

KNOWLEDGE MANAGEMENT RESEARCH AGENDA IN THE POST-INDUSTRIAL SOCIETY: SOME INSIGHTS INTO ITS INTELLECTUAL AND CONCEPTUAL DEVELOPMENTS

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Abstract

As knowledge is increasingly valued as a core/critical asset for business organizations in the post-industrial society, there is a growing interest in integrating knowledge management solutions into corporate processes. Thus, these topics have also entered the horizon of theoretical/empirical reflection, leading to the shaping of a research area in search of its own identity and physiognomy. In this context, the aim of this paper is to map and explore, through a systematic approach, the intellectual and conceptual developments in the area of knowledge management employing scientometric techniques. Unlike other studies of this kind, bibliometric tools are used to systematically capture recent contributions/developments in this research area, as well as thematic developments across time frames, without focusing on the reporting and interpretation of scientometric indicators. Beyond the inherent limitations, our paper brings theoretical implications in terms of mapping thematic developments and revealing new research niches. In addition, the analysis of the most relevant scientific contributions entails managerial implications for business organizations in terms of the solutions they may provide.

Keywords: *knowledge; knowledge management; science mapping; bibliometric research; systematic review.*

JEL Classification: *D83; M10*

I. INTRODUCTION

Knowledge has become the critical feature of post-industrial society. The post-industrial society implies, first of all, a change in the profile of the social structure and, in the descriptive terms identified by Bell (1976), three characteristics are noted, namely in the economic sector there is a shift from production to services, in technology there is the centrality of new science-based industries, and in sociological terms there is the rise of new technical elites and the emergence of a new stratification principle. From this perspective, post-industrial society marks the emergence of new axial structures and axial principles: a shift from a goods-producing society to an information or knowledge society and, in terms of ways of knowing, a shift in the axis of abstraction from empiricism or trial and error to theory and the codification of theoretical knowledge for guiding innovation and policy formulation. In other words, as Drucker (1993) postulated a few decades ago, knowledge is the only meaningful resource in post-capitalist society from which other factors of production can be derived. Formal knowledge has become both a personal resource and an essential economic resource, and knowledge, in this new sense, plays the role of knowledge as utility, as a means to achieve social and economic outcomes; knowledge is now applied to knowledge. In a more modern context, as Toffler (1970) has put it, the dictum *knowledge is power* is now understood to mean *knowledge is change*, and accelerated knowledge acquisition, as a source of technological development, accelerates change.

As Hansen et al. (1999), knowledge management is nothing new when one considers that, over time, family business owners have passed on business knowledge to their children, craftsmen have passed on trade secrets to their apprentices, and workers have exchanged ideas and knowledge in the workplace. With industrialization and technological progress, the shift from natural resources to intellectual assets as a source of competitiveness has made executives concerned with understanding the knowledge that underpins businesses and how the use of this knowledge can provide a competitive advantage. Knowledge, skills and related intangible assets have taken on a key role in driving competitive advantage in developed economies; this development is not only due to the importance of knowledge per se, but also to the rapid expansion of goods and factor markets, making intangible assets the main basis for competitive differentiation in many sectors (Teece, 1998).

Knowledge management (KM) research has enjoyed a rich and prosperous tradition, fuelled and stimulated mainly by the ideas advanced by Nonaka (1991), Nonaka and Takeuchi (1995) who, by investigating the experience of Japanese companies in depth for several years, formalized a generic model of organizational knowledge creation. The international scientific flow has increased considerably in recent decades, resulting in a body of research featured by a multitude of conceptual and empirical approaches.

In this context, the aim of this paper is to map and explore, through a systematic approach, intellectual and conceptual developments in the knowledge management research area employing scientometric tools.

The literature provides a number of papers that review topics in the area of *knowledge management* research using science mapping techniques. Some of the most relevant of these papers address topics directly related to established journals in the international scientific stream, such as the International Journal of Knowledge Management (Kataria et al., 2020) and Journal of Knowledge Management (Chaudhuri et al., 2021). Other papers examine the area of *knowledge management* research and aim to identify where KM stands in the overall development cycle of a discipline (Kör et al., 2022) or to capture major trends in research in this discipline (Akhavan et al., 2016). While all of these studies improve our understanding of KM research, we believe that as the field emerges as a more independently focused area, mapping thematic developments and revealing potential new research "hot spots" would bring additional depth and clarity to this thematic area. Bibliometric tools allow us to explore a large amount of data, to refine and understand the scientific output in order to identify influential contributions, dynamics, relevant trends and themes, inter-disciplinary connections and to map/visualize the intellectual structure of the thematic area (Braam & Moed, 1991; Di Stefano et al., 2010; Cobo et al., 2011; Zupic & Čater, 2015; Pereira et al., 2019). Major advantages of the scientometric approach regard objectivity, neutrality and the possibility of aggregating a large amount of information (Nerur et al., 2008). Given these advantages, the present paper, unlike other studies of this kind, uses bibliometric instrumentation to identify and systematize recent contributions/developments in this research area, as well as thematic developments over time frames, without extra focus on reporting and interpreting scientometric indicators.

The paper is further structured as follows. Section two describes the stages of the research approach and discusses the main bibliometric methods used. The third section reports and interprets the main results. The last section summarizes the main conclusions of our scientific approach.

II. RESEARCH DESIGN

To understand the intellectual structure of the *knowledge management* thematic area, a systematic investigation of the bibliographic corpus provided by the Web of Science Core Collection was carried out. Currently, there are several databases that group scientific production at the international level, but WoS is, unequivocally, the most comprehensive database that includes more than 20,000 high-quality journals. The analysis was designed on two levels, namely macro and micro. The following diagram illustrates the architecture of the whole analytical process.

