Center for Management Science Research
ISSN: 3006-5291 3006-5283 Volume 4, Issue 3, 2026

BENEFITS AND CHALLENGES OF KNOWLEDGE MANAGEMENT (KM) IMPLEMENTATION IN CONSTRUCTION ORGANIZATIONS

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DOI: https://doi.org/10.5281/zenodo.22075410

Keywords
Knowledge Management (KM), KM implementation challenges, KM implementation benefits, Construction industry, Barriers to KM

Article History
Received: 26 January 2026
Accepted: 11 March 2026
Published: 25 March 2026

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Abstract

Purpose: This *study aims to explore and document the benefits and challenges associated with Knowledge Management (KM) implementation in the construction industry, as identified by past research. Understanding these factors is critical for improving KM adoption and enhancing project and organizational performance in construction firms.*

Design/methodology/approach: *A systematic literature review (SLR) methodology was adopted to synthesize existing studies on KM implementation in the construction sector. Relevant research articles published over recent years were critically analyzed to identify key challenges and benefits, with an emphasis on socio-technical factors affecting KM success.*

Findings :*The review highlights multiple challenges including cultural resistance, lack of skilled personnel, inadequate technological infrastructure, and poor knowledge sharing. Conversely, KM implementation benefits such as improved collaboration, enhanced decision-making, and increased organizational learning were identified. The findings reveal that people and process-related issues are more critical barriers than purely technological challenges in construction KM initiatives.*

Originality/value : *This study contributes a comprehensive synthesis of KM implementation issues and advantages specific to the construction industry, an area with limited consolidated research. The results provide valuable insights for both academics and practitioners to design better KM strategies and overcome implementation barriers unique to construction projects.*

1. Introduction

Organizations today face various challenges in managing knowledge effectively, especially within the construction sector where projects are complex and dynamic. Knowledge Management (KM) refers to the processes and systems organizations use to create, share, and utilize knowledge to improve performance and innovation (Ahmad & An, 2008; Dave & Koskela, 2009). Effective KM has been shown to enhance collaboration, decision-making, and project outcomes in construction firms (Yap & Lock, 2017; Olanrewaju et al., 2019).

Despite these benefits, many organizations encounter significant barriers in implementing KM initiatives successfully. Prior research has identified multiple challenges such as cultural resistance, inadequate technology, lack of skilled personnel, and poor knowledge-sharing practices that hinder KM adoption in construction projects (Pirzad, 2017; Okere, 2017; Magdy et al., 2021). These challenges affect not only

individual employees but also organizational processes and technological infrastructure, highlighting the socio-technical nature of KM implementation difficulties.

Several studies emphasize that the construction industry's unique characteristics—project-based work, transient teams, and high turnover—compound KM challenges (Yusof et al., 2019; Kofi Agyekum, 2017). These factors make knowledge retention and transfer difficult, resulting in frequent knowledge loss and inefficiencies. Moreover, smaller enterprises and SMEs in construction face even greater obstacles due to limited resources and lack of formal KM strategies (Magdy et al., 2021; Yap & Lock, 2017).

On the other hand, successful KM practices have demonstrated notable benefits including improved project coordination, faster problem-solving, and enhanced professional development (Ahmad, 2011; Tan et al., 2012). Leveraging KM can lead to organizational learning and competitive advantage by transforming tacit knowledge into explicit knowledge that is easily shared and reused (Dave & Koskela, 2009; Yepes & López, 2021). Consequently, identifying effective KM strategies and overcoming implementation barriers remains a critical priority for construction firms seeking to improve project outcomes and organizational performance.

While individual studies have explored these challenges and benefits, a consolidated view through a systematic literature review is lacking. This study aims to fill that gap by synthesizing prior research to highlight the key KM issues and advantages specifically within the construction sector. Such synthesis will provide valuable insights for academics and practitioners aiming to develop practical KM frameworks and policies suited to the construction industry's distinctive needs.

2. Research Method for the Current Study:

A Systematic Literature Review (SLR) is defined as "a systematic method for identifying, evaluating and interpreting work produced by researchers, scholars and practitioners" (Marshall, 2010, p. 20). Similarly, Fink (2010) described a research literature review as a "systematic, explicit and reproducible method for identifying, evaluating, and synthesizing the existing body of completed and recorded work produced by researchers, scholars and practitioners," emphasizing its methodological transparency and replicability.

Prior to conducting a systematic review or research synthesis, the existence of sufficient primary research on the topic is essential, as it allows for the formulation of focused research problems and objectives (Cooper and Hedges, 2009). Literature reviews are not based on newly generated data, but rather aim to consolidate, interpret, and critically assess the existing body of published knowledge. As Manten (1973, p. 75) noted, literature reviews are "not based primarily on new facts and findings, but on publications containing such
primary information, whereby the latter is digested, sifted, classified, simplified and synthesized."

The terms **research synthesis**, **research review**, and **systematic review** are often used interchangeably in
academic discourse, though there is no universal consensus on their distinct definitions (Cooper and Hedges, 2009, p. 6). For this study, a systematic approach has been adopted to synthesize literature related to the **implementation of Knowledge Management (KM) in the construction industry**, with specific focus on **its benefits and challenges**.

To ensure methodological rigor and consistency, the guidelines provided by established literature (e.g., Kitchenham, 2007; Kitchenham et al., 2010; Levy and Ellis, 2006) were followed. This review was conducted through the three major stages proposed in SLR methodology:

(1) **The first step** (planning phase) involves formulating well-defined research questions to guide the systematic literature review (SLR) process.

