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Capabilities for service innovation: Bibliometric analysis and directions for future research

Capacidades para inovação em serviços: Análise bibliométrica e direções para pesquisas futuras

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ABSTRACT

Purpose: This study aims to identify how the innovation studies literature addresses the topic of capabilities for service innovation and to propose directions for future research in this field.

Originality/value: There is a gap in the literature on service innovation of the combination of capabilities that guarantees the success of service companies considering the characteristics of service innovators.

Design/methodology/approach: This study comprises a bibliometric analysis of documents retrieved from Scopus and Web of Science databases. The total sample examined consists of 1523 studies published between 1974 and 2020. The data were analyzed with the Bibliometrix R-package, providing many visualization forms. Additional co-citation analysis was carried out using VosViewer software.

Findings: Results indicate a growing discussion about service innovation and capabilities in the period under analysis, but it is still a fragmented theoretical body. There is a great variety of theoretical approaches that have been used to describe capabilities for service innovation. This way, this study contributes to the literature by mapping the current state of the art in the field of service innovation and by identifying its main research themes, which enabled us to propose a research agenda for further development. Finally, we recognize that few studies involve data collected from different geographic regions other than developed countries.

Keywords: bibliometric analysis, innovation capabilities, service innovation, services, Bibliometrix

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RESUMO

Objetivo: Este estudo tem como objetivo identificar como a literatura de estudos de inovação aborda o tema das capacidades para inovação em serviços e propor direções para futuras pesquisas nesse campo.

Originalidade/valor: Existe uma lacuna na literatura sobre inovação em serviços em relação ao que é a combinação de capacidades, que garante o sucesso das empresas de serviços, considerando as características que os inovadores de serviços possuem.

Design/metodologia/abordagem: Este estudo compreende uma análise bibliométrica de documentos recuperados das bases de dados Scopus e Web of Science. A amostra total examinada é composta por 1.523 estudos publicados entre 1974 e 2020. Os dados foram analisados com o Bibliometrix R-package, que também forneceu diversas formas de visualização. Uma análise de cocitação adicional foi realizada usando o *software* VosViewer.

Resultados: Os resultados indicam que há uma crescente discussão sobre inovação e capacidades em serviços no período em análise, mas ainda é um corpo teórico fragmentado. Existe uma grande variedade de abordagens teóricas que têm sido usadas para descrever capacidades para inovação de serviços. Dessa forma, este estudo contribui para a literatura ao mapear o estado da arte atual no campo da inovação em serviços e ao identificar seus principais temas de pesquisa, o que nos permitiu propor uma agenda de pesquisa para posterior desenvolvimento. Por fim, identificamos que poucos estudos envolvem dados coletados em diferentes regiões geográficas, além de países desenvolvidos.

Palavras-chave: análise bibliométrica, capacidades de inovação, inovação em serviços, serviços, Bibliometrix

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INTRODUCTION

Due to the rapid diffusion of digital technologies in the last decades, it is now possible to observe a convergence process among different economic activities. This way, there is an increasing relevance of a service logic across many sectors, impacting the share of gross domestic product (GDP) value added and labor markets globally (Organisation for Economic Co-operation and Development – OECD, 2020; The World Bank, 2019). But despite its essential participation in global GDP, there is a lack of studies that properly capture how service firms innovate. Large-scale surveys in varying levels of analysis, such as the Global Innovation Index (GII) or consulting firms' global studies, cannot often provide detailed information on what differentiates an innovative firm (or a collective of firms in a country) from its peers. And this is particularly more evident in service sectors.

To generate a standard measurement and create comparisons, the literature on innovation has consolidated research and development (R&D) expenditure as a determinant of innovative performance and, therefore, as a source of competitive advantage for firms (Hagedoorn & Cloodt, 2003). This indicator is commonly used to identify innovation activities in different sectors and compare innovative performance among diverse countries. But there are some limitations in considering only this indicator. For example, in countries with low levels of R&D input, this indicator may not be helpful or may not capture the countries' innovative performance correctly (Furtado & Carvalho, 2005).

In addition to an analysis at the national level, it is essential to highlight that different sectors comprise firms' other characteristics. Even within the same industry, there will be heterogeneous behaviors among actors (Nelson, 1990). Such differences are enhanced by different resource configurations (Dosi, 1988; Nelson, 1990).

A means to better represent the innovative behavior of firms is to use a combination of capabilities (Guan & Ma, 2003; Zawislak et al., 2012). Studies that aim to capture innovation from input and output perspectives (i.e., a capabilities approach to innovation) are some of the most accurate in their approximation to real innovation outcomes (Taques et al., 2021). Such an approach enables a deeper understanding of the dynamics of how companies achieve results through innovation. However, as the literature on capabilities has the manufacturing industry as its starting point, the service sector is analyzed only as technology adopters (Barras, 1986), neglecting its specificities (in the so-called assimilation approach). Therefore, it is necessary to advance the discussion to consider a more integrative approach,

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encompassing both technological and non-technological dimensions of services (Gallouj & Weinstein, 1997), through an effort to map this literature.

In this sense, the question that emerges at this point is: "How has the service innovation literature addressed the topic of capabilities?". To answer this question, it becomes necessary to conduct a bibliometric study that displays the literature's current state on this topic. Therefore, in this study, we collected 1,523 studies published between 1974 and 2020. The data was analyzed using bibliometric software, providing different visualization forms.

Results indicate a growing discussion about service innovation and capabilities; however, the theoretical body is still fragmented. As we have found, there are a variety of theoretical approaches such as "innovation capability(ies)," "dynamic capabilities," "absorptive capacity," and "resource-based view" that has already been used in many different studies, which indicates that it could be analyzed which approach is most suitable for analyzing service innovation activities and outcomes within organizations. We could also identify that few studies involve data collected from different geographic regions other than developed countries.

