ISSN 1678-6971 (electronic version) • RAM, São Paulo, *23*(6), eRAMD220082, 2022
Special Issue, https://doi.org/10.1590/1678-6971/eRAMD220082.en
Submitted: Apr. 4, 2022 | Approved: Aug. 23, 2022

Service innovation and knowledge management: A bibliometric review and future avenues

Inovação em serviços e gestão do conhecimento: Uma revisão bibliométrica e caminhos futuros

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To cite this paper: Bandeira, G. L., Chanquini, A., Tortato, U., & Quandt, C. (2022). Service innovation and knowledge management: A bibliometric review and future avenues. *Revista de Administração Mackenzie*, *23*(6), 1–32. https://doi.org/10.1590/1678-6971/eRAMD220082.en

ABSTRACT

Purpose: The transition from a product-based to a service-based economy is well recognized. In this context, service innovation (SI) has gained *momentum* among scholars. Despite that, a significant challenge associated with the shift from product-centeredness to a service orientation is structuring the knowledge management (KM) process for companies to remain competitive. This study sought to identify theoretical roots, research trajectories, and themes to propose future avenues in this field.

Originality/value: Empirically, this study presents elements for SI and KM by conceptualizing, validating, and discussing the field's integration. The study also sheds light on theoretical roots and identifies the main research themes in literature.

Design/methodology/approach: A review of 144 publications was performed at the intersection between SI and KM. The study conducted two bibliometric analyses – co-citation analysis and co-occurrence analysis – and a qualitative one to criticize the obtained quantitative results.

Findings: This research contributes to the domain's understanding in three major ways. First, theoretical roots showed that the field is characterized by two groups of references: publications in the nascent period (before 2010) and emergent period (after 2011). Second, the meta-analysis showed five pioneering studies and revealed two crucial turning points in the literature, suggesting the following research stages. Third, four distinct research themes were identified: 1. innovation management; 2. business intelligence; 3. knowledge sharing; and 4. governance. Finally, the results highlighted research topics for future groundbreaking qualitative, quantitative, and mixed-methods studies, both theoretically and empirically.

Keywords: bibliometric analysis, innovation ecosystem, literature review, Kibs, service orientation

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RESUMO

Objetivo: A transição de uma economia baseada em produtos para uma economia baseada em serviços é bem reconhecida. Nesse contexto, a inovação em serviços (IS) ganhou força por parte dos estudiosos. Além disso, um grande desafio associado à mudança da centralização no produto para uma orientação a serviços é a estruturação do processo de gestão do conhecimento (GC) para que as empresas se mantenham competitivas. Este estudo buscou identificar raízes teóricas, trajetórias de pesquisa e temas para propor caminhos futuros neste campo.

Originalidade/valor: Empiricamente, o estudo apresenta elementos sobre IS e GC ao conceituar, validar e discutir a integração do campo. O estudo também lança luzes sobre as raízes teóricas e identifica os principais temas de pesquisa na literatura.

Design/metodologia/abordagem: Esta pesquisa revisou 144 publicações na intersecção entre IS e GC, bem como realizou duas análises bibliométricas – análise de cocitação e análise de coocorrência – e uma revisão qualitativa para criticar os resultados quantitativos obtidos.

Resultados: Esta pesquisa contribui para a compreensão do domínio de três maneiras principais. Em primeiro lugar, as raízes teóricas mostraram que o campo é caracterizado por dois grupos de referências citadas: publicações no período nascente (antes de 2010) e no período emergente (após 2011). Em segundo lugar, a metanálise mostrou cinco estudos pioneiros e revelou dois importantes pontos de virada na literatura, sugerindo as próximas etapas de pesquisa. Em terceiro lugar, foram identificados quatro temas de pesquisa distintos: 1. inovação em gestão (*innovation management*); 2. inteligência de negócios (*business intelligence*); 3. compartilhamento de conhecimento (*knowledge sharing*); e 4. governança (*governance*). Finalmente, os resultados destacaram temas de pesquisa para futuros estudos revolucionários de métodos qualitativos, quantitativos e mistos, tanto de forma teórica quanto empírica.

Palavras-chave: análise bibliométrica, ecossistema de inovação, revisão de literatura, Kibs, orientação a serviços

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INTRODUCTION

The transition from a product-based economy to a service-based economy started in the mid. of the 20th century (Barrett & Davidson, 2008) and increased the focus on research in the service field (Paton & McLaughlin, 2008; Helkkula et al., 2018).

Consequently, service innovation (SI) has gained more importance in the last two decades. There was a significant increase in studies on the topic (Dotzel et al., 2013; Ordanini & Parasuraman, 2010). The concept is still novel (Flikkema et al., 2007) and very complex (Edvardsson et al., 2005; Tajeddini et al., 2020). It is common to relate service innovation with product innovation, combining existing services and products to gain a competitive advantage (Chen et al., 2016).

However, the service innovation concept goes beyond, in the direction of a technological trajectory, information and communication technologies (ICTs), and in combination with other resources like knowledge and skills, allows information to be shared in different contexts and so, creating new opportunities for service exchange and innovation (Vargo & Lusch, 2014; Vargo et al., 2015).

Customers increased their participation in value co-creating along the service and product experience (Kim & Yim, 2020). From this perspective, users and customers become the protagonist in the co-creation of value in services. One of the issues raised in a dynamic market environment is human capital, and consequently, knowledge management (KM) has turned out to be an essential area of study in business strategy. Human resources are recognized as a strength to reach competitive advantages (Phillips & Roper, 2009; Khoreva et al., 2017). Global development has changed perspectives from natural growth through innovation. Human resources and knowledge have become the most crucial asset in companies. The fast technological development of the business environment requires companies to focus on delivering value to their customers. So, a deep understanding and knowledge of the competition process and value creation can also provide crucial insights into social problems that can become social innovation (Porter, 2008).

