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Knowledge Risk Management (KRM) In the Healthcare Sector: A Systematic Literature Review

[1]Abdalmohadi Alrababah, [2]Prof. Dr. Huda Ibrahim, [3]Assoc. Prof. Dr. Alawiyah Abd Wahab

[1,2,3]College Art and Science, School of Computing, Universiti Utara Malaysia

Abstract
This research paper seeks to review previous studies on knowledge risk management (KRM) within healthcare organizations. The research was conducted by systematically reviewing peer-reviewed empirical and conceptual studies on Knowledge risk management. The review revealed that few papers address Knowledge risks and their management, especially in the healthcare organizations, fifth major databases, including journals and conference proceedings from Scopus, a total of 14 studies were selected for further analysis, the finding show there has not been a sufficient focus on knowledge risk management research within a healthcare context, there is still a lot to learn and investigate about the management of knowledge risk in healthcare organizations, public or private, handling knowledge is one critical agenda that needs to be improved from time to time. According to the review we conducted, there is some initial research aimed at understanding knowledge risk management in healthcare organizations. Therefore, no empirical studies have been undertaken on KRM in healthcare organizations. Future studies should highlight possible strategies to help healthcare institutions, such as hospitals, focus on their most critical knowledge and potential knowledge threats, and explore potential ways to mitigate or prevent risks associated with this knowledge. To increase knowledge and awareness of KRM practices among academics and healthcare practitioners

Keywords: Healthcare organizations, Knowledge Risks (KR), Knowledge Management (KM), Knowledge Risk Management (KRM)

1. Introduction

Healthcare, as a knowledge-intensive sector, plays a crucial role in managing and preventing diseases, which are vital for human survival [17]. Knowledge is a valuable asset and a source of competitive advantage, but it also potentially entails risks and hazards [8] if not correctly managed. Simply acquiring knowledge does not guarantee a strategic advantage; effective management and application are essential. Healthcare organizations must therefore safely and effectively harness extensive knowledge assets for optimal operation [9].

Knowledge management (KM) is crucial in healthcare for establishing effective processes and ensuring the robustness of healthcare systems [1]. However, despite its significance in the healthcare sector, there remains an incomplete comprehension of the value of knowledge and its potential for fostering innovation and enhancing performance [30].

The complexity of healthcare information systems, akin to other high-risk systems, can lead to errors and adverse events if not properly managed [25]. In healthcare, risk management primarily focuses on ensuring patient safety and well-being. This worldwide concern continues to present challenges due to the overwhelming demand that exceeds available human capacity and resources in healthcare facilities. [15].

Three different interventional approaches have been developed at various levels of healthcare organizations, one of which is to address constraints in risk management [14].

Risk management programs and patient safety improvement are increasingly crucial in Intensive Care Units (ICUs), where invasive diagnostic and therapeutic services are provided to patients with complex illnesses [2].

References [23] and [18] emphasize the importance of a process-oriented approach to risk management in healthcare organizations, encompassing planning, identification, analysis, response, monitoring, and control processes.

2. Problem Statement

Healthcare institutions are increasingly utilizing knowledge management due to their significant reliance on information and evidence-based practices, as well as the vast amount of knowledge that healthcare practitioners must manage and use. Healthcare systems, such as hospitals, are knowledge-intensive environments that constantly evolve due to advancements in medical technology. They require specialized tools, innovative delivery methods, and a wide range of activities.

Research in industrialized nations has demonstrated that implementing a Knowledge Management (KM) system in hospitals enhances knowledge exchange, improves treatment procedures, reduces costs, and improves the quality of patient care [22]. The efficient use of numerous information assets in healthcare organizations is crucial for the smooth functioning of modern medical institutions.

Healthcare organizations should utilize knowledge management systems for improved care quality, efficiency, and productivity, as these systems have been linked to enhanced protection and exploitation [19].

Health information comprises management, professional, and patient information, with commonalities but distinct types for each dimension. While commonalities are acknowledged, fundamental distinctions persist in the necessary information for every aspect, including its effective utilization and adherence to established criteria. The primary goal of healthcare information system development is to create a comprehensive and integrated data structure that can meet the diverse needs of various aspects.

