
Examining the Adequacy of Knowledge Management Tools at the Project Level in Building Construction Firms

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Abstract. This study examines the adequacy of knowledge management tools at the project level in building construction firms. Despite the abundance and proliferation of various knowledge management tools and techniques, knowledge management approaches used by building construction firms are inadequate and weak. However, the assessment and rationale for the application of informal and unsystematic approach are not known. The aim of the study was to examine the adequacy of knowledge management tools with a view to enhancing best practices. The study utilized a descriptive survey research design. The study population of the building construction managers is 2,533 and out of which a sample of (330) construction managers from building construction firms in Lagos State, Nigeria were identified for this study. Data for the analysis were collected through self-administered questionnaires on building construction managers using random sampling method and were analyzed using descriptive statistics. The study revealed that knowledge management tools used were adequate if properly utilized by the construction firms. In conclusion, it was recommended that building construction firms should encourage teamwork building among building managers. In order to successfully capture, retain and transfer knowledge, senior management should recognize and plan for these needs so as to keep from losing valuable project knowledge.

Keywords: Construction firms, Knowledge, Knowledge management, Knowledge management tools, Knowledge management success

Introduction

Firms nowadays are operating in a competitive environment where organisations are searching for strategies that will enable them to improve their performance in order to have a competitive edge over their competitors (Dodd, 2003). To achieve these objectives, Obasan (2011) opined that the establishment and continuous existence of organization requires the adequacy and continuous effective functioning of its materials input with the human element being indispensable in the day to day running of the organisation.

Knowledge, a dynamic human process of justifying personal belief towards the truth, i.e. a justified true believe, is seen as one of the most important resources in any organization (Bhargav & Lauri, 2009). The success or even the survival of any organization depends on how effectively it manages the knowledge present internally and externally (Switzer, 2008). Effective management of this knowledge provides the capacity to store and reuse the existing knowledge gained in the past via past experience on the executed projects and can greatly reduce the time spent on problem solving and increase the quality of work. Ineffectiveness in managing knowledge makes the knowledge irrelevant and not useful for organizations (Yusof & Abu Bakar, 2012). For these reasons, there is an emerging need in the construction sector to effectively implement knowledge management systems with the aim of transcending boundaries for an organization through adequate materials input particularly human resources.

Personalization knowledge management which relies on network of individual is being used to manage knowledge in most of the building construction firms. This approach used by building construction firms, according to studies by Bashir, Hashim and Aliyu (2014) is inadequate. For these reasons, the pool of knowledge is lost because there are no effective ways of managing it (Zuofa, Burns, & Ochieng, 2015). However, the assessment and rationale for

the application of informal and unsystematic approach are not known. With adequate knowledge management, knowledge would hopefully be securely managed and loss of project knowledge will be prevented.

Literature Review

Knowledge Management Practices in Building Construction Firms

There are many definitions of KM but at its essence it entails *getting the right knowledge to the right people at the right time*. According to Sandra and Anne (2010), from an organizational view this involves *the process of critically managing knowledge to meet existing needs, to identify and exploit existing and acquired knowledge assets and to develop new opportunities*. For knowledge to be useful it must be shared (Borges, Viera & Tiago, 2007) but difficulties arise when knowledge cannot be codified (Sandra & Anne, 2010). Explicit knowledge is more easily applied; hence tacit knowledge must be made explicit using techniques such as informal sharing or information systems (Abril, 2007). As knowledge is a fundamental element of all business activities and is therefore not restricted to any particular instrumental change programmed in organisations, this study uncovers key factors to be considered when an organization aims to implement a KM strategy. KM flow can now be discussed as follows:

i. Training/ E-Learning: A key aspect of knowledge management (KM), according to Young (2010) at the personal and team levels is to more collectively and systematically' capture the learning and ideas that are taking place in every construction activities.

Many organizations would like to be more creative, generate more ideas, learn faster, and turn their new learning into better knowledge to share, apply, and exploit. Furthermore, *'The problem is not a shortage of new learning and ideas, but knowledge managers do not effectively capture these learning and ideas—and systematically do anything with them!'* there is the need to find better methods, tools, and techniques to do this collectively and systematically.

