

CHAPTER ONE

1.0

INTRODUCTION

1.1 Background to the Study

Globally, the construction sector is a powerful sector that provides job, stimulates growth and contributes to the economic development of any nation and impact positively on other sectors (Meshksar, 2012; Nnadi, Okeke and Alintah-Abel, 2016). Due to the nature of the construction industry, construction organisations are faced with a lot of competition for their survival, success and growth which anchored on their ability to strategically cope with the dynamism of the construction market (Yusof and Abubakar, 2012).

Unfortunately, the construction projects handled by most construction organisations in Nigeria are confronted with a lot of performance issues, such as poor quality delivery, time and cost overruns as well as owner dissatisfaction (Hafez, 2001; Ademeso and Windapo, 2008). These problems have been attributed to poor knowledge management and reluctant to take-up innovative activities by most of these organisations (Alhaji, Amiruddin and Abdullah, 2013a; 2013b). Subsequently, the construction firms in Nigeria are under tremendous pressure to improve their efficiency and performance in order to eliminate delays, time and cost overrun, unnecessary variations, rework, loss of profit, and loss of business that characterised the sector due to their actions. Despite increase in investment in training, education and research in order to improve on KM implementation in construction organisations there exist certain weaknesses and challenges related to KM which directly affect organisational performance (Alsereihy, Alyoubi and El-emary 2012).

The construction organisations are information generators as most contracts require that every stakeholders exchange vital information across all phases of the projects (Yusof *et al.*, 2012). Ikediashi, Ogunlanaa, Oladokuna and Adewuye, (2012) posit that the successful execution of construction projects relies on the proficiency and usefulness of workers, employees and the project team members which are all under the custody of organisation. Krogh (2002) affirms that when employees communicate and share their knowledge, experiences, lessons learnt, and insights; performances generally are improved. At the preliminary stages of construction projects, an enhanced result could be attained through the recycling of experiences. Ideas, information and knowledge acquired and gained from past projects are brought to play in order to evade recurrence of the blunders of the past projects.

The benefits of knowledge distribution includes improving the worth of the resolutions, decreasing the necessity to consult past projects, and decreasing the time and cost of resolving difficulties and issues (Tserng and Lin, 2004). Thus, knowledge management (KM) is undoubtedly a crucial and indispensable tool for achieving, sustaining and improving organisational efficiency and competitive advantages (Santoro, Vrontis, Thrassou and Dezi 2018; Wie and Miraglia, 2017). Knowledge is a very important asset for gaining competitiveness by construction firms; it is promoted by an environment desirous of innovation and better performance records (Proksch, Haberstoh and Pinkwart, 2017; Kumaravel, and Vikkraman, 2018).

Knowledge of construction processes and practices are at the centre of company's core competence, and the intellectual assets of construction firms are deeply rooted in site management practices. Robinson, Carrilo, Anumba and al-Ghassani, (2001) confirmed that construction firms are yet to employ any viable systematic methods of creating,

capturing, storing sharing and re-using of their professionals' knowledge products, people and processes. The new source of wealth is knowledge; it is an intangible and intellectual asset that must be managed.

There is a considerable pressure on the construction organisations globally, Nigeria inclusive to enhance and improve the efficiency of construction processes in order to mitigate the delays and unnecessary variations leading to time and cost overruns in construction projects (Yusof *et al.*, 2012). Majority of workers in construction organisations in Nigeria acquired wealth of knowledge through training and experience, and these are hardly conveyed or transferred to the younger ones (or new entrants) before their retirement and /or exit from the system. Therefore, the performances of these organisations could be affected and their future threatened if the organisations failed to embrace Knowledge Management. Hence, this study assesses knowledge management (KM) practices among construction organisations with the intention to eliminate or reduce poor performance associated with lack of knowledge management.

1.2 Statement of the Problem

There is the need for the construction organisation to reflect and take decision on timely basis as the construction industry is becoming collaborative, complicated and dynamic. Yusof *et al.* (2012) stressed that there is fast growing information in construction process which leads to the importance of managing knowledge in organisations. This idea aid the application of information and knowledge generated in the past construction projects which is critical and most important resources contributing to project successes (Alhaji *et al.*, 2013a; Tan, 2015).

A lot of data, knowledge and experiences are generated during the construction phases. Most at times these knowledge and experiences vanished because they are not recorded, captured, handled, stored and shared or disseminated among the employees for re-used in future and subsequent projects (Alhaji *et al.*, 2013a, and 2013b). Consequently, problems, mistakes, errors that occurred in previous projects, become recycled in new projects (Oke, Ogunsemi and Adeeko, 2013).

Furthermore, most organisations in Nigeria are facing challenges in handling, storing, organizing and disseminating the information generated when needed to design and build new facility. Therefore for construction organisations to enhance their productivities, performances and promote their images there is the need for the efficient and effective knowledge management which is a critical and essential requirement in construction organisations. Oke *et al.* (2013) affirmed that, knowledge management practices among the construction organisations in Nigeria are still at the infancy.

High percentage organisations failed in term of delivery time, budget and quality on most projects handled in Nigeria due to poor knowledge management practices. The problems would have been overcome or reduced if past experience or knowledge gained in the previous contract has been re-used. More often and majority of the construction organisations do not keep record of the previous works, and the problem is compounded because those that handled them have left for greener pasture.

1.3 Research Questions

The followings are the questions this study intends to answer:-

- i. What are the Knowledge Management processes in construction organisations?
- ii. What are the critical success factors (CSFs) of knowledge management practices in construction organisations?

- iii. What are the barriers to knowledge management practices in the construction organisations?
- iv. Does knowledge management practice influence the performance of construction organisations?
- v. What are the strategies for improving on the knowledge management practices in construction organisations?

1.4 Aim and Objectives of the Study

The aim of this study is to investigate Knowledge Management practices in construction organisations, with a view to suggest strategies for improvement.

In order to achieve the aim of this study, the following objectives were set;

- i. To investigate knowledge management process in construction organisations in Abuja.
- ii. To evaluate critical success factors (CSFs) of knowledge management adoption in construction organisations.
- iii. To assess barriers to knowledge management practices in the construction organisations.
- iv. To determine the influence of knowledge management practice on the performance of construction organisations.
- v. To suggest strategies for improving knowledge management practice in construction organisations.

1.5 Justification of the Study

The target of this study is to improve performance of the construction sector by encouraging the organisations to embrace knowledge management practices. The problems of time/cost overruns and poor quality of construction projects that

characterised the industry in the study area will reduce if not totally eliminated if knowledge acquired in the previous projects are shared and properly managed by those organisations involved. Lin and Lin (2006) stated that knowledge can be reprocessed and exchanged among the engineers and other construction professionals that are involved in the construction works.

Various scholars have written on knowledge management in construction sector due to associated benefits (Alhaji *et al.*, 2013a, and 2013b). For instance, Alhaji *et al.* (2013b) examined Project Knowledge Management (PKM) in Civil Engineering Firms in Nigeria, and discovered that knowledge management has not fully practiced in the Civil Engineering construction Firms.

Similarly, Oke *et al.* (2013) in a study carried out in the south western states of Nigeria on knowledge management. The study found that funding is the major issues in the adoption of ICT for knowledge management by construction professionals. None of these studies assessed knowledge management practices among construction organisations to ascertain whether the organisations agreed on the practices

Determination of CSFs of Km in Nigeria is important since those developed in other countries may not be applicable to Nigeria due to economic and geographical differences.

The study provides more understanding of the concept of knowledge management in the construction industry in Nigeria and it would aid policy or decision-makers in formulating suitable policy/decision regarding quality of employees to be engaged. Hence, this study assesses knowledge management practices among construction organisations in Nigeria.

1.6 Scope of the Study

The study covers knowledge management practices among three categories of construction organisations in Abuja, Nigeria. Professionals working in small, medium and large construction organisations are the target population for the study. The rationale for choosing Abuja for the study is based on the premises that Abuja is the seat of power and administrative headquarters of Nigeria with numerous construction projects, construction firms and professional bodies. In addition, Abuja is a seat of power with a lot of construction companies, consulting firms, practitioners and professional bodies have their head offices or branches (Aje *et al.*, 2015). Moreover, a lot of projects (both private and public) are sited in Abuja. Abuja is one of the metropolitan cities in Nigeria with one of the highest population of construction professionals practicing in either constructing or consulting firms within the built environment (Saidu and Shakantu, 2016).

CHAPTER TWO

2.0 LITERATURE REVIEW

2.1 Concept of Knowledge Management in Construction Organisation

Knowledge has evolved into a vital innovative influence of production and became imperative means of modest benefit to organisation and its customers (Ahmad, Idiake, Mohammed, and Alhassan, 2020). Idris, Bahru, Ali and Aliagha (2015) further advanced that many construction organisations engaged mostly in knowledge management application to respond to the emerging demands resulting from improvement of their professional practices.

The concept of knowledge management (KM) has been defined by numerous scholars reflecting their area of interest and view point. Botha, (2004) and Oke *et al.* (2013) defined knowledge management (KM) as a systematic process of managing important knowledge as well as its accompanying process of generating, putting together, organising, diffusing, usage and manipulation. Knowledge management is a systematic process for acquiring, organizing, sustaining, applying, sharing, and renewing both tacit and explicit knowledge to improve the organisational productivity, increase organisational adaptability, increase values of existing products and services, and/or create new knowledge-intensive products, processes and services (Gottschalk and Khandelwal, 2004). Bounfour (2003) defines KM as a set of procedures, infrastructures, technical and managerial tools, designed to create, share and leverage information and knowledge within and around organisations. According to Oke *et al.* (2013), knowledge management involves the turning of individual and personal knowledge into company knowledge that are shared widely throughout the organisation. They further emphasized that organisations are packed with knowledge and information.

Kull (2005) noted that knowledge management goes beyond delivering the right information to the right people at the right time, but rather, it's about enabling people to understand what they observed and empowering them to use their judgment. It was further maintained that the ability of an organisation to leverage soft knowledge and learn faster, its competitors may be the only source of sustainable advantage in the future.

Based on aforementioned definitions, therefore, the description of knowledge management differs from one scholar to the other, but the central idea is to take KM seriously by allowing processes that add and generated value (Oke *at al.*, 2013). KM has been empirically designed to improve the speed, time, quality, efficiencies and cost of production of the construction industry, (Ahmad and *et al.*, 2020).

The Concept of Knowledge Management in construction organisations is summarised in Figure 2.1

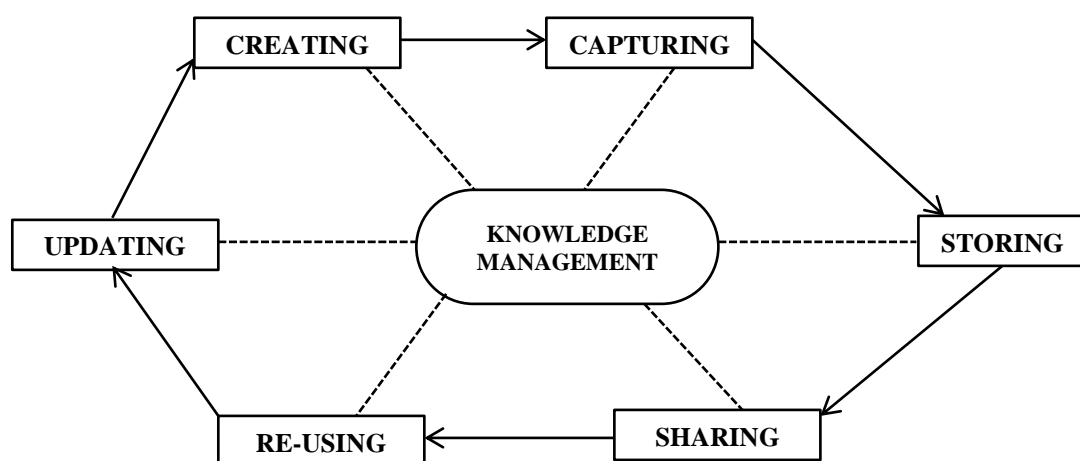


Figure 2.1 Concept of Knowledge Management in construction organisation

Source: Modified from Alhaji et al. (2013a)

2.2 Types of Knowledge in Construction

Knowledge means know-why, know-how, and know-who', or an imperceptible resource of an economy where future earnings/revenues could be obtained or derived. It was further posited that attempts to distinguish between data, information, and knowledge have also concentrated towards the comprehension of the latter (Carrillo *et al.*, 2000). Knowledge originates from data that is first processed into information. According to the submissions of Blumentritt and Johnston (1999) and Carrillo *et al.* (2000), when information enters the system, it becomes knowledge after it has been validated individually or collectively to be useful, valid, and relevant pieces of knowledge to implement in the organisational system.

There are various classifications of knowledge that needs to be managed. This include: foreground and background knowledge; formal (explicit) and tacit (expertise) knowledge; classifications with regards to the function of knowledge for commercial use, or with respect to the functional roles within an organisation (Siemieniuch and Sinclair, 2000). For effective management of these types of knowledge to be achieved, they have to be properly understood. For instance, tacit knowledge is held in people's heads, and it 'oils' the wheels of formal procedures. This makes tacit knowledge difficult to be transferred. In the same vein, foreground knowledge which is that knowledge that can be applied directly to firms and their operations. This type of knowledge is dependent on background or generalised knowledge for it to be effective (Carrillo *et al.*, 2000).

Alhaji *et al.* (2013b) found that project knowledge management practices in the construction industry are the explicit type. It was reported that tacit knowledge is not yet fully practiced in the civil engineering construction firms. This implies that knowledge

and experiences are wastage at the construction site without assigning anybody to be in charge of this knowledge.

2.2.1 Tacit knowledge

Sheeham and Sinclair (2005) found that more than 80% of the useful knowledge generated in construction projects are tacit and cannot be written down. Alhaji *et al.* (2013b) posit that the engineers and experts after the completion of projects are discarded and leave with their domain knowledge without anything to benefit the organisation if not capture store or converted in the repositories for re-use. Thus, according to Alhaji *et al.* (2013a; 2013b), a lot of knowledge exist and characterised the civil engineering construction firms, employees retire or leaves or are sacked, leaving the organisation with their tacit knowledge. Finally, it is impracticable and most time difficult to convert tacit knowledge.

2.2.2 Explicit knowledge

According to Dalkir (2005) and Martensson (2000) those experiences, ideas, lessons learnt that are recorded, stored in physical and concrete forms like video ,audios images, among others etc, are regarded as explicit knowledge. For instance, feedbacks from clients/customers, conversations via emails, weak signals, recurring questions, clients/customers reactions, among others, are examples of explicit knowledge.

Studies on knowledge classification have been advanced on basically two types (tacit and explicit). Table 2.1 below summarizes the difference between these two types of knowledge.

Table 2.1: A Comparison of Tacit and Explicit Knowledge

S/N	Attributes of tacit knowledge	Attributes of explicit knowledge
1	It has the capability to adapt and deal with new and different circumstances.	It has the capability to disperse, to reproduce, and to be reused in the organisations life
2	Know-how, Know-why and care-why (Expertise).	Used for teaching, training.
3	Tendency to collaborate, to transfer culture and exchange, share visions	Ability to organize, to translate a vision into a mission and guideline of operations.
4	Mentoring, coaching to transfer experimental knowledge on the basis of face-to-face	Transfer of knowledge via tangible forms of method e.g. Products, services

Sources: Dalkir 2005; Mansour, 2016

2.3 Knowledge Management Process in Construction Organisation

Knowledge Management process is at the core of knowledge management, it includes a series of activities and procedures such as knowledge creation, sharing, acquisition, documentation, application, transfer, dissemination and responsiveness to knowledge (Seleim & Khalil, 2007; Chen, 2007; Sangkala, 2007; Munir, 2008; Elitan & Anatan, 2009; Yasmeen *et al.*, 2015).