Despite the critical role it plays in patients' lives, there are studies evaluating KM in healthcare settings [21], which have a significant impact on how efficiently and effectively services are delivered in these settings.

Despite the significance of this topic, research on KRM remains in its infancy [16]. In the context of the healthcare industry, there has not been nearly enough of a focus placed on studies about the management of knowledge risks [27], This has necessitated an emphasis on improved identifying and managing of healthcare knowledge and associated hazards, since it provides medical practitioners with a competitive advantage [21], no qualitative research on the practice of KRM dedicated to healthcare organizations has not yet been published in academic journals.

According to Petersen et al. [26], the number of reports and results made available grows as the research area matures, necessitating a summary and overview. Given the importance of identifying the risks associated with healthcare knowledge and information acquisition, it is necessary to structure the field systematically. As cited in the literature, no empirical studies have been conducted to investigate the existing solutions presented in the literature for knowledge risk management in healthcare organizations. To address this research gap, we identified and analyzed the literature on knowledge risk management. This paper intends to carry out a systematic literature review by addressing the following questions: What are the contributions of research on knowledge risk management in healthcare organizations between 2010 and 2023? Which empirical studies are pertinent to knowledge risk management in healthcare organizations?

3. Background

Knowledge risk, a concept in KM, refers to potential loss caused by the storage, protection, or identification of knowledge, potentially reducing the operational or strategic benefit of any party [13]. Knowledge risk refers to the potential loss resulting from the identification, storage, or protection of knowledge, which may reduce operational or strategic benefits. Organizations should focus on managing these risks and identifying, mitigating, and managing knowledge risks for long-term benefits. However, few studies have explored these concepts, providing only a fragmented understanding [10]. Knowledge risk management (KRM) is defined as the process of identifying, analyzing, managing, and controlling risks associated with the acquisition, storage, exchange, and use of knowledge and information [16].KRM has been discovered to be directly related to an organization's sustainability. There is a positive impact on the sustainability, innovativeness, growth, and agility of organizations, as well as their successful digitization [28]. KRM is also viewed as critical for the successful adoption and implementation of technological innovations by the latter. It can also

be used as a methodology to bring together the disparate components of an organization's ecosystem to collaborate on a unified agenda [12].

4. Method

This study employed a systematic review of the literature to understand what previous research on the topic had revealed. The methodology was developed to conduct the systematic review [20]. The methodology was based on six principles: field mapping and scoping review, performing a quality assessment, writing, comprehensive search, data extraction, and synthesis.

Here is a short overview of how the authors implemented these six principles. First, a research plan was crafted that outlined the research questions being explored. This also included defining keywords and establishing criteria for inclusion and exclusion. Our focus was to determine the current status of KRM research in healthcare organizations. The questions that were formulated were: 1) What studies were conducted and which focused on Knowledge risk management in healthcare organizations? 2) What are the most important results of the studies?

It was decided to use several multiple keywords to identify pertinent research articles, including "Knowledge Risk Management in Healthcare Organizations," "Risk," "Knowledge Risk," and "Knowledge Risk Management." The inclusion criteria were: 1) behavioral studies that examined and collected data on the topic, 2) studies that addressed the topic factors of knowledge risk management in healthcare organizations, and 3) peer-reviewed, English language, Science Direct, Emerald, IEEE Xplore, ACM Digital Library, Taylor and Francis online databases. In contrast, the conditions for not selecting the reviewed studies included: 1) studies not related to knowledge risk management, 2) studies focused on technical aspects, 3) non-academic reports and studies, languages other than English, and grey literature. Additionally, a spreadsheet was developed that included essential elements related to the research objective. They are: (Name of the author(s), Year of publication, Research themes, and Main findings).

Second, after all pertinent matters had been identified, one of the writers had access to IEEE Xplore, Taylor & Francis Online, ScienceDirect, Emerald, including publications in Scopus-indexed journals and conference papers, and began searching using combinations of keywords.

The keyword: "knowledge risk" OR "knowledge risk management" AND "healthcare organization". The entire keywords string was scanned for the years between 2010 and 2023.

The keywords were used together in searches across titles, keywords, and abstracts. The search for literature covered articles released between 2010 and 2023.

Third, the authors manually reviewed the abstracts of each paper and, if necessary, other sections of the paper to ensure they truly satisfied the scope of interest. As a result, a total of 14 articles were included for consideration and analysis.

