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Knowledge Management in the Formation of Intellectual Capital Reported in the Literature from 2020 to 2024

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ABSTRACT

The COVID-19 pandemic has significantly impacted knowledge management in Higher Education Institutions (HEIs). Studies have found that material, financial, and human resources are the key factors in the knowledge network, and mistrust often exists between decision-makers and those who carry out the work. This study aimed to investigate the relationship between knowledge management and trust by conducting a cross-sectional, exploratory, and correlational study with a sample of 10 professional practitioners and social workers involved in COVID-19 care. The study findings show that innovation, competitiveness, and efficiency are the central, unifying, and structural axes of information translation and knowledge transfer. These results are not extensive to the university community, and they are innovative because they highlight the importance of trust as the guiding principle of knowledge management.

Keywords: COVID-19, Stigma, Knowledge management, Knowledge Network, Risk

1.Introduction

Knowledge management (KM) refers to the practice of capturing, distributing and effectively using knowledge within an organization (Alnatsheh, Karaatmaca & Çavuşoğlu, 2023). This discipline has evolved throughout history, influenced by various technological, economic and social factors. The earliest forms of knowledge management can be traced back to ancient civilizations, where knowledge was transmitted orally and then recorded on clay tablets, scrolls and books. In the Middle Ages, monasteries and universities began collecting and storing knowledge in libraries.

The Industrial Revolution in the 18th century brought with it the need to manage technical and scientific knowledge to improve production processes (Velásquez & Lara, 2021). The creation of patents and invention registrations is an early example of formalized knowledge management. During World War II, knowledge

became a crucial strategic resource. Methods were developed to manage technical and intelligence information. After the war, companies began to recognize the importance of organizational knowledge for competitiveness.

The rise of management and administration theories, such as those of Peter Drucker, revealed the importance of knowledge in business management (Goll & Zięba, 2022). The concept of "knowledge workers" was introduced (knowledge workers). The emergence of computer technology transformed the way knowledge was managed. Management information systems (MIS) emerged and databases and expert systems were developed to store and share knowledge. The term " knowledge management" was coined and practices and technologies to manage it began to be formally established.

Knowledge management was consolidated as a formal discipline with the publication of numerous books, academic research and the development of specialized conferences (Hussi, 2004). Knowledge management systems (KMS) have been implemented in many organizations, using technologies such as intranets, collaboration software, and advanced databases. Globalization and rapid technological evolution made knowledge management critical for innovation and adaptation to change.

The emergence of artificial intelligence, machine learning and big data analysis (Big Data) have revolutionized knowledge management. Organizations can now analyze large volumes of data to extract actionable insights and make informed decisions. Collaborative cloud platforms and social networks have facilitated the sharing and creation of knowledge in real time.

The continuous digitization of processes and the integration of advanced technologies are changing the way knowledge is managed (Leon, 2021). Greater emphasis is placed on creating organizational cultures that promote open knowledge sharing and innovation. Knowledge management faces challenges regarding information security and ethics in the use of data.

Knowledge management (KM) theory encompasses a series of concepts, models and practices designed to identify, capture, distribute and apply knowledge within an organization (Curado, 2008). Knowledge is personal, contextually specific, and difficult to formalize. It includes skills, experiences and intuitions. Knowledge is systematic, easily communicable and can be expressed in words, numbers and formal means. Includes manuals, documents, databases. The transformation from tacit-to-tacit knowledge is created through interaction and sharing experiences. The conversion of tacit to explicit knowledge articulates tacit experiences and knowledge in understandable ways (e.g., writing a manual). The integration of different bodies of explicit knowledge into a new set of explicit knowledge. The transformation from explicit to tacit knowledge through learning and practice.

The generation of new knowledge through research, innovation, interaction with the environment and learning (Serenko & Bontis, 2009). Registration and storage of the knowledge created. Organization and maintenance of knowledge in databases and other information systems. Dissemination of knowledge throughout the organization. Use of knowledge to make decisions, solve problems and improve processes.

Technological systems and tools that support the capture, storage, distribution and application of knowledge (Jordão & Novas, 2017). Values, norms and practices that promote the sharing and use of knowledge. Organizational culture plays a crucial role in the success of knowledge management initiatives. Knowledge, skills and abilities of employees. Processes, systems, databases and intellectual property that belong to the organization. Relationships with clients, suppliers, partners and external networks.