Knowledge Management process is repetitive exercise, or “a spiral of tacit and explicit knowledge” involving iterative cycle (Nonaka, Toyama, and Konno, 2006). This cycle encompasses four repetitive stages, which are; socialization externalization, combination and internalization. Knowledge Management processes as posited by David and Yusoff (2010), is comprised of knowledge acquisition and application to enhance socio-economic capital and improved the outlook performance and well-being of companies.

Salina and WanFadzilah (2010) found that there is a substantial connection amongst KM processes and organisation performance. Public discussion and public consultation are considered to be the appropriate processes for looking at the ideas, views, concerns

and feedback of all stakeholders in establishing, developing and executing public policies and programmes.

Knowledge documentation means storing organisational memories with the aim of preserving for use in the future, while those activities of the organisation that is meant to improve key actions/activities of an organisation is known as ‘knowledge application’ (Seleim and Khalil, 2007). It is the actual use of knowledge in delivery project or an activity. The activities of exchanging or distributing knowledge among teams, groups or individuals, is knowledge transfer. The way an organisation responds to accessed knowledge, is the responsiveness to knowledge of the organisation (Darroch, 2003). Echols and Shadily (2000), the spreading of organisational knowledge is a process known as knowledge dissemination.

These definitions summarised practice of Knowledge Management process by organisation by four different authors.

In construction firms, Easterby-Smith and Lyles (2003) opined that *“Firms can create it knowledge internally through their research and development or through generating new ways of handling situations. Also, firms can acquire knowledge from external sources such as hiring new employees who have worked for competitors or from industrial networks which allow the firm to be in direct contact with advanced knowledge of other firms”*. Fadeke *et al.* (2015) stated that the various knowledge management activities undertaken within construction firms include: knowledge acquisition, creation, storage, sharing, utilization and maintenance.

Organisations develops and amass tacit knowledge through the accumulation of experience is the process over certain period of time. ‘Cumulative’ described the

process of organisational knowledge accumulation, and it is within the period of accumulation that innovations and technological advances are developed and implemented (Anand *et al.*, 2007). Organisational knowledge is internalised through steps such as acquisition, storage, distribution and use of knowledge. These four steps of KM processes as highlighted by (Cegarra and Rodrigo, 2015) are;

i. Knowledge acquisition

According to Sangkala (2007), described knowledge acquisition as the act of collecting or assembling of knowledge from different sources within or outside the organisation. The acquisition associates to the intra-organisational process that enables the creation of tacit and explicit knowledge, beginning from individuals and incorporating the organisational level as well as the identification and absorption of information and external knowledge source (Gold *et al.*, 2001; Huber, 1991; Cegarra and Rodrigo, 2015), therefore, this scholar assumed that acquisition is the formation of knowledge within the organisation through a learning process, these researchers perceived knowledge acquisition through reality and focuses attention on physical interaction with external entities. Nonaka and Takeuchi (2011) proposed organisational knowledge creation theory to explain organisational knowledge and defined organisational knowledge creation as the capability of an organisation to make new learning, diffuse and spread it throughout the organisation, and represents it in terms of administration, and frameworks.

Therefore, the process involving the creation and formation of knowledge and other components within the organisation is called knowledge acquisition. It is through acquisition that implicit knowledge is converted into explicit knowledge (Alrubaiee *et al.*, 2015). Zaied, Hussein, and Hassan (2012), acquisition is comprised of the actions of

ensuring availability, collecting, and applying the acquired knowledge. Young (2010) argued that organisation should ensure the flow of knowledge in order to enable the learning process among individuals, resulting in improved performance. Based on forgoing, knowledge acquisition is a broad term perceived by different scholars in different perspectives depending on reflection of interest, which encompassed identification, and creation of knowledge as a progressive exercise in an organisation.

ii. Knowledge storage

Yasmeen *et al.* (2015), this process comprise of retaining, organizing, and facilitating access and retrieval of knowledge. It is the organisations memory or knowledge bank. The knowledge storage refers to the organisational memory formation process, in which explicit knowledge is formally stock in physical memory systems or medium and informally retained as values, rules and beliefs that are associated to culture and organisational structure (Argote *et al.*, 2003; Alavi and Leidner, 2001). Zaied *et al.*, (2012), further stressed that, knowledge storage aid the saving knowledge inside the organisation and it covers both physical and non-physical resources of an organisation

iii. Knowledge Distribution

This involves the sharing of new information obtained from various sources, which could drive the emergence and creation of new understanding, knowledge and information (Huber, 1991). Lee and Choi (2003) however suggested that this sharing process requires the organisation to create an enabling environment that will favour sharing or new ideas. Cegarra and Rodrigo (2015) posit that knowledge should be shared in a systemic way, as this guaranteed knowledge dissemination and best practices. It can be deduced that knowledge distribution is synonymous to Knowledge dissemination or transfer which is an activity aim at disseminating, transferring or

spread of knowledge or flow of information, experiences, skills among individuals or groups within the organisation (Waluyo and Wibowo, 2015; Salaheldin, 2009). Basically dissemination is done to ensure that the organisational knowledge is reached every staff.

Four means of transferring knowledge identified by Levine and Prietula (2012) and Brown *et al.* (2001) are;

- a) Self-learning; this is the first way which means that knowledge acquired from written reports of the organisation which contains vital information.
- b) Those acquired from changes that occurred owing to contact among individuals within an organisation or in social meetings.
- c) The third mode of knowledge transfer is called ‘performativity relations’. This includes the explicit knowledge exchanges in a group or professional associations or communities of practice. These communities usually dictate or dominate in certain detailed knowledge, and have a common language.
- d) The fourth and final way of knowledge transfer is through exchange as organisations discharges or performs a job or activities with one or more companies.

iv. Knowledge application

Zaied *et al.* (2012), knowledge application involves the actual use of organisational knowledge assets in the course of production or discharge of activities. It gives the organisations the opportunity to translate the capabilities of their expertise into a continuously embodied product. It enables the benefits of knowledge to be realised through use of both explicit and tacit knowledge on a daily basis at workplace.

Systems are usually used to assess knowledge application using authorized programs and scales and indicators at every level of the organisation (Alrubaiee *et al.*, 2015).

Knowledge application can be in the form of rules, guides, instructions, and /or procedures, to use knowledge in all organisational levels.

v. Knowledge Maintenance

Meihami and Meihamid (2014) refer to knowledge maintenance as the process of maintaining and utilization of knowledge in such a way that makes it accessible as at when needed. An institution or organization can keep knowledge in the form of maps, procedures, methods or even keep it in specialized libraries. Knowledge that had been successfully acquired, generated or created needs to be properly maintained for easy access and retrieval when required which is the essence of maintenance of knowledge (Ahmed *et al.*, 2015). Knowledge Management Process is summarised in Table 2.2 identified from literature.

Table 2.2: Summary of Knowledge Management Processes Cited in Previous Studies

S/N	Knowledge Management Processes	Author/Source
1	Creation, capture, organisation, dissemination, application	Egbu <i>et al.</i> (2001)
2	Creation, storage, dissemination, acquisition	Bhatt (2000)
3	Organisation, storage, dissemination, application, acquisition	Zack (1999)
4	Acquisition, distribution, knowledge interpretation	Shaikh & Aktharsha (2016)
5	Creation, storage, sharing, application	Seleim & Khalil (2007)
6	Creation, capture, organisation, storage, dissemination, application, updating	Elmahdee <i>et al.</i> (2014)
7	Creation, capture, organisation, dissemination, application	Dell & Grayson (1998)
8	Creation, organisation, dissemination	Ruggles (1998)
9	Identification, acquisition and transferring, storage, sharing, application	Alrubaiee <i>et al.</i> (2015)
10	Identification; acquisition; storage; sharing & application	Zwain <i>et al.</i> (2012)
11	Creating & acquisition, Use, modification, Archiving, transfer, translating/repurposing, access, disposal	Tubigi <i>et al.</i> (2013)
12	Creation, organisation, dissemination, application	Horwitch & Armacost (2002)
13	Creation, acquisition, sharing, storage, implementation	Gholami <i>et al.</i> (2013)
14	Capture, storage, application, acquisition	Gold <i>et al.</i> (2001)
15	Acquisition; conversion; application; storing & protection	Zaied <i>et al.</i> (2012)
16	Organisation, dissemination, acquisition	Parikh (2001)
17	Creation, sharing, acquisition, documentation, application, transfer, responsiveness to knowledge, dissemination	Waluyo & Wibowo (2015)
18	Storage, dissemination, acquisition	Tserng & Lin (2005)
19	Creation, capture, organisation, storage, dissemination, application	Lawson (2003)
20	Creation, dissemination, application, compilation/transformation	Wiig (1993)
21	Creation, capture, dissemination, application	Seufert & Krogh (2003)

Source: Researcher's Field Survey, 2021

2.4 Critical Success Factors of Knowledge Management Practice in Construction Organisations

Guribie, Tengan and Kuebutornye (2018) stressed that an effective knowledge management practice depends on several factors which may be environmental, projects and individuals' related factors. Enablers of knowledge management include knowledge

sharing culture, the right technology, infrastructure, and periodic knowledge management assessment/measurement. It was further stated that other determinants of knowledge management practice are the prerequisite knowledge management processes which must be followed in knowledge management implementation; and these include creation of knowledge, capturing, and the dissemination of knowledge.

Zuofa, Ochieng, and Burns, (2015), the critical factors for the adoption of knowledge management could be classified into; the individual/personal, the organisation and technology/information categories. Oke *et al.* (2013) found that active participation of employee; top management support; creating knowledge and application of information technology are the factors that affect the success of knowledge management. A summary of the CSFs for adoption of knowledge management in construction are shown in table 2.3.

Table 2.3: Critical Success Factors of Knowledge Management Practice in Construction Organisation Cited in Previous Studies

S/N	CSF of Knowledge Management Practice	Author/Source
1	Creating Knowledge sharing space	Oke <i>et al.</i> (2013)
2	Application of IT	Oke <i>et al.</i> (2013)
3	Availability of Technology infrastructure	Zuofa <i>et al.</i> (2015), Guribie <i>et al.</i> (2018).
4	Evolution and ease of accessibility to shared knowledge	Zuofa <i>et al.</i> (2015), Guribie <i>et al.</i> (2018).
5	Knowledge-friendly organisation culture	Zuofa <i>et al.</i> (2015)
6	Motivation triggers the development of knowledge, sharing and use of knowledge among workers	Zuofa <i>et al.</i> (2015)
7	Team working	Zuofa <i>et al.</i> (2015)
8	Top management support and commitment	Oke <i>et al.</i> (2013); Zuofa <i>et al.</i> (2015)
9	Open organisational culture	Zuofa <i>et al.</i> (2015),Guribie <i>et al.</i> (2018).
10	Good and effective communication	Zuofa <i>et al.</i> (2015)
11	Availability of personnel incentives	Zuofa <i>et al.</i> (2015)
12	Active participation of employee	Oke <i>et al.</i> (2013); Zuofa <i>et al.</i> (2015)
13	Management leadership and commitment	Oke <i>et al.</i> (2013); Zuofa <i>et al.</i> (2015)
14	Knowledge Management Measurement	Guribie <i>et al.</i> (2018).
15	Conformity to corporate culture	Oke <i>et al.</i> (2013)
16	Motivated workers who develop, share and use knowledge	Oke <i>et al.</i> (2013)
17	Availability of personnel incentives	Oke <i>et al.</i> (2013)
18	Knowledge Management Measurement	Zuofa <i>et al.</i> (2015),Guribie <i>et al.</i> (2018).
19	Financial motivations	Zuofa <i>et al.</i> (2015)
20	Social motivations	Zuofa <i>et al.</i> (2015),Guribie <i>et al.</i> (2018).
21	Conformity to corporate culture	Zuofa <i>et al.</i> (2015)
22	Mimicking the behaviour of leaders	Zuofa <i>et al.</i> (2015)
23	Perceived value and uniqueness of knowledge	Zuofa <i>et al.</i> (2015)

Source: Researcher's field study, 2021

2.5 Barriers to Knowledge Management Practice in the Construction Organisations

The most critical factors to the success or failure of KMP on construction projects is organisational culture. It is the most challenging constraint or inhibitor to the knowledge managers' abilities to deal with on daily basis, in their quest to manage knowledge

effectively (Whelton and Ballard., 2002; Davenport and Prusak, 1998). Thus, organisational culture is a major impediment that requires adequate attention in most organisations (Whelton *et al.*, 2002). As stated by Matin and Sabagh (2015), knowledge management is both a technical problem involving the use of IT and a sociocultural one involving motivating people 'to make them willing to yield up this knowledge for organisational use.

In addition to tackling organisational culture barriers, Whelton *et al.* (2002) suggested that other related and associated inhibitors like workers attitudes, fears or resistance to sharing of knowledge; need to be proactively given adequate attention. Other barriers to the adoption of knowledge management include lack of top management support, initiative overload, poor IT infrastructure, bureaucracy associated with KM, conflicting priorities between KM and other business functions and the difficulties associated with communicating the benefits of knowledge management.

Robinson, Carrillo, Anumba and Al-Ghassani (2005), regard the construction industry is mostly a project-based sector, and argued that KM has remained a recurring issues and challenge in the sector. Information overload, lack of time to share knowledge, not using technology to share knowledge effectively and difficulty in capturing tacit knowledge are few barriers in implementing KM (Carrillo, Robinson, Anumba and Bouchlaghem 2006).

Kasim and Saeed (2018) identified lack of coordination, poor utilisation of communication network, absence of firms' structural approach, and cultural elements as the major critical success factors of knowledge management. Oke *et al.* (2013), stated major barriers to knowledge management in construction include; funding, lack of successful KM model in the construction industry, lack of time and understanding of

KM, lack of adequate and up to date data, lack of proper technical expertise, lack of effective communication among construction professionals, among others.

Yap and Lock (2017), modern communication and digital technological devices can play a vital role in ensuring that existing knowledge are communicated. It is through social interaction of humans that new knowledge are created and shared. Thus, individuals should be willing to take part in transferring knowledge within and outside the organisation, and on projects. The different impediments to knowledge sharing and transfer within a project organisation include;

- i. Pressure from schedule and budget; there is usually the absence of time to enable workers share their ideas because they will be required to be assigned to another tasks as soon they finished with job at hand.
- ii. Fear of discussing errors and mistakes made during discharge of assigned tasks/responsibilities. For fear of being sanctioned or sacked, most workers do not bring to the notice of the line managers mistakes made. Thereby opportunities for proper analysis are missed.
- iii. Poor and inadequate motivation of the workforce by the leadership of a construction project site may lead to lack of or resistance to knowledge sharing among workers. This also leads to loss of knowledge and the benefits of sharing experiences among colleagues or teams.
- iv. Poor management and leadership experiences. Lack of emphasis on communication of experiences and ideas by the project manager could result in a situation where knowledge is not shared. Also, poor leadership could lead to ineffective communication and conflicts may not be resolved leading to impediment to knowledge sharing.

