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Assessing the Effect of Knowledge Management Practices on Organizational Performance in the Construction Industry in Ethiopia

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Purpose: This study focuses on the Ethiopian construction industry, a context that has not been extensively explored in knowledge management. It aims to assess the influence of knowledge and knowledge management practices on organizational performance, assess factors that affect organizational performance in the construction industry, identify barriers that impede knowledge management improvement in the Ethiopian construction industry, and propose a KM framework model suited to the Ethiopian construction industry context.

Study design/methodology/approach: The study employed a mixed-methods research approach with a convergent research design. A web-based questionnaire was created using Google Forms to collect quantitative data and distributed to 190 selected participants, including company owners, general managers, project managers, and senior professionals. 101 valid responses were received, resulting in a response rate of 53.2%. Among these valid responses, 80 were from male participants and 21 from female participants, all included in the data analysis.

Findings: The study indicated that knowledge management practices significantly affect organizational effectiveness, decision-making, innovation, and overall performance in Ethiopia's construction industry. The study identified several challenges, including inadequate knowledge-sharing practices among professionals, poor documentation and information storage systems, and weak mechanisms for learning and integrating new information and knowledge within the Ethiopian construction sector.

Originality/value: The research shows how knowledge is used and its connection to organizational performance within the industry. It emphasizes that organizational performance can be enhanced by adopting a knowledge management framework designed for the Ethiopian construction sector. Additionally, this study is the first to explore the effects of knowledge management practices on organizational performance at the organizational level in the Ethiopian construction industry.

Introduction

The construction industry is renowned globally for its labour and intensive information exchange (Odubiyi et al., 2019). It is one of the most persuasive sectors worldwide and in individual countries; it is also one of the most profitable industries in the world, and it assists in achieving economic development for the nation (Adepoju & Aigbavboa, 2020). The construction industry contributes to economic development by providing comprehensive construction services to meet the growing needs of buildings and infrastructure. It has unique characteristics compared with other industries (Khoa & Chinda,2023).

In most developing countries, like Ethiopia, the industry has faced the challenge of adopting and using cutting-edge technologies to ensure effective resource management and improve efficiency and effectiveness (Odubiyi et al., 2019). Construction companies in developing countries need help managing information and knowledge-related resources in construction

project management. Much of the information about past projects is not used again, resulting in poor quality of work and project delays (Ferrada et al., 2013). Several developing countries, such as Ethiopia, have struggled to incorporate modern technologies into their industries to manage resources effectively and improve efficiency. Construction companies in these countries require assistance in managing information and knowledge-related resources in project management. Often, information from past projects is not utilized, leading to poor-quality work and project delays (Odubiyi et al., 2019; Ferrada et al., 2013).

The construction industry in Ethiopia plays a crucial role in the country's economic growth, serving as the largest source of employment for millions of skilled and unskilled workers. It contributed 27% to the country's economic development from 2010 to 2019, as the Ethiopian Economics Association (EEA) reported in 2021. However, the sector faces significant challenges and requires attention from both public and private stakeholders to improve.

The current study aimed to assess the effect of KM practices on organizational performance in the construction industry in Ethiopia by linking KM practices with the construction industry practices by assessing the impact of KM in the construction industry and identifying the factors that affect organizational performance in the Ethiopian construction industry, examining the barriers that impede KM improvement and propose the KM framework that suited to the Ethiopian construction industry to enhance better organizational performance and competitive advantage.

Literature Review

KM refers to how an organization handles knowledge at various stages of its organizational system (Nurung et al., 2023). KM ensures insights, results, and learning within an organization are captured and made available for employees to find, use, update, adopt, and integrate into organizational processes (Girard & Girard, 2015). KM helps organizations consolidate their position in the competitive environment, which is critical for creating a competitive advantage (Mohaghegh et al., 2024).

KM practices also refer to the specific activities, behaviours, and routines organizations adopt to manage knowledge effectively. These practices are often informal and can vary widely across different organizations. The critical features include knowledge acquisition, sharing collaboration culture strategy, and technology. Effective KM practices, including delivering practical knowledge to the right person at the right time, supporting decision-making, and improving operational efficiencies, might help construction companies achieve sustainable development and competitive advantages (Khoa & Chinda, 2023). Thus, KM practices significantly enhance individual and team performance and overall organizational performance over time. It is critical to organizational success and incorporates KM practices and processes that facilitate effective KM. Understanding these two components' differences is essential for effective KM in any organization (Polas et al., 2023).