This way, this study contributes to the literature by mapping the current state of the art in the field of service innovation and by identifying its main research themes, which enabled us to propose a research agenda for further development.

The paper is structured as follows. The following section presents a brief background on service innovation and innovation capabilities literature. After that, the methodological procedures are described. The results of this bibliometric study, the research on the topics, and the directions for future research are presented next. The last section outlines the conclusion and limitations of the study.

THEORETICAL BACKGROUND

Innovation can be understood as a new or improved product (good or service) or process (or a combination thereof) that differs significantly from the unit's previous products or processes, being derived from knowledge-based activities that involve the practical application of existing or newly developed information and knowledge (OECD, 2018).

In the case of services, it should be noted that, unlike the manufacturing industry, they are based on intangible activities that are produced and consumed simultaneously, changing the conditions of consumed users (Moeller, 2010). In this sense, another fundamental characteristic of every

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service activity is client participation in various forms during its provision (Gallouj & Weinstein, 1997). More than that, at the interface between the service provider and its customer, different types of interaction occur, and various elements are exchanged, such as information, knowledge, or emotions (Sundbo & Gallouj, 2000). Users' engagement through their time, availability, attention, data transmission, or effort is necessary for the co-production of services by users and the firm (Karmarkar & Roels, 2015). These specificities need to be considered when analyzing innovation in this sector of economic activity.

Therefore, it is not recommended to treat the development of new services and new products the same (Storey et al., 2016), once that in service industries the distinction between product and processes can be nebulous (OECD, 2018). Besides technological breakthroughs, other kinds of knowledge, such as market characteristics, organizational best practices, consumer habits and tastes, and institutions, might be a crucial strategic asset in services.

These different types of knowledge (technological and non-technological) may be, however, often quickly, easily, and cheaply copied by competitors, unlike innovative physical products, which may gain years of protection via patents, or simply the length of time it takes to develop them (Storey et al., 2016). The innovation activities of many innovators are based on purchasing, imitating, or modifying products, business process equipment, or business methods already in use by other firms or organizations (OECD, 2018).

Thus, service innovation processes must be open, driven by customer engagement, encourage and support employee participation during development, and manage the knowledge that open innovation generates. More valuable services are developed through this dynamic process and the orchestration of many actors in a system. On the management side, top management support, stimulating communication, and creating a favorable atmosphere for the innovation project are all aspects reported to reinforce service innovation success (Santos-Vijande et al., 2021).

One way that authors in the innovation literature have tried to capture firms' innovative behavior is through the capabilities approach. The theory of firms' capabilities derives from an evolutionary process of economic change (Nelson & Winter, 1982). In that sense, to be capable of something means "to have a generally reliable capacity to bring that thing about as a result of intended action" (Dosi et al., 2000, p. 2). More specifically, it refers to the ability to generate innovations (Lawson & Samson, 2001).

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The micro-foundations that constitute the variety of capabilities approaches reside in a broad and diverse range of sources. Organizational structures, systems, processes, and procedures – all those managerial issues – make a firm capable of generating ideas and leveraging them into the market. In academic terms, it was analyzed through concepts such as resource-based view (Barney, 1991; Wernerfelt, 1984), routines (Nelson & Winter, 1982), absorptive capacity (Cohen & Levinthal, 1990; Zahra & George, 2002), organizational capabilities (Chandler, 1992; Dosi et al., 2000), technological capabilities (Bell & Pavitt, 1995; Lall, 1992), dynamic capabilities (Teece, 2014; Teece et al., 1997), and innovation capabilities (Guan & Ma, 2003; Zawislak et al., 2012).

But, as mentioned earlier, the current dynamic of economic activities requires not just limiting the analysis of service innovation to an assimilation approach but advancing the discussion towards an integrative approach. By integrating service innovation and capabilities in a bibliometric analysis, considering the specificities of this economic activity, the following sections may provide not only insights into what studies and authors have proposed alternatives to understand this process and overcome the obstacles of managing innovation in service organizations, but also pave the way for the future development of the field.

METHODOLOGY

Bibliometric studies provide information about the people and institutions conducting research, as well as the places of publication, being relevant to identify those who can give the best concepts or methodological contributions (Podsakoff et al., 2008). Thus, it provides insight and contributes information about the literature on a given area (Ellegaard, 2018). The present study's conduction of bibliometrics is based on different techniques. Among them is the analysis of citations, which consists of exposing lists and rankings of publications (Zupic & Cater, 2014). Also, the authors examined clusters performed using the bibliometrix R-package, which provides a set of tools for quantitative research in bibliometrics (Aria & Cuccurullo, 2017). In addition, the visualization of similarities method (Van Eck & Waltman, 2007) was applied using a co-citation analysis tool in the VosViewer software (Van Eck & Waltman, 2010). The selection of this bibliometric software was made by the arbitrary decision of the authors through the identification of those tools that would make carrying out the desired analyses more robust and trustful.

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Regarding the databases from which the documents were extracted, the option was made for those which, according to Harzing and Alakangas (2016), are two of the most significant scientific knowledge databases, Scopus (Elsevier's database) and the Web of Science (Thomson Reuters' database, main collection). Although Harzing and Alakangas (2016) point to a similar coverage among these chosen bases, it was decided to maintain them due to greater completeness in the analysis, collecting the most significant number of studies that could be relevant.

Another point to be defined before conducting the study was the keywords that would guide the search. To do that, a preliminary investigation was carried out in an exploratory way in the databases, using as main terms "service," "innovation capability," "innovation capacity," "service innovation," and "innovation in service." The results of this preliminary search were exported to the VosViewer software, which provided a map of relationships between the keywords of the articles that returned to try to identify possible new terms to be considered. Thus, with the results of this search, some new words were added to the selection of keywords, such as "servitization" and "innovative capacity." After that, the string was operationalized as follows: ((("service*" OR "servitization*") AND ("innovati* capab*" OR "innovati* capacit*")) OR (("service* innovati*" OR "innovati* in service*") AND ("capabilit*" OR "capacit*")).

