The evolution of knowledge sharing and innovation: exploring epistemological reflections

A evolução da partilha de conhecimentos e da inovação: explorando reflexões epistemológicas

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Roberta Dutra de Andrade
PhD Student in Management
Institution: Universidade da Beira Interior
Address: Covilhã - Portugal
E-mail: roberta.andrade@ubi.pt

Vitor Cesar Benfica
Master in Applied Economy
Institution: Universidade da Beira Interior
Address: Covilhã - Portugal
E-mail: vitor.benfica@ubi.pt

ABSTRACT
This article comprehensively explores the historical roots of the association between knowledge sharing and innovation within organisations, tracing its theoretical evolution since 1973. The methodology employed in this study involved a meticulous examination of knowledge-related concepts in philosophy and management, establishing connections between these fields, identifying significant themes prevalent during different periods, and tracking the evolution of epistemological perspectives in the literature that connect these constructs. This investigation identified four distinct theoretical stages in the literature's development: embryonic, emergent, young growth, and accelerated growth. During the life cycle of this research area, it was observed that the study of knowledge sharing and innovation has transitioned from a primarily technological approach to a focus on knowledge networks in the young growth stage and eventually to an emphasis on the acquisition process in the more accelerated growth stage. However, the notions of maturity and saturation do not accurately apply to the current state of the art, as the number of articles published on this topic has experienced exponential growth since 2000. Seminal papers in this field highlight the significance of dialogue as the primary instrument for transforming knowledge into innovation and establish that innovation is contingent upon knowledge sharing. Hence, organisations that foster a knowledge-sharing culture facilitate the development of their innovation capabilities. From an epistemological standpoint, authors in the knowledge management realm engage with various philosophical currents, ranging from Plato’s rationalism to Polanyi’s ideas, encompassing the empiricism of Bacon and Locke, and exploring the dialectic of Hegel.

Keywords: philosophy, knowledge, knowledge sharing and innovation.
RESUMO
Este artigo explora de forma abrangente as raízes históricas da associação entre compartilhamento de conhecimento e inovação dentro das organizações, traçando sua evolução teórica desde 1973. A metodologia empregada neste estudo envolveu um exame meticuloso de conceitos relacionados ao conhecimento em filosofia e gestão, estabelecendo conexões entre esses campos, identificando temas significativos prevalentes em diferentes períodos, e acompanhando a evolução das perspectivas epistemológicas na literatura que conectam esses construtores. Esta investigação identificou quatro fases teóricas distintas no desenvolvimento da literatura: embrionário, emergente, crescimento jovem e crescimento acelerado. Durante o ciclo de vida desta área de pesquisa, observou-se que o estudo da partilha de conhecimento e inovação passou de uma abordagem essencialmente tecnológica para um foco em redes de conhecimento na fase de crescimento jovem e, eventualmente, para uma ênfase no processo de aquisição na fase de crescimento mais acelerado. No entanto, as noções de maturidade e saturação não se aplicam com precisão ao estado atual da arte, já que o número de artigos publicados sobre este tópico tem experimentado um crescimento exponencial desde 2000. Os trabalhos do seminário neste domínio sublinham a importância do diálogo como instrumento primordial para transformar o conhecimento em inovação e estabelecem que a inovação depende da partilha de conhecimentos. Por conseguinte, as organizações que promovem uma cultura de partilha de conhecimentos facilitam o desenvolvimento das suas capacidades de inovação. De um ponto de vista epistemológico, os autores no campo da gestão do conhecimento se envolvem com várias correntes filosóficas, que vão desde o racionalismo de Platão até as ideias de Polanyi, abrangendo o empirismo de Bacon e Locke, e explorando a dialética de Hegel.

Palavras-chave: filosofia, conhecimento, compartilhamento de conhecimento e inovação.