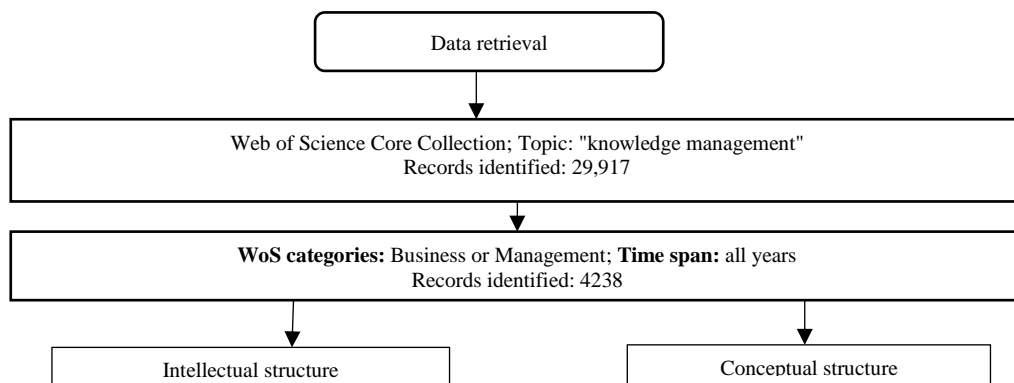


Figure 1. Research architecture
Source: Elaborated by the authors

Macro-analysis offers the advantage of obtaining an overview of the area of knowledge under investigation, mainly exploring the dynamics of scientific results over the period under analysis. It allows comparisons between different time periods, categories, research areas, institutions, countries, etc. For the extraction of data from the WoS database, search parameters and refinement criteria were established, as shown in Figure 1.

Micro-analysis allows us to draw a specific picture of the area of knowledge, identifying its intellectual structure, changes or certain trends. The main input in the creation of the metadata was the set of bibliometric variables extracted from the WoS database whose content was explored and mapped with the web application Biblioshiny from the Bibliometrix package. The R Bibliometrix package offers the advantage of using a set of efficient statistical tools and algorithms for quantitative research and data visualization in bibliometrics and scientometrics (Aria & Cuccurullo, 2017).

The bibliometric approach integrates the rigor of quantitative research into the subjective evaluation of the literature (Zupic & Čater, 2015). The summary of the main bibliometric methods is reported in the following table.

Table 1. Matrix of the bibliometric methods employed in the micro-analysis of the area of knowledge investigated and the research questions they answer

Structure	Method	Use	Units of analysis	Research questions	Statistical technique	Advantages	Limits
Intellectual	Citation	Estimates the influence of authors	Document Author	Who are the most influential authors in the research area investigated?	Network analysis Historiograph	Provides information on the relative influence of authors	It does not allow to outline connections among authors.
Conceptual	Co-word	Analyze the content by connecting the words that appear in the title, abstract and keywords.	Keywords (including author keywords)	How can the dynamics of the conceptual structure of the investigated area be described? Which topics are associated with a particular line of research?	Thematic evolution	Uses the content of the documents.	Words can have different meanings. Quality of keywords.

Source: adapted from (Braam & Moed, 1991; Di Stefano et al., 2010; Walter & Ribière, 2013; Zupic & Čater, 2015; Aria & Cuccurullo, 2017)

Mixing different methods to explore pathways across the scientific field under consideration will provide more meaningful insights. Following the mapping of the investigated research field, we will establish time frames in the evolution of scientific production according to its dynamics and we will review the major scientific contributions, selected mainly according to the number of citations, to the development of the knowledge management research field.

III. RESULTS AND DISCUSSIONS

3.1. General perspective

Table 2 provides a descriptive summary of the bibliometric data retrieved from the Web of Science Core Collection for the period 1987-2024, organized by category of information with reference to sources, documents, authors and keywords.

Table 2. Annual scientific production during 1987-2024

Main information	Counts/Indices	Main information	Counts/Indices
Sources (Journals, Books, etc)	254	Authors	8123
Documents	4238	Authors of single-authored docs	561
Annual Growth Rate %	1.89	Single-authored docs	636
Document Average Age	8.58	Co-Authors per Doc	2.7
Average citations per doc	46.53	International co-authorships %	33.13
References	149543		
Keywords Plus (ID)	3759		
Author's Keywords (DE)	8933		

Source: Computed with Biblioshiny based on data extracted from WoS

From what may be seen, over the more than 37 years since WoS has been recording scientific production in this research area, in the Business or/and Management categories, the more than 4200 papers are published in about 250 sources, mostly journals, with an annual growth rate of almost 2%. We also note that the majority of papers are the result of collaborations among authors, of which about 33% are international collaborations. The number of keywords, both keywords plus and author's keywords, reveals a trend towards diversification of the topics addressed in these papers, based on a large corpus of bibliographical references.

The average age of documents of about 8.58 years and the average number of citations per document indicate an increasing interest in topics within the KM research area, especially in the recent period, as illustrated in Figure 2.

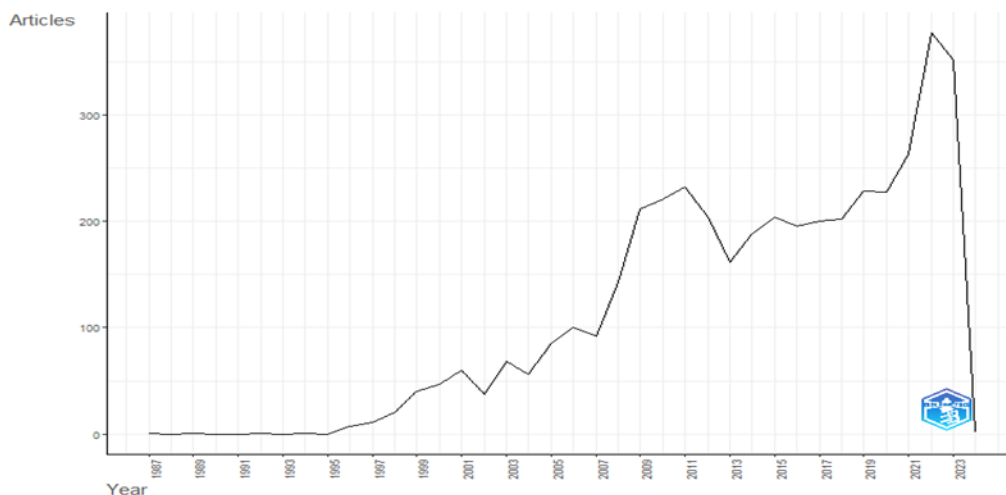


Figure 2. Dynamics of scientific research in the *knowledge management* thematic area

Source: Computed by the authors with Bibliometrix/Biblioshiny

The information reported in Figure 2 suggests that the field of knowledge management research is relatively new and that it tends to develop through more contributions especially after 2002. Although the number of results retrieved for the 2024 is not complete (the search was carried out during 2023, but papers with early access status were also included), it is expected that the dynamics of scientific production in this research area will remain high.