This search string was submitted to search on November 19, 2020, and applied to the article title, abstract, and keywords fields (Scopus) and topic (Web of Science). As search limiters/filters, it was decided not to define any. Thus, all types of publications were considered without a predefined time interval, making the research as comprehensive as possible. As a result of that initial search, 1,273 documents were obtained from Scopus and 1,236 documents from Web of Science.

The research results were exported in BibTex format and imported into the R package called Bibliometrix, through which data was cleaned (exclusion of duplicate records or without all bibliographic information, and reading of titles, abstracts, and keywords to verify suitability for the research objective). In addition, to convert this database into a format that could be used in other bibliometric tools, the OpenXlsx package was used. This step was necessary to use the cleaned *corpus* in the VosViewer software.

Of the 2,509 records obtained between both databases, 639 appeared duplicated, and 53 had no information about the authors (they were conference reviews). This way, a *corpus* of 1,817 documents was delimited. These 1,817 documents were checked to see which ones had service innovation as their central theme, specifically focusing on capabilities. This was

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done by reading all studies' titles, abstracts, and keywords, excluding those that could not be used. This step was conducted by three authors separately, aiming to reduce any bias in the research. Through this analysis, there was a reduction from the 1,817 unique studies found in the initial search in the databases to some 1,523 studies published between 1974 and 2020, which were considered the final *corpus* to be analyzed. This reduction finds support in the sense that innovation is an increasingly popular term, which makes a search involving this time return results that do not necessarily reflect the interest of the research. This cleaning process aimed precisely at eliminating these studies from the analysis.

Once the *corpus* of analysis was established and the necessary information imported into both software used in the study, it was necessary to define the indicators that would be used to carry out the bibliometric analysis. In the literature, there is no consensus on which bibliometric indicators should be used, which explains a large number of existing indicators and a considerable variation in the use of these indicators between different studies. To try to reach a broader scope, several indicators were sought. Table 1 shows the indicators used in this study.

Table 1

Bibliometric indicators used in the study

Indicator	Description	Retrieved from
Number of publications	Total studies published by the analysis unit	Podsakoff et al. (2008)
Number of citations	Total citations received by the unit of analysis	Bonilla et al. (2015)
C/P	Total of citations divided by the total of publications	Merigó et al. (2015)
C/A	The average number of citations received per year	Fagerberg et al. (2012)
h-index	Number of studies from a certain analysis unit that received at least the same number of citations	Hirsch (2005)
g-index	The number "x" of articles that, added together, received at least the number "x^2" of citations.	Egghe (2006)

Source: Elaborated by the authors.

It is essential to highlight that, due to the limitations inherent to ranking, it was necessary to establish an indicator that would be used mainly during the presentation of the results. For this, the number of publications was used,

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highlighting that it is recognized that the number of publications does not always represent a greater relevance within the research field. However, it is usually one of the most used bibliometric indicators considered by researchers.

Finally, for the stage of identifying research trends over time (which enabled the development of the research plan), biblioshiny was used. Biblioshiny is a shiny app providing a web interface for bibliometrix. In this, the thematic evolution functionality was used, delimiting the extraction every ten years, starting in 1995, in addition to performing extraction of the entire research period (1974-2020). This decision was due to the low number of publications found in this research from 1974 to 1994, representing isolated research efforts rather than research trends per se. However, for the extraction of the whole period, it was considered data starting in 1974 because the low representation of studies from this period did not significantly alter the results.

The results around the bibliometric indicators and the different analyses conducted, including identifying research trends, are presented in the following section.

RESULTS AND DISCUSSION

In this section, we present the main results from the bibliometric analysis and discuss how the service innovation literature has been incorporating the capabilities approach in different studies. From these results, we delineate the evolution of scientific production in this emerging area and propose some future research directions that can be explored to enrich its theoretical background.

Bibliometric analysis

There has been a growing interest in the intersection between service innovation and capabilities. Figure 1 shows that a great number of documents (1,523 in total) analyzed in the defined timespan (1974-2020) were published in the last 15 years. However, Figure 2 shows that the average number of citations per document, presented as a function of the year in which the citation occurred, is still low (1.6), representing an average of 12.54 citations per document over that period.

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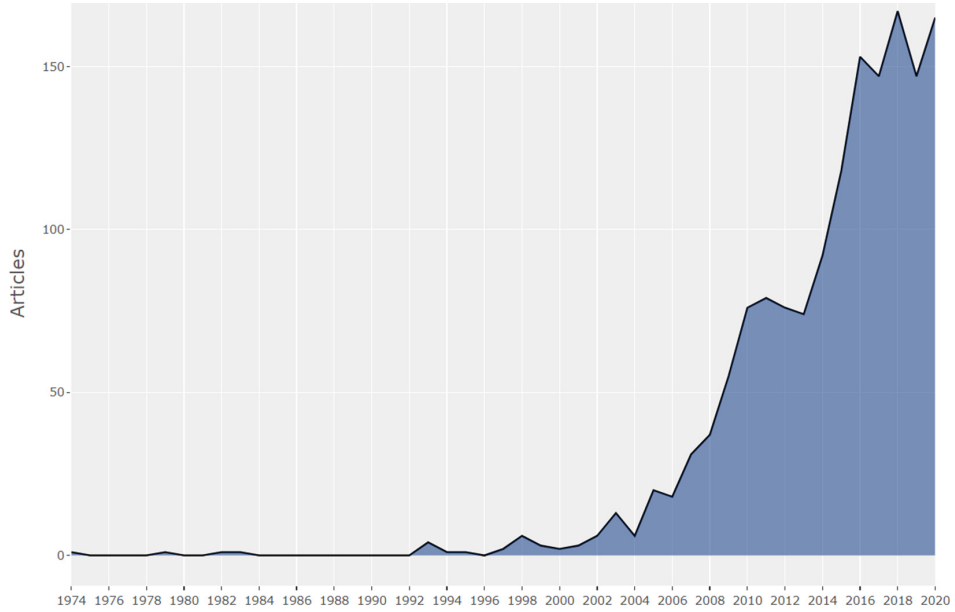
Figure 1