(2) **The second step** (conducting phase) focuses on developing a comprehensive search strategy, which includes:

- Identifying the appropriate databases to be

searched, along with establishing a relevant time frame for the literature.

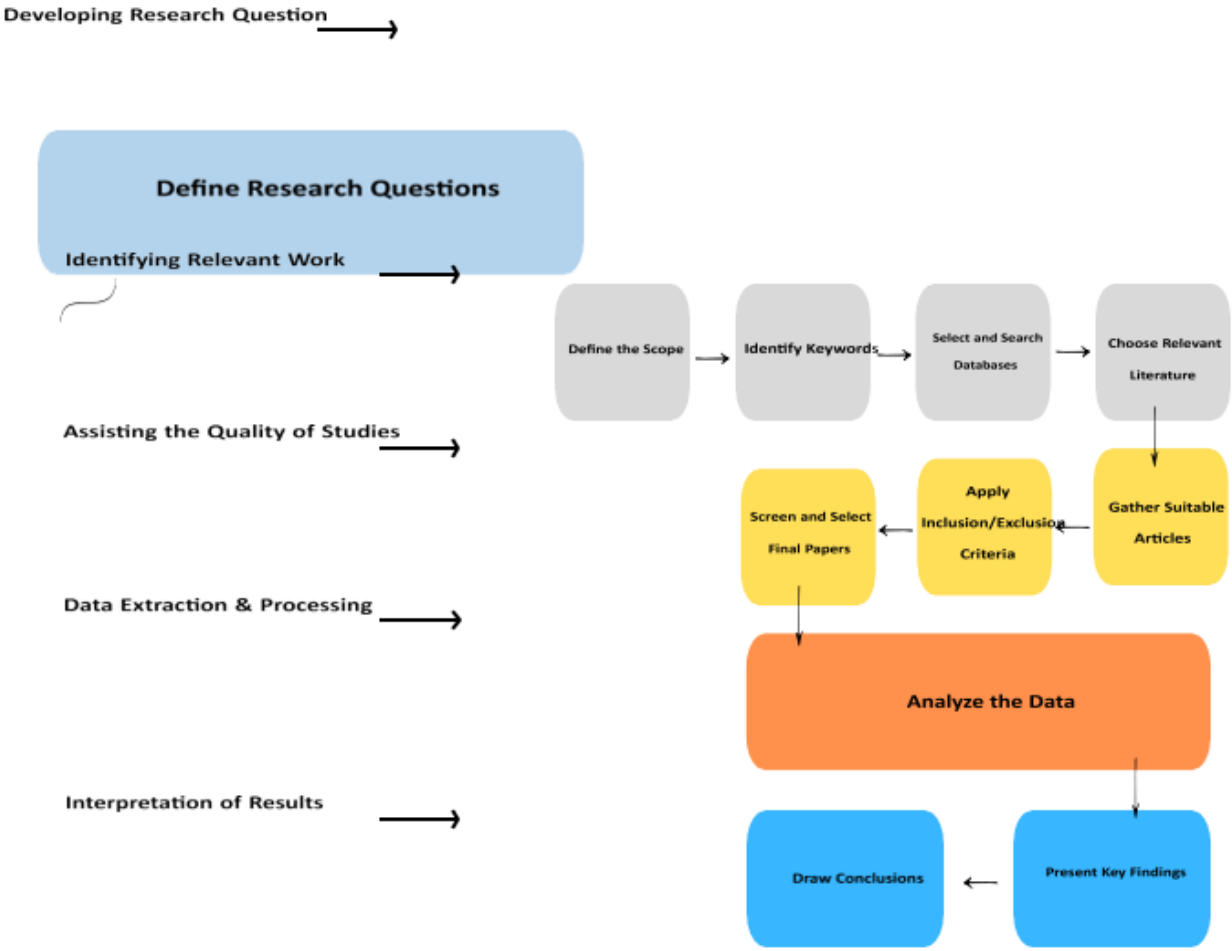
- Defining effective search strings or keywords that are essential for retrieving the most relevant studies.

- Selecting studies based on predefined quality assessment criteria. This step involves the inclusion and exclusion of publications based on relevance, quality, and scope.
- Initiating the data extraction phase from the selected literature.

(3) **The final step** (reporting phase) is the synthesis of the reviewed literature. This includes analyzing the extracted data, reporting key findings, discussing the results, and presenting conclusions that highlight implications and directions for future research.

3. process for Systematic literature review:

The SLR process followed in this study is illustrated in Figure 1. It comprises five main steps. Step 1 involves formulating the research questions. In Step 2, we detail the strategy used to identify relevant literature, including the databases searched and the search strings applied. Step 3 focuses on evaluating the quality of the identified studies through clearly defined inclusion and exclusion criteria. In Step 4, data is extracted from the selected studies. Finally, Step 5 involves analyzing the data and presenting the findings of the review. Each of these steps is elaborated in the sections below.



3.1 Research question:

This research intends to address the following

research questions:

1. What are the key benefits of implementing Knowledge Management practices in the construction industry?

What are the major challenges and barriers hindering successful KM implementation in construction projects?