KM Process

The KM process is essential in contemporary organizations, considering knowledge a significant competitive success factor. It systematically manages all activities and processes related to knowledge acquisition, sharing, storing or retaining, and application or utilization (Dei,2019). KM processes are knowledge acquisition or creation, knowledge sharing or transfer, knowledge storage or retention, and knowledge application or utilization (Shongwe, 2016). The KM process creates new knowledge through the KM cycle (i.e., acquiring, sharing, storing, and utilizing) organizational knowledge (Sahibzada et al., 2023).

KM Practices

The literature on KM practices delineates them as deliberate and managerial strategies to achieve organizational objectives by systematically managing knowledge resources. These practices facilitate the utilization and development of knowledge for organizational advantage and intersect with related domains such as human resource management and information technology (Inkinen, 2016). Additionally, it encompasses the creation and optimization of processes that enhance operational efficiency and effectiveness, thereby driving improvements in overall organizational performance (Kero,2016). In this context, understanding KM practices empowers researchers and practitioners to understand the fundamental principles governing organizational activities related to KM. This comprehension is crucial for designing and implementing effective developmental and transformational initiatives within the organization (Hussinki et al.,2017).

KM Enablers

KM Enablers comprise people, processes, technologies, and strategies. People consist of individuals or groups who take ownership and direct KM activities and core functions of organizations. Processes also help to understand how an organization establishes a content life cycle and the types of business processes that lead the content lifecycle process and workflow. Technology also consists of critical technologies that assist KM communication and collaboration. Technological tools include document management system collaboration and communication facilities (Guribie & Tengan, 2018). Technology also supports understanding how organizations can best leverage and link existing technology with the KM system and helps us understand how technology enables collaboration and people-to-people connection (Algahtani, 2019).

Organizational Performance

Performance is a comprehensive concept that applies to all activities within organizations of all kinds. Organizational performance refers to the quality of work and staff efficiency in decision-making, process improvement, and development. It is also the extent to which the organization meets its own needs and the needs of stakeholders to survive and grow (Abualoush et al., 2018). Organizational performance is an indicator of an organization's ability to meet the requirements of its stakeholders and remain competitive in the market. It is also known as the outcome of the actions or activities of an organization's members that measures how well an organization has achieved its objectives (Ha et al., 2016). Organizational performance is a cyclical process described as setting organizational goals, executing the work based on organizational process, assessing the organizational progress, comparing organizational outcomes against set goals, and strengthening organizational governance (Mwagona & Kinyua, 2023).

Methodology

The study employed a mixed-methods approach and a convergent research design. A web-based survey was used to gather quantitative data. Face-to-face interviews were used to collect qualitative data.190 participants were involved in the questionnaire survey. 101 valid responses were received and used for analysis. Out of the 101 valid responses received, 80 were from male respondents and 21 from female respondents, all of whom were included in the analysis. A 5-point Likert scale was utilized to examine the level of influence, with the following scale: [1] = Very Low, [2] = Low, [3] = Moderate, [4] = High, [5] = Very High. Data collection techniques involved random sampling for quantitative and purposive sampling for qualitative data. Both descriptive and inferential statistics were used. Mean scores were used to compare the level of influence, and Pearson's correlation was used to assess the bivariate relationship

between the two variables. The effect of KM on organizational performance was examined using linear regression. The data were analyzed using IBM SPSS software, version 26. This paper presents only the quantitative findings and KM practices-related variables of the research.

Theoretical Framework

A theoretical or conceptual framework for KM is a comprehensive system that includes people, processes, technology, and strategy. It ensures that KM is applied systematically and effectively to improve organizational performance in any knowledge domain (Waheed, 2020).