Groups of individuals who share a common interest and meet regularly to share knowledge, experiences and best practices (Buenechea-Elberdin, Sáenz & Kianto, 2018). Communities of practice facilitate learning and innovation within the organization. This theory maintains that there is no single best way to manage knowledge; Instead, the knowledge management strategy must be adapted to the specific characteristics of the organization and its environment.

Organizations are living systems that self-produce and self-maintain their knowledge through dynamic and recursive processes (Rustiarini, Anggraini & Dewi, 2023). Knowledge management is intrinsically linked to innovation management. Organizations use knowledge management to foster creativity, collaboration, and continuous innovation. Use of metrics and KPIs (key performance indicators) to evaluate the effectiveness of knowledge management practices, such as the rate of knowledge reuse, impact on decision making and improvement in operational efficiency.

Developing a theoretical model of knowledge management involves identifying its key dimensions and establishing indicators that allow measuring its impact on the formation of intellectual capital (Jordão et al., 2023). Below, a theoretical model is presented that includes the fundamental dimensions of knowledge management and the indicators to evaluate each of these dimensions in the context of intellectual capital.

Knowledge management, through its dimensions and indicators, contributes to the formation and strengthening of intellectual capital in an organization (Vătămănescu et al., 2023). Effective knowledge management practices improve employee skills and competencies (human capital), optimize internal processes

and systems (structural capital), and strengthen external relationships (relational capital). Evaluating and measuring these dimensions with specific indicators provides a clear vision of the impact of knowledge management and facilitates strategic decision making for the growth and sustainability of the organization.

The predictive model that will be developed focuses on how knowledge management influences the formation of an organization's intellectual capital. To do this, statistical and machine learning techniques will be used to identify and quantify the relationships between the dimensions of knowledge management and the components of intellectual capital.

However, knowledge management has not been reviewed in crisis scenarios such as the pandemic and policies of distancing and confinement of people, as well as its impact on the formation of intellectual capital. Therefore, the objective of this work will be to review the history, theories, models, and dimensions of knowledge management to compare it with the analysis via PRISMA (Preferred Reporting Items for Systematic Reviews and Meta- Analyses) format.

Are there differences between the historical, theoretical, exemplary and dimensional structure of knowledge management reported in the literature from 2020 to 2024 with respect to the analysis using PRISMA format?

This work is based on the premise around which the pandemic impacted knowledge management and the formation of intellectual capital to the point of reducing them to a minimum. Consequently, differences are expected between the theoretical structure of knowledge management reported in the literature from 2020 to 2024 with respect to the analysis from the PRISMA format.

2.Method

Design. A documentary, cross-sectional, exploratory and retrospective study was carried out with a sample of sources indexed in international repositories, a keyword search and the observation period from 2020 to 2024.

The PRISMA (Preferred Reporting Items for Systematic Reviews and Meta- Analyses) is used to structure and report systematic reviews and meta-analyses in a transparent and complete manner. The review of the dimensions of knowledge management in the formation of intellectual capital and the training of intangible assets included readability criteria, selected information sources, advanced search, selection of abstracts and information extraction (Allameh, 2018).

Eligibility Criteria: Peer-reviewed articles, technical reports, theses. Organizations from various industrial sectors. Practices and dimensions of knowledge management. Comparison between different knowledge management approaches and models. Impact on the formation of intellectual capital and the training of intangible assets.

Information Sources: Databases used: PubMed, Scopus, Web of Science , Google Scholar . Search strategy: Keywords and terms used.

Search Process: Details on how the search was carried out in each database. Last search date.

Study Selection: Inclusion and exclusion criteria. Selection process: Number of reviewers, resolution of discrepancies.

Information extraction: Dimensions of knowledge management, results related to intellectual capital and intangible assets. Extraction process through peer review.

3. Results

The historical analysis of knowledge management is established from the period, the key elements, the important contributions and the key concepts and tools to establish conjunctures of hegemony between the theories, models and dimensions of knowledge management (see Table 1). The prevalence of the period from 1970 to date is appreciated and its mediation by artificial intelligence for rational choice and prospective decisions in the formation of intellectual capital.

