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A Model Examining the Knowledge Management Process in the Construction Organisation in Nigeria.

Katun M. Idris [1], Rasheed T. Bhadmus [2] & Bello Kabir [3]
[1, 2] *Faculty of Built Environment, Department of Quantity Surveying, The Federal Polytechnic, Bauchi.*
[3] *Faculty of Built Environment, Department of Building Technology, The Federal Polytechnic, Bauchi.*

ABSTRACT: *Construction organisations are becoming more conscious that the knowledge management process is the key and supreme in attaining reasonable, efficiency and innovations in businesses. This research investigates the significant ways and method in which knowledge management process in the multinational construction organisation acquired, create, disseminate and re-acquire available knowledge in their project-based activities. This research was carried out in the multinational construction organisation because of their innovative progression on knowledge management adoption. The research study established a hypothetical framework that links adopted empirically validated variables of the knowledge management process. The study investigated thirty three multinational construction organisation with two hundred and ten survey questionnaires distributed to their knowledge workers. The study adopted quantitative research method of approach using structural equation modeling (SEM) to validate the research framework with the factor loadings for the variables been significant. Cronbash Alpha factors of 0.800, 0.855, 0.808, 0.807 and 0.799 for knowledge acquisition, creation, sharing, storing and reuse respectively were achieved. The research finding display that management of knowledge in construction projects is a chain. Also, the study serves as a guide to the construction industry on the effect KM Process in deepened reflectiveness of the surpassing role of effective knowledge management in the construction organisation.*

Keywords: *Knowledge management, Construction, Organisation, Theoretical framework, Structural equation model.*

I. INTRODUCTION

The greatest organisational challenge is how to integrate the incongruent skills, know-how and knowledge of individual members of the organization into merchandise, development, amenities and finished goods that will benefit the organisationas a whole [1]. Knowledge management (KM) is a wide procedure of identifying, organising, sharing and using information and professional knowledge within the organization [2]. [3] on the other hand, highlighted that KM is an assortment of accomplishments, process and strategies, which empower organisations to share knowledge to advance their efficiency, competence and creativity and to provide better services. KM provides tools and other services to the beneficiaries to capture, share, reuse, disseminate, and create completely new skills available to allow problems to be solved using the best process, such as that problem solving, decision making, and brand new creativity can emerge without spending additional time and funds on reinventing solutions that have already been conceived or agreed by the organisation. KM provides valuable straight assets by suggesting that for an organisation to remain relevant, it must create, modernize, store, share, capture and make innovations without extra time in problem-solving and exploit opportunities [4, 5]. KM is a way of advancing useful knowledge within the organisationin which organisations generate value from their knowledgeable and knowledge-based resources. A successful KM process is expected to provide information about organisational workers' experience, skills and qualifications in order to influence the support required in the problem-solving and decision-making processes.

II. KNOWLEDGE MANAGEMENT PROCESS IN THE CONSTRUCTION ORGANISATION

The review of the KM literatures signifies that the KM process is an unending practice in an organization which starts with acquisition, creating, sharing, storing and reusing relevant knowledge resources through proper application. However, [6] argue that KM is a business procedure concerning a variety of practices adopted by organisations to acquire, create, share, store and disseminate the organisational knowledge assets. Some look at KM processes as a scheme, a method and a discipline which deals with manufacture, society, storage, distribution, utilizing and appraising of knowledge to achieve organiational goals.

Knowledge Acquisition

Acquisition encompasses finding and capturing existing knowledge and generating new knowledge. Acquisition of knowledge is identified as a procedure of extracting, configuring and establishing familiarity directed from a single area, and usually field expertise is needed to transform it into a usable and movable document [4]. Learning from external sources, attend seminars, conferences, hire knowledge worker by the organisationis also referred to as knowledge acquisition. Outside learning is crucial for organisational sustainability: thus, a rounded approach for the assessment sequence includes contractors, contenders, associates and outdoor businesses [7, 8]. The author further argues that during knowledge acquisition, environmental learning that is well-defined and appropriate to the professionals appointed will improve the probability of a project's success.

Knowledge Creation

The ability of workers to produce knowledge in an organisationis vital to their success, and has a major influence on project results and the organisational competitive benefit. Knowledge creation is conceived as the procedure for adapting the learning entrenched in organized societies, assessment of creativity, through forecasting, infrastructures and problem solving, into a brand new form resulting from brand new combinations of experiences [9, 10]. Knowledge creation necessitates active interface among workers to combine individuals' existing unstated and categorical learning, which advances current processes and discovers new potentials [11]. [12] concur that the main drivers for knowledge creation in the construction industry are the need to solve problems, modernize and manage changes. Subsequently, [13] adopted the concept of dynamic knowledge creation. This consists of four parts, known as Socialization, Externalization, Internalization and Combination.