3. What KM tools and strategies are commonly used in construction organizations to support KM implementation?

3.2 Digital Resources:

To proceed with the research synthesis/systematic review, the researcher's decision about databases to be searched for obtaining relevant literature is a challenging task. Where to look and how to look for needed information relevant to research questions is really of prime importance at the outset of review (Poojary and Bagadia, 2014). The following databases were selected and then searched:

- **Digital Library**
- **Google Scholar**
- **ResearchGate**

3.3 Literature Search

Systematic Literature Review (SLR) employs a rigorous approach to summarize findings from prior research. The aim of the literature search in conducting a research synthesis or systematic review is to ensure exhaustive coverage of all relevant studies conducted on the topic of interest within the specified timeframe. Many reviewers who have performed systematic reviews noted in a survey that they "did not stop searching until they felt they had accomplished their goal" (Cooper and Hedges, 2009, p. 12).

The literature search is carefully structured around the research questions, which allows the researcher to establish clear criteria for inclusion and exclusion, evaluate the effectiveness of interventions, and make informed judgments based on evidence that supports practical recommendations (Baker, 2016, p. 267).

Articles closely related to the topic of Knowledge Management implementation in construction organizations were retrieved using various keywords and search strings. Examples of search terms included: "Knowledge Management," "KM implementation," "knowledge sharing," "KM challenges," "KM benefits," "construction industry," "knowledge transfer," and "KM adoption in construction."

3.4 Research Articles Extraction Criteria:

After gathering ample relevant literature for synthesis, it is essential to extract from each selected document information that contributes meaningfully to the research questions identified for this study (Cooper and Hedges, 2009). This step also assists in filtering the collected literature by excluding studies that do not directly address the scope of KM implementation in the construction industry.

The selection criteria adopted and applied in this study to identify the most relevant papers and articles are as follows:

- Studies that focused specifically on Knowledge Management (KM) implementation in construction organizations were included.
- Articles that discussed KM-related challenges, barriers, benefits, , or strategies were considered eligible for review.
- Studies that were not related to the construction sector were excluded.
- Articles that did not address KM implementation aspects were also excluded.
- Only publications written in English were considered.

As a result of applying these inclusion and exclusion criteria rigorously, 13 papers out of an initial 26 identified studies were finalized and included in this systematic literature review. The details of these selected papers are presented in the next section.

4. Data evaluation:

Table I. Total research papers/articles found/downloaded/collected after rigorous search

Science Direct	Google Scholar	ResearchGate	Digital Library	Total
2	13	8	3	26

Table II. Papers/articles selected for review

Google Scholar	ResearchGate	Digital Library	Total
10	2	1	13

	Challenge 1	Challenge 2	Challenge 3	Challenge 4	Challenge 5	Challenge 6	Challenge 7	Challenge 8	Chal
	*	*	*	*	*				
	*	*	*	*					
	*	*	*	*					
. H.	*	*	*	*	*				
	*	*	*	*					
A.	*	*	*						
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ah, , &	*	*	*	*					
N. M. ssan ,	*	*	*	*					
	*	*	*						
M., &									
.	*	*							
	*	*	*	*					

Author	Benefit 1	Benefit 2	Benefit 3	Benefit 4	Benefit 5	Benefit 6	Benefit 7	Benefit 8	Benefit 9	Be 10
Ali Pirzad										
George Okere	*	*	*	*	*	*				
Ahmad, H. S., & An, M										
Ahmed, S., & Sobuz, M. H. R	*	*	*	*	*	*	*			
Hesham Saleh Ahmad										
Yap, J. B. H., & Lock, A.	*	*	*	*	*	*	*	*	*	*
Magdy, A., Eid, A., & Khodeir, L. M	*	*	*	*	*	*				
Olanrewaju, O. I., Faridah, M. S., Ebhohimen, I. J., & Danasabe, M. Y.	*	*	*	*	*	*	*	*	*	*

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Yusof, M. N., Yahaya, N. M. M., Awang, N., Nik Hassan, N. N. B., & Khor, S. C.										
Kofi Agyekum	*	*	*	*	*					
Tan, H. C., Carrillo, P. M., & Anumba,	*	*	*	*	*					
Dave, B., & Koskela, L.	*	*	*	*	*					
Yepes, V., & López, S.	*	*	*	*	*	*				

5. Findings

A total of **45 challenges** and **63** benefits related to KM implementation were identified in this research, based on past studies. These challenges and benefits were further **categorized** according to a **taxonomy.** The following are some of the critical challenges and benefits of KM implementation in the construction industry, as revealed by the research findings.

Critical chellanges:

The various issues and challenges identified through the research synthesis/systematic review are presented in the table below, organized hierarchically based on their frequency of occurrence. This table illustrates how often each challenge has been reported in existing literature.

A higher frequency suggests greater emphasis or concern in prior studies, helping to gauge the relative severity or criticality of each issue.

In the context of KM implementation in the construction industry, "**Lack of standard work processes**" emerged as the most critical challenge, with the highest frequency of 10. This reflects a significant concern regarding the absence of consistent procedures across projects.

Other frequently cited challenges include "**Employees' resistance to knowledge sharing**" (frequency: 9), "**Insufficient financial resources/funding**" (frequency: 9), "**Lack of leadership/management support**" (frequency: 7), and "**Complexity of construction processes**" (frequency: 6). While somewhat less critical, these challenges still represent notable barriers to effective KM implementation.

A visual representation of these issues and challenges is provided below. These findings can be used to prioritize efforts, as challenges with higher frequencies likely require greater focus and intervention.

Organizations aiming to implement KM in construction can leverage this ranking to strategically plan their approach. It is reasonable to assume that higher-ranked challenges demand more resources, attention, and mitigation strategies compared to those ranked lower.