3.2. Intellectual structure

In any scientific field, certain publications have made a fundamental contribution to the development and structuring of that field; because of their multiplier effect, such works are considered as accelerating factors, which have a strong direct influence on the evolution of an area of knowledge (Berry & Parasuraman, 1993). In Figure 3, following a historiographical framework, we depict the influence of a number of scientific works on the evolution of the research field of knowledge management.

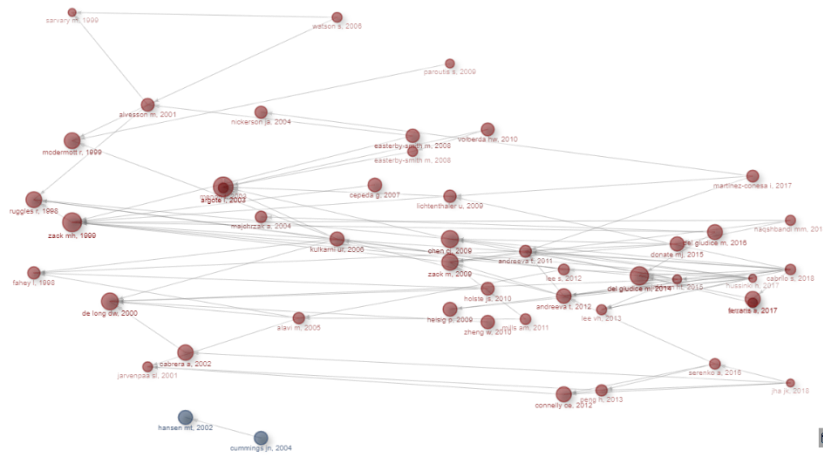


Figure 3. Historiograph

Source: Computed by the authors with Bibliometrix/Biblioshiny

This figure shows that there are a number of papers with a significant accelerating effect in the field of investigated subject, which are also among the most cited.

The diagram in Figure 4 reports the most cited papers worldwide that address topics in the knowledge management research area; they cumulate more than 900 citations over the entire period of analysis.

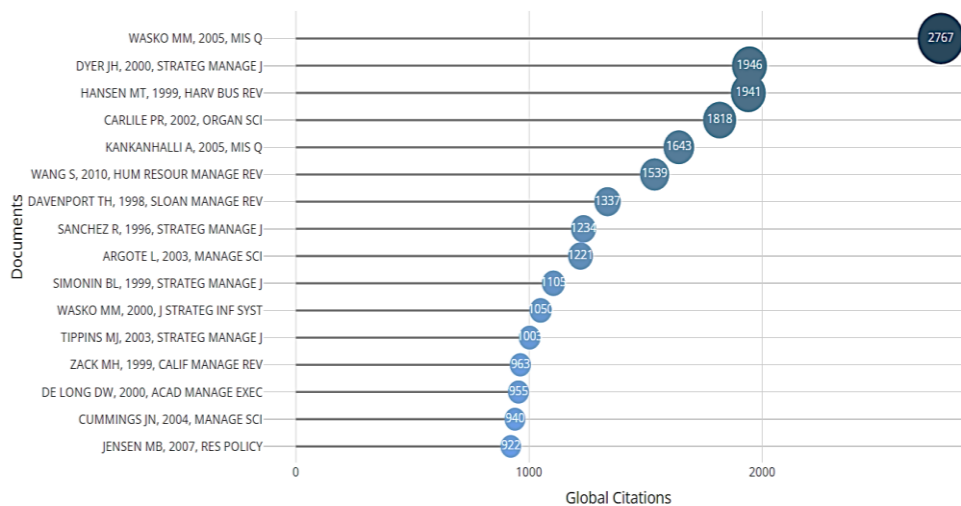


Figure 4. Most globally cited documents

Source: Computed by the authors with Bibliometrix/Biblioshiny

In Table 3 we provide a synoptic of papers with more than 900 citations globally in the knowledge management research area, as shown in Figure 3.

Table 3. Synoptic of papers with over 900 citations

Author	Title	Keywords
(Wasko & Faraj, 2005)	<i>Why Should I Share? Examining Social Capital and Knowledge Contribution in Electronic Networks of Practice</i>	electronic networks of practice, knowledge management, online communities, social capital
(Dyer & Nobeoka, 2000)	<i>Creating and managing a high performance knowledge-sharing network: the Toyota case</i>	knowledge management; learning; networks
(Hansen et al., 1999)	<i>What's Your Strategy for Managing Knowledge?</i>	knowledge management; codification; personalization; competitive strategy
(Carlile, 2002)	<i>A Pragmatic View of Knowledge and Boundaries: Boundary Objects in New Product Development</i>	knowledge; knowledge management; boundary objects; ethnography; new product development