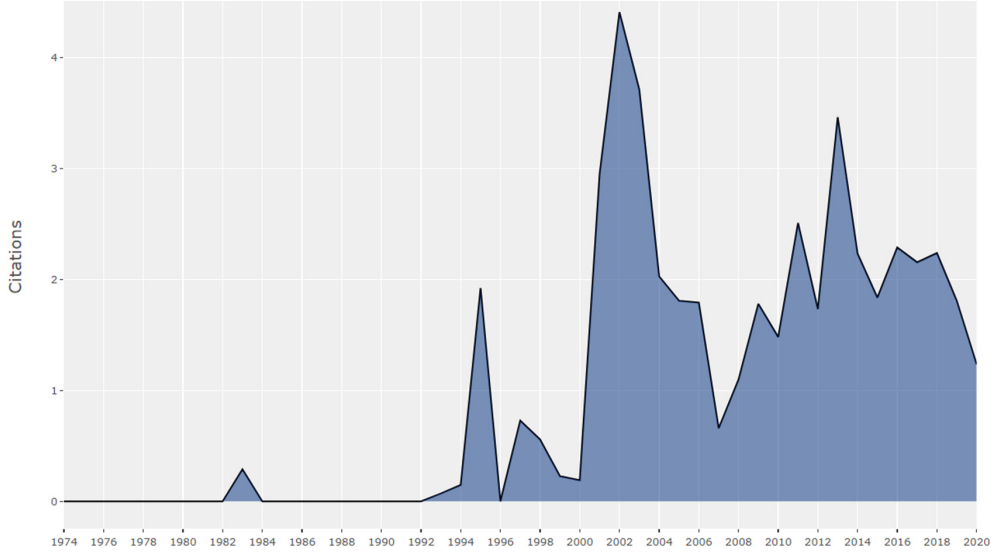
Number of documents (1974-2020)



Source: Research data, elaborated using Bibliometrix.

Figure 2

Average citations per document (1974-2020)



Source: Research data, elaborated using Bibliometrix.

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The studies analyzed derive from 946 sources such as journals, books, and others. Indeed, almost two-thirds of these publications are articles (932), and the other types are related to conferences (268) and proceedings papers (186), book chapters (60), reviews (37), and so on.

As expected, the most frequent words are "innovation" and "service innovation." The results evidence that these studies have adopted quite different approaches to analyzing this phenomenon, such as "innovation capability(ies)," "dynamic capabilities," "absorptive capacity," and "resource-based view." Some studies were also concerned with aspects related to strategic management, such as "knowledge management," "innovation management," and "open innovation," and performance ("performance," "firm performance," or "innovation performance").

The keyword "servitization" also appeared in some studies, a crucial trend in services per se and the agriculture and manufacturing sectors. They also refer to contextual factors such as the size of companies ("SMEs" or "small and medium") and location ("China"). The number of occurrences for each keyword mentioned is presented in Table 2.

Table 2

Keywords occurrence

Keywords	Occurrences	Keywords	Occurrences
Innovation	294	Absorptive capacity	26
Service innovation	240	Capabilities	26
Innovation capability	66	SMEs	26
Knowledge management	44	China	25
Performance	41	Service	25
Dynamic capabilities	40	Innovation management	24
Open innovation	35	Innovation capabilities	23
Services	34	Innovation capacity	22
Servitization	31	Innovation performance	21
Firm performance	28	Resource-based view	21

Source: Elaborated by the authors.

To understand the relationship among these topics, the authors also developed a network analysis with all the keywords indicated in the studies

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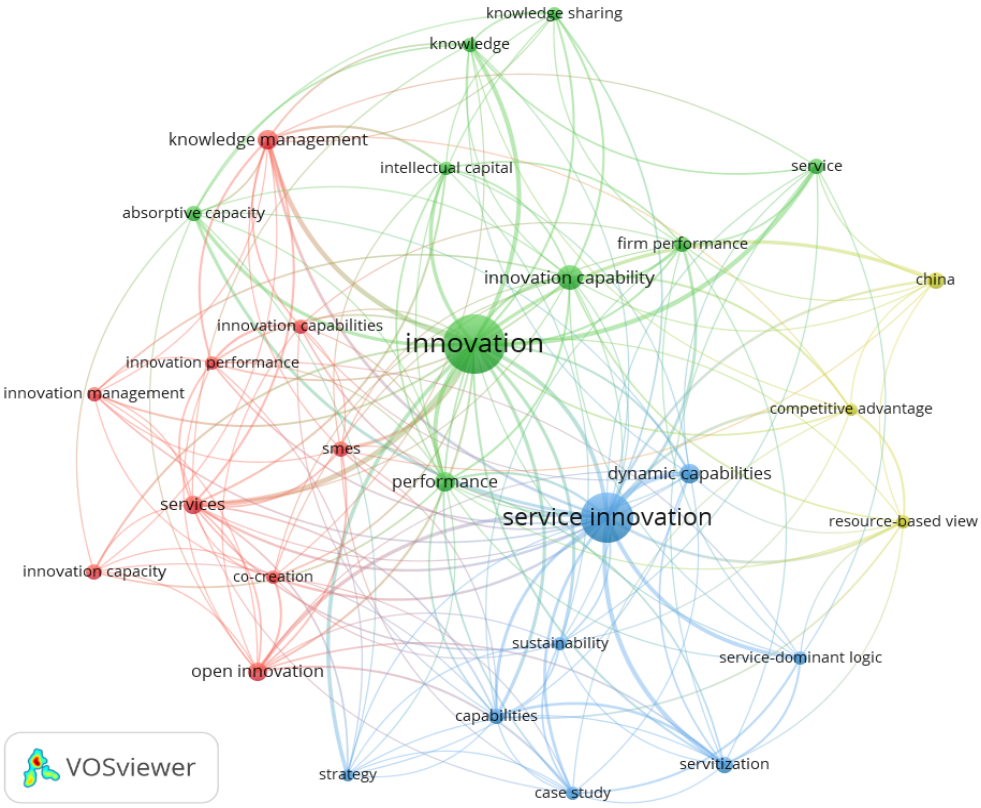
within the final database. The results show the existence of four (4) clusters that focus on different aspects related to innovation in services (Figure 3).