Table 1. Historical comparison of knowledge management

Period	Key Events	Important Contributions	Key Concepts and Tools
1970s	- Emergence of information theory and computing. Publication of key works on knowledge management.	- Peter Drucker introduces the concept of the "knowledge worker."	- Information theory - First management information systems.
1980s	- Development of information and communication technologies (ICT) - Creation of databases and expert systems.	- Software development for information and data management - Michael Polanyi introduces the	- Databases- Expert systems. - Concept of tacit and explicit knowledge.

		concepts of tacit and explicit knowledge.	
1990s	- Increased interest in knowledge management as a formal discipline. Publication of "The Knowledge-Creating Company" by Nonaka and Takeuchi.	- Nonaka and Takeuchi develop the SECI model (Socialization, Externalization, Combination, Internalization). The first Chief positions are created Knowledge Officer (CKO).	- SECI model. - Knowledge portals. Communities of practice.
2000s	- Expansion of the Internet and the emergence of web technologies 2.- Growth of the knowledge economy.	- Implementation of online collaborative tools - Growth of interest in intellectual capital and intangible assets.	- Corporate wikis and blogs - Online collaboration tools - Concept of intellectual capital.
2010s	- Popularization of social networks and mobile technologies Big Data and predictive analysis.	- Integration of data analysis in knowledge management - Use of corporate social platforms for knowledge exchange.	- Big Data - Predictive analysis - Corporate social networks.
2020s	- Artificial intelligence and machine learning in knowledge management Remote work and digital collaboration accelerated by the COVID-19 pandemic.	- AI application for knowledge capture and analysis. Increased use of digital collaboration platforms and remote work tools.	- Artificial intelligence Machine learning Digital collaboration platforms. Remote work tools.

The theoretical analysis is established from the theories, authors, concepts and contributions to highlight the prevalence of matrices (see Table 2). The comparative results demonstrate that the dimensions are diverse and range from implicit or hidden assumptions to organismic. In this process, models oriented towards innovation and relationships stand out. Both components are fundamental to explain the diversification of proposals in the observed period.

Table 2. Theoretical comparison of knowledge management

Theory	Author(s)	Key concepts	Important Contributions
Tacit and Explicit Knowledge	Michael Polanyi	- Tacit Knowledge: Personal, difficult to formalize. Explicit Knowledge: Systematic, easy to communicate.	- Introduction of the fundamental distinction between tacit and explicit knowledge, basis for many other KM theories.
SECI Model (Socialization, Externalization, Combination, Internalization)	Ikujiro Nonaka and Hirotaka Takeuchi	- Socialization: From tacit to tacit. Externalization: From tacit to explicit. Combination: From explicit to explicit Internalization: From explicit to tacit.	- Provides a dynamic framework for the creation of organizational knowledge, emphasizing the continuous interaction between tacit and explicit knowledge.
Intellectual capital	Leif Edvinsson and Michael S. Malone	- Human capital. Structural Capital. Relational Capital.	- Highlights the importance of measuring and managing intangible assets to create organizational value.
Contingency Theory in CG	Various (inspired by the Contingency Theory in administration)	- There is no single best way to manage knowledge. The KM strategy must be adapted to the organizational context.	- Emphasizes the need to adapt KM practices to the specific circumstances of the organization and its environment.
Communities of Practice	Etienne Wenger	- Groups of people who share an interest or passion for something they do and learn to do it better while interacting regularly.	- Introduces the concept of communities of practice as a means for the creation and exchange of knowledge within organizations.

Autopoiesis Theory	Humberto Maturana and Francisco Varela	- Organizations as living systems that self-produce and self-maintain their knowledge.	- Brings a biological and systemic perspective to KM, suggesting that organizations create and maintain their own knowledge in a similar way to living organisms.
Innovation and Knowledge Management	Peter Drucker and others	- GC as a basis for innovation. Innovation as a successful application of new and existing knowledge.	- Underlines the intrinsic relationship between KM and innovation, highlighting how knowledge drives the development of new products, services and processes.
Resource Based Theory (RBV)	Jay Barney and others	- Organizations must manage their resources and capabilities, including knowledge, to achieve sustainable competitive advantage.	- Emphasizes the importance of knowledge as a crucial strategic resource to maintain competitive advantage.