(Kankanhalli et al., 2005)	<i>Contributing Knowledge to Electronic Knowledge Repositories: An Empirical Investigation</i>	knowledge management; electronic knowledge repositories; knowledge contribution; social exchange; social capital
(Wang & Noe, 2010)	<i>Knowledge sharing: A review and directions for future research</i>	knowledge sharing; knowledge exchange; knowledge management
(Davenport et al., 1998)	<i>Successful Knowledge Management Projects</i>	knowledge; knowledge management projects; knowledge repositories; tacit knowledge
(Sanchez & Mahoney, 1996)	<i>Modularity, flexibility, and knowledge management in product and organization design</i>	coordination; knowledge management; modularity; strategic flexibility
(Argote et al., 2003)	<i>Managing Knowledge in Organizations: An Integrative Framework and Review of Emerging Themes</i>	knowledge management; organizational learning; knowledge transfer; innovation; organizational memory
(Simonin, 1999)	<i>Ambiguity and the Process of Knowledge Transfer in Strategic Alliances</i>	strategic alliances; knowledge transfer; causal ambiguity; organizational learning, knowledge management
(Wasko & Faraj, 2000)	<i>"It is what one does": why people participate and help others in electronic communities of practice</i>	knowledge management practices; people participation; electronic communities
(Tippins & Sohi, 2003)	<i>IT competency and firm performance: is organizational learning a missing link?</i>	organizational learning; information technology competency; resource-based view; knowledge management
(Zack, 1999)	<i>Developing a Knowledge Strategy</i>	knowledge; strategic resource; knowledge-based competitive advantage; knowledge mapping
(De Long & Fahey, 2000)	<i>Diagnosing cultural barriers to knowledge management</i>	knowledge; culture; social interaction, knowledge flow; knowledge-oriented culture
(Cummings, 2004)	<i>Work Groups, Structural Diversity, and Knowledge Sharing in a Global Organization</i>	knowledge management; team diversity; social networks; organisational innovation
(Jensen et al., 2007)	<i>Forms of knowledge and modes of innovation</i>	knowledge management; forms of knowledge; modes of innovation

Source: Elaborated by the authors

Building on the structural view of hierarchy in complex systems, Sanchez & Mahoney (1996) document the interrelationships between product design, organization design, learning and knowledge management processes and competitive strategy. They investigate approaches to knowledge management in product creation processes in a firm that facilitate specific forms of "coordinated self-organizing processes" capable of developing the firm's strategic flexibility to respond favorably to environmental changes.

Davenport et al. (1998) address the pragmatic realities of knowledge management, focusing on a tangible and pragmatic activity, namely knowledge management projects as efforts to "do something useful" with knowledge, to achieve organizational goals by structuring people, technology and the knowledge base.

Recognizing that some companies automate knowledge management, while others rely on their people to share knowledge through more traditional means, Hansen et al. (1999) study knowledge management practices in management consulting companies. The starting premise is that in these companies, knowledge is the main asset, which is why they were among the first to pay attention to and make significant investments in knowledge management. They were also among the first to aggressively explore the use of information technology to capture and disseminate knowledge.

Simonin (1999) examines the role played by the "causal ambiguity" nature of knowledge in the process of knowledge transfer between partners in a strategic alliance. He introduces and empirically investigates the premises of knowledge ambiguity: tacitness, asset specificity, complexity, experience, partner protectiveness, cultural distance and organizational distance. Further, he demonstrates the significant mediating effect of knowledge ambiguity on knowledge transfer. Also, he investigates the strength of the relationships between these

explanatory variables, ambiguity and knowledge transfer in the context of possible moderating effects exerted by three important theoretical constructs, namely collaborative know-how, learning capacity and duration of the established alliance.

To remain competitive, firms must explicitly manage their intellectual resources and capabilities; in this regard, Zack (1999) provides a framework for describing and evaluating an organization's knowledge strategy. The framework is illustrated using examples from five companies representing the spectrum of physical and knowledge-based products and services. Knowledge forms the essential foundation of competition. To compete successfully through knowledge requires either aligning strategy with what the organization knows or developing the knowledge and capabilities needed to support a desired strategy.

De Long and Fahey (2000) demonstrate the importance of the cultural perspective on many aspects important for effective knowledge management; they define three distinct types of knowledge (human, social, structured). They explore four ways in which organizational culture shapes the creation, sharing and use of knowledge; they also suggest diagnostic steps that managers can take to assess the fit between firm culture and desirable knowledge use behaviors.

In light of the growing literature on organizational learning as a source of competitive advantage, Dyer & Nobeoka (2000) examine the "black box" of knowledge sharing within the Toyota network and show that Toyota's ability to effectively generate and manage network-wide knowledge sharing processes explains, at least in part, the relative productivity advantages enjoyed by Toyota and its suppliers.

Information and communication technologies, in the form of knowledge management systems (KMS), are seen as effective means of facilitating knowledge exchange. From this perspective, Wasko & Faraj (2000) discuss the implications of the public versus private good approach to knowledge exchange. They attempt to provide an answer to the question of why people contribute time and effort to the provision of knowledge as a public good, given the tendency of individuals to act in their own self-interest. Knowledge management practices and systems designed and applied within organizations to support knowledge sharing start from the premise that knowledge is a private good that is exchanged in expectation of a commensurable return. Because of the benefits conferred by collaborative technologies that connect groups of people, organizations should also consider developing electronic communities of practice and managing knowledge as a public good.

Starting from the premise that there are problems that specialized knowledge causes to organizations, Carlile (2002) explores the extent to which, in new product development, knowledge can be both a barrier and a source of innovation; the characteristics of knowledge that lead to innovative problem solving within a function actually impede problem solving across functions in a firm (*knowledge boundaries*).

Argote et al. (2003) propose an integrative framework that highlights knowledge management effects and contextual properties as key dimensions. The framework identifies common areas of research where contextual properties (of units, relationships and knowledge) affect knowledge management outcomes (creation, retention and transfer). It also identifies key causal mechanisms (capability, motivation and opportunity) that help explain how and why particular contextual properties affect knowledge management outcomes.

In the context of the resource-based view, Tippins & Sohi (2003) explore how information technology can be exploited to gain competitive advantage, examining the mediating role of organizational learning in the relationship between IT competence and firm performance. They develop a conceptualization of IT competence, propose a notion of IT competence that encompasses IT knowledge, IT operations, and IT objects, provide an operational measure of this construct, and deepen the understanding of how IT competence affects firm performance.

Cummings (2004) argues that external knowledge sharing will be more strongly associated with performance when work groups are more structurally diverse. A structurally diverse work group is one in which members, by virtue of different organizational affiliations, roles or positions, can expose the group to unique sources of knowledge. It is assumed that if members of structurally diverse working groups engage in external knowledge exchange, their performance will improve due to this active exchange of knowledge through unique external sources

Given the fundamental role of the EKR (*electronic knowledge repository*) in capturing and disseminating organizational knowledge, Kankanhalli et al. (2005) formulate and test a theoretical model to explain their use by knowledge contributors. The model draws on social exchange theory to identify the cost and benefit factors that condition the use of EKR, and on social capital theory to capture the moderating influence of contextual factors.

