

Enhancing Construction Industry Performance: Assessing the Impact of Knowledge Management Practices on Process Improvement in Lagos State Contracting Firm

Abstract

This study aims to assess the impact of knowledge management practices on process improvement in a contracting firm in Lagos State to enhance the overall performance of the construction industry in Nigeria. The study surveyed 159 registered construction firms in Lagos State. Descriptive statistics were employed as the statistical method in this study. We utilized the Statistical Package for the Social Sciences (SPSS) software, and Cronbach's alpha was computed to assess the reliability of the 5-point Likert scale for this study. The data analysis utilized several statistical tools, including frequency and percentage analysis, mean item score calculation, standard deviation computation, Pearson correlation analysis, and the Kruskal–Wallis H test. The results were interpreted and presented in tables. The chi-square value (χ^2) of process improvement strategies adopted in construction firms was 3.817 at the degree of freedom (df) of 14. The computed chi-square values (χ^2) from the statistical table at a significant level of 0.034 implied a robust consensus among professionals. Prioritizing and integrating these practices into operations can enhance project outcomes, bolster competitiveness, and drive sustainable growth in the industry. The findings emphasize the need for ongoing training, enlightening professionals on knowledge management, effective human resources management, and developing information processing mechanisms to facilitate this integration successfully.

Keywords: Knowledge management, Process improvement, Construction industry, Contracting firm, Performance enhancement.

1. Introduction

Construction projects, being a multi-disciplinary action, involve different professionals through different phases of the building (Kassim, Baharuddin, & Samad, 2016); this makes the execution of a project a rather complex process which is temporary. Over the years, construction organizations have passed through different phases in providing these services to the satisfaction of their clients (Pinto & Rouhiainen, 2002). While providing these services, information and knowledge are produced, shared, transferred, learnt, and gained. Knowledge activities and, most important intrinsic capital of an enterprise, and it is necessary to develop an efficient and effective system of managing this resource, as it creates greater productivity, promotes innovation, more

qualitative performance of business activities, and provides competitive advantage for better delivery (Hoe & Mansori, 2018). Knowledge, as a significant organizational resource that provides a competitive advantage in business circles, has become increasingly widely recognized as vital in the business world (Omotayo, 2015). Construction firms are information-intensive organizations whose personnel utilize knowledge in their day-to-day operations managing this knowledge is therefore critical for better service delivery (Adegbembo, Awodele, & Oke, 2020). As noted by Muthuveloo, Shanmugam, and Teoh (2017), with the effect of organizational processes being prioritized, there has been increasing interest in the tacit dimension of knowledge. Knowledge management has proven to benefit and improve the performance of organizations, particularly construction firms in Nigeria (OLANREWAJU, Musa, IDIAKE, & MOHAMMED, 2019). This is in line with (Tserng & Lin, 2004) findings, which claim that knowledge management is the process of creating, sharing, using, managing, saving, and retrieving an organization's knowledge and information.

Knowledge management refers to a multidisciplinary approach to achieving organizational objectives by making the best use of knowledge. Cucović and Cucović (2014) also submit that knowledge management is turning self-taught knowledge and experience into corporate knowledge that can be widely shared throughout the organization. Studies such as Omotayo (2015) and Cucović and Cucović (2014) have revealed that organizations that proactively manage knowledge stand to reap considerable rewards, for example, in cost savings (Suresh, Olayinka, Chinyio, & Renukappa, 2016), process efficacy (Anumba, Egbu, & Carrillo, 2008), and reduction in errors and claims (Sokhanvar, Matthews, & Yarlagadda, 2014). Such organizations can deliver more innovative solutions to their clients (Anumba et al., 2008). Global economic competition has compelled many organizations to explore all possible options for improving the delivery of their products and services. This has necessitated an increase in the number of construction companies that apply actions to improve their projects' performance by reducing all kinds of waste during construction with proper planning processes (Bowden, Dorr, Thorpe, & Anumba, 2006).

The construction sector, in general, is characterized by frequent deadlines, delays, budget overruns and problems in maintaining proper quality. To prevent these problems, it is necessary to set the knowledge gained from reprojects into new projects. The construction organizations in Nigeria have been under considerable pressure to improve the efficiency of the construction process. Dave and Appleby (2015) advised that organizations must constantly monitor, measure, evaluate and

improve their processes to remain competitive. Construction organizations are no different in this aspect and increasingly realize the need for process improvement due to external and internal pressures. Raj and Singh (2018) propose socio-economic and demographic characteristics of laborers in Varanasi City's construction industry (India). The construction industry has been widely criticized for its low quality of delivery of construction projects even in developed countries (Amri & Marey-Pérez, 2020). Process improvement in construction firms increases awareness of processes that would enhance organizational capability to explore and exploit organizational competencies by sharing good practices across projects; identifying improvement areas that need organizational attention and efforts; prioritizing activities to achieve continuous improvement; and facilitating discussions on process improvement throughout the organization so that people can share contexts beyond their immediate project or functional boundaries (Mellado, Lou, & Becerra, 2020). The success of organizational-level process improvement hinges on the individual and organizational capabilities to create, transfer, and exploit knowledge to the organization's advantage. Process improvement requires developing and integrating internal and external knowledge across all levels of the construction organization (Razkenari, Fenner, Shojaei, Hakim, & Kibert, 2020). The synergy between knowledge management and organizational processes is key to successfully building and developing an enabling environment for better results in the construction industry (Pellegrini, Ciampi, Marzi, & Orlando, 2020), an analysis of the quality of life of construction laborers in varanasi, India using quantile regression (Raj, Swain, Behera, & Singh, 2021), evaluation of important variables affecting labour performance in Sri Lanka's building industry (Manoharan, Dissanayake, Pathirana, Deegahawature, & Silva, 2023), an assessment of the industry's performance Chinese construction industry's adoption of Industry 4.0 digitalization techniques for sustainable construction management (Sajjad et al., 2023), and utilizing the rapid application development method to create a knowledge management system for national construction company employee performance improvement (Yumhi, Dharmawan, Febrian, & Sutisna, 2024). This study, therefore, seeks to evaluate knowledge management practices among construction professionals in construction firms as they affect construction processes in the Nigerian construction industry. The main contributions are given below:

1. This study provides valuable insights into how these practices can enhance the overall performance of the construction industry in Nigeria.
2. The finding indicates a strong agreement among industry professionals regarding the importance

of knowledge management practices for process improvement in construction firms.

3. The population analysis enhances the generalizability of the study's findings to similar construction firms in Nigeria.

2. METHODOLOGY

This study used a survey research design with a questionnaire to obtain data from registered construction firms in Lagos State. The population for this research was One Hundred and Fifty-Nine (159) registered construction firms in Lagos State. The data was obtained from the Lagos State Development and Property Corporation. The five-point Likert scale questions ranged from 1- very low to 5- very high (Green et al., 2019). The reliability statistics of the items showed a Cronbach's alpha value ranging from 0.799 to 0.967, signifying a very high level of internal consistency of the items.

2.1 Data Analysis

2.1.1 Profile of the respondent

Table 2.1: Demographic Information of Respondents

Variables	Classification	Frequency	Percent
Gender	Male	80	69.6
	Female	35	30.4
	Total	115	100.0
Type of Organization of respondent	Government	29	25.2
	Private	75	65.2
		11	9.6
	Total	115	100.0
Specialty of Organization	Consulting	34	29.6
	Contracting	81	70.4
	Total	115	100.0
Profession of Respondents	Quantity Surveyor	68	59.1
	Engineer	18	15.7
	Architect	9	7.8
	Builder	20	17.4
	Total	115	100.0
Academic Qualification of Respondents	HND	41	35.7
	BSc/BTech	35	30.4
	MSc/MTech	37	32.2
	PhD	2	1.7
	Total	115	100.0
Professional Qualification of Respondents	MNIA	8	7.0
	MNIQS	66	57.4

	MNIOB	18	15.7
	MNICE	18	15.7
	Others	5	4.3
	Total	115	100.0
Years of Experience of Respondents in the Profession	1-5	7	6.1
	6-10	9	7.8
	11-15	28	24.3
	16-20	48	41.7
	20 and above	23	20.1
	Total	115	100.0
Number of Projects Involved	1-5	7	6.1
	6-10	10	8.7
	11-15	25	21.7
	16-20	49	42.6
	20 and above	24	20.9
	Total	115	100.0

The respondent is depicted in Figure 1. It shows the general demographics of the respondents. It can be seen from the table that 69.6 per cent of the respondents are Male, while 30.4 per cent are Females.

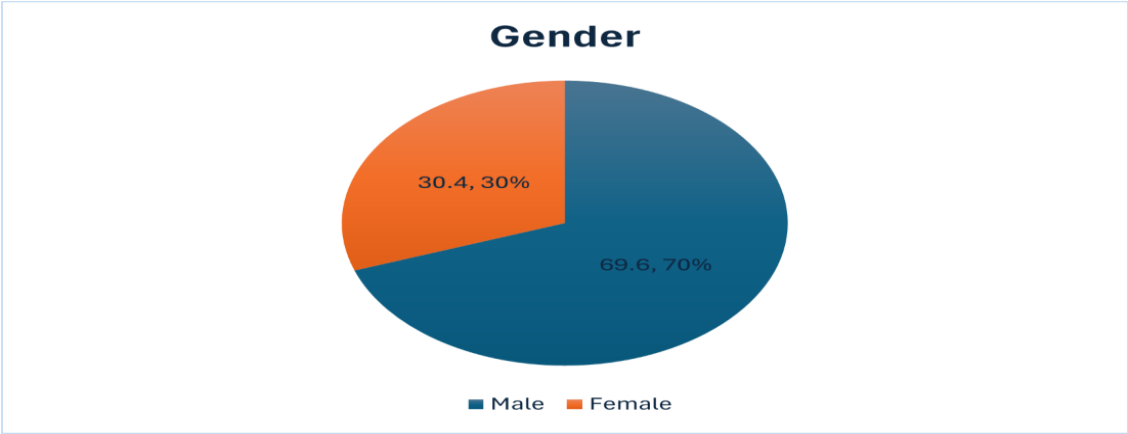


Figure 1. Gender.

Moreover, 25.2 percent of the respondents work in Government firms, 65.2 percent in private sector engagements, and 9.6 others (Figure 2).