- v. The absence of strategy for managing knowledge. This results to neglect and none provision of structures in place for capturing and storing knowledge.
- vi. The non-existence of the needed technology to capture, store knowledge in an organization.
- vii. Cultural differences and differing level of understanding of workers. This could result to misunderstanding and duplication of duties.
- viii. Attitudes of workers toward knowledge capturing, storage and retrieval. The focus of workers is always on the task they perform and upon which payment or evaluations are based and less time is therefore given to knowledge capturing, storage as a result of time pressure.
- ix. The absence of training on how to document experiences and knowledge gained during tasks or project execution. Employees lack basic training on how to even share knowledge or what tools to use to share knowledge when discharging project activities.
- x. Construction projects are unique and are characterized by different ideas, stakeholders, scope and timelines.

Polyaninova (2011), the lack of incentives to promote knowledge sharing among employees, often result in project failure, the lack of adequate attention to the identification of lessons learnt from successes and failures of past engagements, the perception that new project are not another challenge, over reliance on technical expertise of individuals, and the reluctant of leaderships/management to discuss projects that did not perform well. The summary of the barriers identified from previous studies is shown on Table 2.4

Table 2.4: Summary of Barriers to Knowledge Management Practice Cited in Previous

S/N	Barriers	Author/Source
1	Absence of incentives to promote sharing knowledge and insight among employees;	Cameron (2002); Polyaninova (2011)
2	Uniqueness of construction Projects	Oke <i>et al.</i> (2013), Carrillo <i>et al.</i> (2006), Kazi <i>et al.</i> (1999);
3	Mainly a male sector	Leal <i>et al.</i> (2017)
4	Lack of formal review and learning processes	Whelton <i>et al.</i> (2002), Whelton and Ballard (2002)
5	Multi-Disciplinary Teams Management is reluctant to talk about projects that did not work well	Oke <i>et al.</i> (2013), Carrillo <i>et al.</i> (2006), Kazi <i>et al.</i> (1999);
6	Lack of client education of process	Cameron (2002); Polyaninova (2011)
7	Large number of SMEs	Whelton <i>et al.</i> (2002), Whelton and Ballard (2002)
8	lack of IT support facilities	Oke <i>et al.</i> (2013), Carrillo <i>et al.</i> (2006), Kazi <i>et al.</i> (1999);
9	Assumptions about new projects are not challenged	Oke <i>et al.</i> (2013), Carrillo <i>et al.</i> (2006), Kazi <i>et al.</i> (1999);
10	Poor group dynamics	Cameron (2002); Polyaninova (2011)
11	Absence of firms structural approach	Whelton <i>et al.</i> (2002), Whelton and Ballard (2002)
12	Inadequate stakeholder involvement and participation	Kasim and Saeed (2018)
13	Lack of Learning	Whelton <i>et al.</i> (2002), Whelton and Ballard (2002)
14	Low level of training/intellectual capital	Oke <i>et al.</i> (2013), Carrillo <i>et al.</i> (2006), Kazi <i>et al.</i> (1999);
15	cultural elements	Leal <i>et al.</i> (2017)
16	Organization hires and promotes individuals based on technical expertise alone	Carrillo <i>et al.</i> (2006), Kazi <i>et al.</i> (1999); Oke <i>et al.</i> (2013), Kasim and Saeed (2018)
17	Lack of top management support	Cameron (2002); Polyaninova (2011)
18	Little time or attention is given to identifying lessons learned from past project failures and successes;	Robinson et al (2005), Oke <i>et al.</i> (2013), Whelton <i>et al.</i> (2002)
19	Poor communication networks	Cameron (2002); Polyaninova (2011)
20	Lengthy Time Period	Kasim and Saeed (2018)
21	Lack of 'voice' of the user group(s)	Oke <i>et al.</i> (2013), Carrillo <i>et al.</i> (2006), Kazi <i>et al.</i> (1999);
22	High turnover	Whelton <i>et al.</i> (2002), Whelton and Ballard (2002)
23	problem of Converting Knowledge	Leal <i>et al.</i> (2017)
24	Misunderstanding of client organization and culture	Oke <i>et al.</i> (2013), Carrillo <i>et al.</i> (2006), Kazi <i>et al.</i> (1999);
25	Lack of Time (Time constraint)	Whelton <i>et al.</i> (2002), Whelton and Ballard (2002)
26	Lack of coordination	Carrillo <i>et al.</i> (2006), Oke <i>et al.</i> (2013), Leal <i>et al.</i> (2017), Kazi <i>et al.</i> (1999)
27	Trying to solve large problems	Kasim and Saeed (2018)
28		Oke <i>et al.</i> (2013), Carrillo <i>et al.</i> (2006), Kazi <i>et al.</i> (1999);

2.6 Knowledge Management Practices Influencing Performance of Construction Organisations

Lev (2001) perceived KM as systematic and continued exercise that involves acquiring, applying and storing of intellectual capital proficiently. Furthermore, KM includes the creation, sharing and application of knowledge for the purpose of achieving value and remaining in competition by an organisation.

Both public and private organisations have been investing in KM with focus to develop and attract human capital and resources that would help them reach their visions (Omotayo, 2015).

Jashapara, (2004) stated that organisations are successful when KM practices are adopted in a strategic way. The manipulation and improvement of organisational knowledge assets for fulfilling the objectives of the organisation, is connected to KM. Furthermore, organisations can gain a competitive advantage when KM is successfully implemented (Heisig *et al.*, 2016).

At the initial stage of KM, emphasis was on technical issues and provision of IT solutions. Gradually, it moved to social aspects that impact on community, individual development, and the environment of the project (Botha *et al.*, 2014).

Human motivation and willingness was reported by Ahmad, Idiake, Mohammed and Alhassan (2020) to have influence on adoption of ICT for KM that is effective and efficient. Thus, the acquisition, storage, sharing and transfer of organisational knowledge are dependent on motivations and willingness of the workforce to derived technology. Knowledge management practice with IT support facilities include but limited to groupware, online databases, internet, intranet, management soft wares and virtual communities (Lin and Lin, 2006), further stated that it is through the processing

of data, managing contents, system and communication technologies and storage, that the critical role of IT in KM is made clearer.

2.6.1 Performance of construction organisations

Mbithia (2014) defined firm's performance as the accomplishment of high levels of outcomes in terms of financial performance and service delivery to customers by improving competencies and employee's enthusiasm. Performance refers to the outputs and results of processes, products, and services that are compared with other standards among organisations (Sangkal, 2007). Performance has many ways of being measured, i.e., profitability, finance, learning, and growth (Ellitan and Anatan, 2009). From above definitions, it can be summarised that performance is a capability considered from two perspectives; organisational context while other from customer satisfaction.

Organisational performance has been defined by different scholars in both objective and subjective perspectives as indices used to measure the concept (Apospori Nikandrou, Brewster and Papalexandris, 2008). Subjective measures of performance are perceptual performance measures which are found to have a strong correlation with objective measurements and are often used as a valid indicator of performance (Wall *et al.*, 2004).

The prominent organisations performance measures include customers satisfaction, finances, internal business process, learning and growth (Waluyo and Wibowo, 2015; Chen, 2007). Organisational performance are often measured by the financial and non-financial performance parameters (Waluyo and *et al.*, 2015), although, the use of only the financial measurements is a non-modern means of measuring performance.

Antunes and Pinheiro (2019) suggested that KM practices would help in the improvement of the SMEs and their undertakings so they become more stable and

effective to struggle. Other researchers examined the role of KM practices on organisational performance and found that knowledge management practices are positively related to organisational and business performance (Abuaddous *et al.*, 2018; Cerchione and Esposito, 2017; Serrat, 2017). The argument was supported by findings of Lopes *et al.* (2017) and Shahbakhsh, (2013). Akhavan and Hosseini (2015) revealed that organisations with better KM practices are likely to accomplish higher organisational performance. It was further stated that practicing the three knowledge management processes thus; knowledge sharing, acquisition, and application contribute to innovation which helps to improve organisational performance.

Ongeti (2014) posit that a company's performance is related to how well and efficient the management of scarce organisational resource, the efficacy of the production process and the products and .or services meeting clients' needs, and the overall financial stability of the firms. Organisational productivity, effectiveness and rating in the industry are common measures of corporate performance (Elmahdee *et al.*, 2014). These three key parameters have link to the market position, product leadership, profitability, productivity, personnel attitudes and development, and the Corporate Social Responsibility (CSR) of the firms.

According to Sheikh and Aktharsha (2016), a common management terms that dominate social research is how organisation can outperform their competitors. In the knowledge based sector, managing performance helps to enhance service delivery and the efficiency of the process of production system. Performance goes beyond doing the work but also monitoring outcomes. Performance has a strong link to the strategic objectives of the organisation, contribution to the economy and level of satisfaction obtained by the clients. Thus, according to Sheikh and Aktharsh (2016), 'performance

management and measurement' is about the integration and systematic approach towards enhancing the achievement of organisational strategic performance objective, and mission and values. The influence of KM practices on organisational performance is summarised in Table 2.5.

Table 2.5: Summary of Organisational Performance Cited in Previous Studies

S/N	Organisational Performance Indicators	Sources
1	Helps to achieve company growth performance	Yusof and AbuBakar (2012).
2	It brings about innovation and creativity	Yusof and AbuBakar (2012).
3	Improves company productivity	Yusof and AbuBakar (2012).
4	Helps improve company revenue drive and profitability	Yusof and AbuBakar (2012).
5	Improves firms competitive advantages	Yusof and AbuBakar (2012).
6	Reducing the time and cost of solving problems	Van Donk and Riezebos (2005); Alhaji <i>et al.</i> (2013a).
7	Improving the quality of the solutions	Van Donk and Riezebos (2005); Alhaji <i>et al.</i> (2013a).
8	Minimizing the need to consult past projects	Van Donk and Riezebos (2005); Alhaji <i>et al.</i> (2013a).
9	Knowledge management improves organisational efficiency	Song <i>et al.</i> (2001); Alhaji <i>et al.</i> (2013a)
10	It reduces training cost	Song <i>et al.</i> (2001); Alhaji <i>et al.</i> (2013a)
11	Enhance communication among employees which triggers project goal achievement	Song <i>et al.</i> (2001); Alhaji <i>et al.</i> (2013a)
12	Improves project performance	Krogh (2002); Wie and Miraglia, 2017; Tserng and Lin, 2004
13	reduction in errors and mistakes of past projects	Krogh (2002); Wie and Miraglia, 2017; Tserng and Lin, 2004
14	Reduce risks of uncertainty	Song <i>et al.</i> (2001); Alhaji <i>et al.</i> (2013a)
15	Prevent reinvention of the wheel	Sulaiman and Burke (2011)
16	Improvement in job analysis and specification	Oke <i>et al.</i> (2013)
17	Improvement in communication skills	Oke <i>et al.</i> (2013)
18	Training benefits of new employee	Oke <i>et al.</i> (2013)
19	Improvement in productivity	Oke <i>et al.</i> (2013)
20	Increased customer satisfaction	Oke <i>et al.</i> (2013)

Source: Researcher's field study, 2021

2.7 Strategies for Improving Knowledge Management Practices in Construction Organisations

Organisational strategies provide a framework for decision making, thus, KM is not approached in a haphazard manner without any defined boundaries (Boseman and Phatak, 1989). Construction companies and their professional teams have developed local and international skills and expertise through the practices of KM (Carrillo *et al.*, 2000).

KM is a relatively new concept to construction sector, and the debate is whether it is a passing management craze or a long-lasting asset (Carrillo *et al.*, 2000). Informed organisations have realised that KM is a non-monetary asset of the organisation that aids the achievement of competitive advantage. KM personnels are only engaged by few companies who are interested in the concept but other limits the use of KM to intranets (Robinson *et al.*, (2005).

A strategy is what will establish the main plans to be executed and have resource assigned to them. Teams or individuals could be assigned to analyse ideas, data and new issues as a way of developing a suitable and responsive strategy for managing knowledge (Carrillo *et al.*, 2000).

Normally, a responsive KM implementation strategy and approach for an organisation should contain clear goals and ways to attain them within schedule.

Among the considerations for construction organisations will be to know what aspect of the production processes will yield most benefits, which aspect or part of the firm will benefit most from a KM strategy. Also to be considered are; medium to be used (individuals of IT), how huge issue is to be recognised, and evaluation system of the

process, among others. Carrillo *et al.* (2000) highlight other considerations for developing a strategy for KM adoption and application in organisations as:

- i. A business case that will usher KM practices into the organisation.
- ii. Mapping of the processes within an organizations business to know the small part that will yield more benefits.
- iii. An expert should be appointed.
- iv. Find out what information is required to ensure smooth working for the front-line operatives.
- v. A prototype should be developed by assigning and allocating sufficient resources both (financial and non-financial).
- vi. Begin from small issues that are dependent on knowledge within before evolving into the larger supply chain.
- vii. Clearly define the approach for ensuring a successful KM lifecycle from identification, capturing till maintenance of knowledge.
- viii. An appropriate approach for handling impediments related to time constraints and validation of data.
- ix. Appraise improvement and get response regularly from the front-line workers.
- x. Ensure control by re-examination of adopted strategy and what have been achieved on regular basis for signs of likely need for revisions.

However, a good and most sustainable way to developing KM strategy is to learn from entities that have successfully implemented and are at the advanced stage of KM practices.

It was suggested by Hassan, (2016) that construction organisations and other corporate firms should consider certain critical proactive measures which are strategic and

targeted to knowledge management. It was highlighted that there is need for corporate knowledge to be completely utilized, Mechanism for inter-organisational collaboration should be established, Ensure that both explicit and tacit knowledge based in organization are transferred to employees, Ensuring that knowledge are properly used, protected and not abused in organisations. The use of ICT tools and facilities should be encouraged, timely and well planned trainings, seminars and workshops should be provided to increase staff knowledge and experiences. Using knowledge to strategically change organizational direction, an environment where research and innovative activities should be created, and a sense of job security created in the minds of employees, organizational culture tolerance to risk should be created.

Oke *et al.* (2013) posits that among the best strategies for KM in construction organisations, construction professionals should embrace ICT application to make KM easier and facilitate speedy results, also that Government should invest more in the construction industry, this will bring more funding. Table 2.6 is a summary of the identified knowledge management strategies employed by organisations.

Table 2.6: Summary of Strategies for Improving Knowledge Management Practices cited in previous studies.

S/N	Strategies for Improving Knowledge Management Practices	Author/Source
1	Construction professionals embracing ICT application to make knowledge management easier to facilitate instate results	Oke <i>et al.</i> (2013), Hassan <i>et al.</i> (2016), Leal <i>et al.</i> (2017) Kasim and Saeed (2018)
2	Government should invest more in the construction industry, this will bring more funding	Oke <i>et al.</i> (2013), Leal <i>et al.</i> (2017), Kasim and Saeed (2018)
3	Corporate knowledge should be completely utilized,	Hassan <i>et al.</i> (2016), Leal <i>et al.</i> (2017), Kasim and Saeed (2018)
4	Mechanism for inter-organizational collaboration should be establish,	Hassan <i>et al.</i> (2016),Leal <i>et al.</i> (2017), Kasim and Saeed (2018)
5	Ensure that both explicit and tacit knowledge based in organization are transferred to employees,	Hassan <i>et al.</i> (2016),Leal <i>et al.</i> (2017), Kasim and Saeed (2018)
6	Ensuring that knowledge are properly used, protected and not abused within and inside organisations.	Hassan <i>et al.</i> (2016), Leal <i>et al.</i> (2017), Kasim and Saeed (2018)
7	Top management has a role to place to ensure the entrenchment of KM practices	Hassan <i>et al.</i> (2016),Leal <i>et al.</i> (2017), Kasim and Saeed (2018)
8	Timely and well planned trainings, seminars and workshops should be provided to increase staff knowledge and experiences.	Hassan <i>et al.</i> (2016),Leal <i>et al.</i> (2017), Kasim and Saeed (2018)
9	Using knowledge to strategically change organisational direction	Hassan <i>et al.</i> (2016),Leal <i>et al.</i> (2017), Kasim and Saeed (2018)
10	An environment where research and innovative activities should be created	Hassan <i>et al.</i> (2016),Leal <i>et al.</i> (2017), Kasim and Saeed (2018)
11	Sense of job security created in the minds of employees,	Hassan <i>et al.</i> (2016),Leal <i>et al.</i> (2017), Kasim and Saeed (2018)
12	Organisational culture tolerance to risk should be created.	Hassan <i>et al.</i> (2016),Leal <i>et al.</i> (2017), Kasim and Saeed (2018)
13	Personal knowledge management should be adjusted according to individual preferences and meets different needs	Ly <i>et al.</i> (2005)

Source: Researcher's field study, 2021

CHAPTER THREE

3.0 RESEARCH METHODOLOGY

3.1 Research Design

A research design is a road map or plans that assist researcher in responding and finding solutions to key questions that are intended to be answer in systematic way (Shamsudin, 2017). It was advised that to make the research design must contain defined objectives, research questions, resources for data collection. This study assessed knowledge management practices among construction organisations in Abuja, Nigeria. This study adopted survey research design.