As an antecedent of innovation, KM is a critical area in the organization (Darroch, 2005). Many studies present approaches, some toward technical knowledge and others toward strategic understanding (Liebeskind, 1996). One of the most common concepts in the area is tacit, implicit, and explicit knowledge, per the definition of Nonaka and Konno (1998).

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This study performs a comprehensive literature review to understand the intersection of KM and SI. This research aims to answer the following research questions:

1. What are the theoretical roots of research on KM in SI?
2. What are KM and SI publications' primary research roots and themes??
3. What are the new research avenues for expanding the field of KM and SI?

Under those sentences, a bibliometric analysis of 144 journal articles in the field was performed. A three-pillar survey was conducted: 1. quantitative analyses: co-citation analysis, and co-occurrence analysis; 2. qualitative review of the articles to obtain deeper insights; and 3. the quantitative results.

The remainder of this paper is organized as follows: the next section details the literature overview; the methodological procedures for the bibliometric analysis are described in the third section; section 4 presents the results and discussion; and finally section 5 provides concluding remarks, limitations, and new research opportunities.

LITERATURE REVIEW

The systematic review seeks to minimize bias and identify potential knowledge gaps for future studies. It brings replicability, a scientific and transparent approach, and explores a specific question or practice problem considering existing studies (Tranfield et al., 2003).

Concepts are the foundation of theory building and testing. Concept-centric writing raises the quality of a literature review and relates it to the core idea of synthesizing what is known about it. It requires a high level of synthesis power and needs to integrate concepts across domains into a more holistic perspective (Watson & Webster, 2020).

Service innovation

SI is a broad concept and contributes to many research areas, such as management, economy, and marketing, transforming from a product-based economy to a service-based economy in the second half of the twentieth century (Barrett & Davidson, 2008). Based on the theme's relevance, there was an increase in research in this field (Barrett et al., 2015). Also, long-established firms faced a business transformation from products to services

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in the primary business models. They decided to reshape their business models, from selling products to providing services and innovating them to improve their competitive advantage (Spohrer & Maglio, 2008).

There are many possibilities for services definition due to the principle that everything that can be exchanged is a service. Value creation to the customer without transferring the ownership provides resources and experiences that can be tangible or intangible. This is the nature of services, according to Lovelock (1983). In Vargo and Lusch's (2014) perspective, every physical product is a service waiting to happen.

To distinguish the concept of service from SI, one of the most common notions is creating a new service, an invention to be introduced in the market, to accomplish what is required for further growth (Spohrer & Maglio, 2008; Snyder et al., 2016). However, the theory building is still novel (Flikkema et al., 2007; Martin, 2016).

Studies in SI and knowledge-intensive business services (Kibs) have three different perspectives: 1. assimilation, 2. demarcation, and 3. synthesis (Coombs & Miles, 2000; Miles et al., 2018; Miles et al., 2021). Assimilation is fundamentally like manufacturing innovation and can be studied according to methods and concepts developed with minor modifications to the conventional approach. Second is demarcation, which specializes in studies of innovation in services with different approaches and methods. Third is synthesis, the one which requires more development. It covers broader aspects of innovation in the economy and is an integrative perspective of both other perspectives.

Nowadays, it is part of the evolution of the studies in SI to consider the effects of a pandemic in the customer view and how those services or new types of services have been transformed with the new requirements such as social distance and different restrictions in different areas. Therefore, service scopes have been affected (Pilawa et al., 2022).

Nevertheless, there is a potential of taking the customer perspective in this transformation due to the requirement of connecting this within the KM process towards customer satisfaction and engagement.

Knowledge management

As an antecedent of innovation, KM is a critical area in the organization (Darroch, 2005). It is not a new field of study; there are a lot of studies due to its pioneer phase. The life cycle agenda is in a stage in which elements of success factors and approaches are more relevant (Heisig, 2009). Tacit,

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implicit, and explicit knowledge, as per the definition of Nonaka and Konno (1998), are essential terms to recognize the KM establishing process.

Tacit knowledge is about the individual and what they have in their minds, explicit knowledge is about the procedures, documentation, and organizational systems, and implicit knowledge is embedded within the organization's processes, products, or services (Baptista & Mendonça, 2009). Many studies discuss the positive relationship between KM and innovation. An essential factor is that its usefulness is progressive, meaning that a piece of knowledge can be transformed to the next level (Lee, 2016; Chaita & Sibanda, 2021).

Developed economies transformed their economies from raw material processing and manufacturing to processing information and its development, application, and transfer of knowledge to capture more value. This is explained by increased returns in four aspects: 1. standards and network externalities, once established, can yield a significant "rent" and become dominant with more excellent customer benefits; 2. customer lock-in, high technologies investments from the customer perspective that require high efforts and switching costs; 3. significant upfront costs, amplified in software, high cost at the first and second copy from the original at zero cost; 4. consider producer learning, producers become more efficient as experience is gained (Teece, 1998).

KM activities are summarized in five most frequently broad categories: share, create, apply, store, and identify knowledge (Heisig, 2009). Knowledge sharing is the fundamental way employees can mutually exchange knowledge and contribute to knowledge creation, application, innovation, and ultimately, the organization's competitive advantage (Wang & Noe, 2010).

Customers increased their participation in the process of co-creation value along the service experience. From this perspective, the user becomes the value co-creation protagonist (Kim & Yim, 2020).

The field of KM is directly linked to the organization's performance and innovation capabilities (Adams & Lamont, 2003; Darroch & McNaughton, 2002; Du-Plessis, 2007; Pyka, 2002) and therefore plays a vital role in many areas of the organization, such as research and development (R&D), innovation speed, and innovation magnitude. It is an enabler for the firm's strategic position (Liao et al., 2010; Mardani et al., 2018).