Yusof and Abubakar (2012), in support of the view, asserted that ineffectiveness in managing knowledge tools make the knowledge irrelevant and not useful for organizations. For instance, if there are two organizations in the same competitive business and one organization does not capture learning and ideas, as they happen in the workplace—collectively and systematically—but does this 'episodically' from time to time. *'The very process of writing down explicitly what you think you have learned, or a new idea, is a fundamental process of knowledge organization that will develop further and refine the tacit knowledge in the individual to the next higher level.'* The study further suggested that personal capture tools should be integrated with corporate capture tools. Naturally, electronic tools are much preferred to paper-based tools for less risk of omission, speed, and accuracy. However, the key step is to capture learning and ideas manually or electronically.

ii. Peer Assist/Tutoring: Ping (2010) said that tutoring knowledge includes information of common students' errors and misconceptions, and tutoring knowledge is the most important knowledge. Since it is the key for us to build a customized learning system for each worker, which can deliver appropriate individual instruction to help workers learn more effectively and efficiently, hence highlighted that:

It is a technique used by a project team to solicit assistance from peers and subject matter experts regarding a significant issue the team is facing.

The ability of the Peer Assist to tap into the experience and knowledge of peers makes it a valuable tool that yields immediate insights and results. The project leader normally initiates the assistance when he or she thinks peers could assist them in their project.

iii. Collaborative Physical Workspace: Physical workspace, in this context, literally means the settings in which actually work takes place — or simply the physical aspects of our

office. When workers share or create knowledge, workers usually interact with other people through face-to-face communication—they discuss, dialogue, or simply just ask a question. The physical workspace is where such human interactions take place and it can support knowledge sharing/creation if it is well-designed (Chihab, 2009).

Young (2010) argued that good physical workspace does not mean luxury office that small and medium-sized enterprises rarely afford. Instead, it is about understanding how people interact—or create and share knowledge, and designing physical environment to support such human activities.

The researcher stated further that the design of good physical workspaces to support knowledge sharing and creation varies a great deal, depending upon what kind of interactive scenes that an organization needs.

iv. Libraries: Young (2010) defined libraries as a technique that provides the structure to organize information, documents, and libraries in a consistent way. This structure assists people to efficiently navigate, store, and retrieve needed data and information across the organization. It builds a natural workflow and knowledge needs in an intuitive structure.

Taxonomy can be considered according to him as a classification system, i.e., ‘The Table of Contents’ for an organization’s knowledge capital. Library also provides pointers to human-based expertise and knowledge.

v. Document Libraries leading to a Document Management System: Young (2010) stated that from the Information Management science, and from the Library sciences, information and document management have always been interested in document repository. Efficient and effective access to documents is the antidote to ‘information overload’. Maintaining a ‘document repository’ with good categorization and is paramount to filing and, subsequently, searching and finding the right information at the right time.

Furthermore, for KM, we are concerned with developing our knowledge assets. Ideally, knowledge workers should plan to identify what our key knowledge assets are, and should identify and develop information assets to support them. A good, well-planned document library, leading to a document management system, will pay dividends as part of any knowledge portal or KM system (Young, 2010).

vi. Journal: Moonseo, Changbum, hyun-Soo and Seungium (2007) looked at a Blog as a very simple ‘journal style’ website that contains a list of entries, usually in reverse chronological order. The entries are typically short articles or stories, often relating to current events. However, the entries do not have to be just plain text. They could also be photographs, videos, audio recordings, or a mixture of all the types.

The content of a blog may be created by a single author or, in the case of some of the more popular blogs, a whole collection of writers. Although any website could call itself a blog, there are several features that are generally found in blogs. These are:

a. The content is essentially linear. Stories, and items, are added to a growing list, and readers can scroll through the list to see how the author(s) thoughts have developed.

b. The blog has a focus. This is interpreted very liberally—people’s blogs wander across a whole range of topics—but even when stretched to the limit, there is usually some sense that the blog is about something.

vii. Online Network Services: Young (2010) defined social network as a group of people who share a common area of interest. Social network services are online systems that support social networking.

The core services they offer usually include:

a. Finding people who have similar interests or needs;

b. Aggregating people into groups, or subgroups, and being able to communicate with those groups; and

c. Sharing content, such as documents links to relevant websites, or even streaming video.