The premise for selecting survey research design is that data collected from various stakeholders with the aid of Questionnaire which is considered to be cheaper for the researcher.

3.2 Study Population

Cooper and Schindler (2014) considered population as the sum or collection of critical elements of the study upon which inferences are based. According to Mugenda and Mugenda (2003), population refers to the quantity of objects, people, or happenings that have related or noticeable features.

For the purpose of this study, the population is construction professionals working with construction-based organisations. These organisations are those involved in building and civil engineering construction projects. The premise for selecting Abuja is that, it is the administrative headquarters of Nigeria with a lot of construction projects being executed by Federal government and Private developers. This attracts a lot of professionals, investors and developers to the country's capital. Aje *et al.* (2015) noted a lot of companies, professionals and professional bodies are attracted to situate their head

offices or branches in Abuja. Thus, the presence of many firms, professionals and artisans in Abuja, implies that, there is the possibility of having high number of respondents from which data are collected. The target population for this study is construction professionals obtained from professional bodies, that is the total number of all construction professionals members comprises of Architects, Builders, Engineers and Quantity surveyors working in construction organisations within Abuja, Nigeria.

3.3 Sampling Frame

A list of institutions, individuals, professional association, or locations or other units where samples for a survey can be obtained or drawn from, is termed as, ‘sample frame’ (Cooper and Schindler, 2014; Saunders *et al.*, 2007). For this study, the sample frame was a list of construction professionals in the built environment is the study area. The target participants were obtained from the various professional bodies within the study area. These professional organisations are; Nigerian institute of Architects (NIA) for Architects, The Nigerian Institute of Quantity Surveyors (NIQS) for Quantity Surveyors, the Nigerian Society of Engineers (NSE) for Engineers, and Nigerian Institute of Builders (NIOB) for Building (Table 3.1)

Table 3.1: Sample Frame of the Study

S/N	Construction Professionals	Total Population
1.	Architect	625
2.	Quantity surveyor	1,200
3.	Builder	600
4.	Engineer	7,875
	Total	10,300

Source: NIA, NIQS, NIOB, NSE, (2019).

3.4 Sample Size

A given portion or part of the population that met the study criteria was subsequently selected as sample to meet the aim of the study. The sample size usually has a

relationship and share similar characteristics with the target population (Cooper & Schindler, 2014; Kolawole, 2005; Nkoli, 2011). Cooper & Schindler (2014) advocated for a large sample size for the purpose of representativeness and adequacy. For this study the sample size is 370 and this was obtained using Krejcie and Morgan (1970) formula at 95% confidence level.

$$S = \frac{X^2 NP(1 - P)}{d^2(N - 1) + X^2 P(1 - P)} \quad [3.1]$$

Where;

S = study sample size

X = confidence level of study, 1.96 at 95% confidence used for current study

d = Precision required 5% (0.05) used in the current research

P = Estimated population variance, 0.50 used for current study

N= Population of study = 10,300

$$\begin{aligned}
 s &= \frac{1.96^2 \times 10,300 \times 0.5 \times (1 - 0.5)}{(0.05^2 \times (10,300 - 1)) + ((1.96^2) \times 0.5 \times (1 - 0.5))} \\
 &= \frac{9897.1200}{(25.7475 + 0.9604)} \\
 &= \frac{9897.1200}{26.7079} \quad ; \quad S = 370.381
 \end{aligned}$$

Therefore, S = 370

This sample size of 370 was complied with Krejcie and Morgan (1970). From the Krejcie and Morgan's (1970) table, 370 is equivalent to 10,000 populations. Since the

next population from the table is 15,000 which is far from 10,300 populations for this study, the 370 was adopted for the study.

Out of the 370 questionnaires administered in the course of the data collection exercise, 158 were recovered, and 2 were rejected for poor and incomplete response. The remaining 156 represents an effective and adequate response rate of 42.16% deemed adequate for analysis. The decision to affirm this response rate to be adequate was based on the suggestions of Moser and Kalton (1999) and Akintoye (2000) regarding unbiased construction survey. It was suggested that a response rate of 20-30% and above is ideal. Thus, response rate of 42.16% was adjudged adequate, and following this decision all analyses data were carried out subsequently.

3.5 Sampling Technique

Sampling technique permits the study of a given percentage of the target population. Sampling techniques helps to minimise and improve survey speed, accuracy, and cost of collecting data. With this knowing and knowledge, it is therefore, vital to adopt an appropriate technique for the work and for sampling of the participants /target population.

This study, thus, adopted a stratified random sampling technique in the collection of data from the participants. The stratified random sampling technique involves the categorisation of the respondents' strata or class; in this case, it was into four different strata before they were sampled (Architects, Builders, Quantity surveyors and Engineers).

3.6 Data Collection Instrument

The research employed the use of close-ended well-structured questionnaire, which contain list of written questions to solicit response from the respondents. In addition, variables are provided in tables, and check boxes provided makes it's a lot easier for the participants to choose from the options. The questionnaire was designed to blend with the key research questions which would also aid meeting the study objectives and major aim. The questions in the research instrument were based on a 5-point Likert scale where (1 = lowest scale and 5 = highest scale). The Likert scale is suitable for assessing survey participants' attitudes towards an attribute, and it is easy, minimises ambiguity, mistake and confusion (Manu, 2015).

The questionnaire is divided into six (6) sections thus:

Section A - Questions about participants' basic and background details.

Section B - Questions on KM processes in construction organisations.

Section C - Questions on critical success factors (CSFs) of the adoption of knowledge management practices among construction organisations.

Section D - Questions on barriers to adoption of knowledge management practices.

Section E - Questions on influence of km practices on performance of construction organisations

Section F- Questions on strategies for improving knowledge management practices.

3.7 Pilot Survey

A pilot survey using questionnaire was carried out in line with the suggestion of Fellows and Liu, (2008) and Douglas and *et al.* (2018). It was suggested that research instrument (such as questionnaire), should be piloted at the initial stage of study; with an aim of testing how clear and intelligible are the questions contained therein. Pilot survey will also show how easy the questions are sampling respondents, and to detect ambiguities.

The initial draft was first sent to five (5) randomly selected seasoned construction-based professionals (2 Quantity surveyors, 1 Builder, 1 Engineer, and 1 Architect) in the study area. The study of the industry-based professionals influenced a major change to the final draft of the questionnaire.

A pilot study ensured that the participants comprehend the questionnaire contents, and to know whether participants can answer the questions appropriately.

3.8 Reliability and Validity Test of the Instrument

In order to determine how reliable and valid the research instrument is, a Cronbach's Alpha evaluation for Consistency and validity was carried out. According to Binyam *et al.* (2016), the consistency of the content of the questionnaire is the measure of the correctness and exactitudes of the adopted measurement procedure, this test normally will give the Cronbach alpha value of less than 0.50 as unacceptable, greater than or equal to 0.50 as poor, greater than or equal to 0.60 as questionable, greater than or equal to 0.70 as acceptable, greater than or equal to 0.80 as good and greater than or equal to 0.90 as excellent, respectively. Prior to actual data analysis, the study conducted a reliability and validity test on the gathered data to ascertain their reliability and consistency level. Table 3.2 shows that the research instrument and the gathered data have high level of reliability and internal consistency, as the alpha values ranges from 0.801 – 0.921. The average alpha value for this study is 0.862.

Table 3.2: Cronbach's Alpha Test For Reliability and Validity

No	Variables Tested	Cronbach's Alpha	Nr. of Items
1	To investigate KM processes in construction organisations	0.801	6
2	To evaluate critical success factors (CSFs) of the adoption of knowledge management practices in construction organisations	0.815	23
3	To assess barriers to knowledge management practices in construction organization	0.887	8
4	To determine influence of KM practices on performance of construction organisations	0.921	28
5	To suggest strategies to improve on the KM practices in construction organisations	0.905	13
Average		0.862	

Source: Researcher's Field Study, 2021

3.9 Data Collection Procedure

The primary data for this study was obtained through the use of the structured questionnaire administered randomly on a stratified sampled construction professionals working in construction companies in Abuja. The questionnaire was designed in sections used information derived from extensive literature review. Section 'A' was used to gather data on the background of respondents (Construction Professionals); Section 'B' was subdivided into five (5) parts each addressing each objective. Part '1' investigate KM processes in construction organisations; Part '2' evaluate the Critical Success Factors (CSF) of knowledge management practices adoption in the construction organisations; Part '3' assess barriers to knowledge management in the construction organisations; Part '4' determine influence of KM practices on performance of construction organisations; while Part '5' suggest strategies to improve KM practice in construction organisations.

3.10 Method of Data Analysis

To achieve the aim of this research, appropriate method of analysing data was employed and this ranges from descriptive and inferential statistics, the use of percentage,

frequencies, Mean Item Score (MIS) to Kruskal-Wallis H Test. Presentation and ranking of results from the analysis are presented in Tables and Charts. The actual data processing was carried out using the Statistical Package for the Social Sciences (SPSS 20) software.

3.10.1 Percentage

Percentile helps to rate variables in accordance to their degree of existence or occurrence. When the percentage is high, the level of importance attached is also high. Pallant (2007) posit that the percentile allocates values between 0 and 100 to a variable, by using the size of the variable and summation of entire size. The highest percentile possible is 100.

The formula is
$$P = \frac{n \times 100}{N}$$

Where;

P = Percentage sort,

N = Frequency or size of variable under consideration, and

N = Target population.

This analytical tool was used in analysing the basic and general information of the respondents.

3.10.2 Mean item score (MIS)

This method of analysis was employed for the entire five objectives of the study. Thus, to investigate knowledge management process; to evaluate the critical success factors (CSFs) on adoption of knowledge management practices in construction organisations; to assess barriers to knowledge management practices in construction organisations; to determine influence of knowledge management practices on performance of construction organisations and to suggest strategies to improve on the KM practice in

construction organisations. MIS was employed as Mean based analytics for two reasons; that is to rank and determine level of importance of the different variables assessed.

The Mean Item Score formula is thus:

$$MIS = \frac{5n_5 + 4n_4 + 3n_3 + 2n_2 + 1n_1}{n_5 + n_4 + n_3 + n_2 + n_1}$$

Where;

n = number of occurrence (frequency) of each rank,

n₁ to n₅ = frequency of responses based on the difference scale rating or options

3.10.3 Kruskal-walis H test

Kruskal-Walis H Test was used to test for the existence of any significant statistical difference in the ranking of the individual variables by the construction organisation practitioners. Also, Kruskal-Walis H Test was finally used to determine the difference regarding the views of the practitioners in formulated hypothesis as it pertain to the knowledge management process, critical success factors of the KM adoption, barriers to knowledge management practices, influence of knowledge management practices on organisational performance and the strategies for improving KM practices in construction organisation.

Table 3.3: Methods of Data Analysis

S/N	Objectives	Analysis Tools
1.	To investigate knowledge management processes in construction organisations.	Mean Item Score (MIS) & Kruskal-Walis H Test
2.	To evaluate the critical success factors (CSFs) of the adoption of KM practices in construction organisations.	
3.	To assess barriers to knowledge management in the construction organisations.	
4.	To determine the influence of KM practice on the performance of construction organisations.	
5	To suggest strategies to improve on the KM practice in construction organisations	
H0	Hypothesis: There is no statistically significant difference in the views of professionals regarding the variables.	Kruskal-Walis H Test

Source: Researcher's field Survey 2021

Probability level of 0.05 was adapted to determined significant level; $P < 0.05$ was considered significant for rejecting the null hypothesis while $P > 0.05$ was considered not significant that is the null hypothesis is acceptable.

3.11 Ethical Considerations

- i. The use of letter of introduction to inform management of target companies of the researcher's intention in investigation
- ii. Official and verbal consent was sought from the HR department of each construction organisation
- iii. Ensuring confidentially and privacy of participant's details by the researcher.
- iv. Avoid the use of misleading questions and statements during sampling by the researcher.
- v. Participation in the survey is willingly and not by pressures from the researcher.
- vi. Ensuring that participants do not suffer any form of physical or mental injury

CHAPTER FOUR

4.0 RESULTS AND DISCUSSION

This chapter presents and discuss the analysis and interpretation of data. The study adopted a primarily sourced data using a closed-ended questionnaire and analysed responses on respondents' background, knowledge management processes, critical success factors (CSFs) of knowledge management adoption, barriers to knowledge management practices, influence of knowledge management practices on the performance of construction organisation and strategies for improving knowledge management practice in construction organisations.

4.1 General Information on the Respondents' Background

Table 4.1 indicates the outcome of the analysis of the participants' basic background details. It revealed that 37.82% of the respondents are employees of public organisations, while 62.18% are from private organisations. With regards to the professionals' composition, 35.90% are Engineers, 32.69% are Quantity Surveyors, 12.18% are Architects, while 11.54% Builders. Working experience of the respondents, 9.74% of the respondents have 1-5 years working experience, 36.36% and 28.57% have 6 to 10 years and 11 to 15 years respectively, while 13.64% and 11.69% of the participants have 16 - 20 years and above 20 years respectively. The average working experience of the respondents is however approximately 11.66 years.

In terms of academic qualifications, 19.87% holds HND, 17.31% hold PGD, 33.33% hold BSc/Mtech (39.71%), while those with MSc./Mtech (27.56%), and PhD is 1.92% . In terms of professionals' membership 7.69% belong to other categories, 12.18% belong to MNIA, 11.54% are members of MNIIOB, 35.90% are members of MNSE, and those who belong to MNIQS are 32.69%. Also, 35.90% are small construction organisation,

22.44% are medium sized and 41.67% are large. Building projects with 62.82% formed a larger part of the project type upon which assessment was based, while the 37.18% are based on Road projects.

It is obvious from the background details, that the three categories of construction organisation are well represented, as well as the professionals. Also, the professionals are equipped academically, have the requisite professional experience to give reasonable and reliable information that aided answering the research questions.