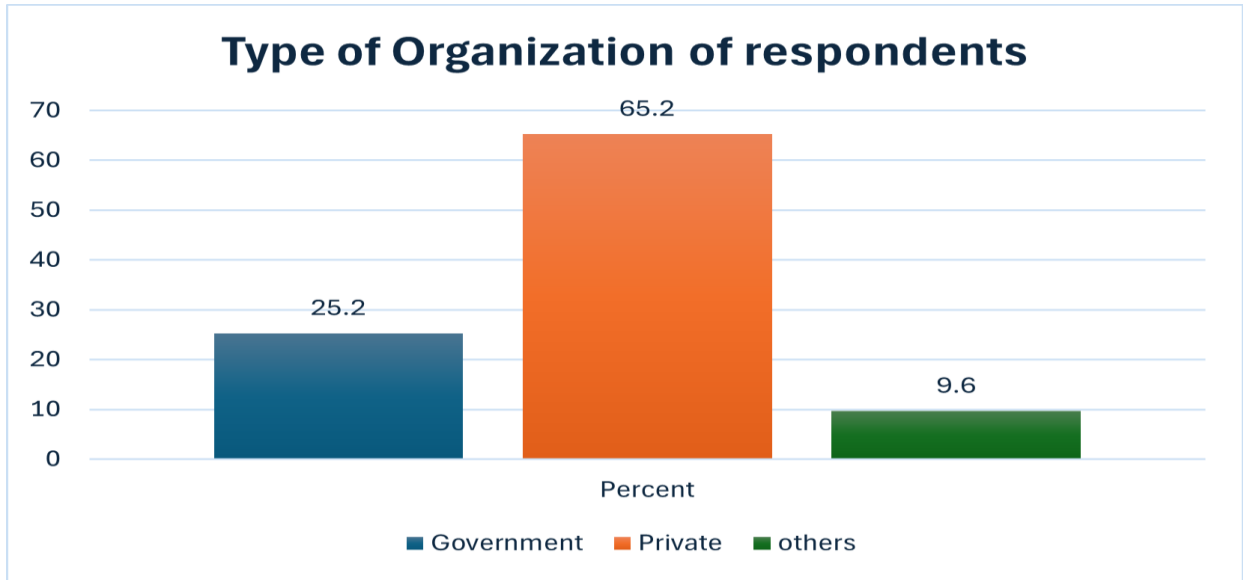


Figure 2: Type of organization of respondents.

Figure 3 indicates the organisation's speciality is mostly contracting services, having a percentage of 70 and consulting 30 percent.

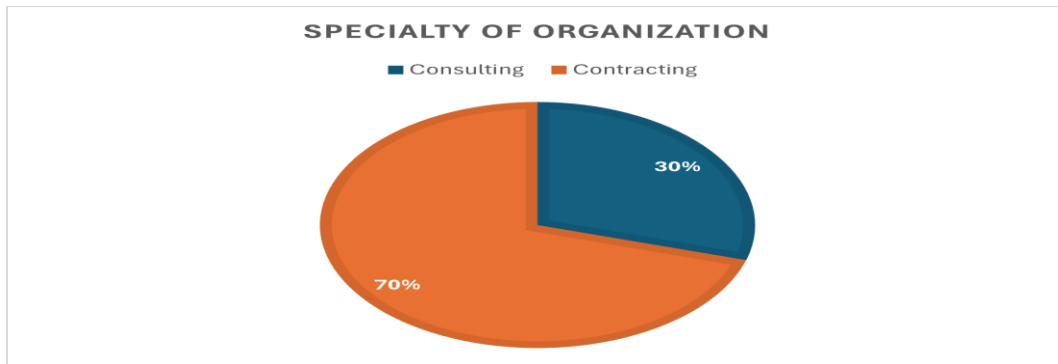


Figure 3. Speciality of organization

Furthermore, Figure 4. Show that 59.1 percent of the respondents are Quantity Surveyors, 15.7 percent are Engineers, 7.8 percent are Architects, and 17.4 percent are Builders.

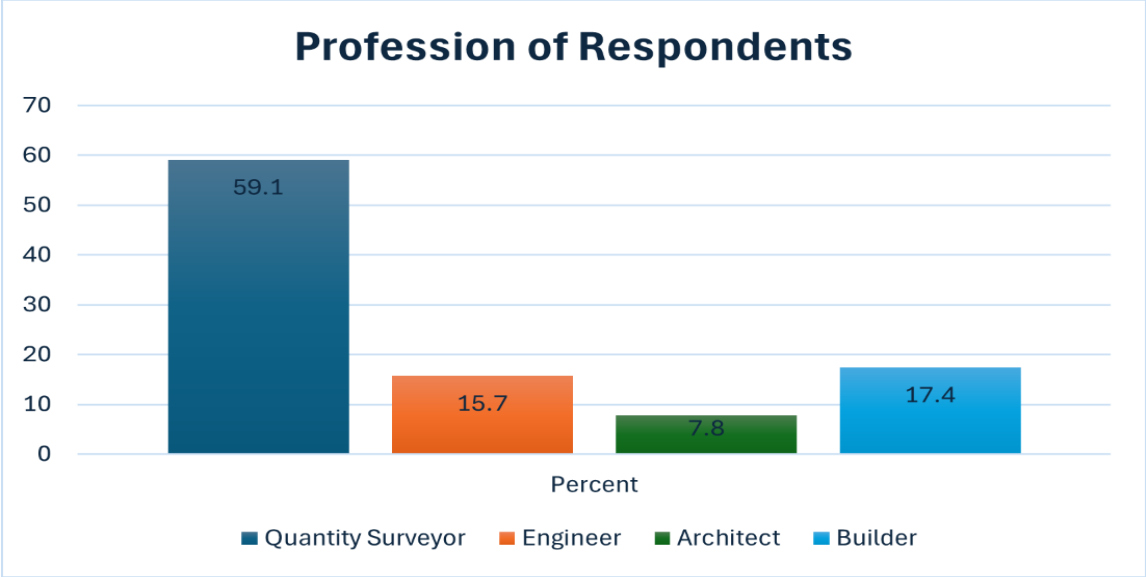


Figure 4. Profession of respondents.