By appealing to collective action theories, Wasko & Faraj (2005) examine how individual motivations and social capital influence knowledge contribution in electronic networks. They show that individuals contribute knowledge to electronic networks of practice when they believe it enhances their professional reputation and, to some extent, because they feel good about helping others. They contribute when they are structurally integrated into the network and when they have experience to share with others.

Jensen et al. (2007) address the tension between two ideal modes of learning and innovation. One mode is based on the production and use of codified scientific and technical knowledge (the Science, Technology and Innovation - STI mode) and the other is an experiential learning mode based on action, use and interaction (the

Doing, Using, Interacting mode). They argue that by focusing the analysis on frameworks and structures that promote learning within and across organizations, it is possible both to develop meaningful measures of learning in the DUI mode and to demonstrate that firms can foster such learning through certain practices and policies.

Based on the premise that knowledge management is largely dependent on knowledge sharing, Wang & Noe (2010) review qualitative and quantitative studies tackling knowledge exchange at the individual level. Based on this review of the literature, they propose a framework for understanding knowledge sharing research that identifies five themes that are emphasized in knowledge sharing research, namely organizational context, interpersonal and team characteristics, cultural characteristics, individual characteristics, and motivational factors.

3.3. Conceptual structure

In Figure 5 we report the evolution of the main research themes in *knowledge management* over the selected time periods in line with the dynamics of scientific research illustrated above in Figure 2.

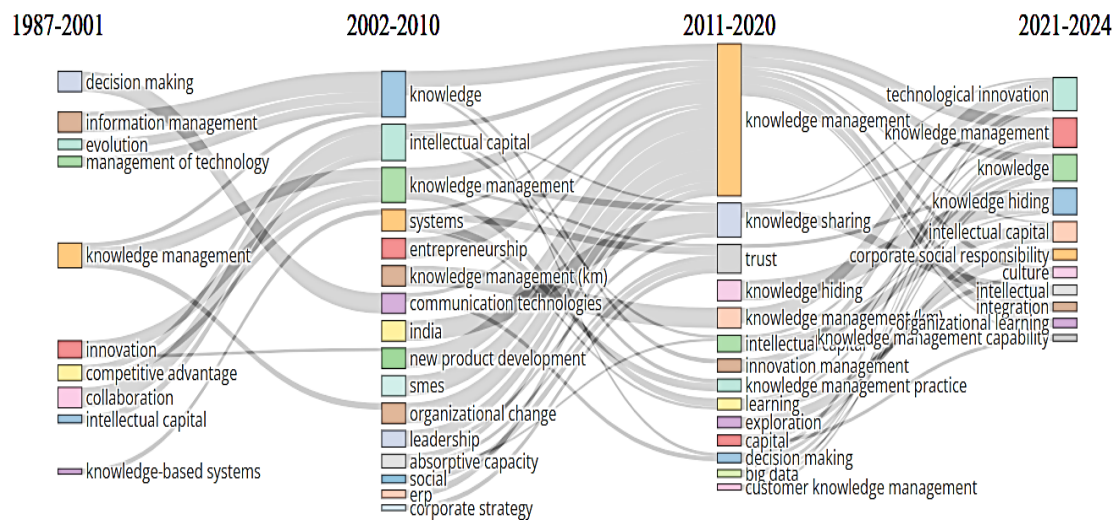


Figure 5. Sankey diagram showing the thematic evolution in the knowledge management *knowledge* domain
Source: Computed by the authors with Bibliometrix/Biblioshiny

This figure reflects the orientation of scientific interest, the evolution/transformation of some topics in the selected periods, and the connections between them, according to their relevance to the research area and their development. Overall, a continuous multiplication and diversification of topics is observed, as well as a change in their development and contribution to the field of knowledge analyzed.

During the period 1987-2001, the most developed themes were *knowledge management*, *decision making* and *information management*, which are also the most relevant to the field, followed by *innovation* and *competitive advantage*. This was the period when the *knowledge management* research field was trying to define its own physiognomy through scientific contributions aimed at conceptualizations and identification of an appropriate methodological tool.

Thus, Appleyard (1996) examines knowledge flows among firms, i.e. the pattern of knowledge sharing in a knowledge-intensive industry such as semiconductors. It attempts to provide answers to questions about how knowledge transfer is achieved outside the firm, to what extent industry characteristics and national institutions may influence knowledge diffusion, and how firms direct knowledge flows in order to understand the mechanism and determinants of knowledge flows.

Around the same time, Sanchez & Mahoney (1996) investigate the interrelationships among product design, organizational design, learning and knowledge management processes and competitive strategy. They develop the concepts of modularity in product design and organizational design based on standardized components and organizational infrastructures as prerequisites for a strategic approach to knowledge management centered on a carefully managed free synchronization of the firm's learning processes, suggesting an approach to reveal new insights into the structure and dynamics of changing product markets and evolving organizational forms.

Based on the results of previous studies suggesting that organizations that are effective at "learning" have developed routines that enable them to effectively and systematically create, store, and use new knowledge, Dyer & Nobeoka (2000) examine facilitated learning through inter-organizational routines that are intentionally designed to stimulate knowledge transfer across organizational boundaries (following observations on the Toyota model). The study provides empirical support for the relational view which argues that 'network' is an important unit of analysis for explaining competitive advantage.

Following on previous research that considered knowledge management processes as universally appropriate, Becerra-Fernandez & Sabherwal (2001) develop a contingency framework based on the premise that particular contexts influence the appropriateness of a knowledge management model. They link the knowledge management process to two attributes of organizational subunit tasks, namely internalization for focused, process-oriented tasks; externalization for focused, content-oriented tasks; combination for broad, content-oriented tasks; and socialization for broad, process-oriented tasks.

