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ELEMENTS OF KNOWLEDGE MANAGEMENT (KM) IN THE NIGERIAN CONSTRUCTION INDUSTRY: THE PROFESSIONALS' PERCEPTIONS

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ABSTRACT: *This study assessed the perception of construction professionals on the elements of knowledge management (KM) in the Nigerian construction industry. Being a survey research, the study was effected by the use of questionnaire, literature searches and direct observations. Accordingly, a total of 250 questionnaire were distributed but 235 responded properly to the questionnaire. This correspond to 94% return rate. Data collected were analysed using percentages and mean score and were presented in tables. The result shows that the ten key KM elements which are: planning, discovering, locating and capturing, integrating, organization and storage, maintaining, assessing, adaptation, sharing and transferring, modifying and applying, archiving and retirement all have sMS more than 3.0. Thus, the ten KM element are all significant to professionals within the study area. Therefore, the research recommends that KM elements should be used to build KM models and ensure collaboration among the construction professionals as regard KM.*

KEYWORDS: knowledge management, construction, built environment, professionals

INTRODUCTION

The advancement in technology and the speed of execution of modern construction projects involve interrelationship of the voluminous interdependent activities and knowledge of past projects by professionals of the industry [1]. It is also a common theme in the construction management literature that the construction industry is diverse. One of the reasons for this position is that different construction professionals have to come together, even with dissimilarities in their background, training and exposure, to deliver project goals [2]. More so, to achieve the goals of a typical construction project, more than one construction professional is involved [3]. Thus, depending on the type and nature, different construction professionals are involved in construction projects. For instance, in complex building project, the services of architects, engineers, quantity surveyors, builders are important. In a typical bungalow project, only the services of architects or civil engineers may be required. Also, in a developing country like Nigeria, it is constant to have

architects, civil engineers, builders and quantity surveyors as primary construction professionals on contracted building projects. Other professionals such as services engineer may be commissioned as well but not in all cases. Whatever the mix of construction professionals on different projects, each has its own its own interest, especially in the exercise of their skills and judgement [4]. According to [5] in the past there has been no structured approach to learning from construction projects once they are completed. At present the construction industry is adapting concepts of knowledge management (KM) to improve the situation, as Knowledge is noted to be one of the most important resources contributing towards managerial decision-making and for enhancing the competitive advantage of construction firms [6].

Knowledge has been described as information, which has been used and becomes a part of a person's knowledge-based experience and behavioural patterns [7, 8]. Individuals as well as professionals have different knowledge-based capacity and experience, thus leading to different problem-solving approaches and decision-making. When choosing a construction professional, knowledge and experience are significant [9]. Professional must therefore be capable of knowing how to synchronize, use, manage, and utilize such knowledge in a project. According to [10] Lessons learned from the construction industry have proved that reusing and sharing knowledge can enhance construction projects successfully by decreasing cost and time of completion and improving the whole competitiveness of the organisation.

The main benefit of identifying KM elements of each knowledge professional in the construction work is to enable the industry companies to complete the projects with reduced cost and time while improving the quality of projects. By reusing and sharing previous experiences and knowledge, employees can find the solutions for their problems without spending extra time, effort and resources on reinventing solutions that have already been invented elsewhere in the organisations [11,12]. Based on this, this study assessed the professionals' perception of the elements of knowledge management (KM) in the Nigerian construction industry with a view to …..

LITERATURE REVIEW

Built Environment & Knowledge Management Elements

Given the focus on how the built environmental professionals' roles and identities are formed in construction projects, the power of position, and interaction between, actors, structures and agencies is viewed through a practice lens [13]. This perspective sees practice as institutionalized way of doing something. Applying a "practice lens" in the sense of institutionalized doing, means seeing practice as emergent and collective actions of 'knowing how to align humans and artifacts within a socio-technical ensemble and therefore knowing how to construct and maintain an action-net, which is interwoven and deployed so that every element has a place and a sense in the interaction'[13]. The construction sector in a country"s economy is an important employer of a nation's workforce as it employs between 2 to 10% of total workforce of most countries [14]. Nigeria had gained an impressive economic growth during the last three decades but its saddled with lots problem and challenges. Therefore, the list of the professionals actively involved in the construction industry includes but not limited to, Architects, Builders, Estate surveyors and

valuers, Land surveyors, Quantity surveyors, Town planners, Civil, Electrical, Mechanical and Structural Engineers.