Knowledge sharing

Knowledge sharing is defined as activities of transferring or reusing ideas, skills and experiences from one person, group or organisationto another [14]. Knowledge sharing is a practice where people or groups mutually exchanges their ideas and information and collaboratively generate new knowledge [15]. [14] stress that KM involves the constant production of new ideas and knowledge within organizations, whereas knowledge sharing can be achieved through collaboration, regular meetings, inter-colleagual review, delegating and transfiguration between tacit and explicit knowledge. Knowledge sharing depends on understanding, communication processes and respect of team members [16]. The author argues that knowledge sharing postulates an association between two people one who acquires knowledge and one who retains knowledge and operational communication becomes critical in the process of knowledge sharing. [17] emphasizes that knowledge sharing is different from information sharing: knowledge sharing requires an understanding of the content of the information, and learns from the information to develop new capacity and ideas.

Knowledge storing

Knowledge from all jobs undertaken must be preserved accurately to be reused again when the need arises. [18] Huysman and Wulf (2006) argue that IT plays a vital part if effective learning is to be managed. The whole learning preserved during task execution is kept within four core arrangements: personnel cognizance, daily diaries, electronic files and electrical learning bases [19]. The author defines this as a type of intangible, determined learning and documenting of files and diaries kept within the organisation. A major challenge relating to accrued learning within the organisations involves knowing what needs to be kept and how it will be re-applied in the future. Knowledge about strategy and products, customers and marketing is information that can enhance organisation performance and should be retained [20]. .

Knowledge reuse

Knowledge reuse refers to triggers and procedures connected with the flow of information from one person to another. Knowledge reuse is recognized as having the potential to derive faster and more consistent decision-making support, without respect to the decision maker's skill in their domain. KM systems should provide a facility that allows easy searching and finds anticipated knowledge, encourage and attend conferences, seminars and editing of tools before re-using [21] (Kaur, 2014). KM systems should be made available to workers or people within the organisationwith a key-word admission process that recognizes staff's expert intent. Organisations use knowledge for three reasons: 1) Knowledge can be reused to examine the work process and create strategies for completive advantage. 2) Knowledge can be used for designing and marketing products. 3) Knowledge in organisations is critical and is dependent on knowledge reuse [22].

III. METHODOLOGY

Structural equation model was adopted to test the index of the knowledge management process from the hypothesized model. The study involves multivariate method analysis to explore the relationship in the measurement model among the variables used. Exploratory factor analysis (EFA) was adopted to see the initial factor loading of the study variables, so all factors that loaded ≤ 4.99 were not considered for further analysis as suggested by [23]. Regression analysis, path analysis and confirmatory factor analysis (CFA) were used. The result of EFA shows that all the variables were statistically significant of Kaiser-Meyer Okin and Bartlet's test (KMO) at <.001. However, confirmatory factor analysis was conducted to the variables.

IV. HYPOTHESIS DEVELOPMENT

Generally in the construction organisation, knowledge management process is view as a techniques which can be acquire, create, share, store and disseminate automatically available knowledge from the inventor to the translator who accepts and transfers the concepts and knowledge to end users [9, 12]. Knowledge is hidden in the employer's heads (tacit knowledge), as it is attaining much more impetus in different areas of research [24]. [13] Pinpointed that knowledge can either be explicit or unstated. Unstated knowledge is accessible through ideas, skills, experiences, and thinking while explicit knowledge is the concepts attained through, educational training like journals reading, attending seminars and conferences, etc. An effective means of knowledge management processes among construction workers or engineers is to prevent mistakes that have already been encountered in past projects from recurring to improve construction management [4, 13]. [17] and [25] agree that KM is a set of procedures, frames, technical and managerial tools, designed to create, acquire, share, store and leverage information and knowledge within and around organisations. Therefore, the above ideas of researchers vary in their images of KM, although there seems to be an agreement to treat KM as a set of procedures allowing the use of knowledge as a key factor to enhance and generate value in construction organizations [26] . The proposed measurement, analysis model was developed as shown in figure 1 with the following hypotheses;

H1a. AQS can positively influence REE
H1b. AQS can positively influence STU
H1c AQS can positively influence SHT
H1d CRE can positively influence AQS
H1e SHT can positively influence STU
H1f SHT can positively influence REE
H1g SHT can positively influence REE
H1h CREE can positively influence SHT.
H1j REE can positively influence AQS.
H1k CREE can positively influence REE