Table 4.1: Basic Details of Respondents

Category	Classification	Freq.	Percent	Cumm. Percent
Ownership of Organisation	Public organisation	59	37.82%	37.82%
	Private organisation	97	62.18%	100.00%
	TOTAL	156	100.00%	
Respondents' Profession	Architect	21	13.46%	13.46%
	Builder	19	12.18%	25.64%
	Engineer	60	38.46%	64.10%
	Quantity Surveyor	56	35.90%	100%
	TOTAL	156	100.00%	
Years of Experience	1 - 5years	15	9.74%	9.74%
	6-10 years	56	36.36%	46.10%
	11-15years	44	28.57%	74.68%
	16-20 years	21	13.64%	88.31%
	Above 20	18	11.69%	100.00%
TOTAL	156	100.00%		
Highest Academic Qualification	HND	31	19.87%	19.87%
	PGD	27	17.31%	37.18%
	B.Sc/B.tech	52	33.33%	70.51%
	M.Sc/M.Tech	43	27.56%	98.08%
	Ph.D	3	1.92%	100.00%
TOTAL	156	100.00%		
Professional Membership	None member (others)	12	7.69%	7.69%
	MNIA	19	12.18%	19.87%
	MNIOB	18	11.54%	31.41%
	MNSE	56	35.90%	67.31%
	MNIQS	51	32.69%	100.00%
	TOTAL	156	100.00%	

Type of Organisation	Small	56	35.90%	35.90%
	Medium	35	22.44%	58.33%
	Large	65	41.67%	100.00%
	TOTAL	156	100.00%	
Project handled by organisation	Building project	98	62.82%	62.82%
	Civil Engineering project	58	37.18%	100.00%
	TOTAL	156	100.00%	

Source: Researcher's Analysis, 2021

Table 4.2, shows the distribution of respondents by organisational size. From this table the various professionals who participated in the survey are obvious.

Table 4.2: Distribution of Respondents by Organisational Size

S/N	Professionals	Small		Medium		Large		Total	
1	Architect	8	38.10%	5	23.81%	8	38.10%	21	100%
2	Builder	7	36.84%	3	15.79%	9	47.37%	19	100%
3	Engineer	20	33.33%	15	25.00%	25	41.67%	60	100%
4	Quantity Surveyor	21	37.50%	12	21.43%	23	41.07%	56	100%
	Total	56		35		65		156	

Source: Researcher's Analysis, 2021

4.2 Knowledge Management Processes in Construction Organisations

Table 4.3 shows the result of the analysis of the various construction organisations' perception of the KM processes employed. From the Table, it can be seen that small construction organisations emphasis on knowledge utilization (MIS=4.57), followed by knowledge acquisition (MIS=4.09), then knowledge transfer (MIS=3.96). The medium size organisations adopts knowledge utilization (MIS=4.29), followed by Knowledge storage (MIS=4.11), and then knowledge acquisition (MIS=3.91). The KM process of the large construction organizations are Knowledge acquisition (MIS=4.74), followed by knowledge creation (MIS=4.42) and Knowledge storage (MIS=4.42), and then Knowledge maintenance (MIS=4.37).

In the overall, the KM processes in order of average MIS weighting of the sample organizations are Knowledge Acquisition (MIS=4.25), Knowledge Utilization

(MIS=4.20), Knowledge Storage (MIS=4.13), Knowledge Creation (MIS=4.07), Knowledge Maintenance (MIS=4.04), and Knowledge Transfer (MIS=3.98).

Further analysis in (Columns 11 & 12) indicates that the view of the respondents varies significantly. This is evident in their P-value of less than 0.05, which implies there is a significant difference in the way three categories organisations practices KM. This also shows a divergent opinion in the ways KM is being practiced among the SMEs and large organisations.

Table 4.3: Result of Analysis on Evaluation of Knowledge Management Processes in Construction Organisations

S/N	KM Processes	Perception of Professionals in Small Firms		Perception of Professionals in Medium Firms		Perception of Professionals in Large Firms		Overall Perception		Kruskal Wallis Test	
		MIS	RK	MIS	RK	MIS	RK	MIS	RK	P-value	Decision
1	Knowledge Utilization	4.57	1 st	4.29	1 st	3.73	6 th	4.20	2 nd	0.000*	Reject
2	Knowledge Acquisition	4.09	2 nd	3.91	3 rd	4.74	1 st	4.25	1 st	0.001*	Reject
3	Knowledge Transfer	3.96	3 rd	3.63	6 th	4.35	5 th	3.98	6 th	0.000*	Reject
4	Knowledge Creation	3.95	5 th	3.86	4 th	4.42	2 nd	4.07	4 th	0.000*	Reject
5	Knowledge Storage	3.88	6 th	4.11	2 nd	4.42	2 nd	4.13	3 rd	0.003*	Reject
6	Knowledge Maintenance	3.96	3 rd	3.80	5 th	4.37	4 th	4.04	5 th	0.001*	Reject
	OVERALL MIS	25.35		24.12		26.17		34.09			

Source: Researcher's Analysis, 2021

*Pvalue<0.05

Further analysis was carried out to ascertain if there is significant difference in views of professional in three categories of construction organisations. Kruskal-Walis test at 95% confidence level was used. The test showed that there is a significant difference in the ranking of the knowledge management processes by these construction firms. There is inconsistencies and divergent view among the various three sizes of organisation regarding the six KM processes. The p-value which is less than 0.05 level of significant

shows a statistical significant difference in perceptions. Thus, the hypothesis which states that there is no statistically significant difference in the views of the construction organisations regarding the Km processes, is therefore, rejected (see table 4.4).

Table 4.4: Comparism of Construction Firms' Perception of KM Processes

Construction Organisations		Kruskal-Walis			
		Mean Rank	Chi Sq.	P-value	Decision
KM Processes	Small	71.2	18.999	0.000	Reject
	Medium	57.5			
	Large	96.1			

Source: Researcher's Analysis, 2021

4.3 Critical Success Factors (CSFs) for adoption of Knowledge Management practices among Construction Organisations

Table 4.4 shows the results of the analysis of the data collected on CSFs to the adoption of knowledge management practices among professionals three categories of construction organisations sampled. For professionals in small organizations, the top 10 CSFs for KM adoption are; Availability of Technology infrastructure (MIS=4.95), Knowledge-friendly organization culture (MIS=4.93), top management support and commitment (MIS=4.75), Good and effective communication MIS=4.75), Application of IT (MIS=4.64), Motivated workers who develop, share and use knowledge (MIS=4.50), Reciprocity (MIS=4.45), Creating Knowledge sharing space (MIS=4.45), Open organizational culture (MIS=4.09), and Evolution and ease of accessibility to shared knowledge (MIS=4.02).

Professionals medium sized organizations are of the opining that CSFs to the KM adoption are; Knowledge-friendly organization culture (MIS=4.83), Availability of Technology infrastructure (MIS=4.94), Good and effective communication (MIS=4.83), top management support and commitment (MIS=4.74), management leadership and commitment (MIS=4.66), Application of IT (MIS=4.63), Creating Knowledge sharing

space (MIS=4.51), Motivated workers who develop, share and use knowledge (MIS=4.43), Open organizational culture (MIS=4.23), and Reciprocity (MIS=4.06).

For professionals in large construction organizations, the top 10 CSFs for KM adoption are; top management support and commitment (MIS=4.72), Creating Knowledge sharing space (MIS=4.49), Application of IT (MIS=4.46), Good and effective communication (MIS=4.46), Motivated workers who develop, share and use knowledge (MIS=4.29), Team working (MIS=4.15), Perceived value and uniqueness of knowledge (MIS=4.14), Reciprocity (MIS=4.11), Evolution and ease of accessibility to shared knowledge (MIS=4.00), and Financial motivations (MIS=3.98).

On the overall, the top 10 critical success factors (CSFs) of KM adoption are: top management support and commitment (MIS=4.74), Good and effective communication (MIS=4.78), Application of IT (MIS=4.56), Availability of Technology infrastructure (MIS=4.54), Creating Knowledge sharing space (MIS=4.48), Motivated workers who develop, share and use knowledge (MIS=4.40), Knowledge-friendly organisation culture (MIS=4.25), Open organisational culture (MIS=4.05) management leadership and commitment (MIS=4.05) and Evolution and ease of accessibility to shared knowledge (MIS=4.00)

The least five (5) Critical Success Factors (CSFs) of Knowledge management adoption are; Conformity with corporate culture (MIS=3.35), Availability of personnel incentives (MIS=3.03), Honouring Knowledge sharing commitments (MIS=2.99), Mimicking the behaviour of leaders (MIS=2.85), and Active participation of employee (MIS=2.48).

Further analysis was carried out to ascertain if there is agreement in ranking of Critical Success Factors (CSFs) among professional in three category of organisation. Kruskal

Walis H test revealed that these organisations views varied significantly on 5 of the identified factors (representing 21.74%). The factors that respondents differ on their perceptions have their p-value of less than 0.05. These factors are; mimicking the behaviour of leaders, Perceived value and uniqueness of knowledge, Availability of Technology infrastructure, Availability of personnel incentives, and Active participation of employee. This significant difference in views implies variability in the way these organisations perceives these factors. This variation in views could be attributed to the relative understanding of how these factors influence the adoption of knowledge management practices in the various organisational sizes. There is also a possibility of that the objectives of Knowledge management differs from organisation to organisation.

78.25% (18) of the Critical Success Factors (CSFs) showed non-significant difference; these factors have p-value of > 0.05 . This non-significant result implies convergent views regarding the factors that are critical to the success of Knowledge management adoption in the organisations. Based on the number of factors with P-value > 0.05 , it was concluded that there is no significant difference in the perception of professionals in three categories of construction organisations regarding the factors critical to the successful adoption of knowledge management.

Table 4.5: Result Kruskal-Wallis H Test on Critical Success Factors (CSFs) of knowledge Management Practices

S/N	CSFs for the adoption of knowledge management	Perception of professionals in Small Firms		Perception of professionals in Medium Firms		Perception of professionals in Large Firms		Overall Perception		Kruskal Wallis Test	
		MIS	Rank	MIS	Rank	MIS	Rank	MIS	Rank	P-value	Decision
1	Reciprocity	4.45	7 th	4.06	10 th	4.11	8 th	4.20	8 th	0.725	Accept
2	Peer recognition	3.66	16 th	3.60	15 th	3.57	16 th	3.61	16 th	0.844	Accept
3	Honouring Knowledge sharing commitments	3.00	21 st	3.00	20 th	2.98	23 rd	2.99	20 th	0.994	Accept
4	Financial motivations	3.98	12 th	4.03	12 th	3.98	10 th	4.00	12 th	0.947	Accept
5	Social motivations	3.54	18 th	3.49	16 th	3.43	18 th	3.48	18 th	0.855	Accept
6	Conformity to corporate culture	3.41	19 th	3.34	18 th	3.31	20 th	3.35	19 th	0.935	Accept
7	Mimicking the behaviour of leaders	3.16	20 th	2.00	22 nd	3.05	22 nd	2.74	22 nd	0.000*	Reject
8	Perceived value and uniqueness of knowledge	3.63	17 th	4.00	13 th	4.14	7 th	3.92	14 th	0.000*	Reject
9	Culture	3.98	12 th	4.06	10 th	3.97	12 th	4.00	11 th	0.855	Accept
10	Creating Knowledge sharing space	4.45	7 th	4.51	7 th	4.49	2 nd	4.48	5 th	0.932	Accept
11	Application of IT	4.64	5 th	4.63	6 th	4.46	3 rd	4.58	4 th	0.080	Accept
12	Availability of Technology infrastructure	4.95	1 st	4.94	2 nd	3.98	10 th	4.62	3 rd	0.000*	Reject
13	Evolution and ease of accessibility to shared knowledge	4.02	10 th	3.97	14 th	4.00	9 th	4.00	13 th	0.914	Accept
14	Knowledge-friendly organisation culture	4.93	2 nd	4.83	1 st	3.20	2 st	4.38	7 th	0.222	Accept

15	Motivated workers who develop, share and use knowledge	4.50	6 th	4.43	8 th	4.29	5 th	4.41	6 th	0.430	Accept
16	Team working	4.00	11 th	3.43	17 th	4.15	6 th	3.86	15 th	0.085	Accept
17	top management support and commitment	4.75	3 rd	4.74	4 th	4.72	1 st	4.74	1 st	0.942	Accept
18	Open organisational culture	4.09	9 th	4.23	9 th	3.92	13 th	4.08	10 th	0.269	Accept
19	Good and effective communication	4.75	3 rd	4.83	3 rd	4.46	3 rd	4.68	2 nd	0.103	Accept
20	Availability of personnel incentives	2.70	22 nd	2.60	21 st	3.55	17 th	2.95	21 th	0.000*	Reject
21	Active participation of employee	2.41	23 rd	1.00	23 rd	3.34	19 th	2.25	23 rd	0.000*	Reject
22	management leadership and commitment	3.89	14 th	4.66	5 th	3.86	14 th	4.14	9 th	0.051	Accept
23	Knowledge Management Measurement	3.70	15 th	3.17	19 th	3.62	15 th	3.49	17 th	0.091	Accept
	OVERALL MIS	84.64		82.34		83.15		85.21			

Source: Researcher's Analysis, 2021

*Pvalue<0.05

Further analysis was carried out to ascertain degree of variation in perceptions of professionals in three categories of organisations on CSFs of KM practices. Kruskal-Walis test at 95% confidence level was used. It was revealed that there is no significant difference in the perceptions of these construction organisations regarding the factors critical to the successful adoption of knowledge management in construction. The result in Table 4.5 showed that the P-value > 0.05 , implies a non-significant difference in the views of the professionals. Based on this, the hypothesis which state that there is no significant difference in the perception of construction organisations regarding the factors critical to the successful adoption of knowledge management is therefore, accepted.

Table 4.6: Comparison of Construction Firms' Perception of Critical Success Factors of the KM Adoption

		Kruskal-Walis			
		Mean Rank	Chi Sq.	P-value	Decision
CSFs to adoption of KM	Construction Organisations Small	86.88	3.538	0.171	Accept
	Medium	69.36			
	Large	76.21			

N = 56 for Small, N = 35 for Medium, N = 65 for Large, df = 2

Source: Researcher's Analysis, 2021

4.4 Barriers to Knowledge Management Practices in Construction Organisations

Table 4.7 shows the result of the analysis of perception of professionals in the three categories of construction organisations' on barriers to knowledge management.

Based on the perception of professionals in small construction organisations, the top 10 Barriers to KM practices in construction organizations are; lack of IT support facilities (MIS=0.986), Lack of formal review and learning processes (MIS=0.957), Absence of firms structural approach (MIS=0.921), Low level of training/intellectual capital (MIS=0.882), Large number of SMEs (MIS=0.850), Lack of coordination (MIS=0.832),

Lack of Time (Time constraint) (MIS=0.829), Inadequate stakeholder involvement and participation (MIS=0.821), problem of Converting Knowledge (MIS=0.811), and Poor communication network (MIS=0.800).

For professionals in the medium size construction organizations the major barriers to KM practices are; Lack of formal review and learning processes (MIS=0.954), lack of IT support facilities (MIS=0.931), Poor communication network (MIS=0.891), Lack of adequate technology (MIS=0.891), Lack of client education on process (MIS=0.874), Absence of firms structural approach (MIS=0.851), Lack of Time (Time constraint) (MIS=0.840), Lack of standard work process (MIS=0.840), Misunderstanding of client organization and culture (MIS=0.834), and problem of Converting Knowledge (MIS=0.823).

Perception of professionals in the large construction organisations indicate, the top 10 barriers as; Poor communication network (MIS=0.994), Lack of formal review and learning processes (MIS=0.972), Lack of adequate technology (MIS=0.902), Low level of training/intellectual capital (MIS=0.868), Multi-Disciplinary Teams (MIS=0.843), cultural elements (MIS=0.828), problem of Converting Knowledge (MIS=0.828), Lack of top management support (MIS=0.828), Lack of standard work process (MIS=0.828), and Organizational culture (MIS=0.825).