Amid growing recognition of the role of knowledge as a critical resource for organizations, Holsapple & Joshi (2000) conduct a Delphi study exploring the factors that influence the success of knowledge management initiatives within organizations. The resulting framework identifies three categories of influences exerted on knowledge management in organizations, namely managerial influences, resource-related influences, and influences exerted by the organization's external environment.

Grover & Davenport (2001) recount in pragmatic terms what has been known to date about knowledge, information technology, practice and research in knowledge management and, on this basis, propose two complementary frameworks that illustrate potential opportunities for shaping a research agenda in this area. The first framework focuses on the knowledge process and the context in which this process is embedded. The second framework, which complements the first, focuses on the transactional perspective in which knowledge exchange takes place in a market.

Work towards building a specific conceptual register continued with other notable contributions. Thus, Tsoukas & Vladimirou (2001) mix the belief in the personal character of knowledge assumed by Polanyi with the idea that all knowledge is fundamentally collective, advanced by Wittgenstein, to illustrate, on the one hand, how individuals acquire knowledge and expand their knowledge collections and, on the other hand, how knowledge, in organized contexts, becomes organizational. Concerned also with possible proactive strategic alternatives regarding knowledge, Von Krogh et al. (2001) develop a framework based on four strategies, namely leveraging existing knowledge within the company, enhancing existing knowledge within the company, assimilating new knowledge from outside the company to build a new domain of knowledge, and finally experimenting/testing/exploring new knowledge within the company.

Beyond 2002, the themes of *knowledge* and *knowledge management* develop more strongly. Until 2010, the topic of *knowledge* was addressed in research in tandem with *information management* and *management of technology*. Research is now much more oriented towards *knowledge management* per se, but also in connection with *innovation* and *competitive advantage*. It is notable, first of all, that the most relevant papers for the investigated research area, reviewed above, belong to this period. To these are added contributions that develop topics that have appeared previously, such as, for example, *intellectual capital* through studies that address it in conjunction with *innovation* and *competitive advantage*. New, niche topics such as *entrepreneurship*, *organizational change*, *new product development* are also emerging, which will evolve in the next phase and be integrated into research on *knowledge management*, as well as *leadership* and *absorptive capacity*, which will later, together with *organizational change*, be addressed in studies on *knowledge sharing*.

As Cabrera and Cabrera note (2002), the growing interest in integrating knowledge management solutions into the work of companies derives from the characteristics that make knowledge potential sources of competitive advantage, namely its quality as a unique intangible asset, path dependent, causally ambiguous and difficult to imitate or substitute. Added to this are technological advances, the adoption of global communication networks and protocols, which make the implementation of knowledge management systems possible and economically feasible. Thus, on the basis of a number of sociological studies, Cabrera and Cabrera (2002) provide a framework that facilitates the understanding of the psycho-sociological processes that govern exchanges between employees and offers concrete cross-functional solutions to solve dilemmas related to knowledge sharing in organizations. Along the same lines, Cabrera and Cabrera (2005) suggest that intentions to share knowledge are determined by positive attitudes towards knowledge sharing as well as perceptions of sharing norms. They examine the socio-psychological determinants of knowledge sharing through the lens of social capital theory, social dilemma theory and social exchange theory, with the aim of identifying managerial practices that encourage and support knowledge sharing behaviors among employees and knowledge flows in organizations. In another study, Cabrera et al. (2006) also provide empirical evidence on the possible effects of individual variables (such as personality, self-efficacy and organizational commitment), individual perceptions of how the organization is run (professional autonomy, rewards associated with knowledge sharing and perceived support from colleagues and superiors) and individual perceptions of existing knowledge management systems (availability and quality of systems) on knowledge sharing.

The emergence of information and communication technologies has led to transformations in approaches to new product development as the knowledge base underpinning most products becomes increasingly diverse and dynamic. Nambiisan (2002) looks at new product development from the perspective of three consumer roles, namely resource, co-creator and user, and explores how customers participate in knowledge creation in environments where interactions are computer shaped and community oriented.

Agreeing that specific KM methods vary according to the type of knowledge and key competencies of organizations, Choi and Lee (2003) provide empirical evidence on the impact of four KM styles they identify, namely dynamic, system-oriented, human-oriented, and passive, on performance within organizations. The findings suggest that the dynamic style, which integrates explicit-oriented with tacit-oriented methods, results in better performance.

In a complex conceptual approach based on skills development and knowledge creation as a way of solving problems, Nickerson and Zenger (2004) develop a knowledge-based theory of the firm that addresses a number of gaps identified in previous literature. They explain how a firm's prospective goals of knowledge creation dictate the choice of how to organize, the critical question being not so much whether knowledge should be owned or purchased in the market or how knowledge exchange should be facilitated, but rather how a manager should organize individuals to generate the knowledge the firm seeks.

Knowledge reuse with the express purpose of facilitating the development of radical innovative solutions is addressed in research by Majchrzak et al. (2004). The results, despite the non-linear and chaotic nature of radical innovation, lead to the development of a process model for knowledge reuse for radical innovation and the identification of factors affecting this process.

In a study investigating the interrelationships among environmental uncertainty, knowledge transfer and competitive advantage, Liao and Hu (2007) conclude that knowledge transfer could lead to the development of organizations' core competencies and then to the competitive advantage. On the one hand, this makes knowledge transfer a very important activity in a rapidly changing industrial environment and, on the other hand, environmental uncertainty appears as a vital factor in knowledge transfer.

In the context of a growing interest in communities of practice as promoters of learning and knowledge generation in a variety of different work environments, Amin and Roberts (2008), after a review of a substantial body of theory, challenge the increasingly homogenous and instrumentalist use of the term 'communities of practice' to encapsulate 'knowledge in action' and argue for the importance of differentiating among varieties of knowledge in action. In the four collaborative work environments considered, contrasts in organizational, technical and spatial structure, together with those related to the nature and intensity of social interaction, are significant enough to affect the nature of the economic creativity generated.