1 INTRODUCTION
Innovation is highly dependent on knowledge sharing between individuals, teams and organisations and underpinned by its applicability to the design or improvement of new products, services and business models. As it is considered a fundamental capacity to maintain the competitive advantage of organisations, its relationship with knowledge management and sharing has been studied since 1973 and has followed an upward curve of growth since the 2000s ((R. D. de Andrade & Pinheiro, 2023) Castaneda & Cuellar, 2020; Ceylan, 2013).

The importance given to the subject at present is because innovation integrates technical and physical components related to knowledge in product development. There is also an understanding that dialogue is the main instrument for converting knowledge into creation and depends on sharing knowledge (Diercks et al., 2019; Cardeal et al., 2001; ). Thus, the question is: How do organisations learn? How is knowledge shared? How do they apply learning to foster innovation? How will knowledge be managed?
This research examines the historical evolution and scholarly exploration of the interplay between innovation and knowledge sharing from their inception to the present. The study seeks to identify distinct periods in the relationship between these domains, highlight the key themes prevalent during each period, trace the evolution of epistemological currents, and pinpoint seminal articles that mark significant theoretical transitions. The research justification came from the need to examine the concepts of knowledge present in philosophy and management capable of identifying the milestones of theoretical evolution in the relationship between the constructs and how they behave and relate.

2 THEORETICAL FRAMEWORK

2.1 KNOWLEDGE SHARING

Organisational knowledge is crucial in achieving and sustaining a competitive edge in a rapidly changing economy (Bratianu & Bejinaru, 2019; Yeo, 2018). Consequently, scholars have directed their efforts toward investigating the process of knowledge generation and dissemination among individuals, teams, and diverse entities (Haq & Davies, 2023). The intensified focus on this subject arises from the recognition that the creation and control of knowledge flow are vital elements that can yield numerous advantages, including cost savings, reduced project development time, enhanced team effectiveness, bolstered innovation capacity, and overall organisational prosperity (Djeflat, 2009; Mitchell & Shepherd, 2010).

Knowledge sharing is considered one of the leading research topics in management and can be defined as interactions between individuals that provide an exchange of experiences, skills and tacit and explicit knowledge ((R. Andrade et al., 2022) Serenko & Bontis, 2016; Helmstadter, 2003; Hogel et al., 2003). Cummings (2003) understands knowledge sharing as how organisations access their knowledge and that of other organisations, while Gibbert and Krause (2002) understand it as the collaborator's desire to give others the knowledge acquired or created by yes. In summary, sharing knowledge is essential for its creation and application in an organisational context, which is necessary for knowledge management and corporate innovation (Hendriks, 2004; Huysman & De Wit, 2002).
2.2 INNOVATION

The term innovation encompasses various definitions and encompasses diverse approaches. For some authors, innovation is a process in which knowledge is acquired, shared and assimilated to create knowledge that incorporates products and services (Herkema, 2003), methods and processes (Andrade et al., 2023) Brew & Tierney, (2012) and social and environmental contexts (Harrington et al., 2017). According to Pfotenhauer, Juhl & Aarden (2019), it would only be possible to guarantee economic competitiveness if our societies and institutions were sufficiently focused on innovation and, therefore, the author considers it an imperative for policymakers worldwide.

In addition to financial resources and research and development, innovation depends directly on human resources since it is based on the exchange of competence, expertise, information, intuitions and creative approaches between individuals (Murimbika & Urban, 2014; Castaneda, 2015).

In short, innovation is associated with knowledge sharing. However, the more complex the invention, the greater the number of barriers human beings will face in its application (Torugsa & Arundel, 2016). According to the OECD (2005), there are four types of innovation: product, process, marketing and organisational. Other classifications of invention are technological or not (Nelson, 1993), incremental or radical, and disruptive and open innovation (Chesbrough, 2012).

2.3 KNOWLEDGE SHARING AND INNOVATION

In innovation, knowledge sharing is the exchange of expertise to create or improve products and services of value, and lack of knowledge is the main barrier to innovation (Storey & Kelly, 2002). Therefore, innovation is only possible with knowledge sharing (Kremer et al., 2019).