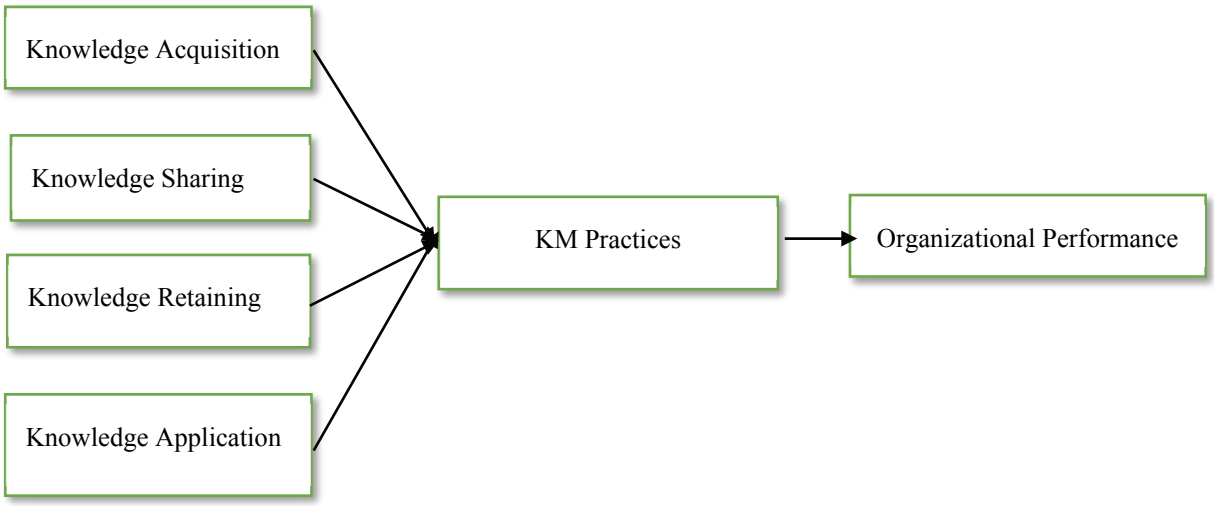

Figure 1: KM Practices Conceptual Framework

Knowledge acquisition practices involve activities to gather and organize knowledge from various sources for organizational benefit. Knowledge-sharing practices focus on communicating tacit or explicit knowledge among individuals and teams. Knowledge retention practices aim to preserve valuable knowledge within the organization, while knowledge application practices utilize this knowledge to enhance processes and performance (Abbas & Sağsan, 2019). Organizational performance practices seek to improve efficiency and competitive advantage through these KM practices. This study addresses four research questions, with a focus on the first two research questions.

Research question 1: What are the KM practices in the Ethiopian construction industry?

Research question 2: What factors influence organizational performance in the construction industry in Ethiopia?

Research question 3: What are the barriers that impede KM in the construction industry in Ethiopia?

Research question 4: What kind of KM framework is appropriate for the construction industry in Ethiopia?

KM practices application positively impacts organizational performance (Bayari et al.,2022). Applying four KM practices such as knowledge creation, knowledge acquisition, knowledge sharing, and knowledge utilization, significantly impacts organizational performance in any organization (Abbas & Sağsan,2019). The construction industry is renowned for its knowledge-intensive characteristics. Knowledge-intensive organizations aim to achieve efficient utilization

of knowledge resources. In turn, such organizations enhance organizational performance and achieve competitive advantage in the competitive business environment. Therefore, the following hypotheses are proposed.

H1. knowledge acquisition practices significantly and positively impact organizational performance in the Ethiopian construction industry.

H2. Knowledge-sharing practices significantly and positively impact organizational performance in the Ethiopian construction industry.

H3. Knowledge retention practices significantly and positively impact organizational performance in the Ethiopian construction industry.

H4. knowledge application practices significantly and positively impact organizational performance in the Ethiopian construction industry.

Survey Design

The study targeted Ethiopian grade-one construction and consulting companies registered with the Ministry of Urban Development and Infrastructure (MUDI). The questionnaire consists of six parts: Section A**:** General information about the respondent and organization. Section B: Types of knowledge used in the construction industry. Section C: KM practices in the construction industry. Section D: Organizational performance within the construction industry. Section E**:** Barriers to KM implementation and factors influencing organizational performance. Section F: General Questions regarding the impact of KM practices on organizational performance in the construction industry. A pilot study was conducted, and feedback was received to finalize the questionnaire, which was distributed via email. 190 participants, including company owners, general managers, and senior professionals, were surveyed, resulting in 101 valid responses for analysis.