Figure 5 shows that their academic qualifications range from HND 35.7 percent, BSc/BTech 30.4 percent, MSc/MTech 32.2 percent and PhD, just 1.7 percent.

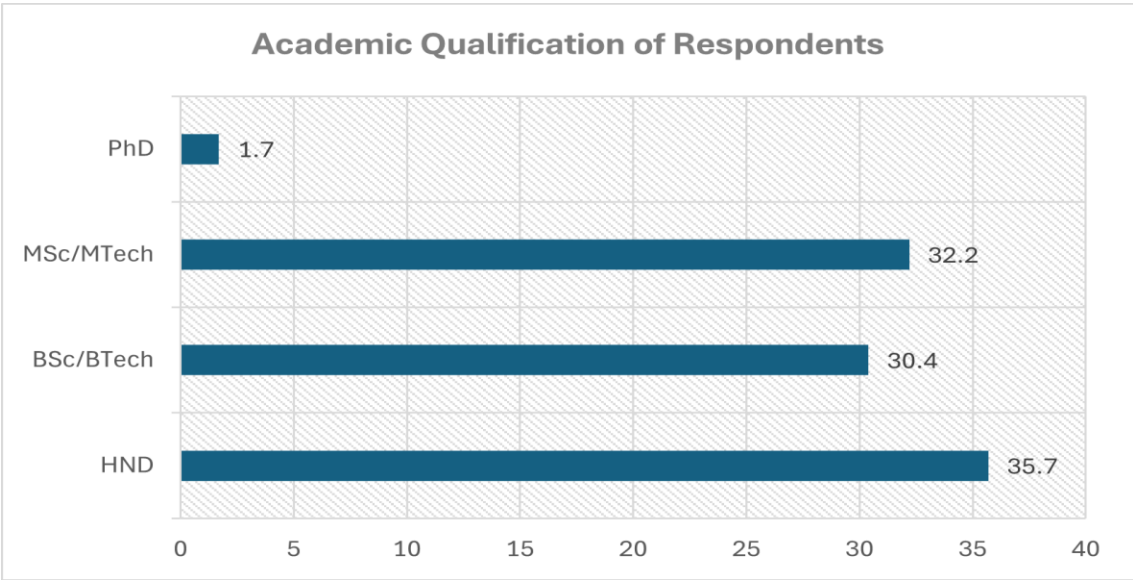


Figure 5. Academic qualification of respondents.

In addition, the respondent's professional qualifications are MNIA 7.0%, MNIQS 57.4%, MNIOB 15.7%, MNICE 15.7 %, and others 4.2 %, as shown in Figure 6.

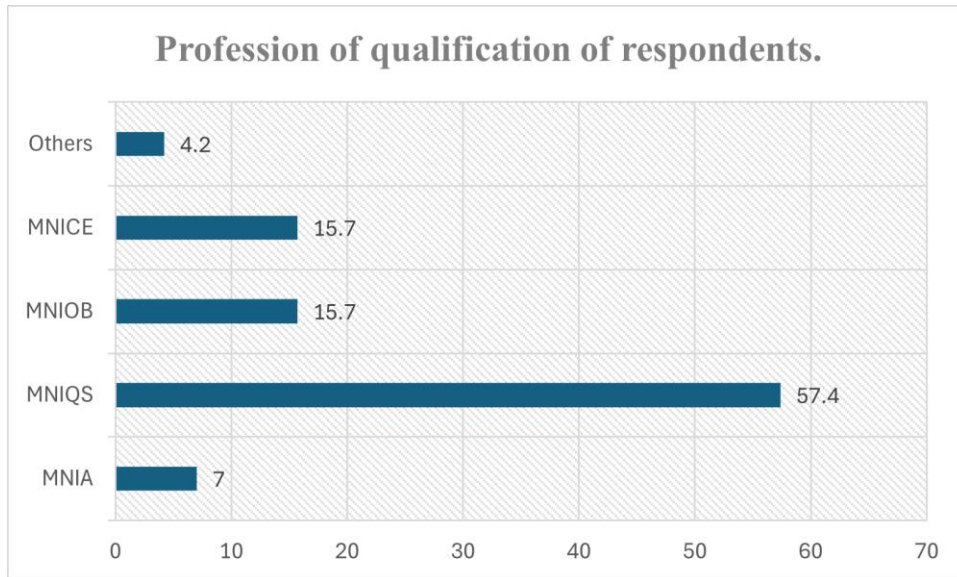


Figure 6. Profession of qualification of respondents.

Figure 7 shows 6.1% with an average of 1-5, 7.8% with an average of 6-10, 24.3% with an average of 41.7, and Others with just 20.1 % with an average of 20 and above years of experience.