Social networks can be very powerful knowledge-sharing tools. A well-targeted network can provide its members with access to highly relevant knowledge, connections, and advice. In a business setting, knowledge sharing allows companies to have a much closer relationship with customers, and potential customers. Internet-based social networking has opened up a totally new way of managing customer relationships (Young, 2010).

viii. Building Knowledge Clusters or Internet: An internet forum is a web application for holding discussion and posting user generated content. Internet forums are also commonly referred to as web forums, message boards, discussion boards, (electronic) discussion groups, discussion forums, bulletin board or simply forums. The terms “forum” and “board” may refer to the entire community or to a specific sub-forum dealing with a distinct topic. Messages within these sub-forums are then displayed either in chronological order or as threaded discussions (Bhargav & Lauri, 2009).

Throughout history, organizations have grouped together in various types of clusters so as to be more effective. Guilds, societies, associations, networks, and so on, continue to help support and develop their members. However, since the birth of the 'Knowledge Economy', there has been far more emphasis on the knowledge contained, developed, and applied within organizations. There is much more interest in the different types of Knowledge Network. The Knowledge Economy and the primary (KM) processes, in turn, have been newly enabled, in radical and fundamentally new ways, by communication, information, and collaborative working technologies based on the Internet (Young, 2010).

ix. Collaborative /Conference Virtual Workspaces: Chihab (2009) stated that the essence of a collaborative virtual workspace is that it enables people to work together, irrespective of where they are physically located. In practical terms, this means that it has to involve a combination of document sharing, collaborative editing, and audio/video conferencing. Although suppliers offer software packages that contain all these elements, many users assemble their own collection of tools that meet their specific needs.

There are many reasons for using a virtual workspace, including

- a. It allows organizations to access the best skills anywhere in the world;
- b. It can dramatically reduce travel costs; and
- c. It allows people to work when and where is most effective for them, as well as giving them access to information when they need it.

x. Mentor/Mentee Scheme: Mentoring is a work relationship between a senior and junior organizational member with an intentional agenda designed to transfer experience and learning. The mentor has experience and seniority in the organization, and personally advises, counsels, coaches, and promotes the career development of the mentee (Andy, 2010).

Mentoring is an intervention that has proven highly effective and has become especially popular in recent years. Mentoring is an excellent vehicle for general corporate career development. Mentoring is a form of knowledge sharing. It builds a caring, trusting culture. In terms of the knowledge-creation cycle, it creates a space for people where they can internalize explicit knowledge through reflection on their experiences, throw ideas around in a safe socialization space, and work to verbally express what they know (to externalize). The self-reflection that can result from a mentoring relationship can be a powerful growth experience and can give you new insights about yourself. This applies both for the mentor and the mentee (Young, 2010).

Research Methodology

The methodology of a research is the procedure used in collecting information and data in order to make contribution in area of study. Therefore, the process in this research involves assessing the knowledge management practices at the project level through the collection of detailed data on the existing condition of knowledge management techniques and using the

data collected to justify the actual conditions so as to make improvement in building construction firms.

Research Design

Therefore, a quantitative research method was adopted for this study through a questionnaire survey as did by other researchers on a similar related area of study (Mukherjee, 2007; Tarila, Zuofa & Ochieng, 2015; Oke Ogunseni & Adeeko, 2013). The use of questionnaire survey was adopted for this study because Kasimu, Roslan and Fabhhlin (2013) highlighted that the beliefs, perception, ideas, views and thought of construction managers about area under study can be gotten very easily due to the flexible nature of questionnaire survey which can also be in structured format and can cover large number of sample of individuals from a population.

Population and Sample Size

The study only covered knowledge management in building construction firms with respect to the application of knowledge management at the project level. The study area for this research work is Lagos State. The choice of Lagos state for this study was premised on the fact that the city has a fair concentration of building construction firms.