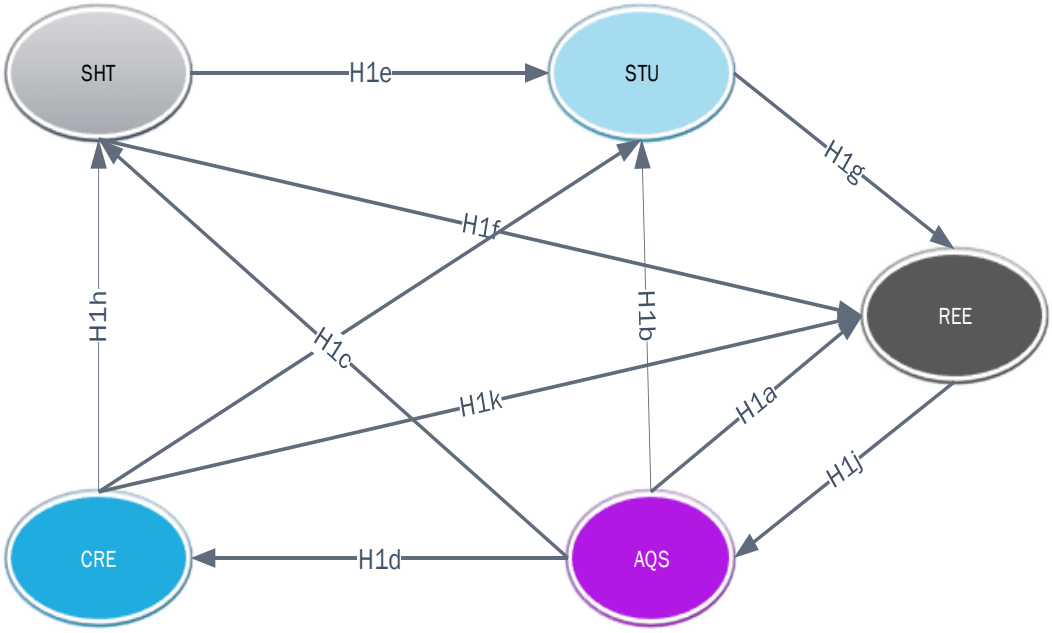

Figure 1: Proposed confirmatory analysis model of knowledge management process

Note; AQS= Acquisition, CRE= creation, SHT= sharing and transfer, STU= storing and updating, RRU= reuse.Table captions appear centered above the table in upper and lower case letters. When referring to a table in the text, no abbreviation is used and "Table" is capitalized.

Result summary for exploratory factor analysis (EFA).

Table 1: Test of reliability -KMO and Bartlett's Test for knowledge management process.

Analysis		Results
Kaiser-Meyer-Olkin Measure of Sampling Adequacy		.880
Bartlett's Test of Sphericity	Approx. Chi-Square	2621.303
	df	91
	Sig.	.000

The Kaiser-Mayer-Okin (KMO) measures of sampling accuracy for the knowledge management process in the construction organisation, measure of sampling activities, population correlation matrix as well as Bartlett's Test of shericity display as follows; the value of KMO .880 is above recommended values of .5 by [27] and [28] , the p value is significant, the total variance extracted from the exploratory factor analysis (EFA) is 59.744% and 16.59%. Therefore, the result of factor analysis is meaningful.

Table 2: Assessment of Normality for examining measurement model for KM process

Variable	min	max	skew	c.r.	kurtosis	c.r.
KST4	1.000	5.000	-.328	-2.263	-.207	-.714
KST3	1.000	5.000	-.606	-4.178	-.345	-1.190
KSU4	1.000	5.000	-.254	-1.754	-.203	-.699
KC1	1.000	5.000	.333	2.294	-.484	-1.667
KC2	1.000	5.000	.088	.604	-.779	-2.686
KC3	1.000	5.000	.179	1.236	-.963	-3.318
KAC1	1.000	5.000	-.535	-3.685	-.251	-.866
KAC2	1.000	5.000	.111	.762	-.393	-1.354
KAC3	1.000	5.000	-.309	-2.127	-.159	-.548
KRE4	1.000	5.000	.005	.038	-.271	-.932
KRE3	1.000	5.000	.207	1.430	.151	.520
KRE2	1.000	5.000	.060	.415	-.062	-.214
KSU3	1.000	5.000	-.002	-.016	-.660	-2.274
KSU2	1.000	5.000	-.114	-.786	-.193	-.664
Multivariate					16.606	6.622