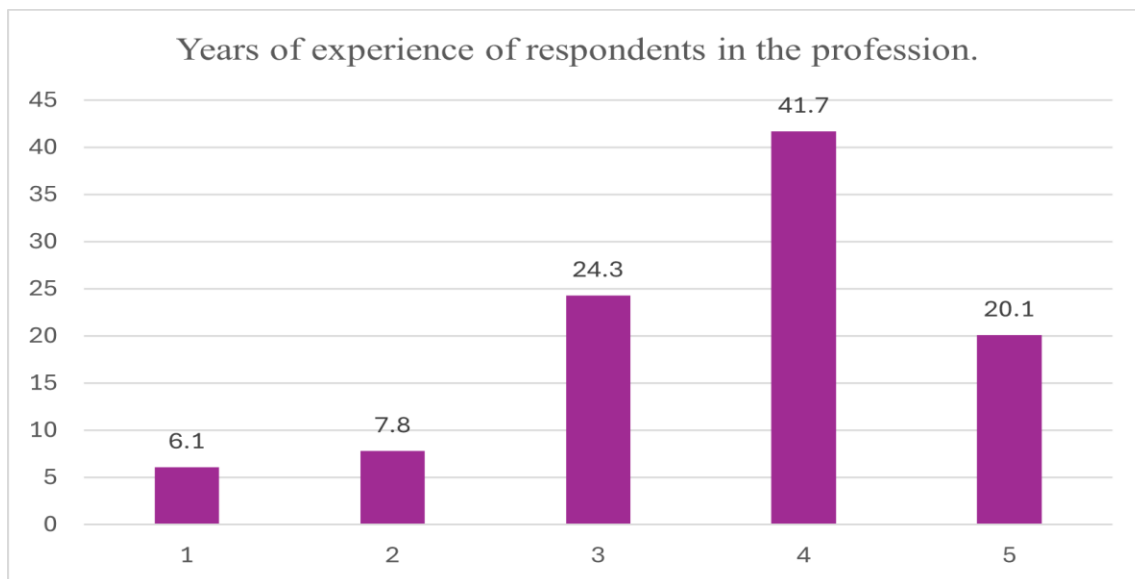


Figure 7. Years of experience of respondents in the profession.

2.1.2 Knowledge Management Practices Used by Construction Firms

Table 2.2 shows the knowledge management practices used by construction firms. It can be seen

that we secured our study solely through bidding and tendering procedures, with a Mean Item Score of 4.55 was ranked first. Next to this is new entrants are normally properly oriented and trained, with a Mean Item Score of 4.45, which was ranked second; consolidation of experience gained was ranked third with a Mean item Score of 4.43. Moreover, the Human resources management unit in my office delivers excellently and was ranked fourth with a Mean Item Score of 4.38. Relationships with clients are highly prioritized in my firm has a Mean Item Score of 4.35, Clients' complaints are listened to and learnt from for complete satisfaction has a mean Item score of 4.32. Proper documentation to carry clients along contractual obligations has a mean Item Score of 4.21. Clients' expectations are set as targets to be surpassed in my organization has a Mean Item Score of 4,10 and is ranked fourth, fifth, sixth, seventh and eighth, respectively. Moreso, Existing operational policies can solve challenges for new staff was ranked ninth with a Mean Item Score of 4.08.

The knowledge base of my company can ensure firm growth in the long run was ranked tenth with a Mean Item Score of 4.07, Human resources management unit in my office delivers excellently was ranked eleventh with a Mean Item Score of 4.04, existing knowledge base can be leveraged upon to guarantee profitability and Knowledge base is often maintained through basic office procedures both has a mean item score of 3.95 and are ranked twelfth respectively. Consolidation of experience gained has a mean item score of 3.95, was ranked fourteenth; human resources management units exist actively in my company structure was ranked fifteenth and had a mean item score of 3.92, was ranked fifteenth; Research and knowledge improvement is prioritized in my organization was ranked sixteenth has a mean item score of 3.81. was ranked sixteenth, My office recognizes that people make all other components of KM work has a mean item score of 3.78 was ranked seventeenth, leveraged upon existing knowledge In managing inter-firm competition has a mean item score of 3.73 and was ranked eighteenth. Myself and colleagues are very comfortable with our office welfare package has a mean item score of 3.70 and was ranked nineteenth Fit for purpose technology is being deployed to meet organizational targets has a mean item score of 3.57 and was ranked twenty Office software use and training are regularly organized to staff has a mean item score of 3.56 and ranked twenty-first. Necessary hardware components training on usage is done periodically has a Mean Item Score of 3.54 and ranked least. Tabachnick and Fidell, 2007 suggested 0.60 as the minimum value of the KMO index suitable for factor

analysis. Field (2009) opined that a data set that attained a KMO index of 0.50 and Bartlett's test of sphericity where ($p < 0.05$) is good enough for factor analysis. From **Table 2.2**, it is observable that a KMO index of 0.818 (greater than 0.5) was obtained, and Bartlett's test of sphericity was significant ($p = 0.000$). These results confirmed that the data was appropriate for factor analysis. Figure 8 shows the knowledge management practices of the respondents.

Table 2.2: Knowledge Management Practices Used by Construction Firms

Knowledge Management Practices	Mean	Std. Dev.	Rank
We secure our projects solely through bidding and tendering procedures	4.55	.830	1 st
New entrants are normally properly oriented and trained	4.45	.752	2 nd
Consolidation of experience gained	4.43	.956	3 rd
Human resources management unit in my office delivers excellently	4.38	.779	4 th
Relationships with clients is highly prioritized in my firm	4.35	.838	5 th
Clients' complaints are listened to and learnt from for complete satisfaction	4.31	.912	6 th
Proper documentation to carry clients along contractual obligations	4.21	.884	7 th
Clients' expectations are set as targets to be surpassed in my organization	4.10	.810	8 th
The deployment of improved technology to improve client satisfaction	4.04	.968	9 th
Claims and disputes rarely occur and if they do, they are settled cordially	3.94	.930	10 th
Existing operational policies can solve challenges for new staff	4.08	.850	11 th
The knowledge base of my company can ensure firm growth in the long run	4.07	.886	12 th
existing knowledge base can be leveraged upon to guarantee profitability	3.95	.857	13 th
Knowledge base is often maintained through basic office procedures	3.95	.916	14 th
Human resources management units exist actively in my company structure	3.92	1.061	15 th