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METHOD

Data collection

A bibliometric analysis was used to examine the theoretical roots, main research themes, and evolution of the intersection of SI in KM. Data were collected from the Scopus database in February 2022. It identified publications through a Boolean search by running a query for the following keywords: ("knowledge management" OR "KM" OR "KM processes" OR "Knowledge resource*" AND "service innovation" OR "service innovativeness" OR "service design" OR "service management" OR "service innovation capabilit*"). The asterisk (*) was added to support the variations in the sampled keywords. Zipf's law was followed to reduce the index size and improve the processing speed of data retrieval systems (Zipf, 1932), which establishes the relationship between the frequency of any word in the text and its rank. It is well-known in the literature and widely used in linguistic informatics (Yatsko, 2015; Liu et al., 2018; Liu et al., 2015).

The search terms were performed on the title, abstract, and keywords of each publication, in which the papers were filtered by document type ("article") to identify the most influential contributions in the field. The timeframe of documents was not controlled, and only publications in the English language were considered without the restriction of a subject area.

A total of 164 publications matched the search criteria after being independently and manually reviewed by four researchers to confirm the validity and correspondence of the research string. A cleaning process was conducted to remove duplicated papers that did not focus on KM and SI. In total, 144 publications were selected, and the metadata from all 144 documents was stored in different formats (*.RIS, *.CSV, and *.BIB) for further analyses.

The selected papers allowed the identification of commonly addressed bibliometrics information. The citation metrics (shown in Figure 1) are distributed from 2008 to 2022 and presented a representative increase over the years. The number of publications exploring SI and KM increased after 2016; 67 of the analyzed papers (46.52%) were published in the last seven years and 46 (31.94%) over the previous three years (2019-2021). These results indicate that the theme is gaining momentum from scholars in the field.

The number of citations per cited publication was calculated for each year to better understand the paper's impact. In the sampled documents, 112 publications (77,77%) received citations. The citation per cited publication analysis indicates a substantial increase in citations in 2014 and 2015.

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Additionally, 15 papers received citations in 2015, among which Barrett et al. (2015) and Chang and Lin (2015) received 495 and 145 citations, respectively, an outstanding performance.

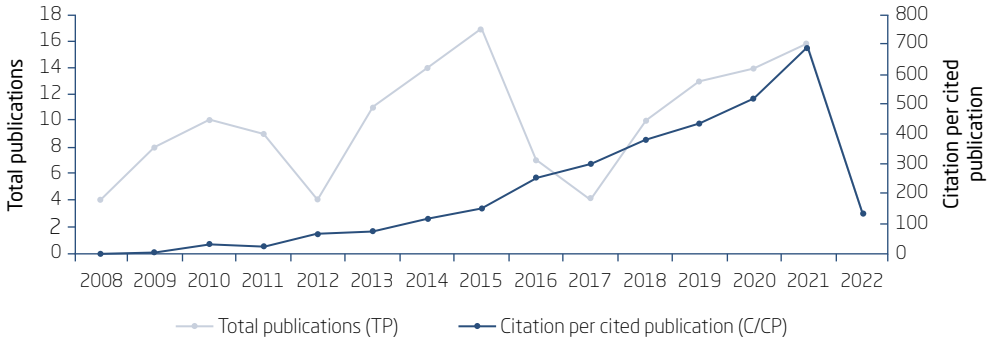
The number of citations shows a common phenomenon in science: few scientists perform the leading scientific research. This behavior was first found by Lotka (1926). The inverse square law of productivity states that the number of scientists producing n papers is $1/n^2$ of those making one paper. The skewed distributions have also been widely found regarding multidisciplinary citation patterns (Bensman & Smolinsky, 2017; Kwiek, 2018).

This study also follows Bradford's law, which sought to determine the dispersion of articles in journals to identify core journals in a subject field or discipline (Bradford, 1934; Hjørland & Nicolaisen, 2005; Locatelli et al., 2021).

Most representative journals in the sampled papers were also identified based on their number of published papers: the *Journal of Knowledge Management* (with 16 papers) is the first, while the *Journal of Information and Knowledge Management* (with nine papers) is the second most influential journal. The third place is occupied by the *Journal of Service Management* (3) followed by the *Journal of Service Research* (3), and the *Journal of Business and Industrial Marketing* (2).

Figure 1

Distribution of total publications (TP) and citations per cited publication (C/CP)



Source: Elaborated by the authors.

Note: The number of reported citations was based on data from the Scopus database in February 2022.

A worldwide analysis of the sampled papers shows that 37 countries received publications centered in China, the United Kingdom, the United

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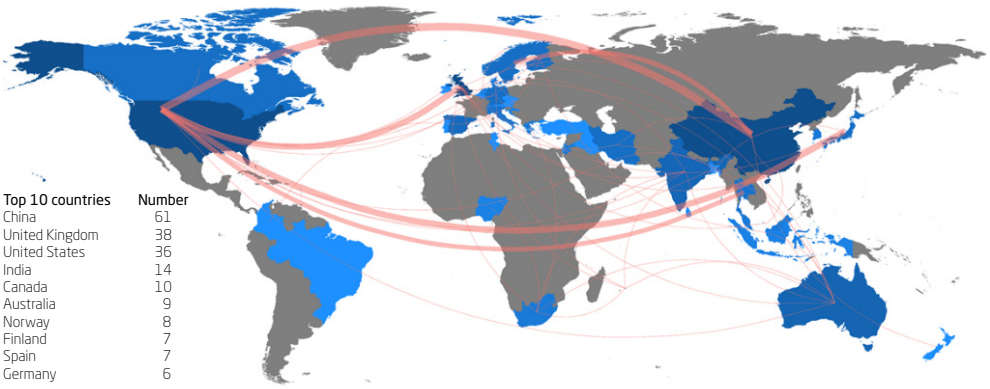
States, India, Canada, and others, as shown in Figure 2. Despite the substantial diversity, which includes Asia, Europe, and American scholars, there is a lack of academic efforts in prominent regions such as Africa (*e.g.*, Ghana) and Latin America (*e.g.*, Argentina, Chile, Mexico). The highlighted collaboration efforts across countries show a frequent collaboration between China and United States, China and Switzerland, the United States and Japan, Colombia and Spain, and United Kingdom and the United States. This demonstrates the global interest in the intersection of SI and KM.