The population size of 2533 managers was used in this study and was drawn from registered building construction firms retrieved from FRIS 2015. These companies are made up of 1. Micro enterprises. 2. Small enterprises and 3. Medium enterprises (building construction firms) as categorized by (Abdulazeez, 2012). This has a corresponding employee's size of 0 to 10, 10 to 99 and 100 to 299 respectively. Also Odediran, Adeyinka, Opatunji, and Morakinyo, (2011) classified construction firms into small, medium and large in Nigeria. The nature of the large firms (over 300 workers) are said to have large numbers of workers. Therefore, construction managers in small and medium serve as source of primary data for this research. According to Shittu *et al.* (2013), the combination of small and medium sized construction firms make up 90 percent of the total registered enterprises as at 2013 in Nigeria.

Therefore building construction managers who serve as respondents in construction firms in Lagos State constitute the population of the study. Sample of a research is described as a limited number of observations from a population. Usually samples are drawn because it is impossible to cover all observations in a population (Ibrahim, 2011).

Since the population size, N is known for a categorical data with margin of error = 0.05, $p = 0.05$ and $t = 1.65$; therefore the sample size, $n = 254$ using the table from Bartlett, Kotrlik, and Higgins (2001). According to Bartlett, Kotrlik, and Higgins (2001) a margin of error between 3% and 5% is acceptable for educational research.

Salkind Neil (1999) stated that 10% - 50% of the corrected sample size can be added to the initial sample size. Therefore, 40% of No of calculated sample is added to account for lost questionnaires or uncooperative respondents as recommended by (Salkind, 1999).

Therefore final sample size is obtained as shown

$$N_0 = 254 \times 0.40 = 76 + n_0 = 76 + 254 = 330$$

Therefore, the study finally administered 330 questionnaires to building construction managers in building construction firms in Lagos State. To this end random sampling system was used to select the building construction firms that were issued the structured questionnaires through hand delivery to managers in their offices. The respondents were asked to indicate their numbers of employees in the questionnaire so as to determine various categories of firms.

Results and Discussion

A total of 330 copies of questionnaire were issued. However, after series of follow-up and reminders, only 257 questionnaires were completed and returned. The number of questionnaire completed and returned was higher than the sample size computed for the study (254). Based on this, the numbers of questionnaires completed and returned were therefore considered adequate for analysis as 257 represents 78% of the total questionnaire administered (330).

Figure 1 shows the firms used in this study consist of Micro firms, with number of employees (0-9), Small firms with number of employees (10-90) and Medium firms with number of employees (100-299). Questionnaires were administered to managers in these firms which yielded response rate of Micro 33 (10%), Small 173 (53%) and Medium 51 (15%) respectively. The highest response rate of 53% was gotten from small size firms (10-99) which shows that they constitute a larger portion of responses in this study. In research carried out by (Egbu, Hari, Kumar, (2003) on small and medium size construction firms, it shows that these enterprises have challenges implementing knowledge management initiatives. Therefore responses gotten from these firms are considered to be relevant to this study.

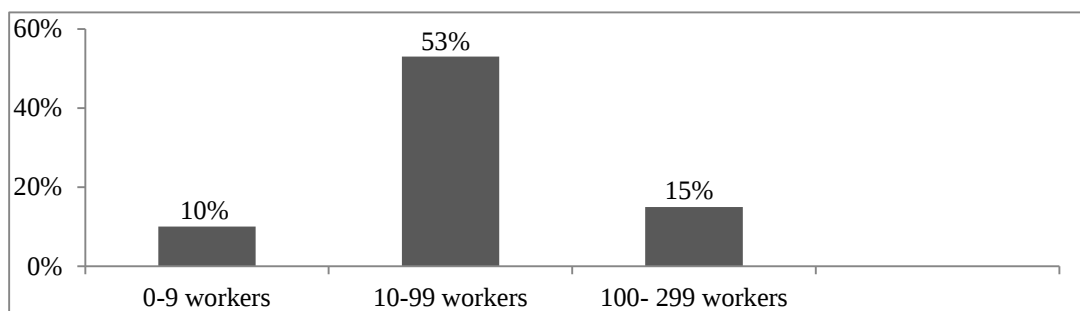


Figure 1. Characteristics of company responses rate

Source: Field Survey (2017)

Table 1 shows the respondents by qualification. (7) 2.72% managers hold Ph.D, (39) 15.18% hold M.Sc., (134) 52.14% hold B.Sc. and (77) 29.96% hold HND. It could be seen in this research that professionals with Bachelor's degree B.Sc. are those that participated in the research as they made up the largest percentage of the responses. This shows that all the construction managers are not only academically inclined but also have more knowledge on area under study.