Research and knowledge improvement is prioritized in my organization	3.81	.945	16 th
My office recognizes that people make all other components of KM work	3.78	.935	17 th
leveraged upon existing knowledge in managing inter-firm competition	3.73	.967	18 th
Myself and colleagues are very comfortable with our office welfare package	3.70	1.156	19 th
Fit-for-purpose technology is being deployed to meet organizational targets	3.57	.928	20 th
Office software use and training are regularly organized to staff	3.56	1.086	21 st
Necessary hardware components training on usage is done periodically	3.54	1.118	22 nd

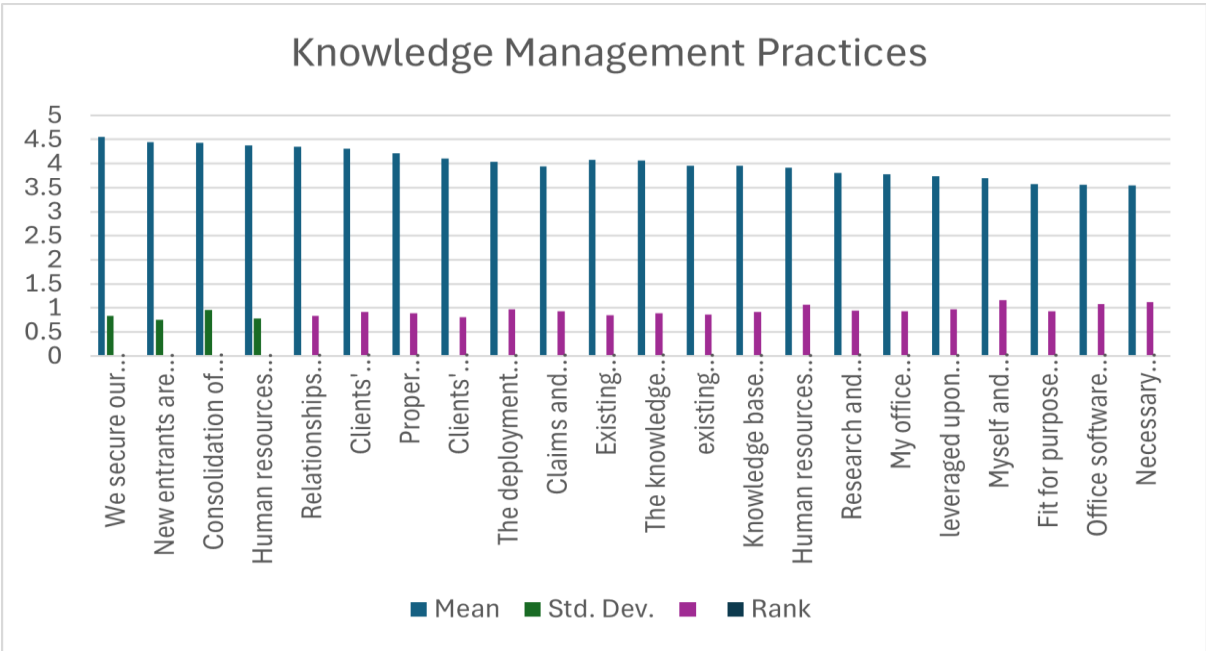


Figure 8. Knowledge management practices

Table 2.3 shows the test on the Knowledge Management Practices used by construction firms. The Kruskal-Wallis H test reveals that of all the variables tested, Clients' expectations are set as targets

to be surpassed, The knowledge base of my company can ensure firm growth in the long run, A knowledge base is often maintained through basic office procedures, Human resources management units exist actively in my company structure, Office software use and training are regularly organized to staff, Fit for purpose technology is being deployed to meet organizational targets, leveraged upon existing knowledge In managing inter-firm competition and Research and knowledge improvement is prioritized in my organization has a *P*-value greater than 0.05. This means the professionals have converging ideas on these variables. The remaining fourteen practices have a *p-value* of less than 0.05, which denotes that there is a significant difference in the opinions of the professionals, which makes the alternate hypothesis accepted while the null hypothesis was rejected. The fourteen practices are Relationships with clients are highly prioritized in my firm, Clients' complaints are listened to and learnt from for complete satisfaction, Proper documentation to carry clients along contractual obligations, We secure our projects solely through bidding and tendering procedures, The deployment of improved technology to improve client satisfaction, Claims and disputes rarely occur, and if they do, they are settled cordially, New entrants usually are properly oriented and trained, Existing operational policies can solve challenges for new staff, Human resources management unit in my office delivers excellently, an existing knowledge base can be leveraged upon to guarantee profitability, Consolidation of experience gained, My office recognizes that people make all other components of KM work, Myself and colleagues are very comfortable with our office welfare package and Necessary hardware components training on usage is done periodically. The twenty-two (22) variables were subjected to factor analysis; it observable from **Table 2.3** that all variables (KMPs) had a commonality score that is greater than 0.2; therefore, in line with the recommendation of Child (2009), it is safe to proceed with the factor analysis. This is because the ratio of each item's unique variance to its shared variance is acceptable (Effendi, Matore, Khairani, & Adnan, 2019). Figure 9 shows the Kruskal-Wallis H test for the Knowledge management practices of the respondents.