Several authors have noted the importance of studying innovation and knowledge sharing. Cavusgil, Calantone and Zhao (2003) point out that the greater the amount of tacit knowledge transferred, the greater the company's capacity for innovation. In this context, acquiring knowledge to build new skills through collaboration has been an effective means of successful innovation (Adams et al., 1998).
Since behaviours related to knowledge sharing positively influence the innovation of sharers and organisations in terms of propensity and ability to promote and implement new ideas (Castaneda & Cuellar, 2020), knowledge sharing becomes a mediator between collaborative innovation and organisational performance (Wang & Hu, 2018).

3 METHODOLOGY

This study carried out a systematic review, covering publications that related both constructs of interest: knowledge sharing and innovation. The temporal delimitation dated from 1973, when the first article on the two themes was published, until then. The study used two databases: Web of Science and Scopus. The terms used in the research strings were: knowledge sharing/exchange/transfer and innovation. The research protocol aimed to investigate the evolutionary trajectory of the literature concerning the connection between innovation and knowledge sharing, starting from its initial stages, and explore potential avenues for future studies and theoretical advancements based on the existing state of the field. The central question guiding this inquiry was: How has the scholarly discourse on the relationship between innovation and knowledge sharing evolved, and what are the future research and theoretical development directions in light of the current state of knowledge?

To identify the evolution of the relationship between knowledge sharing and innovation, we applied the life cycle theory (Chanchetti et al., 2016), which states that areas of knowledge develop according to an S curve operationalised in four stages: emerging, growth, maturation and saturation. To identify the development of the relationship over time, the number of publications was used as a performance measure, and to identify seminal articles in the generation of theories on knowledge sharing and innovation, two bibliometric indicators based on the analysis of social networks were used: the degree centrality and between-node centrality (Saavedra et al., 2018).

In each phase of progression, namely embryonic, emerging, young growth, and accelerated growth, the study identified the primary thematic focus by analysing the co-occurrence network of words, encompassing abstracts, author names, and article titles.
4 RESULTS ANALYSIS

The academic examination of the relationship between innovation and knowledge sharing was initiated in 1973 with the publication of the first article on the theme. Since then, this study area has experienced significant growth, particularly after 2000. Consequently, this study needs to cover the stages of maturation and saturation. During the embryonic phase, which consisted of 12 articles, the primary research topics revolved around knowledge transference and the role of knowledge supervisors in facilitating knowledge transfer in multinational corporations operating in underdeveloped countries.

Frequently occurring keywords included "cooperation" and "connection." Technological innovation emerged as the central theme during this phase. The subsequent stage, the emerging phase (comprising 52 articles), spanned from 1986 to 1995 and highlighted the importance of universities in knowledge transfer for technological innovation and patent licensing. It also emphasised the significance of knowledge discussion among government and academia and the role of networks in disseminating innovation.

The young growth stage (encompassing 990 articles) followed, starting in 1996 and concluding in 2006. Notable innovation themes during this phase included innovation systems, product development, policies, management, and diffusion. Regarding knowledge management, key themes included communities of practice, social networks, e-learning, knowledge management systems, and knowledge creation.

The current period (comprising 7,052 articles), marked by the most substantial growth, commenced in 2007. The literature on knowledge management in this stage focused on absorptive capacity, the knowledge acquisition process, the international transfer of tacit knowledge, and technology transfer in innovation management. Within the fourth stage, identified clusters indicate that the current state of the art revolves around absorptive capacity, technology transfer, innovation systems and exchange channels, network alliances, organisational learning, organisational conditions for knowledge sharing, and service innovation.