Chen and Huang (2009) document the mediating role that knowledge management capabilities play in the relationship between strategic human resources practices and innovation performance. Strategic human resources practices manifest their beneficial effects on innovation performance through knowledge acquisition, sharing and use capabilities, which underlines the critical roles of human resources management and KM in the innovation process. In the same register of interest, in an attempt to identify and explain one of the mechanisms by which contextual and strategic organizational factors can be mobilized to achieve higher levels of organizational effectiveness, Zheng et al. (2010) investigate and argue the mediating role of knowledge management on the relationship among organizational culture, structure, strategy and organizational effectiveness.

In the context of an open innovation orientation that challenges traditional approaches to corporate boundaries, Lichtenthaler and Lichtenthaler (2009) combine research on knowledge management, absorptive capacity and dynamic capabilities and develop an integrative framework for examining a firm's ability to dynamically manage knowledge in open innovation processes, which is founded on the consideration of the exploration, retention and exploitation of knowledge within and across organizational boundaries.

During the time frame 2011-2020, *knowledge management* research dominates the scientific landscape, integrating and refining previous topics such as *knowledge*, *intellectual capital*, *innovation*, while new topics emerge by developing/integrating older ones such as *knowledge sharing* and *trust*, or niche topics without previous intellectual ramifications such as *knowledge hiding*. A number of earlier themes, including *intellectual capital* and *decision making*, are beginning to lose relevance to the knowledge domain under analysis.

While most of the research that dominated the scientific landscape in previous periods has tackled primarily the direct relationship between KM and innovation, after 2011 a more focused scientific interest in considering contingent influences that may arise in the interrelationships between knowledge processes and innovation performance becomes visible. In this respect, Andreeva and Kianto (2011) examine innovation from a knowledge-based perspective and propose a conceptual model that integrates four key knowledge and innovation processes and tests possible mediating and moderating effects that may occur between these variables; the model also includes knowledge intensity as a contingency variable that has a profound impact on knowledge management and innovation practices. In the same vein, Jiménez-Jiménez and Sanz-Valle (2011) attempt to address some of the vulnerabilities identified in previous research and explore integratively the relationships between organizational learning, innovation and performance together in a single model. In addition, they examine the likely moderating effect of firm size and age, industry, and environmental turbulence on the relationships between organizational learning, innovation, and performance. The literature on organizational innovation has also developed over the past decade through contributions that address organizational learning as a support for organizational creativity and intelligence, which involves the acquisition, sharing and use of knowledge. In this register, García-Morales et al. (2012) test the influence exerted by transformational leadership on organizational performance through

dynamic organizational learning and innovation capabilities, the influence exerted by organizational learning on organizational performance through innovation and, last but not least, the influence of organizational innovation on organizational performance. Donate et al. (2015) focus on organizational leadership as a prerequisite for developing and fostering knowledge management practices for innovation in technology-intensive firms, based on the premise that the competitive advantages of these firms essentially depend on developing new products and exploiting knowledge assets at a fast, efficient and flexible pace. They discuss a specific type of leadership, namely knowledge-oriented leadership, and analyze its influence on KM practices, as well as the mediating role of KM practices in the relationship between knowledge-oriented leadership and product innovation performance.

The emergence of the knowledge-based economy and society is accompanied by the development of activities that make intensive use of knowledge assets or intellectual capital as a key resource in achieving competitive advantage. Martín-de-Castro et al. (2011) review the origins and nature of intellectual capital, highlighting the strategic role of different intangible assets, such as talented and dedicated workers, cultural values or long-term relationships between the firm and its stakeholders - customers, partners, suppliers and society at large - in gaining and maintaining competitive advantage. Judging the level of empirical support for the resource-based view of the firm to be uncertain, they propose a refinement of this theory and a recognition of the role of intellectual capital in achieving performance, as this framework (*intellectual capital-based view of the firm*) may offer more scope for empirical testing than the resource-based view of the firm.

The impact of KM practices on firms' economic performance and competitiveness is explored by Andreeva and Kianto (2012) who consider a framework that integrates two categories of management practices that impact KM effectiveness, namely human resources management and information and communication technologies, both of which are assumed to affect firms' economic performance and competitiveness.

As the issue of *knowledge sharing* has become increasingly relevant to the KM thematic area, research has begun to highlight that, despite efforts to develop mechanisms to facilitate knowledge transfer within organizations, employee behavior can be burdened by a degree of reluctance. Connelly et al. (2012) discuss *knowledge hiding* as something that occurs in organizations, meaning an intentional attempt by one person to withhold or hide knowledge that has been requested by another person; thus knowledge hiding becomes a barrier to effective knowledge transfer. They develop a multidimensional measure to assess knowledge hiding and to distinguish this behavior from related constructs and focus on distrust as a key predictor of knowledge hiding in organizations. In the same vein, Peng (2013) seeks to identify the context and reasons that lead employees to hide knowledge; he advances and tests the hypothesis that territoriality is a more important proxy variable than psychological ownership when the tendency to hide knowledge occurs, and furthermore, territoriality will mediate the link between knowledge-based psychological ownership and knowledge hiding. Based on the finding that knowledge hiding is frequently observed in modern organizations, Serenko and Bontis (2016) explore the antecedents and consequences of intra-organizational knowledge hiding, investigating the extent to which three types of enabling conditions (organizational KM systems, policies, and culture) and job insecurity (as measured by full-time equivalent compensation and involuntary turnover) have an effect on intra-organizational knowledge hiding. The study empirically tests two constructs commonly considered as antecedents and consequences of knowledge sharing, namely mutual knowledge hiding and voluntary turnover.

Much of the literature converges on the idea that knowledge flows among the components of an organizational structure (viewed as a network) are essential for the conduct of organizational processes, including innovation and new product development, as well as for performance. In this context, Tortoriello et al. (2012) highlight the importance of the network context and analyze the extent to which the strength of the links, network cohesion and network breadth influence the level of knowledge gained in inter-unit transfers.