Despite the overall process being the same, KM elements have been given different names and are referred to as differently by various researchers. Bhatt [15] describes the KM elements as the sequence of knowledge creation, knowledge validation, knowledge presentation, knowledge distribution and knowledge application which he ultimately classified as the process. The following table contains different terms used by different researchers for the same overall KM elements. These elements can also be grouped in a sequential order thereby constituting a knowledge management process.

Table 1: Various Knowledge Management Elements

Author(s)	Knowledge management Elements
Robinson et al. [16]	Discovering, locating and capturing, Organisation and storage, Sharing and transferring, Modifying and applying, Archiving and retirement
Kululanga and McCaffer [17]	Acquiring, Creating, Sharing, Storing and Utilizing
Rollett [18]	Planning, Creating, Integrating, Organizing, Transferring, Maintaining and Assessing
Tiwana [19]	Acquisition, Sharing, and Utilization
Bhatt [20]	Creation, Validation, Presentation, Distribution and Application
Mertins et al. [21]	Create, Store, Distribute and Apply
Soliman and Spooner [22]	Create, Capture, Organize, Access and Use
Davenport and Prusak [23]	Knowledge generation: acquisition, dedicate resources, fusion, adaptation and knowledge networking, Knowledge codification and coordination, and Knowledge transfer

Source: Adapted from [24]

METHODOLOGY

This study was carried out in Kaduna State, Nigeria, using a quantitative approach, precisely questionnaire survey. The essence of the questionnaire is to capture a wide range of opinions concerning the proposed benefit of BIM as a KM tool for collaboration among construction professionals. The key parameters considered in the research are knowledge workers as described by [25] as being responsible for providing important skills and knowledge in the construction industry. Oke et al. [26] also identified them as include Engineers, Quantity Surveyors, Estate surveyors, Architects, and Builders at management level of the firm, which is also referred to as the built environment professionals. These professionals are constrained within the boundaries of the academia and those working in the building construction firms in Nigeria, with not less than a Bachelor degree (BSc/BTech/BEng) and not less than five (5) years' experience. Therefore, the population of this study constitutes of fully registered professionals particularly Architects,

Builders, Engineers, Quantity Surveyor and Estate Surveyors and Valuers residing and practicing in the study area.

Sampling generally are concerned with the selection of a subset of individual, from within a statistical population to estimate characteristic of the whole population. The objective of sampling is to provide a practical means of enabling the data collection and processing components of research to be carried out whilst ensuring that the sample provides a good representation of the population [27]. In identifying the appropriate sample size, the research used an equation proposed by was advanced by [28], which generated a sample of 50 respondents drawn from each of the professional body identified above, thereby making a total sample size of 250 however, 235 responded properly to the questionnaire. This correspond to 94% return rate.

The analyses of data and discussion of results was based on the use of categorical data, which are grouped based on the five-point likert scale. Therefore the choice of Mean Score (MS) was used in the analysis, to identify the significant key knowledge management elements as identified by each knowledge management professional. Based on the assertion of [29] any elements with mean score (MS) less than 3.0 is considered insignificant, while 3.0 and above is significant.

RESULTS

The research classified the responses based on each of the key knowledge management professionals to identify the knowledge management elements that are relevant to each of the professional groups. The research identified ten (10) key KM elements from a review of several literatures. These elements are: Planning, Discovering, locating and capturing, Integrating, Organisation and storage, Maintaining, Assessing, Adaptation, Sharing and transferring, Modifying and applying, Archiving and retirement.