The seminal articles in Table 1 affirm that dialogue is the primary instrument for converting knowledge into innovation and relies on knowledge sharing. Therefore, organisations that foster knowledge sharing facilitate their innovation capabilities.
TABLE 1: Main papers on the relationship linking knowledge sharing and innovation

<table>
<thead>
<tr>
<th>Authors</th>
<th>publication year</th>
<th>Quotes so far</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cohen, W. and Levinthal, D.</td>
<td>(nineteen ninety)</td>
<td>36,930</td>
</tr>
<tr>
<td>Szulanski, G.</td>
<td>(1996)</td>
<td>9,942</td>
</tr>
<tr>
<td>Grant, R.</td>
<td>(1996)</td>
<td>17,115</td>
</tr>
<tr>
<td>Nonaka, I.</td>
<td>(1994)</td>
<td>58,523</td>
</tr>
<tr>
<td>Powell, W., Koput, K. and Smith-Doerr</td>
<td>(1996)</td>
<td>9,935</td>
</tr>
<tr>
<td>March, J.</td>
<td>(1991)</td>
<td>20,938</td>
</tr>
<tr>
<td>Granovetter, M.</td>
<td>(1973)</td>
<td>49,212</td>
</tr>
<tr>
<td>Eisenhardt, K.</td>
<td>(1989)</td>
<td>47,688</td>
</tr>
<tr>
<td>Lane, P. and Lubatkin, M.</td>
<td>(1998)</td>
<td>5,675</td>
</tr>
<tr>
<td>Tsai, W.</td>
<td>(2001)</td>
<td>4,713</td>
</tr>
</tbody>
</table>

Source: prepared by the author

Based on the lifecycle stages outlined in Table 2, it can be inferred that the examination of knowledge sharing and innovation has transitioned from a technological perspective in the young growth phase to a focus on knowledge networks and, subsequently, to the acquisition process in the more advanced accelerated growth stage.

TABLE 2: Evolution of theoretical concepts from the perspective of life cycle theory

<table>
<thead>
<tr>
<th>stages of evolution</th>
<th>Approach</th>
<th>Keywords</th>
<th>main topics</th>
<th>main authors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Embryonic</td>
<td>Conceptual</td>
<td>Cooperation; Connection; Tecnologic</td>
<td>*Knowledge transfer and the role of managers in the expansion of multinationals to underdeveloped countries;</td>
<td>Glazer (1973); Sahal</td>
</tr>
<tr>
<td>(1973 – 1985)</td>
<td></td>
<td>innovation; Knowledge transfer; Industry;</td>
<td>*Importance of information technologies to facilitate knowledge and innovation; *Problems in transferring knowledge in innovation; *Innovation as a process of self-organisation; *Knowledge transfer for innovation in different areas and between organisations.</td>
<td>(1983); Garner (1985); Rupp (1976); Sorg (1984); Bosman (1982); Gaitskell (1979).</td>
</tr>
<tr>
<td></td>
<td>12 articles</td>
<td>Law Suit.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>emerging</td>
<td>Technological</td>
<td>Innovation; Technology transfer;</td>
<td>*The role of universities in transferring knowledge to generate technological innovation and patent licenses;</td>
<td>Shea &amp; Basch (1990);</td>
</tr>
<tr>
<td>(1986 – 1995)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>52 articles</td>
<td></td>
<td></td>
<td></td>
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</tbody>
</table>
Another complementary way of analysis was to divide the most relevant keywords into four quadrants, as shown in Table 3. Declining topics were no longer popular in the field in recent years and were disappearing. Established and consolidated topics were the most important words that continue to be used as current research topics and suffer some seasonality over the stages of evolution.
TABLE 3: Main topics in knowledge sharing and innovation