Table 1: Knowledge and KM Practices survey items

Code	Items	Mean	Std.Dev.
TK1	The construction industry is knowledge-based	3.71	1.01
TK2	Knowledge is a competitive asset for a company in the construction industry	3.92	1.01
TK3	Sharing personalized knowledge benefits employees of my company	3.99	0.88
TK4	Personalized knowledge is beneficial for learning best practices	4.06	0.95
TK5	My company invests time and money in personalized knowledge-sharing	3.10	1.00
TK6	My company has a clear procedure for personalized knowledge sharing	2.96	0.98
TK7	My company provides employees with sufficient training in knowledge-sharing	2.76	1.09
TK8	Employees at my company are encouraged to create a network for knowledge-sharing	2.97	1.12
EK1	My company integrates best practices and lessons learned from previous project performance	3.40	0.86
EK2	My company's KM system is widely accepted and updated	2.96	0.97
EK3	My company properly prepares cost estimation and manages it	3.57	0.96
EK4	My company learns about relevant legislation for each project	3.57	0.86
EK5	My company's current information communication technology systems are sufficient to support the daily work	3.29	0.97
EK6	My company correctly prepares the budget for bidding	3.39	1.00

EK7	My company properly selects materials or types of equipment for each project based on project volume and complexity	3.57	0.97
EK8	My company controls project quality frequently per the design and specification on the spot	3.83	0.90
KA1	Our organization acquires knowledge about customers and suppliers	3.47	0.90
KA2	Our organization has a transparent process for acquiring knowledge about competitors within the industry	3.30	0.95
KA3	Our organization has a transparent process for acquiring expertise and intelligence	3.37	0.88
KA4	Our organization obtains essential information from collaboration partners outside the organization.	3.47	0.90
KA5	Our organization can acquire knowledge that is used to develop specific programs	3.50	0.89
KS1	Our organization always shares its knowledge with its stakeholders	3.36	0.98
KS2	Our organization shares relevant knowledge among employees and business units	3.41	0.97
KS3	Meetings and workshops are generally held for employees	3.11	1.04
KS4	Open communication and informal networks, such as communities of practice, are formed to facilitate knowledge dissemination and sharing	3.14	0.99
KS5	The staff members are informed of the organizational events through formal and informal channels	3.42	0.99
KR1	When experienced employees leave, they are encouraged to transfer and distribute their knowledge to others	2.88	1.09
KR2	Our organization has effective information systems that store existing knowledge	2.86	1.08
KR3	Mentoring and coaching are used to familiarize new employees with their tasks	3.24	1.08
KR4	Our organization lost crucial knowledge because of employee turnover, retirement, and poor knowledge-sharing practices	3.00	1.09
KR5	Our organization lost crucial knowledge because of a lack of information	2.93	1.05
AK1	The created knowledge is structured in independent modules, which allow its integration to develop different applications and new usages	2.81	0.92
AK2	Our organization has processes for applying/using knowledge in the development of new products/services	3.03	0.95
AK3	Our organization has processes for applying/using knowledge to solve new problems	3.30	0.98
AK4	Our organization has a process for converting knowledge into action plans	3.40	0.92
AK5	Our organization applies knowledge efficiently to reach its goals	3.38	0.91
OP1	Our organization provides high-quality services at low cost and high speed	3.50	0.88
OP2	Our organization performs well in improving the efficiency and effectiveness of services delivered	3.54	0.96
OP3	Our organization competes in the current market and is considered profitable	3.41	1.00
OP4	KM enabled our company to grow faster than competitors and enhanced the project performance capacity	3.18	1.04
OP5	Our organization is more innovative compared with competitors	3.23	1.05

Demographic Information of the Respondents

The analysis and interpretation of the current study are based on the entire sample. Out of the 101 valid responses considered for the study, the majority (79.2%) of the participants were male, and (20.8%) were female. In terms of experience, (35.6%) had 5-10 years of experience, 18.8% had 16-20 years of experience, 18.8% had greater than 20 years, 15.8% had 11-15 years of experience, and only 10.9% had less than five years of experience in the construction industry. 89% of respondents had at least five years of experience and above.