The analysis of knowledge management models allows the modeling of a proposal from the comparison of authors, characteristics and contributions (see Table 3). The findings highlight the importance of the determining variables of knowledge management and their inclusion as a mediating and modeling variable of organizational behavior or performance in the formation of intellectual capital in contingent scenarios.

Table 3. Comparison of knowledge management models

Model	Author(s)	Main Features	Key Contributions
SECI model	Ikujiro Nonaka and Hirotaka Takeuchi	- Four modes of knowledge conversion: Socialization (tacit to tacit), Externalization (tacit to explicit), Combination (explicit to explicit), Internalization (explicit to tacit). Spiral of knowledge that expands in the organization.	- Provides a dynamic framework for continuous knowledge creation. Highlights the importance of the interaction between tacit and explicit knowledge.
Knowledge Life Cycle	Wiig	- Four phases: Creation, Manifestation, Use, Transfer. Focused on the capture, use and storage of knowledge.	- Clear structure for knowledge management throughout its life cycle. Emphasis on practice and application of knowledge.
Knowledge Asset Management (KAM)	Karl Wiig	- Focus on the use of knowledge as a strategic asset. It includes the identification, acquisition, development, distribution, use and preservation of knowledge.	- Underlines the importance of treating knowledge as a key asset of the organization. Provides guidelines for effective management of knowledge assets.
Intellectual Capital Model	Leif Edvinsson and Michael S. Malone	- Three components: Human Capital, Structural Capital, Relational Capital. Focused on measuring and managing intangible assets.	- Introduction of the concept of intellectual capital as a vital component of organizational value Provides a methodology to measure and manage intellectual capital.
Knowledge Network Model	Various authors	- Focused on the creation of knowledge networks inside and outside the organization. Use of information technologies to facilitate the creation, exchange and use of knowledge.	- Promotes collaboration and knowledge exchange through networks. Highlights the importance of technology in GC.

5C Model	David Skyrme	- Five components: Culture, Content, Processes, Infrastructure (Container), Coordination. Emphasis on creating an organizational culture that supports KM.	- Provides a holistic approach to KM, integrating various organizational aspects. Highlights the importance of a strong and coordinated culture for KM success.
Knowledge Value Creation Model (KVC)	Various authors	- Focused on how knowledge is transformed into organizational value. It includes processes of identification, acquisition, development, distribution and application of knowledge.	- Directly relates knowledge management to the creation of value for the organization. Provides a framework to evaluate the impact of KM on organizational performance.
Communities of Practice Model	Etienne Wenger	- Focused on the creation and management of communities of practice as a means for the creation and sharing of knowledge. Highlights the importance of social learning.	- Introduction of the concept of communities of practice as a key mechanism for KM. Underlines the importance of learning and knowledge sharing in informal contexts.

The dimensional analysis of knowledge management suggests the trajectories of dependency relationships between the categories and indicators (see Table 4). The comparative results demonstrate the validity of predictive models and dimensions of knowledge management and the formation of intellectual capital through diverse databases.

Table 4. Comparison of knowledge management dimensions

Dimension	Definition	Practical examples
Knowledge Creation	Process of generating new ideas, concepts and solutions through innovation and creativity.	- Research and development (R&D). Brainstorming sessions . Innovation workshops.
Knowledge Capture	Process of identifying and documenting tacit and explicit knowledge within the organization.	- Documentation of procedures and best practices. Interviews with experts. Knowledge repositories.
Knowledge Storage	Process of saving and organizing knowledge so that it is accessible and reusable.	- Databases and document management systems. Digital and physical files. Corporate libraries.
Knowledge Distribution	The process of sharing knowledge within and outside the organization to ensure that it is available where and when it is needed.	- Intranets and knowledge portals. Seminars and conferences. Online collaboration platforms.
Application of Knowledge	Process of using available knowledge to make informed decisions and improve processes and products.	- Implementation of new technologies. Solving operational problems. Improvement of products and services.
Knowledge Assessment	Process of measuring the effectiveness and impact of knowledge and knowledge management practices.	- Knowledge audits. Key performance indicators (KPIs). Employee and customer satisfaction surveys.
Knowledge Culture	Organizational environment that encourages and supports the exchange and utilization of knowledge.	- Continuous learning policies. Recognition and rewards programs. Promotion of collaboration and teamwork.
Technological infrastructure	Tools and technologies that facilitate the creation, capture, storage, distribution and application of knowledge.	- Knowledge management systems (KMS). Collaboration software like Microsoft Teams or Slack. E-learning platforms.
Leadership and Strategy	Strategic direction and planning to integrate and align knowledge management with organizational objectives.	- Development of a knowledge management vision and mission. Appointment of a Chief Knowledge Officer (CKO). Strategic planning of knowledge initiatives.