<table>
<thead>
<tr>
<th>Emerging Topics</th>
<th>Consolidated Topics</th>
</tr>
</thead>
<tbody>
<tr>
<td>* Entrepreneurial learning</td>
<td>* Innovation</td>
</tr>
<tr>
<td>* Innovative supplier</td>
<td>* Open innovation</td>
</tr>
<tr>
<td>** Co-production of knowledge</td>
<td>** Knowledge transfer</td>
</tr>
<tr>
<td>** Concealment of knowledge</td>
<td>** Knowledge sharing</td>
</tr>
<tr>
<td>*** Industry 4.0</td>
<td>** Knowledge management</td>
</tr>
<tr>
<td>*** Supplier innovation</td>
<td>*** Networks</td>
</tr>
<tr>
<td></td>
<td>*** Share Capital</td>
</tr>
<tr>
<td></td>
<td>*** Organizational learning</td>
</tr>
<tr>
<td>Topics in Decline</td>
<td>Established Topics</td>
</tr>
<tr>
<td>* Industrial innovation</td>
<td>* Innovation</td>
</tr>
<tr>
<td>** Chain of knowledge</td>
<td>* Open innovation</td>
</tr>
<tr>
<td>** Knowledge capture</td>
<td>** Knowledge transfer</td>
</tr>
<tr>
<td>*** Tech community</td>
<td>** Knowledge sharing</td>
</tr>
<tr>
<td>*** Community of practice</td>
<td>** Technology transfer</td>
</tr>
<tr>
<td></td>
<td>*** Absorptive capacity</td>
</tr>
<tr>
<td></td>
<td>*** Networks</td>
</tr>
</tbody>
</table>

(*) topics on innovation, (**) on knowledge sharing and (***) other topics. Source: prepared by the author

Network analysis reveals that open innovation emerges as the primary outcome of the knowledge-sharing process, contributing to technology transfer and fostering innovative practices. Absorptive capacity and social capital emerge as key interconnected themes, as they play a vital role in identifying and internalising external knowledge to pursue institutional goals effectively.

5 EPISTEMOLOGICAL CONSIDERATIONS

Regarding the theory of knowledge, scholars of scientific methodology divide the different levels of learning into four: popular, theological, philosophical and scientific. While organisational knowledge, over time, was adopted in the theoretical perspective of knowledge management (Ichijo & Ichijo, 1993).

Knowledge, seen as the main object of organisations, underwent interpretative changes in the so-called 'information age' and assumed a new role, distinct from Western philosophy. Such epistemological modifications took place from the construction of management and organisations. From the industrial revolution, knowledge management in market-oriented organisations started to use the production of knowledge to generate the output of goods and services and, in this way, the authors of knowledge management flirted with several philosophical currents, from Plato's rationalism to the modern concepts of Polanyi, passing through the empiricism of Bacon and Locke and the dialectic of Hegel.
The first perception of knowledge used in the evolution of management theory refers to Plato's rationalism, the steadfast and justified belief that, in *Theaetetus*, states that “knowledge is true opinion accompanied by explanation and opinion lacking explanation is found on the margin of knowledge” (Plato, 2010, p.302). It is understood at this point that the explanation of a phenomenon, which constitutes science itself, must reach immutable, universal and eternal ideas, going beyond particular and sensible data. From this statement, we can derive two arguments: the first is that opinions and beliefs cannot be the foundation of knowledge, and the second is that opinion needs rational justification to be knowledge. In short, beliefs cannot be true because they lack reason and valid proof, while knowledge is knowledge because it is identified with the truth.

The first publications in knowledge management tried to differentiate the Western and Eastern philosophical traditions, assuming that the dualist view of the Western tradition was based on the separation between subject and object and differed from the Eastern tradition in the personal perceptions arising from direct experiences. The assumption until then was that the theoretical and objective elaborations of the Western tradition should be redefined to emphasise individual experiences.

To support this position, some authors resorted to René Descartes (1596-1650), understanding that for him, mind and body, being different, do not have the same attributions, and, therefore, the conditions of possibility of knowledge would be in the mind and not in the body. The approach to this issue encompasses two consequences: (i) it refers to the attempt to overcome what they understood by Western dualism, seeking a more unitary conception of knowledge, and (ii) it is argued that in organisations, the emphasis of knowledge lies more on
experience bodily than in the intellectual, which is why the next step was to dialogue with the empiricists.