On the overall, it can be seen that the top 10 barriers to KM are: Lack of formal review and learning processes (MIS=0.973), Poor communication network (MIS=0.901), Lack of adequate technology (MIS=0.863), Low level of training/intellectual capital (MIS=0.835), Absence of firms structural approach (MIS=0.831), lack of IT support facilities (MIS=0.826), problem of Converting Knowledge (MIS=0.821), Lack of client

education of process (MIS=0.813), Lack of Time (Time constraint) (MIS=0.805), and Lack of coordination (MIS=0.797).

The least five (5) barriers to Knowledge management are; Lengthy Time Period (MIS=0.681), Large number of SMEs (MIS=0.656), Uniqueness of construction Projects (MIS=0.629), mainly a male sector (MIS=0.579), Inadequate stakeholder involvement and participation (MIS=0.559).

On individual barrier basis, a further analysis (Table 4.7, columns 11 & 12) revealed that views of the professionals varied significantly on 50% the factors. These barriers have their P-value of less than 0.05. Also, 50% of the factors show non-significant difference; these barriers have P-value of > 0.05 . This significant and non-significant result implies variability in the organisations as professionals' perceives these factors. This variation in views could be attributed to the relative understanding of knowledge management practices in the various organisations. Also, Knowledge management objectives of the firms of the respondents have also influenced their views; the practice differs from firm to firm.

Table 4.7: Result of Analysis on the Barriers to Knowledge Management in Construction Organisations

S/N	Barriers	Perception of professionals in Small Firms		Perception of professionals in Medium Firms		Perception of professionals in Large Firms		Overall perception		Kruskal Wallis Test	
		MIS	Rank	MIS	Rank	MIS	Rank	MIS	Rank	P-value	Decision
1	Lack of coordination	0.832	6	0.766	18	0.785	15	0.794	11	0.175	Accept
2	Poor communication network	0.800	10	0.891	3	0.994	1	0.895	2	0.000	Reject
3	Absence of firms structural approach	0.921	3	0.851	6	0.742	19	0.838	4	0.000	Reject
4	cultural elements	0.739	16	0.777	16	0.828	6	0.781	12	0.101	Accept
5	Lack of 'voice' of the user group(s)	0.718	18	0.789	15	0.812	11	0.773	14	0.086	Accept
6	Inadequate stakeholder involvement and participation	0.821	8	0.457	28	0.388	28	0.555	28	0.000	Reject
7	Poor group dynamics	0.661	25	0.663	24	0.812	11	0.712	22	0.000	Reject
8	Misunderstanding of client organization and culture	0.796	13	0.834	9	0.754	17	0.795	10	0.087	Accept
9	Lack of client education of process	0.800	10	0.874	5	0.791	14	0.822	6	0.112	Accept
10	Lack of formal review and learning processes	0.957	2	0.954	1	0.972	2	0.961	1	0.033	Reject
11	Lack of Time (Time constraint)	0.829	7	0.840	7	0.766	16	0.812	9	0.110	Accept
12	Trying to solve large problems	0.679	23	0.771	17	0.720	22	0.723	21	0.288	Accept
13	problem of Converting Knowledge	0.811	9	0.823	10	0.828	6	0.820	7	0.345	Accept
14	Large number of SMEs	0.850	5	0.806	12	0.409	27	0.688	24	0.000	Reject
15	Multi-Disciplinary Teams	0.711	20	0.754	19	0.843	5	0.769	15	0.000	Reject
16	Uniqueness of construction Projects	0.686	22	0.571	27	0.612	23	0.623	26	0.150	Accept
17	Lack of Learning	0.700	21	0.800	13	0.723	21	0.741	19	0.156	Accept

18	Lengthy Time Period	0.754	14	0.697	22	0.609	24	0.687	25	0.012	Reject
19	lack of IT support facilities	0.986	1	0.931	2	0.594	25	0.837	5	0.000	Reject
20	Lack of top management support	0.746	15	0.709	21	0.828	6	0.761	16	0.106	Accept
21	Mainly a male sector	0.571	28	0.640	26	0.554	26	0.588	27	0.402	Accept
22	High turnover	0.657	26	0.811	11	0.748	18	0.739	20	0.035	Reject
23	Low level of training/intellectual capital	0.882	4	0.697	22	0.868	4	0.816	8	0.001	Reject
24	Lack of adequate technology	0.800	10	0.891	3	0.902	3	0.864	3	0.034	Reject
25	Diverse individual culture	0.639	27	0.663	24	0.794	13	0.699	23	0.003	Reject
26	Organisational culture	0.714	19	0.714	20	0.825	10	0.751	17	0.105	Accept
27	Lack of adequate training	0.721	17	0.794	14	0.726	20	0.747	18	0.111	Accept
28	Lack of standard work process	0.675	24	0.840	7	0.828	6	0.781	13	0.006	Reject
	OVERALL MIS	22.75		23.12		24.09		25.11			

Source: Researcher's Analysis, 2021

*Pvalue<0.05

Further analysis was carried out to ascertain if there is significant difference in perception among professionals in the three categories of organisation on the barriers to KM practice. Kruskal-Walis test at 95% confidence level was carried out to ascertain if there is variation in the views of professionals in each of the organisation. The result of this analysis is shown on Table 4.8. The test showed that there is a significant difference in the ranking of the barriers to knowledge management practice by three categories of construction organisations. There is inconsistencies and divergent view among the various three sizes of organisation regarding variables. The p-value for the variables is 0.008 which is less than 0.05 level of significance.

Since 50% of the barriers have P-value < 0.05 and 50% > 0.05 (Table 4.8), the result in Table 4.8 will be misleading if a critical examination is not done further. In order to understanding why the result in Table 4.8 turned out to show significant difference, the MIS of the barriers with Pvalue < 0.05 were summed up and those with Pvalue > 0.05 were also summed up. The result showed that (P-value $> 0.05=10.510$; and those with P-value $< 0.05=10.838$). This shows that variables with P-value < 0.05 weighted (0.328) more than those with P-value > 0.05 . Thus, the hypothesis which states that there is no statistically significant difference in the views of the construction organisations, is therefore, rejected.

Table 4.8: Comparison of Construction firms' Perception of Barriers to Knowledge Management Practices

	Construction Organisations	Kruskal-Walis			
		Mean Rank	Chi Sq.	P-value	Decision
Barriers to KM	Small	87.22	7.767	0.008	Reject
	Medium	89.30			
	Large	65.17			

N = 56 for Small, N = 35 for Medium, N = 65 for Large, df = 2

Source: Researcher's Analysis, 2021

4.5 The Influence of knowledge Management Practice on the Performance of Construction Organisations

Table 4.9 presents the results of the analysis of the data collected on the influence of knowledge management practice on the performance of construction organisations. From the perspective of the small organisations, the main influence of KM are; improving organisational productivity and performance (MIS=4.98), Enables organisation to create and maintain values (MIS=4.71), and improves the competitiveness of organisations (MIS=4.20).

The medium size organisations are of the opinion that the main influence of KM on organisations are; improving organizational productivity and performance (MIS=4.89), improves the competitiveness of organisations (MIS=4.54), and helps organisations achieve their visions (MIS=3.94).

For the large construction organizations, the key influence of KM are; improving organizational productivity and performance (MIS=4.92), improves the competitiveness of organizations (MIS=4.42), and leads to organizational sustenance and survival (MIS=4.42).

Overall, the major influence of KM application on construction organisations performance are; improving organisational productivity and performance (MIS=4.93), improves the competitiveness of organisations (MIS=4.38) and helps organisations achieve their visions (MIS=4.01).

87.50% (8) of the variables showed non-significant difference; these strategies have p-value of > 0.05 . This non-significant result implies convergent views regarding the way these organisations view these variables regardless of the size differences. Only 12.5%

(1) of the variables showed that there was a divergent view of the construction organisations, as the p-value was less than 0.05 (i.e. 0.011). This variable is 'enhances community development'. The difference could be based on the differing application level of KM in these organisations and the level of knowledge of the professionals.

Based on the number of strategies with P-value > 0.05 can be concluded that there is no significance difference in the perceptions of professionals in three categories construction organisations regarding the influence of knowledge management practice on the performance of construction organisations.

Table 4.9: Results of Analysis on Influence of Knowledge Management on Performance of Construction Organisations.

S/No	Influence of KM practice	Perception of Professionals in Small Firms		Perception of Professionals in Medium Firms		Perception of Professionals in Large Firms		Overall Perception Rank	Kruskal Wallis Test		
		MIS	Rank	MIS	Rank	MIS	Rank		MIS	P-value	Decision
1	Enables organisation to create and maintain values	4.71	2	3.69	4	3.43	8	3.94	4	0.110	Accept
2	Improves the competitiveness	4.20	3	4.54	2	4.42	2	4.38	2	0.563	Accept
3	Helps organisations achieve their visions	3.95	5	3.94	3	4.14	4	4.01	3	0.140	Accept
4	Leads to organisational success	3.88	7	3.29	6	3.91	7	3.69	7	0.113	Accept
5	Leads to individual development	4.09	4	3.14	7	4.06	5	3.76	6	0.053	Accept
6	Enhances community development	3.95	5	3.09	8	3.95	6	3.66	8	0.011	Reject
7	Improve organisational productivity and performance	4.98	1	4.89	1	4.92	1	4.93	1	0.893	Accept
8	Leads to organisational sustenance and survival	3.50	8	3.69	4	4.42	2	3.87	5	0.070	Accept
OVERALL MIS		33.92		32.12		33.40		34.36			

Source: Researcher's Analysis, 2021

Further analysis was carried out to ascertain if there is any significant difference in the perception of professionals in three categories construction organisations regarding the influence of knowledge management practice on the performance of construction organisations. Kruskal-Walis test at 95% confidence level was carried out to ascertain if there is variation in the views of professionals in each of the construction organisations type. The result in Table 4.10 indicated that the P-value of 0.671 is greater than 0.05, which translate to non-significance different in the views of professionals in the construction organisations. Based on this, the hypothesis which states that there is no significant difference in the perception of construction organisations regarding the influence of knowledge management practice on the performance of construction organisations is therefore accepted.

Table 4.10: Comparism of Construction Organisations' Perception on the Influence of Knowledge Management.

		Kruskal-Walis			
	Construction Organisations	Mean Rank	Chi Sq.	P-value	Decision
Influence of KM	Small	84.87	1.150	0.671	Accept
	Medium	56.07			
	Large	85.09			

Source: Researcher's Analysis, 2021

4.6 Strategies to Improve Knowledge Management Practice in Construction Organisations

In Table 4.11, the results indicate that the important strategies are: Government should invest more in the construction industry, this will bring more funding (MIS=4.09), construction professionals embracing ICT application to make knowledge management easier to facilitate instant results (MIS=4.08), Timely and well planned trainings, seminars and workshops should be provided to increase staff knowledge and experiences (MIS=4.07), ensuring that knowledge are properly used, protected and not

abused within and inside organisations (MIS=4.01), and ensuring that both explicit and tacit knowledge based in organisation are transferred to employees (MIS=3.97).

Analysis of view of professionals in the construction organisations on each of the strategies for improving the practice of knowledge management using Kruskal Wallis test (Table 4.11, columns 5 & 6), shows that the organisations views varied significantly on 4 (30.77%) of the strategies. These strategies score a p-value of less than 0.05, and they are; top management has a role to play to ensure the implementation of KM practices enabling environment; using knowledge to strategically change organisational direction; environment where research and innovative activities should be created; and organisational culture tolerance to risk should be created. This significant difference in views implies variability in the way these organisations perceive these strategies. This variation in views could be attributed to the relative understanding of these measures to be adopted in organisations for improving knowledge management practices.

69.23% (9) of the strategies showed non-significant difference; these strategies have p-value of > 0.05 . This non-significant result implies convergent views regarding the way these organisations view these variables regardless of the size differences.

Based on the number of strategies with P-value > 0.05 , it can be concluded that there is no significance difference in perception of professionals in the construction organisations regarding the strategies to improve on the KM practice.

Table 4.11: Result of Analysis on Strategies for Improving Knowledge Management Practices in Construction Organisations

S/N	Strategies	Perception of professionals in Small Firm		Perception of professionals in Medium Firm		Perception of professionals in Large Firm		Overall perception		Kruskal Wallis Test	
		MIS	RK	MIS	RK	MIS	RK	MIS	RK	P-value	Decision
		1	construction professionals embracing ICT application to make knowledge management easier to facilitate instate results	4.08	2 nd	3.94	4 th	4.06	4 th		
2	Government should invest more in the construction industry, this will bring more funding	4.09	1 st	4.38	2 nd	3.60	8 th	3.61	7 th	0.081	Accept
3	Corporate knowledge should be completely utilized,	3.63	8 th	4.01	3 rd	3.00	11 th	2.99	10 th	0.106	Accept
4	Mechanism for inter-organizational collaboration should be establish,	3.94	7 th	3.69	7 th	4.03	5 th	4.00	5 th	0.693	Accept
5	Ensure that both explicit and tacit knowledge based in organization are transferred to employees,	3.97	5 th	3.76	6 th	3.49	9 th	3.48	8 th	0.398	Accept
6	Ensuring that knowledge are properly used, protected and not abused within and inside organisations.	4.01	4 th	3.66	8 th	3.34	10 th	3.35	9 th	0.056	Accept
7	top management has a role to play to ensure the entrenchment of KM practices enabling environment.	3.56	9 th	4.93	1 st	2.00	3 rd	2.74	11 th	0.000*	Reject
8	Timely and well planned trainings, seminars and workshops should be provided to increase staff knowledge and experiences.	4.07	3 rd	3.87	5 th	4.00	6 th	3.92	6 th	0.372	Accept

9	Using knowledge to strategically change organizational direction	3.12	11 th	3.94	4 th	4.06	4 th	4.00	5 th	0.000*	Reject
10	an environment where research and innovative activities should be created,	3.96	6 th	4.38	2 nd	4.51	3 th	4.48	3 rd	0.000*	Reject
11	sense of job security created in the minds of employees	2.74	12 th	4.01	3 rd	4.63	2 nd	4.58	2 nd	0.274	Accept
12	Organizational culture tolerance to risk should be created	3.49	10 th	3.43	7 th	4.94	1 st	4.62	1 st	0.025*	Reject
13	personal knowledge management should be adjusted according to individual preferences and meets different needs	2.72	13 th	4.11	6 th	3.97	7 th	4.00	5 th	0.342	Accept
OVERALL MIS		49.53		54.02		55.90		47.84			

Source: Researcher's Analysis, 2021

In order to further confirm that there is no significant difference in the perception of these construction organisations regarding the strategies to improve on the KM practice in construction organisations, a further analysis using Kruskal-Walis test at 95% confidence level was carried out to ascertain if there is variation in the views of each of the construction organisations type. The result in table 4.12 showed that the P-value of 0.101 is greater than 0.05, showing a non-significant different in the views of the construction firms. Based on this, the hypothesis which states that there is no significant difference in the perception of professionals in construction organisations regarding the strategies to improve on the KM practice in construction organisations is therefore accepted.