Table 2: Demographic Information of the study sample (N=101)

Variables	Category	N	%
Gender	Male	80	79.2
	Female	21	20.8
Years of experience	Less than five years	11	10.9
	5 - 10 years	36	35.6
	11- 15 years	16	15.8
	16 – 20 years	19	18.8
	Greater than 20 years	19	18.8
Organization type	Construction Companies	44	43.6
	Consulting Companies	30	29.7
	Governmental? Regulatory	19	18.8
	Others	6	7.9
Position of the respondent	CEO/Owner	4	4.0
	General Manager	19	18.8
	Project Manager	24	23.8
	Senior Engineer	45	44.6
	Others	9	8.9
Size of the organization	0 – 99	40	39.6
	100 – 199	22	21.8
	200 – 299	9	8.9
	300 - 399	1	1.0
	Greater than 400	29	28.7

Findings and Results

The factor analysis was performed to streamline the data and pinpoint the primary components that significantly affect organizational performance in Ethiopia's construction industry. This examination revealed seven core components, which were subsequently refined. These elements were transformed into statistical variables to analyze their mean scores and assess their influence on KM application in the construction industry in Ethiopia. In Table 3 below, the variables are displayed alongside their average scores and ranked accordingly.

Table 3: Descriptive statistics of variables related to the construction industry practices.

Item No	Variables	Mean	Std.Dev.	Rank
1	KM Process	3.43	0.71	2
2	Project quality management	3.45	0.71	1
3	Networking and knowledge-sharing practices	3.42	0.75	3
4	Transparency in knowledge acquiring process	3.29	0.79	5
5	The benefit of tacit knowledge sharing	2.92	0.59	7
6	Networking for effective organizational communication	3.18	0.82	6
7	Organizational knowledge retention strategy	3.37	0.82	4

A descriptive statistical analysis has revealed seven key components of KM in the construction industry in Ethiopia. Among these, four components emerged as significant high-ranked factors: (1) Project Quality Management with a mean score of 3.45, (2) Knowledge Management Process scoring 3.43, (3) Networking and Knowledge Sharing Practices with a mean score of 3.42, and (4) Organizational Knowledge Retention Strategies at a mean score of 3.37. In the second tier of ranking, two components were identified as moderately influential: (1) Transparency in the Knowledge-Acquiring Process, with a mean score of 3.29, and (2)

Networking for Effective Organizational Communication, scoring 3.18. Lastly, the component addressing the benefits of tacit knowledge sharing received the lowest ranking, with a mean score of 2.92, indicating that it does not significantly impact organizational performance. This analysis underscores the importance of specific practices in driving efficiency and effectiveness within the industry.

Empirical research shows that effective KM practices at various levels are essential for construction companies to achieve high-quality project outcomes. These practices minimize errors in the design phase, reduce costs from design changes, and preserve team knowledge and skills (Suresh et al., 2017). Additionally, improved project performance occurs when teams share best practices and lessons learned (Thankgod, 2021). Networking in the construction industry enhances knowledge-sharing and transfer through connected practices (Aiello et al., 2018). KM processes include identifying, acquiring, sharing, retaining, and applying knowledge (Gunasekera & Chong, 2018).

Table 4: Descriptive Statistics of KM Practices Variables

Variables	Mean	Std. Dev.	Rank
Knowledge Acquisition	3.42	0.75	1
Knowledge Sharing	3.29	0.79	2
Knowledge Retaining	2.98	0.60	4
Knowledge Application	3.18	0.82	3

Note: ** Correlation is significant at the 0.01 level (2-tailed).

Table 5: Correlation Analysis

Variables	Knowledge Acquisition	Knowledge Sharing	Knowledge Retaining	Knowledge Application	Organizational performance
Knowledge Acquisition	1				
Knowledge Sharing	0.610**	1			
Knowledge Retaining	0.473**	0.538**	1		
Knowledge Application	0.711**	0.718**	0.487**	1	
Organizational Performance	0.648**	0.578**	0.414**	0.637**	1

Note: ** Correlation is significant at the 0.01 level (2-tailed).

Table 6: Model Summary

Model	R	R Square	Adjusted R Square	STD error of the estimate
1	0.71	0.50	0.477	0.590

a. Predictors: (Constant), KAP (Knowledge application), KR (Knowledge retaining), KA (Knowledge acquisition), and KS (Knowledge sharing).
b. Dependent Variable: OP (Organizational Performance

Table 7: ANOVA

Model		Sum of Squares	df	Mean Square	F	Sig
	Regression	33.161	4	8.290	23.806	0.000b
	Residual	33.430	96	0.348		
	Total	66.591	100			

a. Dependent Variable: OP (Organizational performance).
b. Predictors: (Constant), KAP (Knowledge application), KR (Knowledge retaining), KA (Knowledge acquisition), and KS (Knowledge sharing).