Fourth, the authors individually read 14 papers and input data related to the research objective into the designated spreadsheet. See Table 1

Fifth, in this phase, the findings were deliberated upon, and the individual data were consolidated under specific categories. These categories were identified through a collaborative effort, with each author independently deriving themes and subsequently discussing them as a group. Through these discussions, adjustments and enhancements were made, ensuring that each topic received consensus from the majority of authors. This systematic approach facilitated the establishment of a comprehensive understanding of knowledge risk management. Sixth, the last step of the review process was dedicated to the composition of the outcomes.

Author /Data	Themes	Finding
Hammoda & Durst (2021)	"Knowledge risks, knowledge risk management, healthcare"	The authors propose a KRM framework for healthcare organizations. The framework identifies important KRs in healthcare and proposes controls to

		reduce those KRs. It also identifies the units and individuals responsible for implementing the proposed controls. The framework builds on the authors' previous work, which included developing the KRs taxonomy for healthcare organizations.
Hammoda & Durst (2022)	"Knowledge Risk Management, Knowledge Risks, Knowledge Management"	The development of a taxonomy for knowledge risks (KRs) in healthcare includes detailed definitions and discussion of their impact on healthcare organizations.
Durst (2022)	"Knowledge Risk Management, Knowledge Risks, Knowledge Management"	An exploratory study aims to provide insight into KRM. Furthermore, to describe whether and to what extent KRM is practiced in various chosen Latin American organizations. The study is conducted through surveys of a sample of organizations in different Latin American nations to understand which and how KRS are managed, as well as the methods and tools used to manage these KRS.
Durst et al. (2018)	"Knowledge Risk Management, Knowledge Risks, Knowledge Management"	The authors proposed a KRM framework to serve as a foundation for upcoming studies on KRM and KRM-related practices
Zieba et al. (2022)	"Knowledge risk, Sustainability, Knowledge risk management, Knowledge management"	The study examines the impact of KRM on organizational sustainability, as well as the role of innovation and agility in this relationship. A survey with a quantitative approach was carried out with 179 professionals from knowledge-intensive organizations dealing with KR and their management. Data for this research was collected through an online survey from various public and private organizations

		around the world. The results indicate that organizational sustainability is positively influenced by both innovativeness and agility; furthermore, organizational innovativeness is positively affected by agility. KRM has been proven to have a partial impact on organizational innovation and agility.
Durst & Zieba (2020)	"Knowledge risks, Knowledge risk management, Business sustainability"	This research provides a conceptual framework to demonstrate how different types of Knowledge risk resources can affect the sustainability and viability of a business, as well as for controlling and mitigating these potential risks. The objective of this research is to address two key inquiries: What are the impacts of knowledge retention on three aspects of organizational sustainability? How can organizations implement to achieve true sustainability through KRs?
Durst et al. (2019)	"Knowledge risk management, organizational performance"	The study examines how KRM impacts organizational performance, focusing on "softer" performance indicators, including agility, sustainability, innovativeness, and responsiveness. Data were gathered through an online survey circulated among both private and public organizations worldwide. After analysing the data and forming hypotheses, the results were validated using structural equation modeling. The findings indicated that KRM has a positive effect on organizational growth, agility, innovativeness, sustainability, and success,

		but has no impact on organizational responsiveness.
Durst & Zieba (2019)	"Knowledge risks knowledge management, taxonomy"	This research is the first systematic and thorough review of the organizational level of knowledge risks. The writers pinpointed, showcased, and analysed possible knowledge risks that organizations may encounter. They suggested a knowledge risk concept map. The map shows several KRs that organizations need to be mindful of. There are three types of knowledge risks (technological, operational, and human).
(Durst, 2019)	"Knowledge risks, knowledge risk management"	This paper aims to review research about the subject of KR. It involves a systematic review of fifty-two interconnected articles on KR. The objective of this research is to review the current knowledge on KRs and associated subjects in the context of researching KM, including various KM activities such as knowledge creation and knowledge transfer.
Durst & Zieba (2017)	"Knowledge risk management, knowledge risks, taxonomy, knowledge management"	The researchers identified a varied set of KR. Nevertheless, this is not an exhaustive list. They created a taxonomy of knowledge risks and divided them into two categories (internal, which originate from inside the organization, and external, which originate from outside the organization). The size of each group, though, was uncertain. The boundaries of each group were unclear, as some risks were identified at the crossing of multiple groups.
Durst & Freedhoff (2016)	"Knowledge risk management"	Authors a knowledge risk management (KRM)