Table 4.12: Comparism of Strategies for Improving Knowledge Management Practices

	Construction Organisations	Kruskal-Walis			Decision
		Mean Rank	Chi Sq.	P-value	
Strategies to improve KM practices	Small	86.80	4.397	0.101	Accept
	Medium	60.74			
	Large	80.91			
N = 56 for Small, N = 35 for Medium, N = 65 for Large, df = 2					

Source: Researcher's Analysis, 2021

4.7 Summary of Findings

The major findings of the study are summarised as follows;

- i. The knowledge management process in construction organisations are; Knowledge Acquisition, Knowledge Utilization, Knowledge Storage, Knowledge Creation, Knowledge Maintenance, and Knowledge Transfer.
- ii. The major critical success factors (CSFs) of KM adoption in construction organisations are: top management support and commitment, Good and effective communication, Application of IT, Availability of Technology infrastructure, Creating Knowledge sharing space, Motivated workers who develop, share and use knowledge, Knowledge-friendly organisation culture, Open organisational

- culture, management leadership and commitment and Evolution and ease of accessibility to shared knowledge.
- iii. The major barriers to KM practices in the Nigerian construction organisations are; Lack of formal review and learning processes, Poor communication network, Lack of adequate technology, Absence of firms structural approach, lack of IT support facilities, Lack of client education of process, problem of Converting Knowledge, Low level of training/intellectual capital, Lack of Time (Time constraint), and Misunderstanding of client organisation and culture.
 - iv. The major influence of KM practices on performance of construction organisations are; improving organisational productivity and performance, improve the competitiveness of organisations, and helps organisations achieve their visions.
 - v. The major strategies for improving knowledge management practices are: Government should invest more in the construction industry, this will bring more funding, construction professionals embracing ICT application to make knowledge management easier to facilitate instate results and Timely and well planned trainings, seminars and workshops should be provided to increase staff knowledge and experiences.

4.8 Discussion of Result

The study revealed that the KM processes practiced in the construction organisations were; knowledge acquisition, creation, utilization, transfer, storage and maintenance. This study finding is in line with previous studies of Elmhdee *et al*, (2014); Ahmad *et al*. (2020) submitted that knowledge management process encompasses activities such as acquisition, creation, utilization or application, transfer, dissemination, storage and maintenance of knowledge. The finding revealed that the most km process practiced in

small organisations is knowledge utilization and acquisition, while knowledge storage was ranked low, which implies poor storage culture. This study affirms the finding that professionals are aware of knowledge utilization and be properly communicated to it users (Ahmad *et al.*, 2020). In medium size organisations, knowledge utilization and storage was the most practicing KM process, while knowledge transfer was ranked low. This finding agreed with the previous study that said knowledge and know-hows and experiences of the construction-based professionals are not easily shared among engineers, experts and contractors and hence a major loss to construction firms, this affirmed the finding of Kasimu *et al.* (2013).

Large organisation concentrated on knowledge acquisition and storage the most practice knowledge management process in the organisation, while knowledge utilization was ranked low. This finding supported the findings that knowledge can be acquired from the organisation's repository, be conveyed from those with the required knowledge outside the organisation this confirmed to finding of Ahmad *et al.* (2020). The finding is in line with the finding of Fadeke *et al.*, (2015) who asserted that experienced employees supervises new staff and the firm places emphasis on lesson learnt on the project are the major forms of knowledge acquisition within construction organisations.

There is a significant difference in the ranking of the knowledge management processes within the three categories of construction firms. This implies inconsistencies and divergent view among the three construction organisations regarding knowledge management process.

The study further found that the critical success factors (CSFs) of KM practice are; good and effective communication, top management support and commitment, application of IT, availability of technology infrastructure, creating Knowledge sharing space, motivated

workers who develop, share and use knowledge, Knowledge-friendly organisation culture, open organisational culture, management leadership and commitment as well as evolution and ease of accessibility to shared knowledge. Small and medium size construction organisations perceived availability of technology infrastructure and knowledge friendly organisational culture as most factors critical to the success of km practice while active participation of employee was ranked low. This finding is in line with findings of Zuofa *et al.* (2015) and Oke *et al.* (2013) found active participation of employee; top management support; creating knowledge and application of information technology as the factors that affect the success of knowledge management. Large size construction organisations perceived top management support and commitment and creating knowledge sharing space as major factors critical to the success of km practice while active honouring knowledge sharing and commitment was ranked low and therefore in relevant. This finding also affirms the findings of Oke *et al.* (2013); Zuofa *et al.* (2015) and Guribie *et al.* (2018) which submitted that the enablers of knowledge management include management support, knowledge sharing culture, the right technology, infrastructure, and periodic knowledge management assessment/ measurement.

The study discovered that the major barriers to knowledge management practice in the construction organisations in the study area are; lack of formal review and learning processes, poor communication network, lack of adequate technology, low level of training/intellectual capital, absence of firms structural approach, lack of IT support facilities, problem of converting knowledge, lack of client education of process, lack of time (time constraint), and lack of coordination. This finding is in line with the reports of Carrillo *et al.* (2000); Robinson *et al.* (2005); Polyaninova, (2011); Oke *et al.* (2013) and Kasim and Saeed, (2018). The perception of small and medium size construction organisations is that lack of IT support facilities and lack of formal and learning processes

as major barriers to knowledge management practice which agree with finding of Guto and Ola –awo, (2020) found that lack formal and learning review processes and lack of IT support facilities and major barriers to knowledge management practices among construction organisations in the study.

Large size organisations perceived that lack of formal and learning processes and poor communication the major obvious barriers to KM practice. This finding uphold the finding of Kasim and Saeed (2018) who stated that lack of coordination, poor utilisation of communication network, absence of firms' structural approach, and cultural elements are the major barriers to KM practice

The study found that the perception of small and medium size construction organisations was that; improving organisational productivity and performance, improves the competitiveness of organisations, and helps organisations achieve their visions are the major factors influencing performance of construction organisations in the study area. This finding is in consonant with the findings of Suzana and Kasim, (2010); Lev, (2001); Heisig *et al.* (2016); Botha *et al.* (2014) and Omotayo, (2015). Also agree with the findings of Suzana and Kasim (2010) found that levels of knowledge management practices were essential in identifying and improving organisational performance and productivity. The perception of large size construction organisations is that the top factors influencing performance of construction organisations are improving organisational productivity and performance and leads to organisational sustenance and survival.

It is obvious that KM enhances the competitiveness of organisations and improves their productivity and performance among their competitors.

On the strategies for improving knowledge management practice in the study, are; management should invest more in the construction industry, this will bring more funding, construction professionals embracing ICT application to make knowledge management easier to facilitate instate results and Timely and well planned trainings, seminars and workshops should be provided to increase staff knowledge and experiences. This finding is in line with finding of Oke *et al.* (2013), Leal *et al.* (2017) Kasim and Saeed (2018). Construction professionals in medium size construction organisations perceived that encouraging the management to welcome the duty of creating and ensuring a proper and favourable KM practices environment and an environment where research and innovative activities should be created are major strategies for improving knowledge management practice in their organisations. While in large construction organisation they perceived that organisational cultural tolerance to risk should be created and sense of job security created in the minds of employees are top strategies for improving knowledge management. This finding agrees with the finding of Carrillo *et al.* (2000) which stated that organisational culture and tolerance to risk and job security are the top strategies for improving knowledge management in their organisation.

Further finding revealed that there is no significant difference in the perception of professionals in the three categories of construction organisations regarding the strategies to improve on the KM practice in construction organisations.

CHAPTER FIVE

5.0 CONCLUSION AND RECOMMENDATIONS

5.1 Conclusion

This research was set out with the aim to assess Knowledge Management practices among construction organisations, with a view to suggesting strategies for improving on the KM practice in construction organisations. The study adopted a survey design approach, questionnaire was used for collection of data from professionals in construction organisations (Small, medium and large) in the study area, to be able to answer the research questions.

Based on the finding, the KM processes of construction organisations are; Knowledge Acquisition, Knowledge Utilization, Knowledge Storage, Knowledge Creation, Knowledge Maintenance, and Knowledge Transfer. The major CSFs of KM practice are: top management support and commitment, Good and effective communication, Application of IT, Availability of Technology infrastructure, Creating Knowledge sharing space, Motivated workers who develop, share and use knowledge, Knowledge-friendly organisation culture, Open organisational culture, management leadership and commitment and Evolution and ease of accessibility to shared knowledge. The barriers to KM practices in the Nigerian construction organisations are; Lack of formal review and learning processes, Poor communication network, Lack of adequate technology, Absence of firms structural approach, lack of IT support facilities, Lack of client education of process, problem of Converting Knowledge, Low level of training/intellectual capital, Lack of Time (Time constraint), and Misunderstanding of client organization and culture. Furthermore, the major influence of KM application on construction organisations performance are; improving organisational productivity and performance, improves the competitiveness of organisations, and helps organisations achieve their visions. Finally,

the strategies for improving knowledge management in construction organisations are; management should invest more in the construction industry, construction professionals embracing ICT application to make knowledge management easier to facilitate instate results and Timely and well planned trainings, seminars and workshops should be conducted to increase staff knowledge and experiences.

There is divergence in the views of construction professionals among the category of construction organisations. Knowledge management approach differs depending on organisational size. Small and medium size construction organisations prefer a more personal approach, whilst larger-size organisations prefer knowledge transfer via technology.

5.2 Recommendations

Grounded on the findings of the research, the recommendation that follows are;

- i. Knowledge management should be formalized and made an integral part of the organisations culture and operations. This will ensure improvement in the intellectual corporate knowledge data base for sustainable practice to improving future projects performance.
- ii. Funds should be provided by management for the acquisition of innovative ICT support facilities and technology for improving data capturing, storage, processing, retrieval and application for improving project performance and organisational efficiency and communication networks
- iii. Top management support and commitment is critical for the optimum performance of every facet of the organisation. Thus, the management should ensure sustainability in knowledge management and information dissemination for improving future project performance, increase productivity and organisational reputation.

- iv. Support and commitment of the CEO in the area of engagement of the right and qualified employees is a key to knowledge management. The owners/CEO of construction organisations should ensure that they remain committed to knowledge management in their respective organisations and also the right and qualified staff should always be engaged or recruited in the execution of projects.
- v. Easy and continuous support for SMEs in area of assessing funding to increase their technical and personnel capacities is important, so as to boost ICT facilities capacities.
- vi. There should also be a continuous seminar and or workshops by construction organisations to constantly update and upgrade employees' knowledge on lessons learnt and experiences sharing in order to withstand competition.

5.3 Areas for Further Studies

This study provides possible direction for further research in the following areas;

- i. Related study could be embarked on in other state or region of the country in order to compare the findings.
- ii. An empirical study is required to determine the amount of time and cost savings that effective and efficient KM can bring to a project and the organisations as a whole.

5.4 Contribution to Knowledge

From the key findings, the following contributions to knowledge are evident;

- i. This study would aid policy makers/decision-makers in creating suitable decision regard quality of employees to engage. Also, the decision to make KM an integral part of the operations can be made.

- ii. The study provides an additional level of comprehension of the concept of knowledge and of knowledge management in the construction industry in Nigeria and by extension other developing countries.
- iii. This study adds to the existing body of knowledge on KM within the construction industry in Nigeria, and indeed globally.

5.5 Implication of the Study

The following are the implications of the study:

- i. Professionals in the construction organisations will increasingly become proficient due to continue update and upgrade of knowledge thereby increase productivity and efficiency.
- ii. The construction organisation that cultivates culture of managing knowledge will improves their performance and productivity thereby stand the chance of withstanding competition in the construction market.
- iii. Consequently, effective knowledge management practice is essential for thriving future of the construction industry.

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APPENDICES

APPENDIX A: QUESTIONNAIRE

Department of Quantity Surveying,
School Environmental Technology,
Federal University of Technology,
P.M.B. 65, Minna,
Niger State.
March, 2020.

Dear sir/ ma,

QUESTIONNAIRE

In partial fulfilment of the requirements for the award of a Master Degree in Quantity Surveying in the Department of Quantity Surveying, Federal University of Technology Minna, Niger State. This questionnaire is designed to “**Assess Knowledge Management Practices in Construction Organisations in Abuja, Nigeria.**” I am soliciting for your assistance to fill in response in the attached questionnaire, please.

While appreciating your busy schedule, your participation in this survey is crucial to the success of this research. The information provided will be kept with utmost confidentiality and shall be used strictly for academic purposes.

Yours Faithfully,

AHMED, JIBRIN GUTO
M.TECH/SET/2018/7865
08055685961/08037976720

SECTION A: RESPONDENT’S GENERAL INFORMATION

Please place a tick (√) where appropriate in box that corresponds to your response to questions from 1 to 7 below

1. Name of your organisation (optional).....
2. Category you belong to: Public organisation { } Private organisation { }
3. Your profession? (i) Architecture { }, (ii) Building { } (iii) Engineering { } (iv) Quantity Surveying { }
Other, please specify.....
4. Years of experience in the organisation: 1-5 { } 5-10 { } 11-15 { } 16-20 { } Above 20 { }
5. Highest Academic Qualification: HND { } PGD { } B.Sc / B.Tech { } M.Sc/M.Tech. { } PhD { }, other please specify
6. Professional Membership: None member { } MNIA { } MNIQB { } MNSE { } MNIQS { }, other please specify
7. Classification of your organisation: Small { }, Medium { }; and Large { }

SECTION B: KNOWLEDGE MANAGEMENT PROCESSES IN CONSTRUCTION ORGANISATIONS.

Please rate this knowledge management processes, according to their level of adoption in your organisations the following scale 1-5: **1=very low adoption, 2 = low adoption, 3 moderate adoptions, 4= high adoption, 5= very high adoption**

S/No	KM process	1	2	3	4	5
1	Knowledge Utilization					
2	Knowledge Acquisition					
3	Knowledge Transfer					
4	Knowledge Creation					
5	Knowledge Storage					
6	Knowledge Maintenance					

SECTION C: Factors Critical To the Success of the Adoption of Knowledge Management Practices among Construction Organisations

Please rate these factors critical to the success of the adoption of knowledge management practices in your construction organisations, based on your their level of significance, use the following scale 1-5: **1=strongly disagree, 2 = Disagree, 3= Neutral, 4= Agree, 5= strongly agree**

Table 2.3: Critical Success Factors for the adoption of knowledge management

S/N	CSF for the adoption of knowledge management	1	2	3	4	5
1	Reciprocity					
2	Peer recognition					
3	Honouring Knowledge sharing commitments					
4	Financial motivations					
5	Social motivations					
6	Conformity to corporate culture					
7	Mimicking the behaviour of leaders					
8	Perceived value and uniqueness of knowledge					

9	Culture					
10	Creating Knowledge sharing space					
11	Application of IT					
12	Availability of Technology infrastructure					
13	Evolution and ease of accessibility to shared knowledge					
14	Knowledge-friendly organisation culture					
15	Motivated workers who develop, share and use knowledge					
16	Team working					
17	top management support and commitment					
18	Open organisational culture					
19	Good and effective communication					
20	Availability of personnel incentives					
21	Active participation of employee					
22	management leadership and commitment					
23	Knowledge Management Measurement					

SECTION D: THE BARRIERS TO KNOWLEDGE MANAGEMENT IN THE CONSTRUCTION ORGANIZATION

Please rate the under listed barriers of knowledge management in construction organisations according to their level of agreement using 5 point scale 1-5:

(1= strongly disagree, 2 = Disagree, 3= Neutral, 4= Agree, 5= strongly Agree

S/N	Barriers	1	2	3	4	5
1	Lack of coordination					
2	Poor communication network					
3	Absence of firms structural approach					
4	cultural elements					
5	Lack of 'voice' of the user group(s)					
6	Inadequate stakeholder involvement and participation					
7	Poor group dynamics					
8	Misunderstanding of client organization and culture					
9	Lack of client education of process					
10	Lack of formal review and learning processes					
11	Lack of Time (Time constraint)					
12	Trying to solve large problems					
13	problem of Converting Knowledge					
14	Large number of SMEs					
15	Multi-Disciplinary Teams					
16	Uniqueness of construction Projects					
17	Lack of Learning					
18	Lengthy Time Period					
19	lack of IT support facilities					
20	Lack of top management support					
21	Mainly a male sector					
22	High turnover					
23	Low level of training/intellectual capital					
24	Lack of adequate technology					
25	Diverse individual culture					
26	Organisational culture					