At the same time, the rapid proliferation and adoption of technologies that facilitate the development of social networks is creating new challenges for organizations as they seek to integrate such networks into their day-to-day activities, including marketing and knowledge management (Kane et al., 2014). Leonardi (2014) provides a grounded theory of communication visibility based on a field study of the implementation of a new enterprise social networking site in a large financial services organization. This theory suggests that communication visibility can improve meta - knowledge, leading to the development of more innovative products and services and reducing knowledge duplication. Along the same lines, Santoro et al. (2018) develop a conceptual model that captures the relationship between knowledge management system, open innovation, knowledge management capability and innovation capability. They argue that firms can and should exploit the Internet of Things by developing, implementing and sustaining knowledge management systems that involve advanced information and communication technologies and the exploration of external sources of knowledge, impacting innovation performance, understood as the ability to introduce new products/services, processes or open new markets.

In recent years, i.e. after 2021, scientific interest is primarily oriented towards *technological innovation*, with research stemming from earlier themes such as *knowledge management*, *intellectual capital*, and *innovation management*. The *knowledge management* thematic area is developing by integrating previous research path (*knowledge management*, *decision making*, *intellectual capital*). There is again a fairly broad interest in the topic of *knowledge* in research that integrates older topics such as *knowledge sharing*, *learning*. At the same time, the

topic of *knowledge hiding* is developing through the evolution of earlier topics such as *knowledge sharing*, *intellectual capital* and *trust*. The topic of *intellectual capital* re-enters the horizon of theoretical reflections and continues to be clearly integrated in research alongside the topic of *knowledge management*.

As organizational design and management practices become increasingly oriented toward knowledge acquisition and processing, the literature tends to refine a number of earlier topics to identify new answers to questions that may have important theoretical and managerial implications. Ali et al. (2021) examine the influence of job insecurity on employees' perceptions of well-being and knowledge sharing or hiding strategies. They provide a theoretical model that investigates expatriate employees' perceptions of well-being, measured in terms of engagement and burnout due to job insecurity; the model also describes the role of both facets of well-being in predicting employees' knowledge sharing and knowledge hiding intentions. In the same register, Oubrich et al. (2021) test how organizational factors of leadership style, organizational design, and human resource management practices contribute to the mitigation of knowledge hiding bias, taking into account specific characteristics of the organizational justice climate and competitive work environment. The issue of knowledge hiding is addressed by Zutshi et al. (2021) within the context of higher education; they develop a conceptual map that illustrates how knowledge hiding is understood and practiced in academic roles. After a review of the literature and an iterative theoretical analysis, the authors identify a number of key research themes regarding knowledge hiding in academic teaching, research and managerial-administrative (or service) roles.

Disruptive digital technologies have changed organizational processes and workflows in organizations in recent years. In this context, Bag et al. (2021) document the potential of artificial intelligence powered by big data as a knowledge management enabler to unlock knowledge-based value for customers, users and the external market. The theoretical model is rooted in knowledge management theory, customer knowledge creation, user knowledge creation and external market knowledge creation (knowledge management process), rational B2B marketing decisions (decision making style) and firm performance (organizational outcome). Del Giudice et al. (2021) investigate how self-adaptive models, through elements such as agility, adaptation and ambidexterity, influence digital innovation; the research focuses on digital systems in which SMEs, stimulated by networking and open innovation solutions, operate and innovate in response to external triggers, exhibiting a balance between exploration and exploitation and pronounced agility. In the same vein, Hock-Doepgen et al. (2021) empirically test the impact exerted by internal and external knowledge management capabilities on business model innovation ability and the moderating role of risk tolerance in SMEs. Recognizing the important role of frugal innovation for firms in developing and emerging countries, Lei et al. (2021) empirically document the influence of transformational leadership on frugal innovation and provide a model that integrates transformational leadership and specific dimensions of frugal innovation through the mediating effect of tacit and explicit knowledge sharing processes. Papa et al. (2021) explore the relationships among reflexive knowledge sharing, open innovation, volume of big data analytics and number of patent applications in the context of complex collaborative networks. Specifically, they test the relationships between knowledge sourcing from an external environment, knowledge transfer to an external environment, and the adoption of useful solutions to obtain adequate returns from innovation. Exploiting the resource-based view to highlight the multidimensional relationship between different environmental strategies adopted by manufacturers to improve corporate environmental performance, Sahoo et al. (2023) examine the critical roles of green knowledge acquisition in the development of green knowledge management and green technological innovation activities in improving corporate environmental performance, positioning resource commitment as a moderator.

IV. CONCLUSIONS

The profile of the post-industrial society is overwhelmingly shaped by the ability to acquire, share and process knowledge for competitive advantage. Against the backdrop of the increased dynamics of knowledge-intensive sectors, this topic has increasingly attracted the interest of researchers. In this context, the aim of this article was to map the intellectual structure and conceptual structure of the *knowledge management* research area using bibliometric tools and to review relevant contributions to the development of this field.

The results of the analysis lead to several stylized facts about the dynamics of scientific production and thematic evolution in the field of KM, between 1987 and 2024, by Web of Science *Business* and *Management* categories.

First of all, the field of knowledge management research is constantly evolving and maturing and is seeking to define its own identity and physiognomy, as demonstrated by the high dynamics of research, especially after 2002, but also by the fact that the most relevant contributions to the development of this field emerged in the period 2002-2010. Secondly, the field is subject to a quite broad and various spectrum of topics, which have evolved over the years. Thus, some topics have evolved in terms of their degree of development and/or relevance to the field of research considered; at the same time, there have been new, niche topics, which have shown a fast development during the recent years, while the importance of other topics has waned.

Like all researches, beyond the limitations specific to each bibliometric method, our study is subject to limitations derived also from the fact that it does not cover book chapters, books and proceedings. In addition, only Business or/and Management categories and only articles published in English were selected. All these criteria may leave out contributions that add value to the field.

Despite these limitations, our paper advances the field in several ways. First, the reference to core themes and thematic developments allows the discovery of potential new research niches in this domain and the design of a research agenda that exploits the complementarities derived from combining different perspectives. In addition, by uncovering the main focus of this research area, the most important areas of application can be targeted. From the analysis of the most influential contributions, it appears that the research results can have highly valuable managerial implications for business organizations interested in their competitive position in a highly competitive, yet dynamic business environment.

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