Figure 2

Country collaboration map



Source: Elaborated by the authors via *software* Bibliometrix.

Note: The minimum frequency was set to one to create the country collaboration map.

Data analysis

Co-citation analysis

To foster insights accordantly with the theoretical roots of SI in KM, the authors performed a co-citation analysis based on the principle that two articles are related if both are cited in subsequent papers. Co-citation analysis inspects the list of articles in the sample to identify and count the frequency of simultaneous use of two given words in contemplation of relationship identification, which means that the number of citations is directly related to the strength of the connection (Aria & Cuccurullo, 2017). However, the co-citation analysis is based on the statement that co-cited articles share a bond or conceptual similarity (Ferreira et al., 2022).

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A co-citation network was created in parallel with a time zone analysis in CiteSpace software, a well-known academic software for bibliometric analysis that allows researchers to identify patterns through scientific information. In both views, the nodes are visual representations of the references, and links indicate the frequency in which two or more papers are cited together (Chen et al., 2012; Cui et al., 2018).

The retrieved metadata of the 144 sampled documents was submitted to network analysis using CiteSpace 4.0.R3 version. To define the parameters that best suit the network, the authors performed multiple tests according to chronological slices and the number of top-cited references and explored the criteria thresholds. These tests are highly recommended to mitigate excessive nodes and blurring of the raised network (Chen, Zhang et al., 2019; Beliaeva et al., 2022; Bigliardi & Filippelli, 2022).

An evaluation of the co-citation network with slices of one, two, three, and five years and the top-cited documents set to 20, 30, and 40 references from each slice showed that the most congruent parameter is the slice of two years within the top 40 references. Additionally, the node types were set to references, the links styles were created in the Cosine class, and the final scope was set to within slices. The re-run procedure revealed empty spaces and the range period changed automatically from 2008 to 2022.

Lastly, the co-citation network generates two outputs: 1. a network that shows the fundamental references and a representation of the field domain; and 2. the time zone view allowing the identification of structural paths, trends in the field, and turning points in the presented literature.

Keyword co-occurrence network

A keyword co-occurrence network was performed to identify the main research themes in SI and KM domains. This analysis provides insights into a field's conceptual structure by exploring the interaction and interconnections of keywords. Two keywords are recognized if they occur in the same author's list (Bornmann et al., 2018). Similarly, a more robust relationship between keywords representing core topics is contemplated. Therefore, the keyword co-occurrence network is based on the rationale that keywords share a tie when they co-occur. It allowed the classification of the research field into thematic clusters based on solid bonds in the sampled keywords.

VOSViewer software, version 1.6.18, was used to conduct the keyword co-occurrence network. Based on the visualization function of clustered network and overlay's view, the authors imported the metadata of 144 publica-

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tions to create both maps assembled by the abstract's text data (Perianes-Rodriguez et al., 2016). A total of 1854 terms were found, and the software extracted 55 terms that matched the threshold. Following the approach suggested by Ferasso et al. (2020), a cleaning step was performed to remove duplicated and not linked topics, resulting in 31 validated terms. To add further insights into the results' interpretations and comprehensibility, the minimum group size was set to ten, and small groups were merged.

Qualitative literature review

Seeking to integrate multiple perspectives in exploring the intersection of SI and KM domains, the authors performed a qualitative literature review. The most influential sampled publications were selected following the approach by Ferasso et al. (2020). This analysis acknowledged the understanding of theoretical roots, trajectories, and thematic themes, allowing inferences related to future research agendas in the study's field.

This is characterized as a partially mixed method approach, using quantitative network analysis methods and qualitative review. After the results were obtained via CiteSpace, Bibliometrix, and VOSViewer (Cobo et al., 2011; Aria & Cuccurullo, 2017) and summarized via a literature analysis, multiple combination analysis was performed to enhance the knowledge base in the research domain.

The analyses were performed accordantly with inductive procedures, and bibliometrics analytics procedures and cross-checked by the authors conforming to their expertise (Snyder, 2019; Zupic & Cater, 2015).

RESULTS

Theoretical roots of research trajectories in the field of KM in SI

A co-citation network was built to identify the theoretical roots and key most influential publications that frequently are cited by documents in KM and SI fields. The co-citation network built using CiteSpace software is shown in Figure 3. The network includes 1,702 nodes and 5,222 links from 4,885 distinct references from the sample.

Influential references are recognized based on their total number of citations and the network's linked connection. The nodes illustrate the references that were most cited by the sampled documents. In addition, the links are

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formed in consonance with the node's betweenness centrality, which measures the ability of one specific node to connect with other nodes (Chen et al., 2010). Lastly, turning points in the network are identified accordantly with the level of betweenness centralities, and a high level implies more nodes.

In this research strand, Agarwal and Islam (2014) is the most cited article in the network. This study investigates tools and technologies in the KM implementation process, proposing a phase map of the KM cycle, and supports the field in the diffusion of innovation. The second most cited paper is by Islam and Ikeda (2014). Its main findings are related to the integration of KM in the building process of a knowledge-sharing culture promoted by the dissemination and utilization of organizational digital knowledge assets. The third influential article is by Leiponen (2006), which builds a typology of organizational knowledge in business services and explores the effects of knowledge on innovation performance; the paper's findings indicate that tacit knowledge is related to service introduction and explicit collective knowledge is associated to service improvements, both relying uniquely upon one pole, which may hinder the innovation processes.