Table 2.3 Kruskal-Wallis H Test for Knowledge Management Practices Used by Construction Firms

S/N	Knowledge Management Practices	Chi-Square	Df	Asymj Sig
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I.	Relationships with clients is highly prioritized in my firm	4.474	3	0.19 2
II.	Clients' complaints are listened to and learnt from for complete satisfaction	8.455	3	0.03 7
III.	Proper documentation to carry clients along contractual obligations	3.806	3	0.00 3
IV.	Clients' expectations are set as targets to be surpassed in my organization	0.603	3	0.08 9
V.	We secure our projects solely through bidding and tendering procedures	7.821	3	0.00 5
VI.	The deployment of improved technology to improve client satisfaction	5.358	3	0.01 4
VII.	Claims and disputes rarely occur and if they do, they are settled cordially	1.817	3	0.01 1
VIII.	New entrants are normally properly oriented and trained	3.266	3	0.03 5
IX.	Existing operational policies can solve challenges for new staff	5.961	3	0.01 4
X.	The knowledge base of my company can ensure firm growth in the long run	0.701	3	0.07 3
XI.	Human resources management unit in my office delivers excellently	2.949	3	0.00 4
XII.	Existing knowledge base can be leveraged upon to guarantee profitability	1.243	3	0.00 7
XIII.	Knowledge base is often maintained through basic office procedures	1.021	3	0.07 6
XIV.	Consolidation of experience gained	5.927	3	0.01 1
XV.	Human resources management units exist actively in my company structure	6.742	3	0.08 1

XVI.	Research and knowledge improvement is prioritized in my organization	6.369	3	0.095
XVII.	My office recognizes that people make all other components of KM work	3.488	3	0.023
XVIII.	leveraged upon existing knowledge In managing inter firm competition	0.766	3	0.058
XIX.	Myself and colleagues are very comfortable with our office welfare package	2.732	3	0.004
XX.	Fit for purpose technology is being deployed to meet organizational targets	3.710	3	0.902
XXI.	Office software use and training are regularly organized to staff	6.613	3	0.813
XII.	Necessary hardware components training on usage is done periodically	4.351	3	0.001

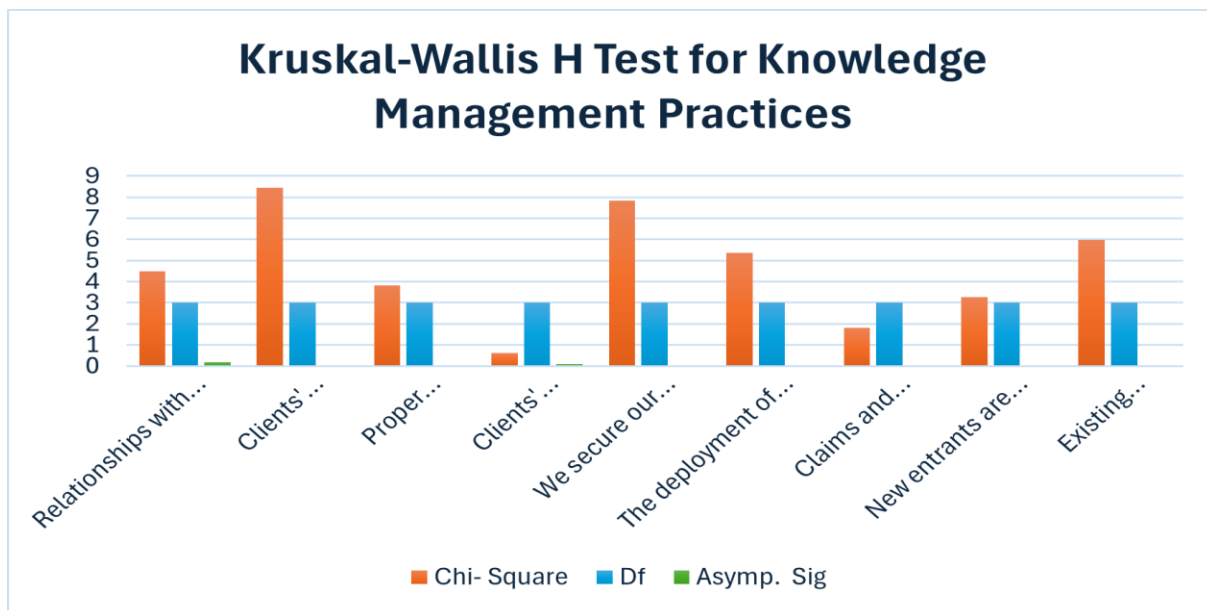


Figure 9. Kruskal-Wallis H test for Knowledge management practices.

2.1.2 Impacts of Knowledge Management on Process Improvement in Construction Firms

Table 2.4 shows the impacts of knowledge management on process improvement in construction firms. It could be seen that Reducing the occurrence of reworks has a positive r value = .620 and a p value = .000, Utilizing knowledge management deliverables has a positive r value = .628 and a p value = .000, Helping in the reduction of the dispute has a positive r value = .601 and a p value = .000, Improving quality delivery has a positive r value = .680 and a p value = .000, Increase in firm competitiveness has a positive r value = .759 and a p value = .000, Reduction of Organization waste has a positive r value = .736 and a p value = .000, Improved Organizational Practice. .756 and a p value = .000, Simplification of processes has a positive r value = .731 and a p value = .000, Cost savings on expenditure has a positive r value = .620 and a p value = .000, Improvement of profitability has a positive r value = .731 and a p value = .000, Reduced risk has a positive r value = .679 and a p value = .000, Improved client satisfaction has a positive r value = .575 and a p value = .000, Improve process visibility has a positive r value = .644 and a p value = .000, Promote organizational compliance has a positive r value = .770 and a p value = .000, Effective resource management has a positive r value = .770 and a p value = .000, The person correlation was found to be positive and statistically significant. This was shown for all the values not greater than ($r = .679, p < .000$). Hence, it could be said that. Knowledge management has a great impact on process improvement. That is, increasing knowledge management variables would lead to a higher process improvement as all the variables are statistically significant.

