funding and attract investors; Both academic and industrial organizations can take advantage of this. We call this type of analysis "capacity analysis". When the data are formulated in this way, strong evidence is generated that the project goes beyond standard engineering by distinguishing the risk that can be eliminated through the standard engineering risk experiment
2014	Open innovation requires integrated ecosystems of competence and community: Lessons learned from open civic innovation	Almirall *et al.*(2014)	Open innovation has received substantial attention from the company as a means of providing companies in hypercompetitive environments with the ability to create a stream of new products and services. Although, companies have generally been slow in adopting open innovation, many cities in the United States and in Europe have been quick to adopt it, providing the necessary expertise on the ground to organize external sources. Based on the review of six cities opening their data for innovation, it was found that while cities often started with either approach to organize their external sources, each approach was inadequate in a way that could potentially be addressed by the addition of another approach. We therefore conclude with an integrated approach in which the needs of the entire ecosystem of innovation sources and sympathizers are organized to address competitive and community needs

Table 1: Continue

Years	Title	Resaercher	Definition of innovation
2013	Entrepreneurship and innovation in the European space sector: Overview and impact of the initiatives of the European Space Agency and the European Union	Bernede	To ensure growth and sustainable innovation in the European space sector, the European Space Agency (ESA) and the European Union (EU) have developed policy measures for the space industry and service providers. In addition, these programs often give special attention to facilitating new business opportunities for SMEs by sharing risks and investments, encouraging them to participate in research and development or service activities. This research aims to analyze the current frameresearch programs implemented in Europe to promote the capabilities of the space industry. From this perspective, this study will examine two parallel trends in the space industry supported by the public sector: strong vertical integration and support for the development of SMEs
2013	PAZ and TerraSAR-X, innovation through international cooperation	Muller *et al.*(2013)	A wide range of time-critical and data-intensive applications will benefit from the constellation, including Defense and Security, Surface Movement Monitoring, Maritime Surveillance, Disaster Management. The study presents the innovative approach of this new type of international collaboration. The context and objectives of the constellation are presented in the introduction, followed by the programmatic frameresearch (distribution of responsibilities, organizational aspects). The technical concept of operations is explained in a third section. Finally, examples of specific applications are presented
2012	Development of innovation capacity through learning netresearchs	Bessant *et al.*(2012)	The importance of innovation is widely accepted but a continuous challenge for research and practice is how to enable the process. What could be done to help companies generate and launch new products and services that drive growth and provide new or improved processes that increase productivity? The nature of the challenge is to facilitate the development of capabilities within organizations to manage the innovation process for themselves. This article focuses on a policy option: the mobilization of shared learning between formally configured groups of organizations in peer learning netresearchs. These form an increasingly important channel within the innovation support policy and in the study, we explore the underlying rationale for such modes of intervention and try to identify some of the dynamics of successful and less successful learning netresearchs
2012	Overflows and absorption capacity in the decision to innovate of Spanish companies: The role of human capital	Lopez-Garcia and Montero (2012)	This study investigates whether the existence of knowledge and the capacity of assimilation of companies, related to the intensity and some practices of human resources management are associated with the decision to innovate of Spanish companies. To do this, we use data from the central balance sheet database, which covers manufacturing and service companies during the period 2003-2007 and uses an estimator proposed by Wooldridge for discrete random-effects models. In addition to these factors, we find that the performance of the innovation shows a high degree of inertia. Some other observed characteristics of the firm, such as size, sales growth, export performance, sector capital intensity or financial structure variables, are also relevant determinants of the probability of innovation
2001	NGI and Internet2: Accelerating the creation of tomorrow's Internet	Kratz *et al.* (2001)	Internet 2 is a consortium of leading US universities researching in partnership with industry and the United States Government's Next Generation Internet Initiative (NGI) to develop a faster and more reliable Internet for research and education including enhanced netresearch services and High-performance and advanced applications that are enabled by those services.By facilitating and coordinating the development, deployment, operation and transfer of netresearch-based applications and advanced netresearch services, Internet2 and NGI are researching together to fundamentally change the way scientists and others research together

CONCLUSION

One of the conclusions derived from the analysis on the bibliometric revision is that the production carried out in the countries of Latin America is really very small compared to countries in Europe or North America which evidences the need to carry out research in countries like Colombia

Within a comparative analysis carried out between the innovation capacities of the organizations in 2001 and those of 2017, it is possible to show that technologies such as information technology and virtual communication continue to be the focus of the implementation of strategies by part of the organizations since they allow the organization to keep abreast with the new technologies and to have first hand the necessary information according to the requirements of the clients.

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