The network (Figure 3) shows two well-defined groups of references that indicate two different periods: before 2010 (the nascent period, shown in yellow) and after 2011 (the emergent period, shown in green). Additionally, both groups are connected by multiple nodes, indicating that the theoretical roots of the field are not limited to isolated groups of scholars. Regarding the nascent period, this interval includes ideas and contributions related to knowledge-intensive business services (Hipp & Grupp, 2005), service portraits and a service perspective on value creation through the lens of customers (Edvardsson et al., 2005), the development of sharing and open innovation dynamics (Chesbrough, 2010) and knowledge creation activities in business service firms (Leiponen, 2006).

The emergent period shows an extensive literature overview, including the two most cited references: Agarwal and Islam (2014) and Islam and Ikeda (2014). Also, the research concepts incorporate ideas appertained to the measurement of SI (Durst et al., 2015) and risk-taking behavior (Jantz, 2012). Furthermore, the core activities that enable value co-creation and value appropriation in the service business context are presented in the research by Kohtamäki and Partanen (2016).

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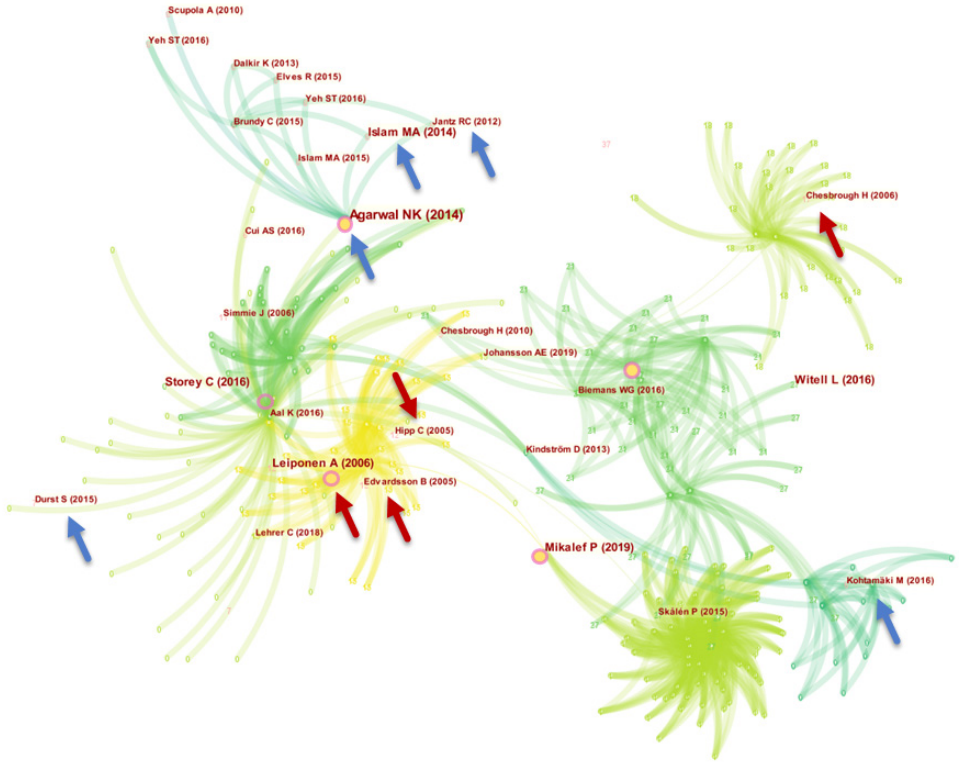
Figure 3

Co-citation network in the research field of KM and SI



Source: Elaborated by the authors via CiteSpace software.

Note: Slice length was set to two years, and the top ten references in each slice were selected to create the co-citation network. Red arrows indicate cited references from the developing period, and blue arrows indicate cited references from the emerging period.

A time zone visualization was created to provide a longitudinal perspective on the theoretical roots of KM and SI fields. Figure 4 displays the evolution path of the theoretical roots over the last 20 years. In the time zone network, the sampled cited documents are arranged in vertical time zones corresponding to their publication's year (Chen & Leydesdorff, 2013) and allow the identification of turning points in the literature according to the year slice.

The time zone visualization shows that the field of SI in KM was structured from 2002 to 2010 (nascent period). Also, this phase contains significant connections, such as the basilar study of Chesbrough (2010), which explores the barriers to business model innovation and the impacts of organizational culture on business model experimentation. Also, an important

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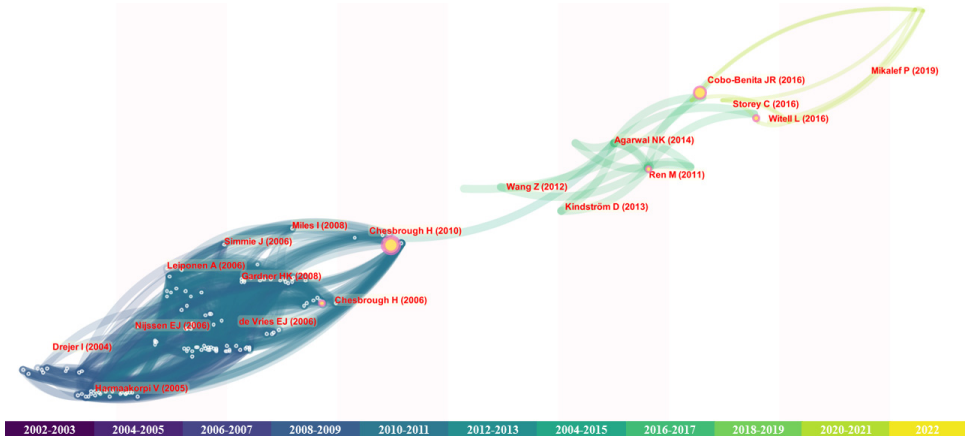
finding is related to the years 2011 to 2022 (emergent period); this phase holds two turning points, a suggestion that the contributions of Cobo-Benita et al. (2016) and Witell et al. (2016) are fountainhead publications for subsequent stages in the field. Kindstrom et al. (2013) introduced a firm's dynamic capabilities as an enabler to SI activities.