Table 2.4 Impacts of Knowledge Management on Process Improvement in Construction Firms

	ROR	UKM	AKM	IQD	IFC	ROW	IOP	SOP	CSE	IOP	R.R	ICS	IPV	POC	ERM
Reduce occurrence of reworks	1	.483**	.367**	.680**	.452**	.445**	.423**	.571**	.620**	.525**	.450**	.375**	.508**	.532**	.479**
Utilizing k.M deliverables	.483**	1	.408**	.530**	.399**	.482**	.596**	.529**	.574**	.628**	.437**	.428**	.552**	.425**	.356**
Helps in the reduction of dispute.	.367**	.408**	1	.601**	.531**	.563**	.556**	.580**	.417**	.602**	.386**	.420**	.307**	.180	.107
Improving quality delivery.	.680**	.530**	.601**	1	.703**	.725**	.575**	.775**	.533**	.646**	.564**	.536**	.589**	.494**	.419**
Increase in firm competitiveness	.452**	.399**	.531**	.703**	1	.736**	.756**	.699**	.323**	.543**	.548**	.572**	.459**	.438**	.360**
Reduction of Organization waste.	.445**	.482**	.563**	.725**	.736**	1	.687**	.683**	.322**	.536**	.390**	.483**	.506**	.256**	.244**
Improved Organizational Practice.	.423**	.596**	.556**	.575**	.756**	.687**	1	.683**	.389**	.664**	.582**	.605**	.469**	.333**	.213*
Simplification of processes	.571**	.529**	.580**	.775**	.699**	.683**	.683**	1	.584**	.731**	.618**	.544**	.651**	.521**	.476**
Cost savings on expenditure	.620**	.574**	.417**	.533**	.323**	.322**	.389**	.584**	1	.653**	.529**	.313**	.575**	.561**	.592**
Improvement of profitability	.525**	.628**	.602**	.646**	.543**	.536**	.664**	.731**	.653**	1	.679**	.555**	.559**	.615**	.449**
Reduced risk	.450**	.437**	.386**	.564**	.548**	.390**	.582**	.618**	.529**	.679**	1	.575**	.631**	.699**	.689**
Improved client satisfaction	.375**	.428**	.420**	.536**	.572**	.483**	.605**	.544**	.313**	.555**	.575**	1	.456**	.352**	.424**
Improve process visibility	.508**	.552**	.307**	.589**	.459**	.506**	.469**	.651**	.575**	.559**	.631**	.456**	1	.644**	.711**
Promote organizational compliance	.532**	.425**	.180	.494**	.438**	.256**	.333**	.521**	.561**	.615**	.699**	.352**	.644**	1	.770**

Effective resource management	.479**	.356**	.107	.419**	.360**	.244**	.213*	.476**	.592**	.449**	.689**	.424**	.711**	.770**	1
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3. Discussion of Findings

The findings on the various knowledge management practices used by construction firms show that projects are secured solely through bidding and tendering procedures, new entrants are properly oriented and trained on the organizational culture and basics, consolidation of experience gained to be tested through individual staff being allowed to manage small scale projects and maintenance works and Personnel Management/Human resources management units to existing actively in the companies structure do construction firms use the primary knowledge management practices (Kivrak, Arslan, Dikmen, & Birgonul, 2008). Once employees are selected, they must be prepared to do their jobs, which is when orientation and training occur. Orientation and training programs are important in developing a committed, flexible, high-potential workforce and socializing new employees. In addition, these programs can save employers money, providing big returns to an organization because an organization that invests money to train its employees results in both the employees and the organization enjoying dividends. The findings of Oyewobi, Abiola-Falemu, and Ibronke (2016) opined that Orientation programs not only improve the rate at which employees can perform their jobs but also help employees satisfy their desires to feel they are part of the organization's social fabric also supports. The findings on the impacts of knowledge management on process improvement in construction firms show that improving quality delivery, increasing firm competitiveness, effective resource management, and reducing Organizational waste are the significant impacts of knowledge management on process improvement in construction firms (Beheshti & Beheshti, 2010). Knowledge, if properly managed, will go a long way to improving the quality of construction project delivery, thereby increasing client satisfaction and promoting the firm's image (Kent & Becerik-Gerber, 2010).

4. Conclusions

In conclusion, the study underscores the pivotal role of knowledge management practices in augmenting process improvement within construction firms. Prioritizing and integrating these practices into operations can enhance project outcomes, bolster competitiveness, and drive sustainable growth in the industry. The findings emphasize the need for ongoing training, enlightening professionals on knowledge management, effective human resources management, and developing information processing mechanisms to facilitate this integration successfully. It

further suggests promising avenues for future research in project governance and public building projects. These include comparative studies across states in Nigeria, focusing on specific project types or contractual arrangements, longitudinal studies to track knowledge management practices over time, cross-industry studies to learn from other sectors, and international comparative studies for broader insights. These directions can enhance our understanding of how knowledge management impacts project delivery in the construction industry.

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