Table 2 indicates the normality of the measurement model of knowledge management process. The degree of impact of multivariate normality on the statistical estimate for the second order model is assumed to be at a minimum and normality is achieved [29]. Uni-variant skewness and kurtosis of the factors were less than one, and this indicates that the pragmatic data is normally disseminated around its mean. During the data analysis, normality and outliner, assessments were used for missing values through data screening. SPSS version 22 shows that only two variable had a missing data and mean substitution method was used because the number is small as suggested by [28]. Thus, skew ness and kurtosis test with leaf plots was adopted to determine the normality distribution during the substation method of missing data. However, the values of standardized regression weight were all significant, which also implies that there were no problems with model design [27, 16] Furthermore, the value of multivariate kurtosis was less than 50, with a tabulated value of 16.606. The assumptions for multivariate normality were achieved [28].

Confirmatory factor analysis

The confirmatory factor analysis is used to analyses the model as proposed by [30]. The p-value recorded 0.001 with all the factor loading above the 0.5 benchmark recommended by [27]. . The average variance extracted as shown in Table 3 is also above the recommended benchmark of 0.6 as suggested by [19]. The instrument reliability of variables was tested via Cronbach Alphas, with all the values above the recommended benchmark of 0.7 as argued by [26]. CMIN was used to measured normalized X2 for the model ($X2/df = 2.312$, where $df = 67$). The result is in line with the benchmark of $\geq 2 \leq 5$ as suggested by [19]. The root means square error (RMSEA) shows a reliable value of .068, which is within the recommended benchmark of $\geq 0.05 \leq 0.08$ as suggested by (Ullman and Bentler, 2003). GFI (goodness of fit index) recorded 0.969 ,

normed fit index (NNFI) recorded .958 and GFI goodness of fit index) is 0.930 which accord to suggest the value of ≥ 0.9 by [30, 27] as good fit. Thus, AGFI (adjusted goodness of fit index) has a value of 0.890, which is lined with ≥ 0.8 recommended by [28]. The authors agree that CFI ≥ 0.9 and RMSEA ≥ 0.05 ≤ .08 designate strong model.

Table 3: Measurement variance analysis and reliability for knowledge management process.

Variable/ Indicators	Factor loadings	Cronbach Alphas	T- Value	Variance extracted
Knowledge Acquisition				
KAC1	**.81**			
KAC2	**.78**	**.800**	**15.123**	**.657**
KAC3	**.84**		**15.935**	
Knowledge creation				
KC1	**.75**			
KC2	**.82**	**.855**	**14.963**	**.669**
KC3	**.88**		**13.751**	
Knowledge sharing				
KST1	**.87**			
KST2	**.88**	**.808**	**17.326**	**.766**
Knowledge storing				
KSU1	**.81**			
KSU2	**.89**	**.807**	**17.743**	**.712**
KSU3	**.83**		**16.054**	
Knowledge reuse				
KRE1	**.93**			
KRE2	**.88**	**.799**	**21.092**	**.793**
KRE3	**.86**		**21.786**	

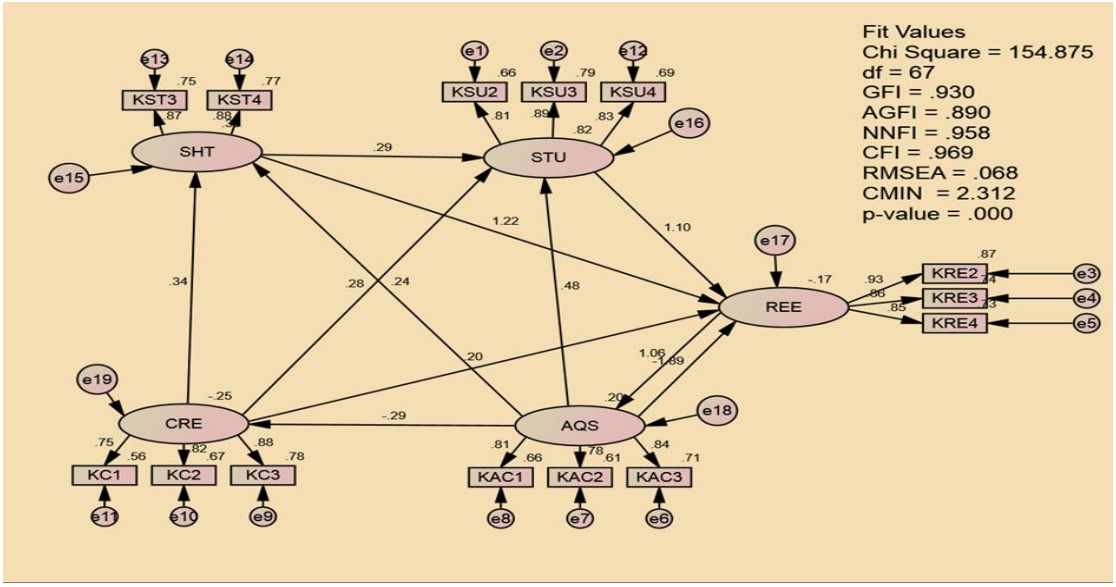

Figure 2: Examining knowledge management process model in the organization..