Figure 3

Network analysis



Source: Research data, elaborated using VosViewer.

The green cluster comprehends themes that deal with the process of knowledge absorption, assimilation, and sharing and how it influences firm performance. The red group concerns innovation management and how companies, especially SMEs, engage in open processes to co-create value and, thus, innovate. The blue cluster encompasses studies devoted to understanding which strategies (e.g., servitization) and dynamic capabilities are necessary for service innovation. They adopt the service-dominant logic and use the case study as the most common method to provide insightful evidence. The yellow cluster represents studies investigating how service firms

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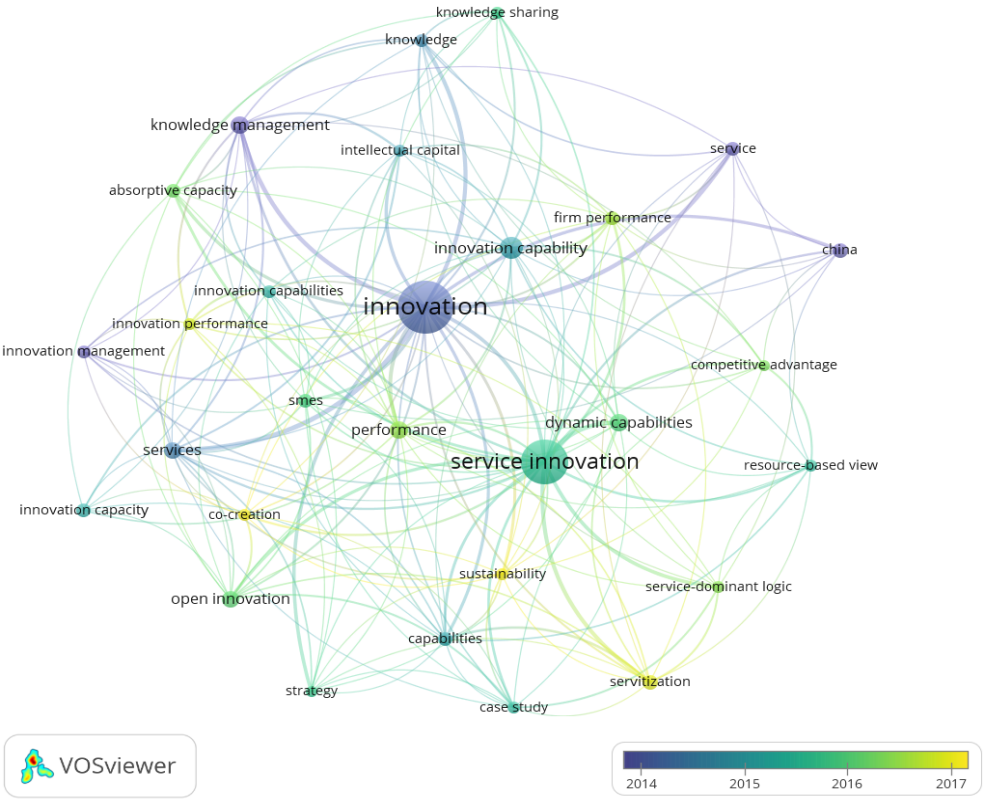
can achieve competitive advantages, and they adopt the resource-based view as the primary theoretical approach.

When considering the newness of these topics, it is possible to affirm that the literature has been shifting its focus from a general discussion about knowledge and innovation management to a more strategic approach based on capabilities. These trending topics are shown in Figure 4.

Figure 4

Recent discussion topics shift (2014-2017)



Source: Research data, elaborated using VosViewer.

After disclosing the types of publications and the most frequent keywords related to innovation in services, we deepen the analysis of the scientific production to identify which are the primary sources of impact, the most relevant authors and papers, and research collaboration among countries in this topic.

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At a broader level of analysis as to the nationality of the authors of the studies, Table 3 presents the authors' countries of origin and classifies them according to the total number of citations.

Table 3

Country scientific production

Rank	Country	Total citations	Number of articles	Citations per document
1st	Australia	2,178	96	22.69
2nd	United States	1,957	165	11.86
3rd	China	1,787	513	3.48
4th	United Kingdom	1,563	208	7.51
5th	Sweden	1,047	87	12.03
6th	Italy	971	82	11.84
7th	Finland	806	85	9.48
8th	Germany	789	94	8.39
9th	Spain	641	137	4.68
10th	Netherlands	605	30	20.17
11th	Belgium	535	8	66.88
12th	France	522	38	13.74
13th	Canada	446	35	12.74
14th	South Korea	376	59	6.37
15th	Hong Kong	319	12	26.58
16th	Denmark	298	23	12.96
17th	Luxembourg	209	15	13.93
18th	Malaysia	175	52	3.37
19th	Brazil	169	74	2.28
20th	Norway	155	47	3.30

Source: Elaborated by the authors.

In this table, the relevance of the studies from Australia have obtained is highlighted. Despite being fifth-placed in the number of publications,

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these studies were the ones that obtained the highest number of citations and a high rate of citations per article when compared to other knowledge producers. Still, the dominance of China stands out in the number of articles. The United States, the United Kingdom, and Spain are the only countries that presented more than 100 articles.