Although knowledge management authors do not deepen John Locke's perspective, they attribute to him the emphasis on experience as the fundamental basis of knowledge. At this point, an attempt was made to demonstrate the opposition established between Descartes and Locke, to highlight the duality that modern philosophy had achieved, since they sought to emphasise that knowledge is the result of the interaction of one subject with the other and in the exchanges they carry out in the daily. Here, the seminal authors Nonaka and Takeushi (1998) state that it is in socialisation that the sharing of experiences and, by extension, the production of knowledge occurs. The fact that they judge that language is not conducive to knowledge suggests that science, with its theoretical peculiarities, tends to legitimise what experience defines and demands, solving the functional equation within an organisation with utilitarian purposes.

Following the evolution of thought about knowledge management, the authors begin to dialogue with philosophical concepts such as dialectic and contradiction, following the example of Hegel and Marx. By understanding that changes are continuous processes and that organisations must be alert to new rearrangements, dialectical reasoning begins to be understood as an essential factor of competitiveness capable of leading the process of knowledge creation. Now, if reality is changeable, there is no sound principle. Therefore, by privileging change and opposites, they define dialectics by stating that a thesis is inadequate when denied by an antithesis, shifting Hegelian dialectical assumptions (knowing historical and universal truth) to the context of organisational management. The management authors understood that change, which occurs through conflict and opposition between different issues, enables a third assumption.

The adapted conception of Hegel's dialectic moulds knowledge management into an organisation's marketing decisions. Therefore, the interest in the customer (synthesis) is the result of the dialogue between the internal perception (thesis) of an organisation about the individual interests of the subjects that compose it and the external perception (antithesis). Thus, dialectic implies understanding the changes due to oppositions and divergences; therefore, the previous experiences are overcome in the face of the creative routine.

In management authors' case, however, the contradiction does not operate on the level of rational thought, occurring when an idea corresponding to a product or service is overcome by
another, resulting in another innovative product or service. From this moment of understanding, there has been an exponential increase in publications associating knowledge management with innovation.

Finally, in the last and current phase of understanding knowledge in management, authors intend to justify the transformation of subjective knowledge into theoretical knowledge from the point of view defended by Michel Polanyi, which takes into account two aspects: tacit and explicit knowledge. It is understood here that ability must be converted to be validated and transformed into new or improved products and services.

Such an epistemological approach intends to ratify the hypothesis that knowledge is the critical factor for the competitiveness of organisations. Therefore, the aim here is not to reach the universal truths defended by Western philosophy but to demonstrate knowledge as a source of competitive advantage through innovation in products and services.

6 FINAL CONSIDERATIONS

From the epistemological analyses and the evolution of the knowledge management theory related to innovation, some real consequences for the current organisations were pointed out, which started to invest in knowledge management to recognise it as a source of competitive advantage. The first concerns reducing knowledge to the utilitarian sphere since the results of expertise must enable continuous innovation. The skills required by management differ from those conceived by the philosophy and epistemologies underlying them. The second concerns the authors starting from a changeable world conception, understanding that there should not be universally valid knowledge.

There cannot be sound knowledge if reality is mutable since the same conceptions would not apply to other circumstances. Thus, by articulating the fundamentals of knowledge management, the author’s dialogue with philosophy and other areas of knowledge envisions the possibility of describing the matrices in which learning occurs and how it relates to organisational theories. Over time, these epistemological perspectives have privileged the observation of facts to the detriment of theological and metaphysical knowledge through case studies to build models of knowledge management that can be visualised in contemporary approaches that rethink the modes of production and work and the role of the knowledge in organisations.
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REFERENCES


Barclay, UK; Murray, P. What is knowledge management. In: Barclay, UK; Murray, P. A knowledge praxis. { Sl.}: {sn}, 1997.


Granovetter, M (1973). The strength of weak ties. American Journal of Sociology, 78(6), 1360-