Table 2: KM Elements for Professional Builders

s/no	Knowledge Elements	Frequency of Response					N	TS	MS
		1	2	3	4	5			
1	Planning	0	3	9	23	11	47	185	3.94
2	Discovering, locating and capturing	2	1	16	19	9	47	172	3.70
3	Integrating	0	2	7	16	22	47	198	4.21
4	Organisation and storage	1	1	9	19	17	47	191	4.06
5	Maintaining	0	3	4	23	17	47	196	4.16
6	Assessing	1	3	7	19	16	47	188	4.00
7	Adaptation	1	2	4	22	18	47	194	4.12
8	Sharing and transferring	0	3	9	23	11	47	181	3.85
9	Modifying and applying	0	1	16	19	11	47	179	3.81
10	Archiving and retirement	0	1	7	17	22	47	201	4.27

Source: Field Survey (2018)

From table 2, the research identified that the highest MS was 4.27 (Archiving and retirement) and lowest MS is 3.81 (Modifying and applying). This indicates that all the KM elements identified are significant to all professional builders.

Table 3: KM Elements for Professional Quantity Surveyors

s/no	Knowledge Elements	Frequency of Response					N	TS	MS
		1	2	3	4	5			
1	Planning	2	3	10	20	12	47	178	3.79
2	Discovering, locating and capturing	3	3	13	19	9	47	167	3.59
3	Integrating	0	2	7	16	22	47	198	4.21
4	Organisation and storage	4	1	9	19	14	47	177	3.80
5	Maintaining	0	3	8	23	13	47	187	3.98
6	Assessing	1	6	6	18	16	47	185	3.90
7	Adaptation	1	2	4	22	18	47	194	4.12
8	Sharing and transferring	1	3	9	23	11	47	181	3.85
9	Modifying and applying	1	0	16	21	9	47	179	3.78
10	Archiving and retirement	0	1	12	12	22	47	196	4.16

Source: Field Survey (2018)

From table 3, the research identified that the highest MS is 4.21 (Integrating) and the lowest MS is 3.59 (Discovering, locating and capturing). This indicates that all the KM elements identified are significant to all professional Quantity Surveyors

Table 4: KM Elements for Professional Architects

s/no	Knowledge Elements	Frequency of Response					N	TS	MS
		1	2	3	4	5			
1	Planning	1	5	5	20	16	47	186	3.96
2	Discovering, locating and capturing	0	3	14	18	12	47	180	3.83
3	Integrating	0	0	13	18	16	47	191	4.06
4	Organisation and storage	1	0	13	19	14	47	184	3.96
5	Maintaining	0	2	11	21	13	47	186	3.96
6	Assessing	0	3	9	17	18	47	191	4.06
7	Adaptation	0	5	10	18	14	47	182	3.87
8	Sharing and transferring	1	2	13	21	10	47	178	3.79
9	Modifying and applying	0	0	19	19	9	47	178	3.79
10	Archiving and retirement	0	5	16	10	16	47	178	3.76

Source: Field Survey (2018)

From table 4, the research identified that the highest MS is 4.06 (Integrating) and the lowest MS is 3.76 (Archiving and retirement). This indicates that all the KM elements identified are significant to all professional Architects.

Table 5: KM Elements for Professional Engineers

s/no	Knowledge Elements	Frequency of Response					N	TS	MS
		1	2	3	4	5			
1	Planning	0	4	12	19	12	47	180	3.83
2	Discovering, locating and capturing	1	2	14	20	10	47	177	3.77
3	Integrating	1	1	11	17	17	47	189	4.02
4	Organisation and storage	1	1	10	22	13	47	186	3.96
5	Maintaining	1	0	13	19	14	47	186	3.96
6	Assessing	0	0	6	20	21	47	203	4.32
7	Adaptation	1	4	14	14	14	47	177	3.77
8	Sharing and transferring	1	1	13	22	10	47	180	3.83
9	Modifying and applying	0	0	13	24	10	47	185	3.94
10	Archiving and retirement	0	3	8	23	13	47	187	3.95

Source: Field Survey (2018)

From table 5, the research identified that the highest MS is 4.32 (Assessing) and the lowest MS is 3.77 (Adaptation and Discovering, locating and capturing). This indicates that all the KM elements identified are significant to all professional Architects.