27	Lack of adequate training					
28	Lack of standard work process					

SECTION E: THE INFLUENCE OF KNOWLEDGE MANAGEMENT PRACTICE ON THE PERFORMANCE OF CONSTRUCTION ORGANISATIONS

Please rate these influence knowledge management practices, according to their level of influence in your organisations the following scale 1-5: **1=very low importance, 2 = low importance, 3 moderate importance, 4= high importance, 5= very high importance**

S/No	Influence of KM Practice	1	2	3	4	5
1	Enables organisation to create and maintain it values					
2	improves the competitiveness of organizations					
3	helps organizations achieve their visions					
4	leads to organizations success					
5	leads to individual development					
6	enhances community development					
7	improving organizational productivity and performance					
8	leads to organizational sustenance and survival					

SECTION F: STRATEGIES FOR IMPROVING KNOWLEDGE MANAGEMENT PRACTICES

Below is a list of strategies or measures of improving the adoption and application of effective knowledge management in construction organisation. Please rate based on your level of agreement, using the scale 1-5. (**5= Strongly Agree; 4= Agree; 3= Neutral; 2=Disagree; 1= Strongly Disagree**)

S/n	Strategies for Encouraging Knowledge Management Practices	Scale				
		1	2	3	4	5
1	Construction professionals embracing ICT application to make knowledge management easier to facilitate instate results					
2	Government should invest more in the construction industry, this will bring more funding					
3	Corporate knowledge should be completely utilized,					
4	Mechanism for inter-organizational collaboration should be establish,					
5	Ensure that both explicit and tacit knowledge based in organization are transferred to employees,					
6	Ensuring that knowledge are properly used, protected and not abused within and inside organisations.					
7	Encourage the top management to embrace the responsibility of creating a proper and favourable environment for knowledge management processes.					
8	Timely and well planned trainings, seminars and workshops should be provided to increase staff knowledge and experiences.					
9	Using knowledge to strategically change organizational direction,					
10	An environment where research and innovative activities should be created,					
11	Sense of job security created in the minds of employees,					
12	Organizational culture tolerance to risk should be created.					
13	Personal knowledge management should be adjusted according to individual preferences and meets different needs					

APPENDIX B: DATA ANALYSIS OUTPUT

1. Reliability- KM process in construction organisations

Case Processing Summary

		N	%
Cases	Valid	156	100.0
	Excluded ^a	0	.0
	Total	156	100.0

a. Listwise deletion based on all variables in the procedure.

Reliability Statistics

Cronbach's Alpha	N of Items
0.801	6

2. Reliability- The factors critical to the success of the adoption of knowledge management practices among construction organisations

Case Processing Summary

		N	%
Cases	Valid	156	100.0
	Excluded ^a	0	.0
	Total	156	100.0

a. Listwise deletion based on all variables in the procedure.

Reliability Statistics

Cronbach's Alpha	N of Items
0.815	23

3. Reliability- The barriers to knowledge management in the construction organisation

Case Processing Summary

		N	%
Cases	Valid	156	100.0
	Excluded ^a	0	.0
	Total	156	100.0

a. Listwise deletion based on all variables in the procedure.

Reliability Statistics

Cronbach's Alpha	N of Items
0.92065	28

4. Reliability- influence of KM practices on performance of construction organisations

1. OBJECTIVE ONE: Kruskal-Wallis Test for KM Processess

Case Processing Summary

Ranks

	Groupfactor	N	Mean Rank
Knowledge Utilization	Small	56	95.46
	medium	35	74.83
	Large	65	65.87
	Total	156	
Knowledge Acquisition	Small	56	70.71
	medium	35	67.33
	Large	65	91.23
	Total	156	
Knowledge Transfer	Small	56	74.94
	medium	35	58.37
	Large	65	92.41
	Total	156	
Knowledge Creation	Small	56	64.86
	medium	35	64.53
	Large	65	97.78
	Total	156	
Knowledge Storage	Small	56	65.12
	medium	35	76.96
	Large	65	90.85
	Total	156	
Knowledge Maintenance	Small	56	70.54
	medium	35	63.47
	Large	65	93.45
	Total	156	

		N	%
Cases	Valid	156	100.0

Excluded ^a	0	.0
Total	156	100.0

a. Listwise deletion based on all variables in the procedure.

Reliability Statistics

Cronbach's Alpha	N of Items
0.887	8

Test Statistics^{a,b}

	Knowledge Utilization	Knowledge Acquisition	Knowledge Transfer	Knowledge Creation	Knowledge Storage	Knowledge Maintenance
Chi-Square	16.791	14.745	15.897	42.289	11.667	14.586
Df	2	2	2	2	2	2
Asymp. Sig.	.000	.001	.000	.000	.003	.001

a. Kruskal Wallis Test

b. Grouping Variable: Groupfactor

Ranks

Groupfactor	N	Mean Rank
VAR00007 Small	56	71.23
medium	35	57.54
Large	65	96.05
Total	156	

Test Statistics^{a,b}

	VAR00007
Chi-Square	18.999
Df	2
Asymp. Sig.	.000

a. Kruskal Wallis Test

b. Grouping Variable:
Groupfactor

NPar Tests

2. OBJECTIVE TWO: Kruskal-Wallis Test for CSF to Adoption of KM

Ranks			
	Organisations	N	Mean Rank
Lack of coordination	Small	56	59.63
	Medium	35	87.09
	Large	65	90.13
	Total	156	
Poor communication network	Small	56	80.89
	Medium	35	78.47
	Large	65	76.45
	Total	156	
Absence of firms structural approach	Small	56	78.81
	Medium	35	78.83
	Large	65	78.05
	Total	156	
cultural elements	Small	56	77.84
	Medium	35	80.54
	Large	65	77.97
	Total	156	
Lack of 'voice' of the user group(s)	Small	56	80.71
	Medium	35	78.76
	Large	65	76.45
	Total	156	
Inadequate stakeholder involvement and participation	Small	56	80.03
	Medium	35	78.47
	Large	65	77.20
	Total	156	

Poor group dynamics	Small	56	87.00
	Medium	35	55.00
	Large	65	83.83
	Total	156	
Misunderstanding of client organization and culture	Small	56	55.78
	Medium	35	75.50
	Large	65	99.69
	Total	156	
Lack of client education of process	Small	56	77.47
	Medium	35	81.74
	Large	65	77.64
	Total	156	
Lack of formal review and learning processes	Small	56	77.16
	Medium	35	80.34
	Large	65	78.66
	Total	156	
Lack of Time (Time constraint)	Small	56	84.93
	Medium	35	83.53
	Large	65	70.25
	Total	156	
Trying to solve large problems	Small	56	100.22
	Medium	35	99.97
	Large	65	48.22
	Total	156	
problem of Converting Knowledge	Small	56	79.71
	Medium	35	76.56
	Large	65	78.50
	Total	156	
Large number of SMEs	Small	56	110.50
	Medium	35	110.50
	Large	65	33.70
	Total	156	
Multi-Disciplinary Teams	Small	56	81.59
	Medium	35	82.50

	Large	65	73.68
	Total	156	
Uniqueness of construction Projects	Small	56	79.18
	Medium	35	63.13
	Large	65	86.19
	Total	156	
Lack of Learning	Small	56	79.50
	Medium	35	78.94
	Large	65	77.40
	Total	156	
Lengthy Time Period	Small	56	79.12
	Medium	35	87.31
	Large	65	73.22
	Total	156	
lack of IT support facilities	Small	56	85.50
	Medium	35	85.50
	Large	65	68.70
	Total	156	
Lack of top management support	Small	56	65.29
	Medium	35	62.17
	Large	65	98.67
	Total	156	
Mainly a male sector	Small	56	76.71
	Medium	35	43.50
	Large	65	98.88
	Total	156	
High turnover	Small	56	71.57
	Medium	35	105.79
	Large	65	69.78
	Total	156	
Low level of training/intellectual capital	Small	56	86.03
	Medium	35	59.91
	Large	65	82.02
	Total	156	

Test Statistics^{a,b}

	Lack of coordination	Poor communication network	Absence of firms structural approach	cultural elements	Lack of 'voice' of the user group(s)	Inadequate stakeholder involvement and participation	Poor group dynamics	Misunders of cli organizati cultu
Chi-Square	0.485	0.338	0.013	0.109	0.313	0.135	19.214	
Df	2	2	2	2	2	2	2	
Asymp. Sig.	0.725	0.844	0.994	0.947	0.855	0.935	0	

a. Kruskal Wallis Test

b. Grouping Variable: organisations

NPar Tests

[DataSet0]

Kruskal-Wallis Test

Ranks

Organisations	N	Mean Rank
VAR00030 Small	56	86.88
Medium	35	69.36
Large	65	76.21
Total	156	

Test Statistics^{a,b}

	VAR00030
Chi-Square	3.536
Df	2
Asymp. Sig.	.171

a. Kruskal Wallis Test

b. Grouping Variable: GroupFactor

3. OBJECTIVE THREE: Kruskal-Wallis Test for the barriers to knowledge management practices in the Nigerian construction organisations.

Ranks			
	GroupFactor	N	Mean Rank
Lack of coordination	Small	56	86.79
	Medium	35	74.34
	Large	65	73.59
	Total	156	
Poor communication network	Small	56	63.27
	Medium	35	73.21
	Large	65	94.47
	Total	156	
Absence of firms structural approach	Small	56	98.56
	Medium	35	80.23
	Large	65	60.28
	Total	156	
cultural elements	Small	56	69.81
	Medium	35	78.24
	Large	65	86.12
	Total	156	
Lack of 'voice' of the user group(s)	Small	56	68.58
	Medium	35	82.44
	Large	65	84.92
	Total	156	
Inadequate stakeholder involvement and participation	Small	56	112.47
	Medium	35	63.50
	Large	65	57.31
	Total	156	
Poor group dynamics	Small	56	64.84

	Medium	35	67.71
	Large	65	96.08
	Total	156	
Misunderstanding of client organization and culture	Small	56	78.88
	Medium	35	91.06
	Large	65	71.42
	Total	156	
Lack of client education of process	Small	56	75.01
	Medium	35	91.21
	Large	65	74.66
	Total	156	
Lack of formal review and learning processes	Small	56	73.07
	Medium	35	85.50
	Large	65	79.41
	Total	156	
Lack of Time (Time constraint)	Small	56	85.39
	Medium	35	82.93
	Large	65	70.18
	Total	156	
Trying to solve large problems	Small	56	73.24
	Medium	35	87.96
	Large	65	77.94
	Total	156	
problem of Converting Knowledge	Small	56	72.06
	Medium	35	81.26
	Large	65	82.56
	Total	156	
Large number of SMEs	Small	56	101.66
	Medium	35	94.19
	Large	65	50.10
	Total	156	
Multi-Disciplinary Teams	Small	56	59.73
	Medium	35	78.69
	Large	65	94.57

	Total	156	
Uniqueness of construction Projects	Small	56	87.12
	Medium	35	69.83
	Large	65	75.75
	Total	156	
Lack of Learning	Small	56	74.10
	Medium	35	90.81
	Large	65	75.66
	Total	156	
Lengthy Time Period	Small	56	91.00
	Medium	35	79.21
	Large	65	67.35
	Total	156	
lack of IT support facilities	Small	56	103.96
	Medium	35	106.50
	Large	65	41.48
	Total	156	
Lack of top management support	Small	56	73.83
	Medium	35	70.26
	Large	65	86.96
	Total	156	
Mainly a male sector	Small	56	76.58
	Medium	35	87.33
	Large	65	75.40
	Total	156	
High turnover	Small	56	68.16
	Medium	35	91.91
	Large	65	80.18
	Total	156	
Low level of training/intellectual capital	Small	56	86.79
	Medium	35	54.80
	Large	65	84.12
	Total	156	
Lack of adequate technology	Small	56	68.98

	Medium	35	79.50
	Large	65	86.16
	Total	156	
Diverse individual culture	Small	56	67.03
	Medium	35	71.17
	Large	65	92.33
	Total	156	
Organisational culture	Small	56	71.90
	Medium	35	73.13
	Large	65	87.08
	Total	156	
Lack of adequate training	Small	56	71.77
	Medium	35	91.21
	Large	65	77.45
	Total	156	
Lack of standard work process	Small	56	64.03
	Medium	35	88.73
	Large	65	85.46
	Total	156	

Test Statistics^{a,b}

	Lack of coordination	Poor communication network	Absence of firms structural approach	cultural elements	Lack of 'voice' of the user group(s)	Inadequate stakeholder involvement and participation	Poor group dynamics	Misunders of clic organizati cultu
Chi-Square	3.491	27.52	25.791	4.575	4.917	54.528	18.476	
Df	2	2	2	2	2	2	2	
Asymp. Sig.	0.175	0	0	0.101	0.086	0	0	

a. Kruskal Wallis Test

b. Grouping Variable: GroupFactor

Kruskal-Wallis Test

Ranks

GroupFactor	N	Mean Rank
VAR00030 Small	56	87.22

Medium	35	89.30
Large	65	65.17
Total	156	

Test Statistics^{a,b}

	VAR00030
Chi-Square	7.767
Df	2
Asymp. Sig.	.008

a. Kruskal Wallis Test

b. Grouping Variable: GroupFactor

4. OBJECTIVE FOUR: Kruskal-Wallis Test for the influencing of KM Practices

Ranks			
	Organisations	N	Mean Rank
Enables organisation to create and maintain it values	Small	56	105.04
	medium	35	68.61
	Large	65	60.96
	Total	156	
improves the competitiveness of organisations	Small	56	77.20
	medium	35	84.79
	Large	65	76.24
	Total	156	
helps organisations achieve their visions	Small	56	74.45
	medium	35	70.79
	Large	65	86.15
	Total	156	
leads to organisationsl success	Small	56	79.02
	medium	35	66.30
	Large	65	84.62
	Total	156	
leads to individual development	Small	56	85.04

	medium	35	62.80
	Large	65	81.32
	Total	156	
enhances community development	Small	56	79.99
	medium	35	60.06
	Large	65	87.15
	Total	156	
improving organisational productivity and performance	Small	56	79.12
	medium	35	78.24
	Large	65	78.10
	Total	156	
leads to organisational sustenance and survival	Small	56	61.78
	medium	35	71.51
	Large	65	96.67
	Total	156	

Test Statistics^{a,b}

	Enables organisation to create and maintain its values	improves the competitiveness of organisations	helps organisations achieve their visions	leads to organisational success	leads to individual development	enhances community development	improving organisational productivity and performance	leads to organisational sustenance and survival
Chi-Square	4.425	1.150	3.929	4.357	6.302	9.067	.226	6.002
Df	2	2	2	2	2	2	2	2
Asymp. Sig.	.110	.563	.140	.113	.053	.011	.893	.070

a. Kruskal Wallis Test

b. Grouping Variable: Organisations

Ranks

Organisations	N	Mean Rank
VAR00007 Small	56	84.87
medium	35	56.07
Large	65	85.09

Ranks

	Organisatio ns	N	Mean Rank
VAR00007	Small	56	84.87
	medium	35	56.07
	Large	65	85.09
	Total	156	