		framework in the context of small and medium-sized enterprises (SMEs) in turbulent times. In this research, the authors identified several knowledge hazards, including relational risk, knowledge loss, human resource-related risks, outsourcing of business functions, knowledge gaps, knowledge leakage, and knowledge waste. The researchers highlighted several knowledge dangers that SMEs confront.	
Bratianu (2018)	"Knowledge risk"	The list of knowledge risks provided by the researcher is not exhaustive. The author argued that knowledge can be broken down into three parts and that literature only emphasizes rational knowledge. Three fundamental types of individual knowledge risk conform to a similar pattern. The suggested categorization is grounded in a theoretical context compared to previous studies. Nevertheless, it handles all types of knowledge risks equally, without making any clear differentiation.	
Turkman & Desouza (2012)	"Knowledge risk, knowledge risk management"	The authors of the paper presented a taxonomy of knowledge risks that are mostly related to network structures. This categorization is limited and does not encompass all types of KR.	
Massingham (2010)	"Risk management, knowledge management"	This research presented a different approach to managing risks in knowledge management frameworks. The article addresses organizational dangers in general and highlights the risks associated with knowledge	

		transfer. Consequently, no KR categorization is available.	

Table 1. ***Focus of literature in KRM areas***

5. Findings And Results

The reviewed papers summarized their main findings within three topics.

5.1. Knowledge Risk and Knowledge Risk Management Concept

[29] Introduced a taxonomy of knowledge risks that are mostly related to network structures, and they reviewed issues related to risks resulting from knowledge sharing in networks. It contributes by categorizing those risks and developing a common language for managing knowledge risks.

[9] A literature review was conducted to identify, describe, and analyse KRs that organizations may face, and a taxonomy of knowledge risks was proposed as a result. They classify KRs into two types: internal (originating within the organisation) and external (originating outside the organisation). Some of the potential risks associated with knowledge appear to be unintentional (for example, knowledge waste, knowledge spillover, or knowledge leakage). In contrast, others seem to be ongoing (such as knowledge attrition or risks associated with knowledge work).

[3] presents a comprehensive approach to knowledge risk, based on knowledge field theory and the metaphor of energy representing knowledge. This is a conceptual analysis grounded in metaphorical thinking and literary background. The findings offer a broader perspective on understanding and implementing the concept of knowledge risk in knowledge management.

[7] Identify and analyze potential KRs that organizations may face. They based their research on a critical review of the existing research on knowledge risks, discussed potential outcomes, and proposed a KR concept map. The map illustrates several KRs that organizations should be aware of. Knowledge risks are divided into three groups: human, technological, and operational. This paper is the first systematic and thorough review of KRs in the organizational context and introduces a knowledge risk taxonomy.

[4] Reviews the existing research on knowledge risk management (KRM) to identify gaps that justify further research activities. The researcher conducts a systematic review of peer-reviewed empirical and conceptual articles on knowledge risk management. This case shows that only a few research papers address knowledge risks and their management.

[8] Generate a conceptual framework to illustrate the potential impact of different knowledge risks on business sustainability. Their analysis was based on a variety of sources, and they concluded that no study had been published that would link KRs to the issue of sustainability while also considering the relevance of risk management and knowledge.

5.2. Knowledge Risk Management in Organizations

[24] The study aims to help in the development of a new research field called knowledge risk management (KRM), which utilizes KM tools and techniques for organizational risk management. The approach involves building on empirical research conducted by the Australian Department of Defense through case study methods. The research investigates the reasons for the ineffectiveness of traditional risk management based on decision trees, and it proposes and tests an alternative KRM model.

[6] A framework for knowledge risk management (KRM) has been proposed for small and medium sized enterprises (SMEs) in turbulent times, the framework highlight the process that searches to mitigate knowledge risks and how KRM could take place in practices taking the case of small consulting company, they identified many knowledge hazards such as knowledge leakage, risks related to human resources, knowledge waste, knowledge gaps risks, outsourcing of business functions risk relational risk and knowledge loss. The researchers pointed out various knowledge risks that small and medium-sized enterprises (SMEs) face.