Challenges:

Frequency	Challenge	Rank
10	Lack of standard work processes	1
9	Employees' resistance to knowledge sharing	2
8	Insufficient financial resources / funding	3
7	Lack of leadership/management support	4
Frequency	**Challenge**	**Rank**

6	Complexity of construction processes	5
3	Difficulty in Managing Tacit Knowledge	6
3	Lack of awareness of KM practices	6
2	Lack of a strategy to KM implementation and coordination	7
2	Not appointing a knowledge manager or a team to implement KM strategy	7
2	Poor IT infrastructure	7
2	Absence of technology	7
2	Inability to capture and reuse project generated knowledge, which may result in mistakes and situations where parties 'reinvent the wheel'	7
1	Bureaucracy and hierarchical	8
1	Governmental organizations are significant political obstacles	8
1	Culture differences	8
1	Insufficient time	8
1	Large number of SMEs – The Nigerian construction industry consists of a large proportion of small to medium-sized enterprise (SMEs)…	8
1	Adversarial relationships encouraged by the strategy of contracting and the project nature with pressure to complete and non-repetitive work	8
1	Lack of Knowledge Generation Reporting	8
1	Long implementation period of lean principles	8
1	Trying to solve large problems – The various stages involved in KM are complex…	8
1	Converting tacit knowledge to explicit knowledge	8
1	The industry usually faces the challenge of how to construct a well-linked KM system	8
1	The construction sector often does not report or document the results of applying knowledge	8
1	Lack of motivation	8

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Benefits:

The various benefits identified through the research synthesis/systematic review are presented in the table below, organized hierarchically based on their frequency of occurrence. This table highlights how often each benefit has been reported in existing literature. A higher frequency suggests greater emphasis or recognition in prior studies, helping to evaluate the relative importance of each benefit.

In the context of KM implementation in the construction industry, **"Employees' experience exchange"** emerged as the most frequently documented benefit, with a frequency of **12**. This highlights the critical role that sharing experience plays in enhancing knowledge management outcomes.

Other frequently cited benefits include **"Knowledge, as a product of learning, helps employees make better decisions"** (frequency: 10), **"Enhanced awareness of knowledge"** and **"Group work improvement"** (both with frequency: 9), indicating significant improvements in organizational awareness and collaboration.

Further benefits such as **"Minimization of knowledge loss while maintaining completeness of important reusable project knowledge"** (frequency: 8), and the integration of previously isolated and standalone KM systems, along with **improved access to knowledge through the integrated system** (both with frequency: 7), also represent important advantages of effective KM implementation.

A visual representation of these benefits is provided below. These findings can guide organizations to focus on leveraging the most impactful benefits during KM implementation in construction.

Benefits:

Frequency	Benefit	Rank
12	Employees' experience exchange	1
10	Knowledge, as a product of learning, helps employees make better decisions...	2
9	Enhanced Awareness of Knowledge	3
9	Group work improvement	3
8	Knowledge loss is minimized whilst completeness of important reusable project knowledge...	4
7	The new system integrates the previously isolated and standalone KM systems...	5
7	improves the access to knowledge through the integrated system...	5

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Frequency	Benefit	Rank
6	The purpose served by the integrated system is in line with Company A's strategy...	6
6	An active exchange of ideas was taking place through the new solution	6
5	Knowledge was being generated through lifecycle of feedback and refinement	6
3	User participation remained high with 90% of worker involvement...	7
3	The knowledge created within the forum was being applied straight into the workplace...	8
3	Compared to the knowledge creation process prior to implementation...	8
2	Knowledge management is a crucial intellectual asset for gaining competitive advantage...	9
2	It provides a systematic, integrated, and directed process...	9
1	Building on existing knowledge transforms organizational beliefs...	10
1	Making tacit knowledge explicit enhances the management process...	10
1	Knowledge management supports professional development...	10
1	Enabling better and faster decision making	10
1	Makes it easy to find relevant information and resources	10

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5.1 Data Analysis and Discussion:

5.1.1 Lack of Standard Work Processes:

In the current review, **lack of standard work processes** was identified as the **most critical challenge** for Knowledge Management (KM) implementation in the construction industry, with a frequency of 10 (ranked #1). Construction firms, especially SMEs, tend to rely heavily on informal, experience-based work practices rather than standardized, repeatable processes. As a result, **knowledge capture, sharing, and reuse become inconsistent and inefficient**, which significantly undermines the objectives of KM.

According to **Yusof et al. (2019)**, the construction sector in many developing regions suffers from poor procedural documentation, leading to fragmented knowledge systems. **Ahmad and An (2008)** proposed a KM model focused on structured knowledge creation and updating, emphasizing the importance of integrating standardized procedures into KM systems. Similarly, **Magdy et al. (2021)** found that the lack of formal process standards in small Egyptian construction firms hindered KM implementation, as workflows were largely undocumented.

Moreover, **Yap and Lock (2017)** noted that Malaysian SMEs lacked operational standardization, which led to challenges in transferring project knowledge. This problem becomes more severe in firms that operate multiple simultaneous projects, where deviations in practice prevent learning from one project to the next. Therefore, it may be inferred that

without **standardized work processes**, KM initiatives lack the necessary foundation for success.

5.1.2 Employees' Resistance to Knowledge Sharing:

Current synthesis found **resistance to knowledge sharing** among employees to be the **second most critical challenge** (ranked #2). This resistance reflects a deeper issue tied to organizational culture, lack of trust, and concerns about losing control or job security. In construction firms, employees often perceive knowledge as a source of power and may be reluctant to share what they know, especially in competitive or hierarchical environments.