Figure 4

Time zone view of the co-citation network



Source: Elaborated by the authors via CiteSpace software.

Note: Slice length was set to two years, and the top ten references in each slice were selected to create the co-citation network using CiteSpace software.

To obtain further comparative insights into the impact of the selected publications on the KM and SI field and their global impact, the local citation score (LCS) and global citation score (GCS) were adopted. LCS indicates the number of citations a publication received by the selected publications in a research domain. In contrast, GCS shows the number of citations a publication received by all publications indexed in the Scopus database (Chen, Zhu et al., 2019). A high LCS level indicates that the publication is essential in the investigated research field, while a high GCS level suggests that the paper gained multidisciplinary momentum in the literature.

Table 1 presents the ten most cited publications from the 144 selected publications and shows their LCS and GCS. The five publications with the highest LCS level are Agarwal and Islam (2014), Islam and Ikeda (2014), Leiponen (2006), Mikalef et al. (2019), and Storey et al. (2015), representing the most influential articles in KM and SI field. The publications with the highest GCS level are Wang and Wang (2012), Witell et al. (2016), Leiponen (2006), Storey et al. (2015), and Mikalef et al. (2019).

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Table 1

Top ten most cited publications

Author(s)	Title	Journal	LCS	GCS
Agarwal and Islam (2014)	"Knowledge management implementation in a library: Mapping tools and technologies to phases of the KM cycle"	*Journal of Information* and *Knowledge Management Systems*	15	28
Islam and Ikeda (2014)	"Convergence issues of knowledge management in digital libraries: Steps towards state-of-the-art digital libraries"	*VINE Journal of Information* and *Knowledge Management Systems*	14	21
Leiponen (2006)	"Managing knowledge for innovation: The case of business-to-business services"	*Journal of Product Innovation Management*	14	161
Mikalef et al. (2019)	"Big data analytics capabilities and innovation: The mediating role of dynamic capabilities and moderating effect of the environment"	*British Journal of Management*	11	127
Storey et al. (2015)	"Success factors for service innovation: A meta-analysis"	*Journal of Product Innovation Management*	9	134
Wang and Wang (2012)	"Knowledge sharing, innovation, and firm performance"	*Expert Systems with Applications*	9	492
Witell et al. (2016)	"Defining service innovation: A review and synthesis"	*Journal of Business Research*	9	178
Aal et al. (2016)	"Innovation in service ecosystems: An empirical study of the integration of values, brands, service systems, and experience rooms"	*Journal of Service Management*	8	30
Biemans et al. (2016)	"New service development: How the field developed, its current status, and recommendations for moving the field forward"	*Journal of Product Innovation Management*	8	74
Cobo-Benita et al. (2016)	"Innovation projects performance: Analyzing the impact of organizational characteristics"	*Journal of Business Research*	7	20

Source: Elaborated by the authors.

Note: The table displays the ten most cited publications out of the 144 publications in the sample.

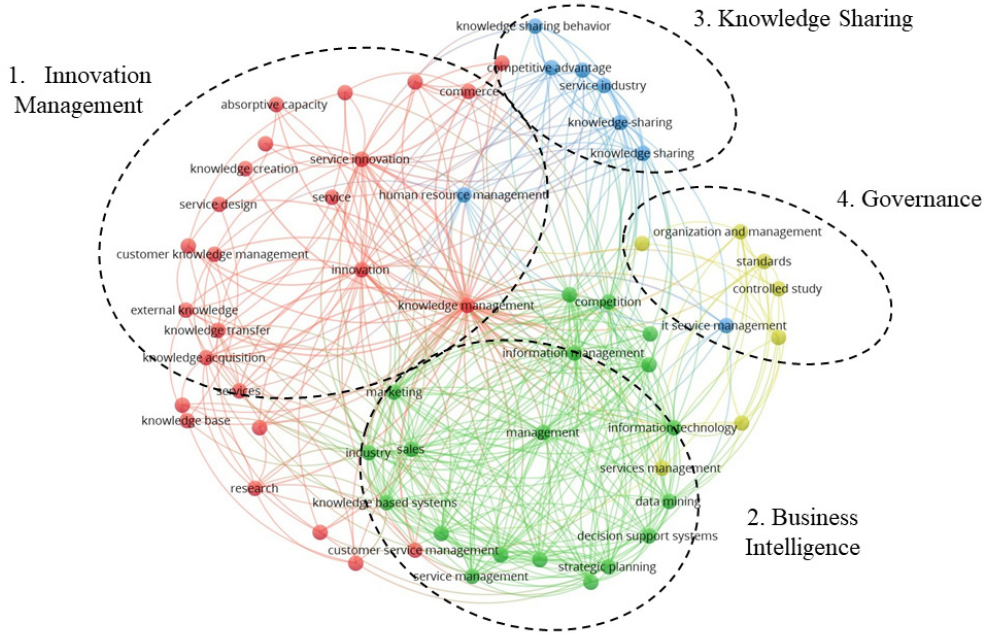
ISSN 1678-6971 (electronic version) • RAM, São Paulo, *23*(6), eRAMD220082, 2022
https://doi.org/10.1590/1678-6971/eRAMD220082.en

Main themes of studies on KM in SI

A co-occurrence network was performed to reveal the main thematic clusters in the SI and KM domains based on the abstracts of the selected publications. Figure 5 displays the term co-occurrence network, and Figure 6 shows the evolution of terms in the network. Both were created using VOSViewer software. The term co-occurrence network allowed the identification of four main themes, the most prominent clusters include 25 terms and is related to innovation management. The second largest cluster contains 19 terms mainly related to business intelligence. The third substantial theme within eight items is associated with knowledge sharing. Finally, the fourth thematic cluster (six terms) concerns governance.