Note; AQS= Acquisition, CRE= creation, SHT= sharing and transfer, STU= storing and updating, RRU= reuse.

V. DISCUSSION

Knowledge management process was assessed via Hypothesis H1a, H1b, H1c, H1d, H1e, H1f, H1g, H1h, H1j and H1k as shown in Figure 2. [11]. recommend the path coefficient of 0.2 and above was measured as fundamentally considerable loading. The AMOS output of confirmatory factor analysis established, dependable and vigorous factor loading as shown in Figure 2. Knowledge management process path loadings measuring 0.34, 0.28, 0.20, 0.20, 0.24, 0.48, -0.29, 1.22, 1.10, 1.06 and -1.89 for knowledge acquisition, knowledge creation, knowledge sharing, knowledge storage and knowledge reuse correspondingly. The result

analysis supported all the hypotheses of H1b, H1c, H1e, H1f, H1g, H1h, H1j and H1k while H1a and H1d were not supported as shown in Table 4. Thus, it is suitable to assume that examining the knowledge management process is in accordance with the literature that suggests that the knowledge management process is a chain or a cyclic system because the knowledge stored and disseminated during construction projects is reacquired during the construction process [9, 21].

Table 4: Structural equation model summary result

Hypothesis	Hypothesized path	Path coefficient	Result
H1a	Knowledge acquisition can positively influence knowledge reuse	-1.89	Not Supported
H1b	Knowledge acquisition can positively influence knowledge storage	0.48	Supported
H1c	Knowledge acquisition can positively influence knowledge sharing	0.24	Supported
H1d	Knowledge creation can positively influence knowledge storage	-0.29	Not supported
H1e	Knowledge sharing can positively influence knowledge storage	0.29	Supported
H1f	Knowledge sharing can positively influence knowledge reuse	1.22	Not Supported
H1g	Knowledge storage can positively influence knowledge reuse	1.10	Not Supported
H1h	Knowledge creation can positively influence knowledge sharing	0.34	Supported
H1j	Knowledge reuse can positively influence knowledge acquisition	1.06	Not Supported
H1k	Knowledge creation can positively influence knowledge reuse	0.20	Supported

VI. CONCLUSION

Knowledge management process is a societal solider and collective unity among the construction organisation employees, train engineers and increase their potential to share available knowledge among their contemporaries and co-workers. Sharing of knowledge, know-how, ideas, experience through a social network either through database, codification, knowledge repositories, learning is encouraged through the knowledge management cognitive process in the construction organisation. This submits that when expert workers in the construction organization tend to teach their contemporaries, the knowledge acquired, knowledge created, store and disseminate are reacquired within the technical know-how of individual workers in the organisation. Thus, adoption of knowledge management process tent to be enhanced and encourage knowledge sharing among their acquaintances and staffs in construction organisation. Also, a successful KM process implementation is expected to provide information about organisational employees' there know-how, expertise and educational training in order to enhance the support required in the problem-solving and decision-making processes. The study reveals that creation of knowledge is not within the milieu of speculative knowledge reuse, thus, knowledge acquisition cannot influence knowledge reuse, but the acquisition of knowledge can enhance the sharing of knowledge in every individual head. Research finding can help knowledge management researchers as well as non- knowledge management compliance in the construction organisationto advocate for the excelling role of knowledge management in the construction organisation. The research has a subsequent contribution to the body of knowledge in the separate ways; first, is the invention of an empirical research model that is validated by examine the structural equation model in the construction organisational to enhance adoption of KM process based on the views of knowledge workers in Nigerian construction organisations. In addition, the researcher provides a research framework for scholars and construction practitioners who intend to carry out a related research in different areas of the world. Many construction industries are still yet to understand the imminent gain of KM process to contest against foreign companies in our developing country. So, identifying the advantages in the KM process will go a long way to increase the organization performance. The Government should upkeep the construction industry by providing a promising environment for the knowledge workers and project managers to hold train professionals and engineers to coach other workers within the industry in order to advance the awareness of the knowledge management process.

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