Okere (2017) emphasized that fear of losing value within the organization often causes professionals to withhold knowledge. **Olanrewaju et al. (2019)** further highlighted that knowledge hoarding in Nigerian construction firms stems from a lack of knowledge-sharing culture and trust. **Yap and Lock (2017)** similarly found that within Malaysian construction SMEs, fear of criticism and inadequate incentives discouraged knowledge contribution.

This aligns with broader KM literature, which points to **change management and trust-building as essential components** for successful implementation. Organizations should invest in building a collaborative environment through **incentive systems, transparency, and engagement activities**, or else risk undermining the potential benefits of KM.

5.1.3 Insufficient Financial Resources / Funding

Insufficient financial resources emerged as the **third most significant challenge** (ranked #3), particularly in resource-constrained firms. Unlike ERP implementations which suffer from hidden costs of training and integration, KM systems face upfront resistance due to the **perceived long-term ROI and difficulty in quantifying direct benefits**.

Yusof et al. (2019) discussed how budget limitations prevented construction companies from investing in dedicated KM systems, tools, and training programs. **Magdy et al. (2021)** noted that for small construction enterprises in Egypt, financial constraints meant KM remained a low-priority item. Moreover, **Ahmad and An (2008)** highlighted that KM-related costs — including technology infrastructure and human capital development — are often overlooked in budgeting, leading to partial or failed implementation.

The findings suggest that **funding is not only a barrier in itself but often exacerbates other KM challenges**, such as lack of training, poor system adoption, and lack of strategic support. Hence,

organizations aiming to adopt KM must consider it a **strategic investment rather than a discretionary expense**.

5.1.4 Lack of Leadership/Management Support

The current literature also pointed out that **lack of leadership support** is a significant barrier (ranked #4) to KM implementation. Similar to ERP projects, KM requires strong leadership commitment to align strategic objectives, allocate resources, and communicate the value of knowledge sharing across all levels.

Yusof et al. (2019) emphasized that without top management involvement, KM systems often fail due to lack of direction and purpose. **Ahmad and An (2008)** argued that leadership is crucial in creating a knowledge-friendly culture. **Tan et al. (2012)** presented a case where KM success was directly linked to proactive leadership practices in a mid-sized construction firm. **Agyekum (2017)** also reported that Ghanaian civil engineering firms lacked visionary leadership, which led to unclear KM policies and ineffective implementation.

Hence, similar to ERP systems (Sarker and Lee, 2003), **KM initiatives must be championed by senior leaders** who articulate the benefits, drive adoption, and sustain momentum. Without this, KM risks becoming isolated or underutilized across the organization.

5.1.5 Complexity of Construction Processes

The **complexity of construction processes** emerged as the **fifth key challenge** in KM

implementation. Construction projects are inherently complex, involving dynamic coordination between stakeholders, temporary project teams, and variable external conditions. This makes **knowledge capture and reuse particularly difficult**.

Yusof et al. (2019) explained that the diversity and unpredictability of tasks in construction projects mean that much of the knowledge remains tacit and undocumented. **Saleh Ahmad (2011)** noted that the dynamic nature of construction projects requires adaptable KM systems capable of handling changing contexts. **Dave and Koskela (2009)** further emphasized the role of **collaborative KM** in handling process complexity, suggesting that knowledge sharing across disciplines and phases is critical, but often underdeveloped.

This echoes ERP integration challenges noted by Bingi et al. (1999), where **system complexity hinders user adoption and slows progress**. In construction, this complexity demands **robust, user-friendly KM tools** that align with real-world site conditions and stakeholder needs. Simplifying knowledge flows and embedding KM into routine project management practices could help address this challenge.

5.2 Analysis and Discussion of Benefits:

5.2.1 Employees' Experience Exchange

In the current synthesis, **employees' experience exchange** was identified as the most frequently reported benefit of Knowledge Management (KM) implementation in the construction industry, with a frequency of 12 (ranked #1). This highlights the vital role that the transfer and sharing of experiential knowledge play in fostering organizational learning and continuous improvement.

According to **Olanrewaju et al. (2019)**, facilitating experience exchange allows project teams to leverage lessons learned and best practices from previous projects, thereby reducing repeated mistakes and improving overall project outcomes. Similarly, **Yap and Lock (2017)** emphasized that experience exchange among employees enhances tacit knowledge sharing, which is critical in construction where explicit documentation is often limited. **Magdy et al. (2021)** also found that encouraging experience exchange boosts innovation and problem-solving capacity in SMEs, which are otherwise constrained by limited formal knowledge resources.

Therefore, fostering a culture and system for experience exchange is fundamental for effective KM, driving better decision-making and operational efficiency in construction firms.

5.2.2 Knowledge as a Product of Learning Helps Employees Make Better Decisions

The second most cited benefit (frequency: 10) relates to the role of knowledge as an enabler for **better decision-making** among employees. KM systems capture, organize, and disseminate critical knowledge assets, equipping employees with relevant information when needed.

Ahmad and An (2008) argue that well-managed knowledge helps employees navigate complex construction project decisions by providing timely access to past project data and expert insights. This benefit was also echoed by **Tan et al. (2012)**, who found that access to organized knowledge significantly reduced uncertainty and risk in project planning and execution. Moreover, **Yusof et al. (2019)** noted that employees empowered with knowledge tend to make more informed decisions that align with organizational goals and standards.