Nevertheless, two points also call attention to the discussion about the main producing countries of the studies contemplated in this analysis. The first is that studies from China, despite being more numerous, received a low number of citations, which may indicate little recognition by the academic community of these publications. The second point to be highlighted is the lack of countries representing Latin America and Africa, which only have Brazil among the primary knowledge producers. Considering service innovation as an emerging topic of discussion, given the convergence of economic activities to this type of activity, it is a warning sign for countries in those regions that the discussion presents itself more incipiently compared to other locations.

Regarding the producers of knowledge at an individual level, 3156 different authors were identified in the analysis *corpus*. At this point, it is interesting to note that only one author published 293 documents (19.23% of the total studies analyzed). In contrast, the majority had participation with more than one researcher. Analyzing these documents' average number of authors, we recognize that those studies were published by at least two researchers (2.07 on average).

Moving towards the documents themselves, Table 4 presents the most cited articles in this field of research. At first, it is interesting to note that, unlike in many other areas, there is excellent representativeness of studies published in the last decade (2010-2020). This just underscores the fact that the topic of innovation capabilities in service is an emerging topic, still under consolidation. Furthermore, the importance of some studies, such as Francis and Bessant (2005) and Kandampully (2002), indicate the field started to emerge mainly in the early 2000s, as we see a growing number of seminal studies in the area during that period.

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Table 4

Most cited articles

Document	Year	Author(s)	Citations	Citations per year
Tacit knowledge transfer and firm innovation capability	2003	Cavusgil et al.	446	26.24
Capabilities for managing service innovation: Towards a conceptual framework	2010	Den Hertog, van der Aa, and de Jong	349	34.90
Servitization: Disentangling the impact of service business model innovation on manufacturing firm performance	2013	Kastalli and Van Looy	320	45.71
Service innovation viewed through a service-dominant logic lens: A conceptual framework and empirical analysis	2011	Ordanini and Parasuraman	296	32.89
Targeting innovation and implications for capability development	2005	Francis and Bessant	247	16.47
Enabling service innovation: A dynamic capabilities approach	2013	Kindström, Kowalkowski, and Sandberg	241	34.43
Analysis of sources of innovation, technological innovation capabilities, and performance: An empirical study of Hong Kong manufacturing industries	2011	Yam, Lo, Tang, and Lau	229	25.44
Innovation as the core competency of a service organization: The role of technology, knowledge, and networks	2002	Kandampully	217	12.06
Dynamic capability building in service value networks for achieving service innovation	2009	Agarwal and Selen	198	18.00
Service delivery innovation: Antecedents and impact on firm performance	2009	Chen, Tsou, and Huang	186	16.91

Source: Elaborated by the authors.

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Once the primary knowledge producers in terms of countries are approached, in addition to a quantitative overview of the authors and the most relevant studies, it is possible to complement the analysis by addressing the main journals that publish such studies. For this, Table 5 presents a list of the main sources of these documents in our database according to their h-index.

Table 5

Source impact

Source	h-index	g-index	Total publications	Total citations	SJR	SJR Best Quartile
Journal of Product Innovation Management	14	15	15	788	3,128	Q1
Journal of Business Research	12	22	22	972	1,871	Q1
Industrial Marketing Management	11	21	21	696	2,084	Q1
Research Policy	10	11	11	1057	3,246	Q1
Service Industries Journal	9	17	18	307	0,629	Q2
Journal of Service Management	9	12	12	622	1,71	Q1
International Journal of Production Economics	9	10	10	397	2,379	Q1
Technovation	8	9	9	647	2,795	Q1
International Journal of Contemporary Hospitality Management	7	10	10	256	2,203	Q1
Industry and Innovation	7	9	9	152	1,738	Q1
Journal of Service Research	7	9	9	669	3,37	Q1

Source: Elaborated by the authors.

Note: SJR and SJR Best Quartile retrieved from http://www.scimagojr.com.

At this point, it is noteworthy that the studies are not only focused on journals for services but also journals that are primarily concerned with industry or innovation more broadly. This, in a way, only reinforces the initial ideas about the great relevance of services in the 21st century and of this convergence of economic activities by breaking the silos between manufac-

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turing and services. Nevertheless, those interested in this research topic may consider these journals important sources of knowledge, given the impact these studies have evidenced by the different indicators presented.

Once the *corpus* of analysis is characterized, it is possible to proceed to our next topic of investigation, aimed at research trends. This topic generates greater depth in the theme discussed in these studies.

Research trends

To address the main research trends, we decided to create thematic maps, which allow analyzing the density and centrality of the themes according to a specific period. In this sense, density represents the internal strength of the network, whereas centrality represents the degree of interaction of a network with other networks (Cobo et al., 2018). Therefore, Figure 5 presents the thematic maps for the periods 1995-2004, 2005-2014, and 2015-2020, in addition to a map compiling the period from 1974-2020. In every map, the upper-right quadrant presents the motor themes; the lower-right quadrant, the basic themes; the lower-left quadrant, the emerging (or disappearing) themes; and the upper-left quadrant, very specialized/niche themes. It is believed that through the thematic maps, the evolution of research themes within the field can be observed (research trends) so that it is possible to infer a research agenda.

Before presenting the thematic maps, it should be noted that they are not directly related to the network of keywords previously shown. In that section, the analysis was based on the terms' interrelationships, while here, the focus is on the evolution of themes within the research field. Another point to be considered is that the period 1974-1994 was suppressed from the individual presentation because it had few publications, which did not allow for adequate analysis. This period was considered only in the final representative framework.