[12] To empirically investigate KRM in organizations, a survey is conducted on a sample of organizations to understand how KRS are managed, what KRS are managed, and what tools and methods

are used to manage them. The researchers proposed a KRM framework to have a base for future investigations into issues associated with KRM and KRM-related practices

[5] Presents information on KRM, as well as knowledge risks addressed in public and private organizations across Latin American nations. The paper has empirically investigated whether and to what extent organizations located in certain Latin American nations manage knowledge-related risks. Based on surveys conducts on a diverse sample that included both private and public organizations located in various Latin American countries to comprehend how knowledge risks are managed, which knowledge risks are managed, and what tools and methods are used to manage these knowledge risks., the findings show that the participating organizations have identified a variety of knowledge risks and used different ways of analyzing them.

[30] To investigate the impact of knowledge risk management (KRM) on organizational sustainability, as well as the role of innovativeness and agility in this relationship, they conducted a quantitative survey of professionals from knowledge-intensive organizations who deal with knowledge risks and their management. The results confirmed the partial influence of KRM on the innovativeness and agility of organizations.

[7] Investigates the impact of knowledge risk management (KRM) on organizational performance, utilizing measures such as innovativeness, responsiveness, sustainability, and agility. Data were collected through an online questionnaire distributed to private and public organizations worldwide. The findings revealed that KRM improves organizational success, sustainability, growth, innovativeness, and agility; however, KRM has no positive effect on organizational responsiveness.

5.3. Knowledge Risk Management In Healthcare Organizations

Regarding research on knowledge risk management in healthcare institutions, it has been demonstrated that there is a notable lack of research on this topic.

[17] They introduced a taxonomy for categorizing knowledge risks in healthcare organizations, which includes detailed descriptions and discussions about the potential effects on healthcare organizations.

They reviewed existing literature about knowledge management (KM) in the healthcare sector. They synthesized their findings, combining them with the authors' insights from their expertise in healthcare and KM to develop the taxonomy of knowledge risk. The results detail 25 varieties of KRs in healthcare institutions and categorize them into three groups (human, operational, and technology). This paper is the first comprehensive discussion of knowledge representation issues in a healthcare context.

In another paper [16], a proposed KRM framework for healthcare organizations was provided. This framework identifies important KR in healthcare and recommends control measures to reduce them. It also identifies the accountable units and individuals responsible for implementing the suggested control measures. The framework builds upon the authors' previous work, which included the development of a knowledge risk (KR) taxonomy for healthcare organizations.

In general, there has been a lack of sufficient focus on knowledge risk management research within a healthcare context. There is still much to learn and investigate about managing knowledge risk in healthcare organizations, whether public or private; handling knowledge is a critical agenda that needs to be continually improved.

Based on the literature, there is some initial research aimed at developing an understanding of knowledge risk management in healthcare organizations. As a consequence, no empirical studies have been developed regarding KRM in healthcare organizations.

6. Conclusion And Future Work

After the review, it can be concluded that research into KRM is still in its early stages, which is surprising given the large number of KM studies aimed at demonstrating the contribution of knowledge and its management to organizational performance.

It is essential to enhance our understanding of KRM so that we can be more aware of the reality of the risks associated with knowledge and thus manage them effectively. With the help of KRM, organizations are expected to be able to introduce knowledge retention and protection measures. This, in turn, can contribute positively to an organization's competitiveness and thus its survival. This is particularly important in healthcare organizations. Future studies should focus on identifying potential strategies to help healthcare

institutions, such as hospitals, prioritize their most critical knowledge and identify potential threats to this knowledge, as well as explore ways to mitigate or prevent risks associated with this knowledge. To increase knowledge and awareness of KRM practices among academics and healthcare practitioners. In the long term, the results will help improve the quality of KM in healthcare organizations.

7. Limitations

A limitation of this paper is the selection of sample studies, which focus only on empirical studies of knowledge risk management. This paper focuses solely on knowledge risk management in healthcare organizations, and other limitations are due to the scope, knowledge, and time available for searching references.

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