Hence, knowledge management acts as a key learning enabler, directly impacting the quality of decisions and the success of construction projects.

5.2.3 Enhanced Awareness of Knowledge and Group Work Improvement

Both **enhanced awareness of knowledge** and **improvement in group work** were equally ranked third, each with a frequency of 9. These benefits underscore the dual importance of knowledge visibility and collaborative work environments in KM success.

Yap and Lock (2017) highlighted that increased awareness of available knowledge resources encourages employees to seek out and utilize

relevant information proactively. This fosters a knowledge-sharing mindset essential for organizational learning.

On the other hand, **Dave and Koskela (2009)** showed that KM tools significantly improve group collaboration by facilitating communication and coordination among interdisciplinary teams on construction projects. Improved group work leads to better integration of diverse expertise, faster problem resolution, and enhanced innovation.

Taxonomy:

5.3 Taxonomy of Issues/Challenges

The issues and challenges identified in this study have been categorized based on their characteristics and relevance to different domains within the construction industry knowledge management (KM) context. Consistent with common classifications in KM and project management literature (Laudon and Laudon, 2016; Amid et al., 2012), these challenges are grouped under Organizational, Human, Strategic, Process-related, Cultural, and Technical/Technological categories, as shown in Table VII.

The organizational domain includes challenges such as lack of standard work processes, inadequate leadership or management support, absence of a dedicated knowledge manager or team, bureaucratic and hierarchical structures, political obstacles within governmental organizations, and the predominance of small to medium-sized enterprises (SMEs) with their unique operational constraints (Pirzad, 2017; Okere, 2017). Furthermore, adversarial relationships arising from contracting strategies and the inherent pressure for timely project completion exacerbate these issues.

Human-related challenges prominently feature employees' resistance to knowledge sharing, limited awareness of KM practices, time constraints, motivation deficits, and the complexity of addressing large-scale problems involved in KM implementation (Ahmad & An, 2008; Yap & Lock, 2017).

Strategic challenges revolve around insufficient financial resources, lack of cohesive KM implementation strategies, and poor coordination, which critically hinder KM adoption and sustainability (Ahmed & Sobuz, 2019; Saleh Ahmad, 2011).

Process-related challenges relate to the complexity of construction processes themselves, difficulties in capturing and reusing project knowledge—which often leads to redundant efforts or "reinventing the wheel"—and insufficient reporting or documentation of knowledge generation activities (Olanrewaju et al., 2019; Yusof et al., 2019).

Cultural challenges include managing tacit knowledge, cultural differences among stakeholders, and the difficulty of converting tacit knowledge into explicit forms that can be widely shared and utilized (Kofi Agyekum, 2017; Tan et al., 2012).

Finally, technical or technological challenges cover poor IT infrastructure, lack of integrated KM technology solutions, and limited documentation or reporting of knowledge application outcomes within construction organizations (Dave & Koskela, 2009; Yepes & López, 2021).

5.4 Taxonomy of Benefits:

The benefits identified from the synthesis of literature on knowledge management (KM) implementation in the construction industry have been categorized into four key domains: Human Resources (HR), Organizational, Technical/Technological, and Knowledge Process-related benefits, as shown in Table VIII. This categorization aligns with established frameworks in KM literature (Laudon and Laudon, 2016; Amid et al., 2012) and reflects the multi-dimensional value KM brings to construction organizations.

Human Resources (HR): The most frequently cited benefits relate to enhanced human capital through improved knowledge sharing and collaboration. Notably, employees' experience exchange emerged as a critical advantage, facilitating tacit knowledge flow and professional growth (Pirzad,

2017; Yap & Lock, 2017). Group work improvement and sustained user participation (with reports of up to 90% worker involvement) highlight the positive impact of KM on team dynamics and
engagement (Okere, 2017). KM also supports faster and better decision-making processes by making relevant information and resources more accessible to employees, thus enhancing individual and
collective competencies.

Organizational: At the organizational level, KM fosters enhanced awareness of the value of knowledge as a strategic asset. Post-implementation evaluations show alignment of integrated KM systems with corporate strategies, which strengthens organizational learning and competitive
advantage (Ahmed & Sobuz, 2019; Saleh Ahmad, 2011). Building upon existing knowledge bases transforms organizational beliefs and cultures towards continuous improvement and innovation.

Technical/Technological: Technical benefits stem primarily from the integration capabilities of modern KM systems. The new KM platforms effectively connect previously isolated and standalone knowledge repositories, improving accessibility and systematic management of organizational knowledge (Dave & Koskela, 2009; Yepes & López, 2021). These integrated systems streamline processes by providing directed, consistent workflows and support cross-functional knowledge
sharing.

Knowledge Process-related:KM enhances knowledge processes by minimizing knowledge loss and ensuring completeness of important reusable project knowledge. It promotes active idea exchange and continuous knowledge generation through feedback loops during project lifecycles (Ahmad & An,
2008; Yusof et al., 2019). Moreover, KM facilitates the conversion of tacit knowledge into explicit knowledge, which improves knowledge codification, transfer, and management efficiency (Kofi Agyekum, 2017).

6. Conclusion

A Systematic Literature Review (SLR) approach was employed in this study to identify and analyze the **challenges and benefits** of Knowledge Management (KM) implementation within the construction industry. This SLR synthesized findings from selected articles published between **2008 and 2021**, providing a structured and comprehensive understanding of the core issues explored by researchers over the years.