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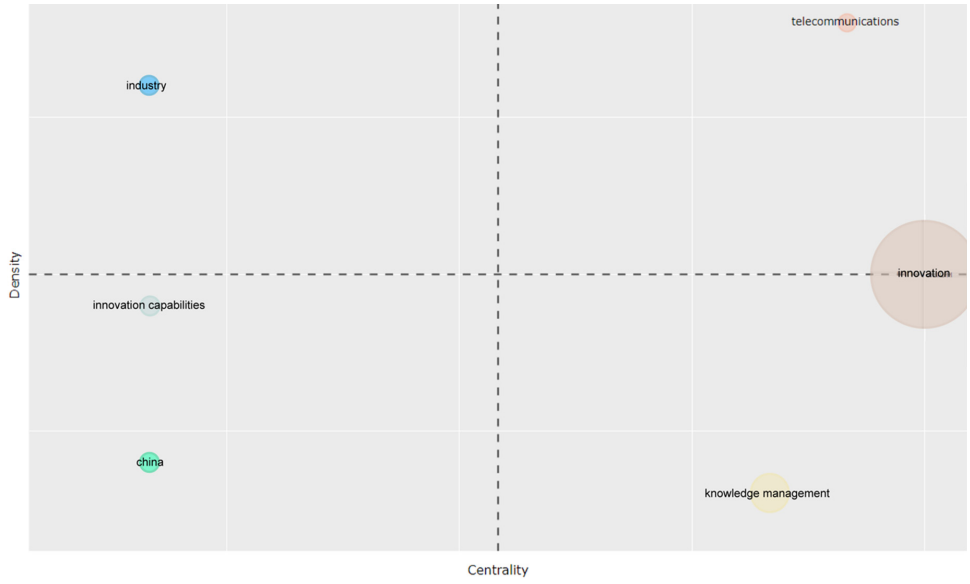
Figure 5a

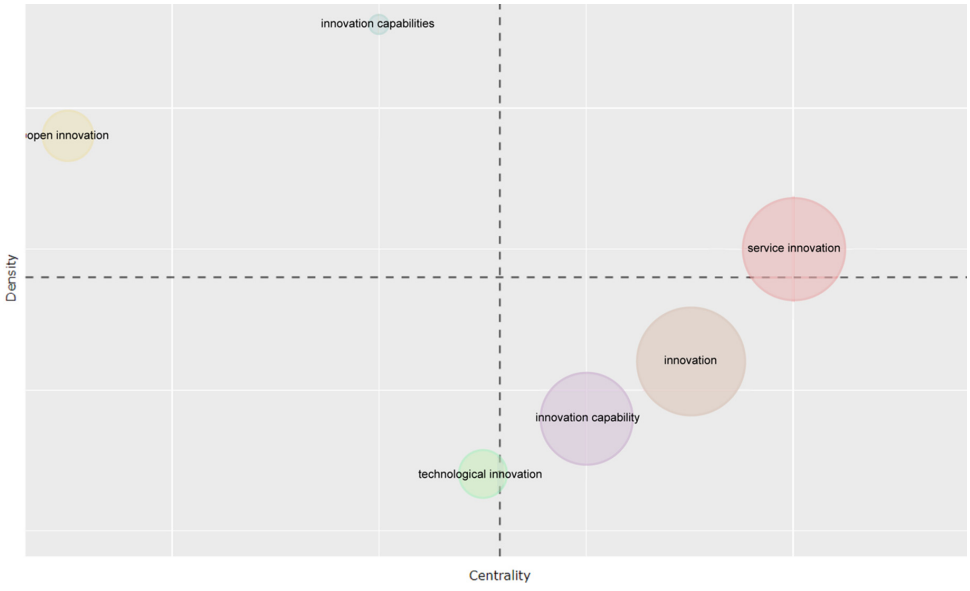
Thematic map (1995-2004)



Source: Research data, elaborated using Bibliometrix.

Figure 5b

Thematic map (2005-2014)



Source: Research data, elaborated using Bibliometrix.

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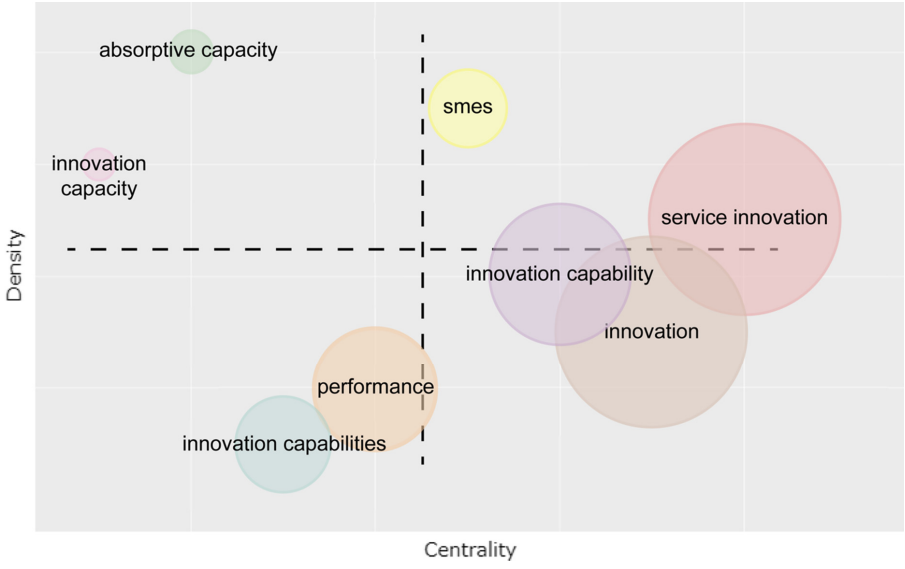
Figure 5c

Thematic map (2015-2020)

Source: Research data, elaborated using Bibliometrix.

Figure 5d

Thematic map (1974-2020)



Source: Research data, elaborated using Bibliometrix.

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As we analyze the period 1995-2004, it is observed that the industry theme is presented as a specialized (or niche) theme. On the other hand, the driving theme of this period was telecommunications, which can be explained by the expansion that this type of activity presented mainly in the 1990s. Knowledge management, in this period, appears as a basic theme, which can be understood as something intrinsic to services, given that its nature is highly knowledge-based. The theme of innovation, in this period, ends up being divided between a motor theme and a basic theme.