Figure 5

Term co-occurrence network based on the abstracts of studies on SI and KM



Source: Elaborated by the authors via VOSViewer software.

Note: Minimum number of occurrences of a term was set to three to create the term co-occurrence network.

The evolution of terms in the co-occurrence network (Figure 6) illustrated that knowledge creation, service design, customer knowledge management, knowledge sharing, competitive advantage, standards, service man-

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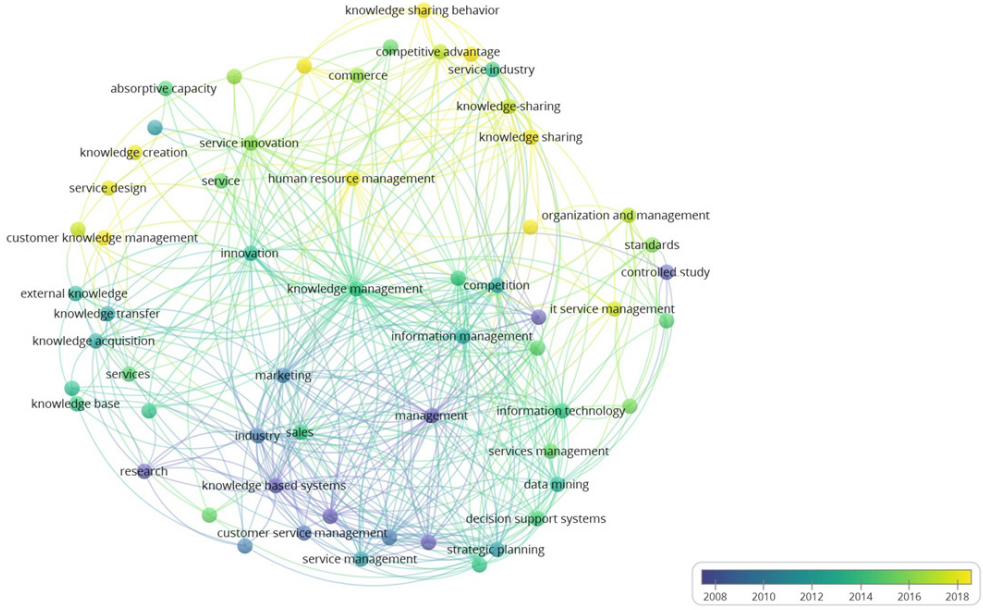
https://doi.org/10.1590/1678-6971/eRAMD220082.en

agement, and absorptive capacity have been heavily investigated in recent studies. The following session shows the four themes recognized by the co-occurrence network analysis, and new research strands are presented.

Figure 6

The evolution of terms in the co-occurrence network



Source: Elaborated by the authors via VOSViewer software (2022).

Note: Minimum number of occurrences of a term was set to three to create the overlay visualization of the co-occurrence.

Innovation management

Innovation is on a global interest's agenda. The collaboration process, idea creation, and improvement, empowering employees, and stimulating creativity are essential factors in this context. Idea management is a structured process for collecting, analyzing, selecting, and distributing ideas. It is a process that integrates part of the innovation process. Existing research has directed considerable attention toward collaborating with a network of actors who share information to develop innovations (Gomes et al., 2016).

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https://doi.org/10.1590/1678-6971/eRAMD220082.en

Business intelligence

The challenges are processing, organizing ideas, and defining which critical requirements for innovation to focus on. In order to stimulate collaboration and KM, it is crucial to improve collaboration and to have a self-organized team practicing constant feedback. The integration of those efforts can be supported by digital platforms and social connections, allowing idea management, quality, and maturity assessment by experts on market dynamics. In KM, capturing data is a core element; different tools can be applied to collect and organize these data to obtain critical information that can influence the organization's strategies and operational plans (Bouaoula et al., 2019).

Knowledge sharing

Innovative behavior is the act of generating, promoting, and applying creative thinking in organizations to improve personal and organizational performance. Organizational commitment affects behavior at the individual level, which means that the organization provides resources to employees and offers a mental state that shows purpose and can be divided into positive emotional commitment and continuous negative commitment. Knowledge-sharing practices in the whole organization are essential for preserving valuable heritage, learning new techniques, solving problems, creating core competencies, and initiating new situations (Hsu, 2008; Hu et al., 2009; Huang et al., 2010; Law & Ngai, 2008).

Governance

With sudden technological changes, economic development, and uncertainties of market dynamics, innovation is the lever for maintaining competitive advantage. In this regard, people embedded in the process are needed within Leadership's engagement. Innovative behavior is a strategic area in organizations, and it is important to adopt measures, metrics, and recognition to stimulate this behavior. It is also valid to present and build proposals with the teams to define those metrics for managing their innovative behaviors. The performance implications of corporate governance have been widely documented chiefly in the United States, the United Kingdom, and, more recently, Germany and Japan (Wu, 2008).

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https://doi.org/10.1590/1678-6971/eRAMD220082.en

Avenues for future research

In this study, the authors proposed understanding the intersection of KM and SI, main trajectories, and research roots based on a literature review. Table 2 lists recommended topics for future studies within the four research themes based on the intersection revealed.