Table 1. Distribution of respondents by qualification

Qualifications of the respondents	Frequency	Percentage
Ph.D	7	2.72
M.Sc	39	15.18
B.Sc	134	52.14
HND	77	29.96
Total	257	100

Source: Field survey (2017)

Table 2 shows the year of experience of respondents that took part in this research. Thus 22.96% of the construction managers have 0 to 5 years of experience, 46.30% has experience between 5 to 10 years followed by 26.07% respondents with 10 to 15 years experience and lastly 4.67% responses from managers with over 15 years of experience. As it is observed 46.30% of the construction managers with experience between 10 and 15 years has the highest percentage of responses. Therefore, responses obtained from a sample like this can be

characterized as “informed” and have been practicing knowledge management in one way or the other.

Table 2. Distribution of respondents by working experience

Experience of the respondents	Frequency	Percentage
1 – 5 years	59	22.96
5 – 10 years	119	46.30
10 – 15 years	67	26.07
Over 15 years	12	4.67
Total	257	100

Source: Field survey (2017)

Tables 3 shows the adequacy of knowledge management tools used in building construction firms. In the table only libraries and journal were claimed by the responses not adequate (mean 2.93 and 2.94). The mean responses of construction managers in other techniques ranged from 3.57-2.93 which shows that existing knowledge management techniques in building construction firms were adequate for managing and sharing knowledge. It can, therefore be concluded that existing knowledge management techniques in building construction firms were adequate given an overall average mean of 3.13. This is contrary to the claim of Bashir *et al.* (2014) where he stated that the existing knowledge management tools are inadequate.

It is obvious that all the knowledge management tools are adequate if they are employed and utilized adequately in the presence of management support in terms of availability of funds. If proper knowledge management tools or techniques are employed, there is no doubt that the opportunity to exchange knowledge will be considerably higher.

The inability of most building construction firms to effectively manage knowledge, incapacitate them to reuse the knowledge gained in the past via past experience which greatly extend the time spent on problem solving and eventually lead to cost overrun. Ineffectiveness in managing knowledge makes the knowledge irrelevant and not useful.

Table 3. Adequacy of existing KM tools in building firms (N = 257)

Items	VA	A	NA	NVA	Mean Std. D	Rank	Decision
1. Telephone calls	152	100	4	1	3.57 0.691	1	Adequate
2. Staff meetings	76	171	10	0	3.26 0.210	2	Adequate
3. Conferences and events	69	171	13	2	3.18 0.212	3	Adequate
4. Seminar/presentations	51	185	18	3	3.12 0.226	4	Adequate
5. External course	63	162	28	4	3.12 0.205	4	Adequate
6. Internet	57	173	22	5	3.11 0.215	6	Adequate
7. Peer tutoring	57	171	25	4	3.10 0.213	7	Adequate
8. Training/E-learning	45	173	35	4	3.01 0.230	8	Adequate

9. Libraries	47	151	55	4	2.94 0.207	9	Not Adequate
10. Journals	30	190	37	0	2.93 0.282	10	Not adequate
Average Mean					3.13		Adequate

Source: Field Survey (2017)

Note: VA = Very Adequate, A = Adequate, NA = Not Adequate, NVA = Not Very Adequate

Conclusion and Recommendation

In the assessment of the adequacy of knowledge management tools in building construction firms, it was concluded in this study that the existing various knowledge management tools were adequate for the effective capturing and sharing of knowledge in building construction firms if properly employed and utilized. One very important objectives of knowledge management are to ensure that knowledge is adequately captured for reuse as at when required. Without creating an adequate platform for capturing and sharing knowledge gained during and after project in the presence of adequate utilization of knowledge management tools, it will be very difficult to reuse them while project knowledge gained via experiences will continue to be lost. With the proper utilization of knowledge management tools, knowledge would hopefully be securely managed.

Finally the study recommends teamwork building in the presence of adequate and proper utilization of knowledge management tools.

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