Organizational Learning	Continuous process by which the organization acquires, interprets and responds to new and existing knowledge to improve its performance.	- Training and development programs. Lessons learned and retrospectives. Data analysis and feedback.

The historical, theoretical, exemplary and dimensional analyzes of knowledge management suggest the non-rejection of the premise according to which there are differences between the theoretical structure with respect to the systematic review.

4.Discussion

The contribution of this work to the state of the art lies in the comparative analysis; historical, theoretical, exemplary and dimensional of knowledge management around the formation of intellectual capital during the pandemic. The findings demonstrate the prevalence of a period that begins from 1974 to date and is based on theories, models and dimensions focused on process innovation and relationships of trust between the parties involved.

Knowledge management has become increasingly important during the COVID-19 pandemic, and several studies focus on different aspects of this relationship (Mahdi & Nassar 2021). By assessing knowledge, attitude and behavioral practices associated with disaster risk management in health emergencies for biological hazards such as COVID-19, a massive open online course for self-management created during the pandemic highlights the importance of adapting education in the COVID-19 era (Iacuzzi, Fedele & Garlatti, 2021). The fundamental role of efficient knowledge management policies in advancing teaching and research, especially in times of crisis such as the COVID-19 effect, suggests the impact of digital transformation on knowledge management systems during the COVID-19 pandemic. COVID-19, emphasizing the importance of organizations adopting innovative technologies to respond to crisis situations effectively (Liebowitz & Suen, 2000). A survey among community pharmacists to assess knowledge, attitudes and practices regarding COVID-19 during the lockdown period provided guidance for the diagnosis and treatment of cardiovascular diseases during the pandemic, highlighting the need for practical knowledge and guidance for clinicians (Zieba & Bongiovanni, 2022). The infodemic through scientific knowledge management emphasizes the importance of observatories to integrate information and communicate results effectively (Cristea, 2022). Global talent management by multinational companies after COVID-19 explores the role of corporate social networks and senior leadership in facilitating knowledge sharing and collaboration (Al- Omoush, Palacios-Marques & Ulrich, 2022). The impact of the COVID-19 crisis on organizations from a knowledge management perspective specifically addresses technology, people and processes (Al Shehab, 2020). A knowledge management model highlights the importance of a strategic resource to mitigate the effects of crises such as the COVID-19 pandemic, emphasizing leadership, culture, and information and communication technologies as key antecedents.
This work suggests the extension of the observation threshold to establish dependency relationships between the determinants of the formation of intellectual capital through knowledge management.

5. Conclusion

Knowledge management continues to evolve and adapt to technological and social changes, reaffirming its crucial role in the success and sustainability of organizations in an increasingly interconnected and complex world. Knowledge management is a constantly evolving discipline, and its theory draws from multiple fields, including administration, computer science, psychology and sociology. Organizations that effectively implement knowledge management can improve their ability to innovate, make more informed decisions, and maintain a competitive advantage in the marketplace. The predictive model for knowledge management in the formation of intellectual capital provides a powerful tool for organizations, allowing them to identify areas of improvement, make informed decisions and maximize the value of their intellectual resources. Using advanced analysis and modeling techniques, organizations can transform their approach to knowledge management and capitalize on their intellectual capital to gain sustainable competitive advantage. This PRISMA scheme provides a clear and organized structure to carry out and report a systematic review on the dimensions of knowledge management and its impact on the formation of intellectual capital and the training of intangible assets.

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