Table 6: KM Element for Professional Estate Valuers

s/no	Knowledge Elements	Frequency of Response					N	TS	MS
		1	2	3	4	5			
1	Planning	1	1	12	18	15	47	186	3.96
2	Discovering, locating and capturing	1	1	13	17	15	47	185	3.94
3	Integrating	1	1	8	16	21	47	196	4.17
4	Organisation and storage	1	1	7	19	19	47	195	4.15
5	Maintaining	1	1	8	17	20	47	195	4.15
6	Assessing	1	1	6	19	20	47	197	4.19
7	Adaptation	1	1	10	18	17	47	190	4.04
8	Sharing and transferring	1	1	10	16	19	47	192	4.09
9	Modifying and applying	1	1	9	20	16	47	190	4.04
10	Archiving and retirement	1	1	8	17	20	47	195	4.15

Source: Field Survey (2018)

From table 6, the research identified that the highest MS is 4.19 (Assessing) and the lowest MS is 3.94 (Discovering, locating and capturing). This indicates that all the KM elements identified are significant to all professional Estate Valuers.

Table 7: The MS of Professional's key KM Elements

s/no	Knowledge Elements	Mean Score (MS)				
		Builder	QS	Architects	Engineers	ES
1	Planning	3.94	3.79	3.96	3.83	3.96
2	Discovering, locating and capturing	3.70	3.59	3.83	3.77	3.94
3	Integrating	4.21	4.21	4.06	4.02	4.17
4	Organisation and storage	4.06	3.80	3.96	3.96	4.15
5	Maintaining	4.16	3.98	3.96	3.96	4.15
6	Assessing	4.00	3.90	4.06	4.32	4.19
7	Adaptation	4.12	4.12	3.87	3.77	4.04
8	Sharing and transferring	3.85	3.85	3.79	3.83	4.09
9	Modifying and applying	3.81	3.78	3.79	3.94	4.04
10	Archiving and retirement	4.27	4.16	3.76	3.95	4.15

Source: Field Survey (2018)

From the research conducted as shown in table 7, all the KM elements identified were significant, therefore can be used to build model and hence enhance collaboration between the various KM professionals.

DISCUSSION

The results in table 2 – 7 shows the responses of the key construction professional to KM elements. From their response, it can be seen that Archiving and retirement, Integrating and Maintaining are core KM elements to Builders. To Quantity surveyors Integrating, Archiving and retirement, and Adaptation are core to them while Integrating and Assessing are core KM elements to architects. And to Engineers and Estate Surveyor assessing and integrating are core KM elements. Thus, integrating element of KM is the most sought element of KM whereas Discovering, locating and capturing KM element is the least required KM to construction professionals in the study area. However, the ranking of these element indicate that all the KM element have MS of over 3.0. This entails that all the elements are very important to construction professionals within the study area.

Implication to research and practice

This research assessed the perception of construction professionals to KM elements. Thus, its implication to research is that it generated data on the perception of construction professional in Nigeria as regards KM element which were previously not existing in sufficient details. To practice, it was able to assess the level of awareness among construction practitioners within the study area.

CONCLUSIONS AND RECOMMENDATIONS

The research therefore concludes that the ten (10) key KM elements which are: Planning, Discovering, locating and capturing, Integrating, Organisation and storage, Maintaining, Assessing, Adaptation, Sharing and transferring, Modifying and applying, Archiving and retirement, are all significant as key KM elements applicable to all Knowledge management

professionals in the construction and built environment professionals. Therefore, the research recommends that all these elements identified should be used to help build KM models as well as to ensure collaboration among the various built environment professionals.

Future Research

Further researches maybe extended to:

i. Other states of Nigeria since the study was basically in Kaduna State.
ii. Should involve the professional in the built environment since this study selected only five (5) professional only.

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