Through this synthesis, a total of **28 unique challenges** were extracted and categorized into six domains: **Organizational, Human, Strategic, Process-related, Cultural, and Technical/Technological**. These domains reflect the multifaceted nature of KM barriers within construction, where socio-technical and process complexities intersect. For instance, issues such as lack of standard work processes, employee resistance to knowledge sharing, and insufficient financial resources were repeatedly highlighted across various regions and contexts.

In addition, **18 key benefits** of KM were identified and grouped under four main categories: **Human Resource, Organizational, Technical/Technological, and Knowledge Process-related**. These include benefits such as improved employee experience exchange, enhanced decision-making capabilities, and better integration of knowledge systems. The frequency-based ranking of benefits and challenges further emphasized where organizations encounter the most friction—and where they stand to gain the most from effective KM strategies.

Moreover, the results of this SLR indicate that the **most critical challenges** to Knowledge Management (KM) implementation in the construction industry are rooted in **organizational and human domains**. Key issues such as lack of standard work processes, insufficient leadership support, and employee resistance to knowledge sharing were consistently highlighted. These findings suggest that **socio-organizational factors**, rather than technical

limitations, represent the most significant barriers to effective KM adoption.

When ranked by frequency, **human resource-related challenges** appeared immediately after organizational issues, with concerns like lack of awareness, time constraints, and motivation hindering KM efforts. Strategic and process-related barriers—such as the absence of clear KM strategies and complexity in construction processes—further compound these difficulties. On the other hand, **technological challenges**, including poor IT infrastructure and isolated KM systems, were cited less frequently, reinforcing the view that **technical issues are generally more manageable** compared to socio-behavioral ones.

On the benefits side, **human resource benefits** emerged as the most commonly reported, particularly in areas like experience exchange, improved teamwork, and better decision-making. These suggest that when KM is successfully implemented, it leads to **substantial human capital development**. Organizational and knowledge-process benefits were also notable, including enhanced awareness of knowledge assets and minimization of knowledge loss. **Technological benefits**, such as system integration and improved access to information, were present but less emphasized.

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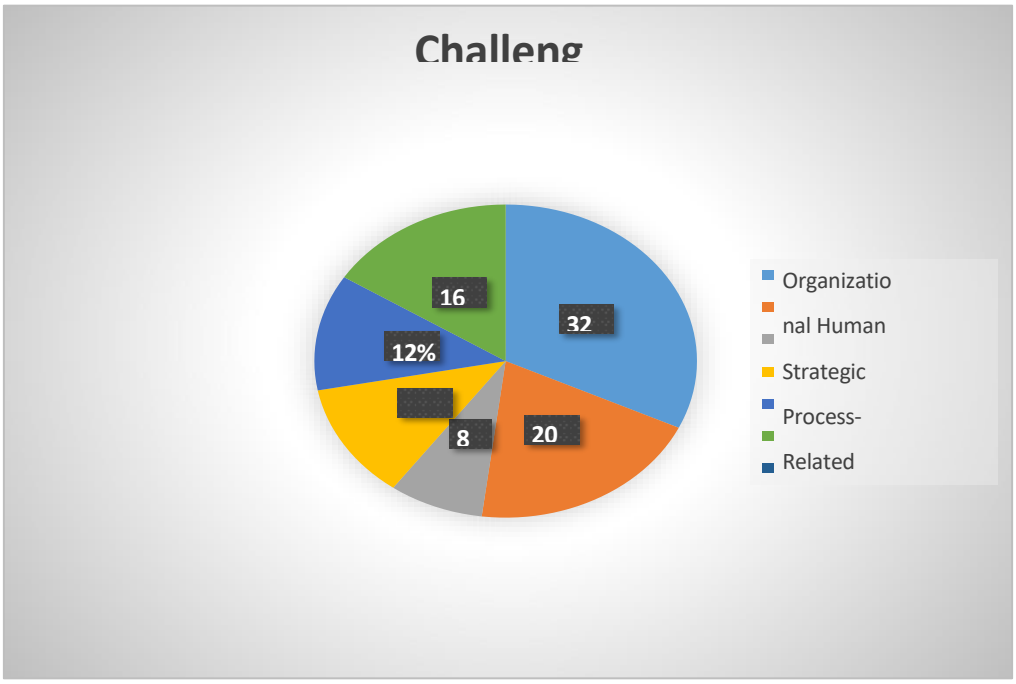
Taxonomy table

Table VII: Taxonomy of Knowledge Management Challenges in Construction

Category	Issues and Challenges
Organizational	Lack of standard work processes; Lack of leadership/management support; Not appointing a knowledge manager/team; Bureaucracy and hierarchy; Political obstacles in government bodies; Large number of SMEs; Adversarial relationships due to contracting and project nature; Long implementation periods for lean principles
Human	Employees' resistance to knowledge sharing; Lack of KM awareness; Insufficient time; Complexity of KM stages; Lack of motivation
Strategic	Insufficient financial resources/funding; Lack of KM strategy and coordination
Process-related	Complexity of construction processes; Inability to capture/reuse project knowledge; Lack of knowledge generation reporting
Cultural	Difficulty managing tacit knowledge; Cultural differences; Challenges in converting tacit to explicit knowledge
Technical/Technological	Poor IT infrastructure; Absence of technology; Challenges in constructing well-linked KM systems; Limited reporting/documentation of KM results

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This categorization highlights that the predominant barriers to effective KM implementation in construction extend beyond mere technological inadequacies, emphasizing the crucial roles of organizational culture, human factors, and strategic planning. Addressing these challenges systematically, as outlined, can transform them into critical success factors enabling efficient knowledge flow, reuse, and organizational learning.