Hypotheses Testing

The study indicates that knowledge management (KM) practices significantly influence organizational performance in the Ethiopian construction industry. Knowledge acquisition has a strong positive effect (β = 0.351, P-value = 0.001), and knowledge application is also impactful (β = 0.252, P-value = 0.038), both below the 0.05 significance threshold. However, knowledge sharing (β = 0.163, P-value = 0.143) and knowledge-retention practices (β = 0.038, P-value = 0.671) do not significantly affect performance. Thus, knowledge acquisition and application are crucial for enhancing organizational performance in this sector.

The correlation analysis indicates strong positive relationships between knowledge application and both knowledge sharing (0.718) and knowledge acquisition (0.711). Knowledge sharing correlates moderately with knowledge acquisition (0.61), while knowledge acquisition and application have moderate correlations of 0.65 and 0.64, respectively. These findings suggest that knowledge acquisition and application significantly impact organizational performance in the Ethiopian construction industry, with correlation coefficients for knowledge acquisition (0.648), knowledge application (0.637), knowledge sharing (0.578), and knowledge retaining (0.414).

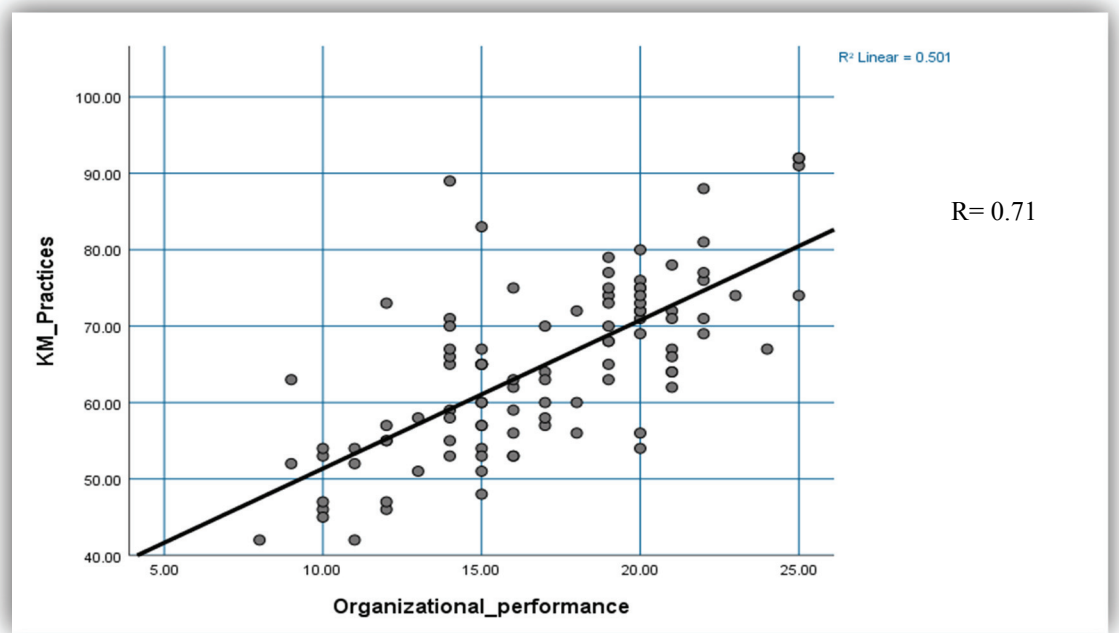

Figure 2: A scatter plot showing the relationship between KM practice and Organizational Performance.
Note: KM practices were evaluated using a composite measure that included 20 distinct KM practice variables. This composite measure allowed for a scoring range from a minimum of 5 to a maximum of 100. Performance was assessed using a set of 5 items rated on a Likert scale, which provided a scoring range from a minimum of 5 to a maximum of 25.