Firstly, issues related to innovation management that have the potential to be investigated are those that integrate the service innovation performance by comparing different cultures and new types of service innovation. Collecting and analyzing longitudinal data are recommended to better explain customer relationships and their temporal evolution. Especially with greater attention on the physical retailers, after the Covid-19 pandemic, the importance of SI has increased because of the negative impacts of the health crisis (Pilawa et al., 2022).

The business intelligence domain is the area with significant potential for expansion of the field. Research directions include using broader samples, various user groups, and different segments and considering small and medium-sized enterprises (SMEs). The importance of technology used is highlighted for further investigations.

Regarding governance, longitudinal analysis of new roadmaps is recommended to implement technological innovations and economic benefits for each configuration of digital service innovation, which means exploring different innovations measurement. It is recommended to understand whether the user involvement may offer unique competencies to the service design process and impact the creation of new designs for the service's field development.

In the knowledge sharing theme, further studies should examine potential antecedents and outcomes of teams learning capabilities in service organizations. Also, future studies on human-related factors in different service sectors and industries, considering retailers involved with both interactive and supportive SI, should gather data from multiple sources and triangulate methods to validate findings, capturing deeper facets and related mechanisms and drivers of interactive and supportive innovation.

Finally, there is evidence of global interest in the intersection of KM and SI in the leading economies, including frequent collaboration between several countries. Considering this dimension, especially across cultures and regions, shows that the field has great potential to be explored. Once the base of the global economy started changing from products to services, knowledge increased its relevance. It is the fuel for innovation capabilities,

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https://doi.org/10.1590/1678-6971/eRAMD220082.en

meaning the power of value creation is unique. Innovation is crucial to the success and survival of companies. It is considered the most critical building block of competitive advantage (Auernhammer et al., 2003).

Table 2

Future research avenues in KM and SI domains

Research themes	Topics for future research	Recommended readings
1. Innovation management	• What are the impacts of innovativeness' performance and SI role in different regions, comparing different cultures' approaches? • What types of SI have retailers implemented during the Covid-19 pandemic, based on different restrictions and their effects on knowledge creation? • What are the key drivers of SI capabilities?	Pilawa et al. (2022) and Migdadi (2021).
2. Business Intelligence	• What validation measures are to be explored in KM and SI? • What aspects are involved in technology, knowledge, service innovation, and organizational performance? • What types of technology are emerging for digital platforms' capabilities for SI?	Kim and Yim (2020) and Wang et al. (2022).
3. Governance	• What are the impacts of processes and product innovation without a roadmap of implementation priorities? • What are the economic benefits for each configuration of digital service innovation, exploring different measurements? • How to understand the user involvement process by competencies to the service design process, and how does data collection support that? • What are the impacts of creating a new design for service development?	Opazo-Basáez et al. (2022) and Magnusson et al. (2003)
4. Knowledge sharing	• What are the antecedents and outcomes of teams learning capabilities in service organizations? • What are the drivers of interactive and supportive innovation in human-related factors in different service sectors? • What is the effectiveness of KM considering cultural and hierarchical differences?	Batt-Rawden et al. (2019) and Law and Ngai (2008).

Source: Elaborated by the authors.

ISSN 1678-6971 (electronic version) • RAM, São Paulo, *23*(6), eRAMD220082, 2022
https://doi.org/10.1590/1678-6971/eRAMD220082.en

FINAL REMARKS

This study aimed to synthesize the development in the intersection field of SI in KM, understanding the theoretical framework by identifying theoretical roots, main research trajectories, and research themes in the study domain and delineating future avenues in the field.

Before discussing the results and limitations, it is important to summarize the methodological pathway of this research.

The authors conducted a citation and co-citation analysis, the keywords co-occurrence network, and a bibliometric analysis with a qualitative literature review to answer the research questions. A mixed method approach was used, building two qualitative methods (co-citation analysis via CiteSpace and co-occurrence network via VOSViewer). Following a qualitative technique (literature review) allowed a robust and synthesized analysis empowering the findings to elucidate the domain's conceptual and intellectual compositions.

The theoretical roots and most cited documents in the field were identified, represented by Agarwal and Islam (2014), Islam and Ikeda (2014), Leiponen (2006), Mikalef et al. (2019), and Storey et al. (2015). In addition, the time zone visualization illustrated two distinct periods: nascent and emergent, respectively represented by the publications before 2010 and after 2011. They exhibit two main turning points for future research in the field that can be represented by the contributions of Cobo-Benita et al. (2016) and Witell et al. (2016).

On the other hand, the co-occurrence analysis allowed the identification of four thematic clusters: 1. innovation management; 2. business intelligence; 3. governance; and 4. knowledge sharing.

Furthermore, this study has some limitations. Firstly, since the scholarly data was delimited to articles in the Scopus database, future research should inspect other databases to validate the findings in this research. Second, the keywords and selection criteriamay limit the scope of the sampled literature. So, further studies may consider using dissimilar keywords to best shape the data collection stage. Lastly, the interpretation of the sampled publications during qualitative analysis may differ according to each author; therefore, the information was cross-checked by the authors. Under these circumstances and based on quantitative bibliometric techniques and qualitative literature review, this paper contributed to extending the current state of art and evolution in the field of KM and SI. Moreover, this research contributes to the international business literature by identifying emerging avenues for future inquiries.

ISSN 1678-6971 (electronic version) • RAM, São Paulo, *23*(6), eRAMD220082, 2022
https://doi.org/10.1590/1678-6971/eRAMD220082.en

This research has contributed to the field of SI and KM by exploring critical references in the area. The main findings described in this research supported suggestions for future research topics. Hopefully, these insights will give rise to new quantitative and mixed methods research for developing this insightful field and promoting groundbreaking studies.

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