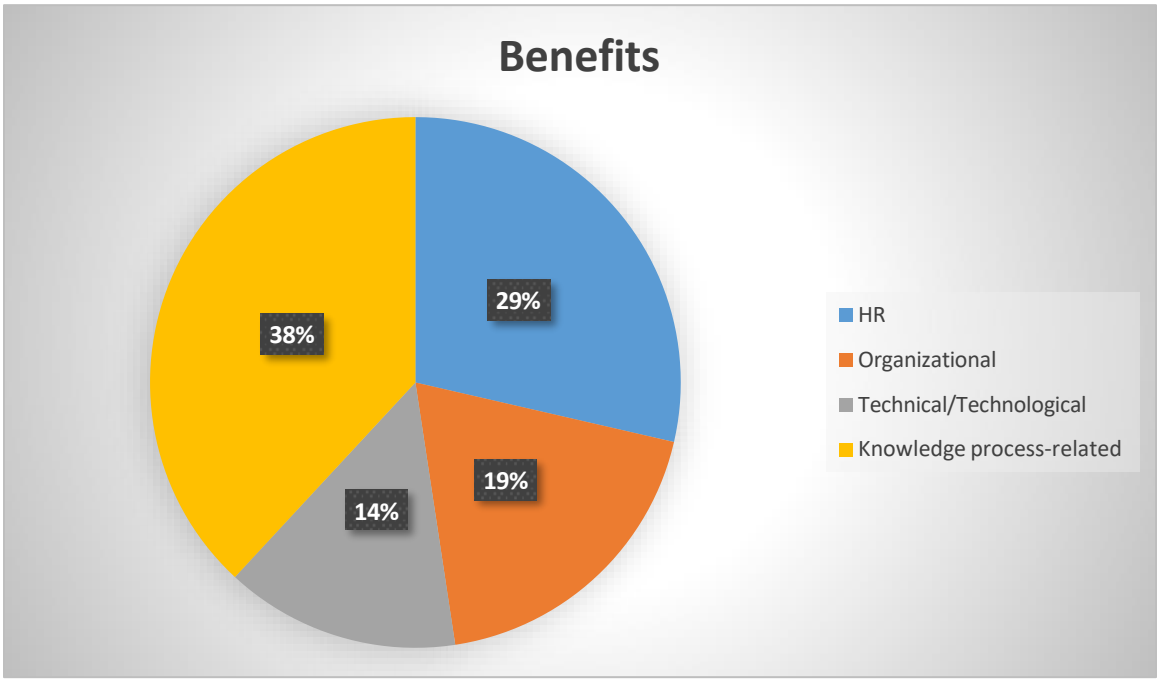
Benefit category

Taxonomy of Knowledge Management Benefits in Construction

Category	Benefits
HR	Employees' experience exchange; Group work improvement; High user participation (~90% involvement); Supports professional development; Enables faster and better decision making; Easier access to relevant information and resources
Organizational	Enhanced awareness of knowledge value; Integration aligned with organizational strategy; KM as a critical intellectual asset for competitive advantage; Builds on existing knowledge to transform organizational culture
Technical/Technological	Integration of previously isolated KM systems; Improved access to knowledge via integrated system; Provides systematic, integrated, and directed KM processes

Knowledge related	**Process-**	Knowledge helps employees make better decisions; Minimizes knowledge loss; Active exchange of ideas; Continuous knowledge generation and refinement; Application of created knowledge in the workplace; Enhances tacit to explicit knowledge conversion

This taxonomy underscores that KM benefits in construction are multi-faceted, spanning human, organizational, technical, and process domains. Such a comprehensive view enables organizations to focus on leveraging these benefits to improve project outcomes, promote innovation, and maintain competitive advantage.



6.2 Future Research Directions

The adoption of Knowledge Management (KM) practices in the construction industry continues to gain importance as organizations seek to improve project efficiency, knowledge retention, and decision-making quality. Despite a growing body of research, the systematic literature review (SLR) confirms that KM implementation still faces persistent and complex challenges, especially in socio-organizational domains. Based on the findings of this review, several future research directions are proposed:

- Deep investigation into high-impact challenges: The most critical challenges identified in this review, such as lack of standard work processes, resistance to knowledge sharing, and insufficient leadership support, warrant in-depth empirical studies to understand their root causes. Future research can explore context-specific barriers (e.g., in small vs. large firms or public vs. private sectors) and develop targeted mitigation strategies for each.
- Socio-technical perspectives on KM adoption: A significant insight from this SLR is that challenges in KM implementation are more closely related to human and organizational behavior than to technological limitations. Therefore, future studies should delve into the

interplay between people, culture, and processes, examining how leadership, organizational culture, and employee attitudes influence KM adoption and sustainability.

- Exploring emerging technologies for KM enablement: As the construction sector begins integrating digital technologies such as Building Information Modeling (BIM), cloud- based platforms, IoT, and artificial intelligence, new opportunities—and challenges— emerge for KM practices. Future research should investigate how these technologies

support or hinder KM implementation, and what new models or frameworks are needed to align digital transformation with effective knowledge management.

- Longitudinal studies on KM benefits realization: While several benefits of KM implementation were identified in this review (e.g., experience exchange, decision- making improvement), few studies have traced how these benefits evolve over time. Future research could conduct longitudinal case studies to assess the sustainability and long-term impact of KM on construction project outcomes, innovation, and organizational learning.

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