The regression analysis indicates a significant correlation between knowledge acquisition and application practices and organizational performance in Ethiopia's construction industry, with p-values of 0.001 and 0.04. Key issues identified include inadequate training programs, limited access to information, insufficient technology integration, and ineffective knowledge management strategies, all negatively impacting performance. The analysis shows a strong link between KM practices and organizational performance, with an R-value of 0.71 and an R-square value of 0.50, suggesting KM practices account for a significant portion of performance variation. This highlights the need for a robust KM framework to enhance performance and achieve sustainable growth in the sector.

The empirical study indicated that knowledge acquisition and application improve organizational performance in Ethiopia's construction sector. KM practices involve several management activities designed to manage knowledge resources effectively (Hussinki et al., 2017). Knowledge acquisition happens through transferring knowledge at the individual level, which leads to new and innovative solutions. This process is essential for managing organizational knowledge (Bratianu, 2015). Once individuals share knowledge within an organization, it's important to use that knowledge to solve specific problems. If the knowledge acquired, stored, and shared is not used well, the whole process is wasted. Effective communication of the KM process is necessary for users to utilize the knowledge efficiently to meet the organization's needs (Igbinovia & Ikenwe, 2018). Therefore, knowledge acquisition and application are key factors that strongly influence organizational performance compared to other elements.

Conclusion

KM encompasses the various ways in which an organization systematically handles knowledge throughout its operational framework. It involves a range of practices that include specific activities, behaviours, and routines tailored to effectively manage both explicit and tacit knowledge. In the context of the construction industry, the significance of KM is profound, as it plays a pivotal role in enhancing organizational efficiency and effectiveness.

Effective management of organizational knowledge is vital for construction companies to improve processes and gain a competitive edge. The current study identified seven key factors influencing KM practices, categorized into high, moderate, and low significance. High-ranked factors include Project Quality Management, the KM Process, Knowledge-Sharing practices, and Organizational Knowledge Retention Strategy. Moderate factors are Transparency in the Knowledge-Acquiring Process and Networking for Effective Organizational Communication. Finally, the impact of tacit knowledge sharing was found to be low or negligible in the construction sector.

Four key KM practice variables were identified that significantly affect organizational performance in the construction industry in Ethiopia. These are knowledge acquisition, knowledge sharing, knowledge retaining, and knowledge application, has a significant and positive impact on organizational performance.

Given these insights, all stakeholders within Ethiopia's construction industry must prioritize the enhancement of these identified factors. By doing so, they can lay a robust foundation for the successful implementation of an integrated KM system, which will ultimately contribute to the sector's growth and resilience. In light of these insights, it is imperative for all stakeholders in Ethiopia's construction industry to actively focus on enhancing the identified factors crucial to their success. By prioritizing these enhancements, they can establish a solid foundation for the

effective implementation of an integrated KM system. This system is not merely a framework but a transformative approach that aims to bolster the growth and resilience of the construction sector.

KM practices represent the strategic management of knowledge resources, serving as the backbone for achieving organizational objectives. As inferential statistical analysis results indicated, KM practices positively impact organizational performance in the Ethiopian construction industry. Among other KM practices, knowledge acquisition practices have a stronger and more positive impact on organizational performance than other KM practices. Notably, knowledge acquisition practices stand out as particularly impactful; they exhibit a stronger and more beneficial effect on organizational performance compared to other KM practices. Consequently, construction and consulting companies in Ethiopia need to pay special attention to enhancing their knowledge acquisition practices. By doing so, these organizations can significantly elevate their overall performance, ensuring a competitive edge in a rapidly evolving industry landscape.

Limitations of the Study

The current study aimed to evaluate the impact of KM practices and assess factors affecting the performance of grade-one construction and consulting companies within Ethiopia's construction industry. Additionally, the study included regulatory organizations and higher education institutions in the questionnaire survey. The study provides valuable insights; however, it does not include data from all relevant stakeholders in the construction industry, specifically suppliers and manufacturers of construction materials. This omission may limit the understanding of the industry's current practices and perspectives.

The researcher faced challenges due to a lack of published journal articles and books addressing the study's topic in the context of the Ethiopian construction sector, as well as a shortage of empirically tested models relevant to the organizational dynamics of the construction industry. Future studies may consider collecting data from a wide range of stakeholders and conducting a higher level of analysis based on a large sample size. In addition, given that the findings were based on cross-sectional data (which does not strictly entail a cause-effect relationship between the variables of interest), future studies may consider collecting longitudinal (time series data) data to examine changes over time in organizational performance.

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