But innovation seemed to acquire greater relevance within the field in the period 2005-2014. Subjects such as open innovation (specialized or niche) and technological innovation (emerging) appear on the thematic map. Nevertheless, innovation capabilities are consolidated as a primary theme (despite the term's existence in the upper-left quadrant, it was considered its most significant presence in the lower-right quadrant). In contrast, innovation starts to share the attention with service innovation, which denotes a more substantial consolidation of the theme of innovation in services.

Within the 2015-2020 period, no theme was identified as emerging. This can indicate a possible maturity of the field, allowing a study like this to represent an initial effort in mapping it. At this point, it is interesting to note that the terms innovation capability, service innovation, and innovation are increasingly consolidated as basic themes, given the movement they showed compared to the previous period.

Finally, we also represent the evolution of the period as a whole (1974-2020). In this, the progression of the field over time is consolidated, allowing us to identify the research trends and how they are positioned within the field. For example, SMEs represent a driving theme since innovation capabilities in service are primarily driven by companies of this size. At this point, it is important to highlight the relevance that innovation capabilities (and capability), innovation, and service innovation have, reaching the point of presenting an intersection. This approximation between the themes and the fact that they are positioned as basic themes indicates that the present research displays a theoretical justification to be carried out and that this intersection is a research theme that can be explored. It is precisely in this overlap between the themes that one of the themes of the research agenda is to be discussed. We present this in the next topic.

Directions for future research

Since it was possible to present an overview of the studies of innovation capabilities in services and the evolution of research trends over time, it is

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now possible to propose a research agenda. This is because the present study aims not only to identify the current state of the art but also, when analyzing the findings, to suggest research themes for advancements in the field. It should be noted that these are presented in the form of themes to be considered in later studies, which must be transformed into research problems and made operational to the point of addressing these identified needs.

At first, the quantitative panorama noted that few studies had been conducted in realities other than the "global north countries." An example of this is that Brazil, the most prominent representative of the subject among the countries of Latin America and Africa, appears only in 19th place. In this sense, the first research suggestion is aimed at conducting studies in countries located in these two regions to verify if there is any institutional specificity that differs from other areas, as well as offering insights that can be adapted to other realities.

In a more qualitative character, it was analyzed that a variety of theoretical approaches have already been used to understand the capabilities of innovation in services. This was evident when we noticed the presence of terms such as dynamic capabilities (present in the keywords), open innovation, absorptive capacity, resource-based view, and innovation capabilities (in the keywords and the research trends). However, these theoretical lenses were grounded and primarily applied in the manufacturing industry. Studies that propose crossing these theories to identify those that may be more appropriate to the reality of innovation in services can be precious for the field.

Furthermore, it is crucial to consider that the ongoing convergence of economic activities is challenging the traditional separation between the manufacturing industry and the service sector. From the results related to the most used keywords, it was possible to highlight that the term "servitization" appears in some leading journals published on the subject. Also, the term "industry" is present in the research trends map (1995-2004 period, emerging or niche themes quadrant). Thus, it is interesting to measure the innovation performance of services or, at least, to propose theoretical frameworks that can capture the essence of service considering its convergence with the manufacturing industry.

Finally, the main point from the research trends we identified is the relationship between innovation, service innovation, and innovation capabilities. As we analyze the field, we note an intersection between these themes, but apparently, this still represents a fragmented theoretical body. This way, this bibliometric analysis indicates that the relevance of these themes is growing, but how the concepts are related remains to be identified.

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Studies that aim to shed light on this relationship could become interesting, for instance, diving into an innovation capabilities approach.

FINAL REMARKS

The main objective of the present study was to identify how the innovation studies literature addresses the topic of service innovation capabilities. For this, a bibliometric study and a qualitative analysis were conducted to understand the relationship between the covered topics. Analyzing what was initially expected and the outlines of the research obtained according to its realization, it can be considered successful in what it originally sought.

This research identified the central studies and journals in the area, and a research agenda targeted to scholars was suggested. A point that should be highlighted is the exciting intersection between the themes of innovation, service innovation, and innovation capabilities as basic themes and engines of the field. Among the different theories used, it seems that "innovation capabilities" is a theoretical approach that has a greater affinity to the theme of service innovation, so a study that systematizes and concatenates these subjects should be promoted.

This study contributes to the literature by mapping the current state of the art in the field and identifying the main research themes, which enabled us to propose a research agenda for further development. As a managerial contribution, the results indicate that companies must be increasingly concerned with understanding and analyzing their capabilities so that they can innovate. Due to the representativeness of small and medium-sized companies as a driving theme, we argue that these companies need to structure their innovation activities. It also signals the need for public policies to foster innovation appropriate to sectoral and size characteristics. Identifying the main countries producing scientific knowledge in this field can be benchmarks for designing and implementing policies to promote service innovation.

However, it is important to mention that this study has some limitations. For instance, the methodological decisions adopted in the conduction of the bibliometrics have influenced the outcome. As there is an operational limitation on the part of the authors regarding the compilation of data, only two databases were used, which despite being highly relevant in the academic environment, still potentially failed to present all studies on the subject. Another point that emerges is that, given the need to create inclusion and exclusion criteria, the analysis is biased based on the authors' decisions.

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Although the reason for creating these criteria was made explicit, it still constitutes a filter created by those responsible, given the impossibility of reading all the articles completely.

In order to overcome these limitations and contribute to the advancement of the field, in addition to the directions for future research that have already been presented, it is suggested that new studies are conducted considering some aspects that were not covered in this research. For instance, other databases besides the two used and other forms of data analysis, such as using a bibliographic coupling method with a factorial analysis to identify research trends, can be mentioned.

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