

bottom, support from all levels of management on the knowledge management implementation in construction (Olatokun and Nwafor, 2012).

2. **Mutual Trust:** This factor includes items pertaining to trust relationship. Each member and party should trust, rely on, and understand other parties' decisions. There will be no weak links among team members. The issues could be resolved in timely and responsive manner.

3. **Willingness to share knowledge:** This factor includes two items that are related to the willingness to share knowledge among project participants. The willingness to share knowledge and a great deal of involvement of end-users are included in this factor. This involves ability of the project participants to be able to creating knowledge sharing space which will considerably help and create adequate knowledge management process within and outside the organization (Yu-Cheng and Lee-Kuo, 2006).

4. **Top Management support:** This factor according to Riege (2007), explains the degree of top management involving and taking knowledge management seriously. Without the support or taking seriously knowledge management by the top management, it will be very difficult to implement knowledge management as this will require a huge sum of money to be able to carry out knowledge management successfully.

5. **Evaluation of knowledge management process:** Omotola 2012 further explained that five items comprise the elements of this factor regarding the evaluation and monitoring of the knowledge management process. Evaluation and monitoring methods include the evaluation of knowledge exchanging and reuse performance, well-defined procedures and responsibilities, and determining measureable goals of individual responsibilities. The evaluation and monitoring process could be ensured by a team leader of knowledge management department champion. Other factors include creating knowledge sharing space that is conducive for knowledge management. According to Du-Plessis (2008), the problem in the construction industry is that employees usually have no time to share and evaluate knowledge before going on to the next project.

4. **Application of IT:** Lei et al. (2010) observed that Information technology (IT) has long been recognized as crucial for successful knowledge management. This is probably a legacy of the growth in knowledge based system in the 80s and early 90s, and has led to much of the early work on knowledge management focusing on the delivery of technological solutions. While it is now recognized that good knowledge management does not result from the implementation of information systems. As a result, Novo et al. (2007) suggested that a revised approach to developing knowledge management system where technology should not be created as a standard application but strongly integrated with overall technology's needs of the firms.

5. **Active participation of employees:** According to Hislop (2013), this factor involves ability of project participant to actively involves in all activities that involve knowledge management in the organization. For participant not being actively involved in the process, sharing of knowledge gained by individual will be extremely difficult. The effectiveness of knowledge management can be evaluated through staff involvement and motivation in projects. The greater the staff involvement, the greater the potential for knowledge transfer.

6. Creating space for knowledge management: The willingness to share knowledge involves ability of the project participants to be able to creating knowledge sharing space that can considerably help and create adequate knowledge management process within and outside the organization. Top Management support brings about the degree of top management involving and taking knowledge management seriously. Without their support, knowledge management will be very difficult to implement as this will require a huge sum of money to be able to carry out knowledge management successfully ((Yu-Cheng & Lee-Kuo, 2006).

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.

Therefore, a quantitative research method was adopted for this study through a questionnaire survey as done by other researchers on a similar related area of study (Mukherjee, 2007, Zuofa, Burns and Ochieng, 2015, Oke *et al.* 2013 and Omotola, 2015). The use of questionnaire survey was adopted for this study because Kasimu *et al.* (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.

A quantitative research method was adopted for the study by the following researchers: Mukherjee (2007) who carried out a research on impact of knowledge management strategy on organizational learning. Sandarac and Anne (2010) also conducted a research on assessing the impact of knowledge management on organizational practice: applying the MeCTIP Model to UK organization. Dave & Koskela (2009) also conducted a literature review research to explain collaborative knowledge management in a construction case study. Zuofa *et al.* (2015) carried out a research to appraise knowledge management perceptions among construction practitioners. Besides, Oke *et al.* (2013) conducted research on assessment of knowledge management among construction professional in Nigeria to examine the areas of the construction industry that will improve as a result of the contributions of knowledge management. Omotayo (2015) also conducted a literature review research to explain knowledge management as an important tool in organizational management. The use of structured questionnaires was adopted by all these researchers; therefore, this research adopted the use of questionnaire to collect data from the respondents.

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 of construction managers drawn from 2533 construction firms in Lagos State was used in this study which constitutes numbers of registered construction firms retrieved from FIRS 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 1 to 10, 10 to 99 and 100 to 299 respectively. Also Odediran *et al.* (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. Therefore, construction managers 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, & Higgins, 2001. According to Bartlett *et al.* (2001) a margin of error between 3% and 5% is acceptable for educational research.

Salkind (1999) stated that 10% - 50% of the corrected sample size can be added to the initial sample size. Therefore, 40% of the corrected sample size 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 firms where building construction managers in those firms serve as respondents 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 their offices.

Primary data was collected using structured questionnaire survey. It was well structured and detailed using source from literature review and opinion of the expert professionals in construction industry. The opinion of the respondents served as a primary source of data for the research which was obtained through self-administered questionnaires while secondary data was obtained through extensive literature search from published and unpublished journals, textbooks, articles, periodicals, electronic resources.

In analyzing data that was collected, simple means, percentage, and charts, were used for the study. The analysis of data was carried out in accordance with the research questions using percentage for bio data, descriptive statistics of mean for research questions. In each case, the responses to questionnaire questions were scored and the mean and percentage were determined and organized in tabular forms. The mean value for positive is < 2.50 otherwise negative i.e. any item above 2.50 is positive (+ve) and any item below is negative (-ve).

Results and Discussion

Table 1: Details of Questionnaires Administered and Returned

	Sample size	No. of Questionnaires distributed	No. of Questionnaires returned	Percentage of returned
Construction firms	254	330	257	78%

Source: Field Survey (2017).

Table 1 above described the representativeness of questionnaires returned from the field survey. A total of 330 questionnaires were issued out. This was to ensure equitable distribution of the questionnaires among the construction firms/managers involved in the study. However, after series of follow-up and reminders, only 257 questionnaires were completed and returned. The number of questionnaires completed and returned was higher than the sample size computed for the study 254. Based on the foregoing assertion, the numbers of questionnaires completed and returned were therefore considered adequate for analysis as 257 represents 78% of the total questionnaires administered (330).

Construction Firm Size

Figure 1 shows the firms assessed in this research consist of Micro (0-9), Small (10-90), Medium (100-299) firms. Questionnaires were administered to 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 et al., 2003) on small and medium size construction firms, it shows that these enterprises have challenges implementing knowledge management initiatives. Therefore, responses obtained from these firms are considered to be relevant to this study.

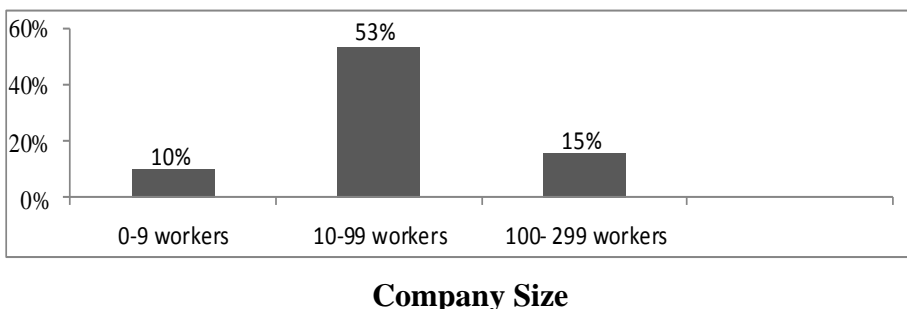


Figure 1: Characteristics of company responses rate
Source: Field Survey (2017)

Table 2: Distribution of Respondents by Qualification

	Frequency	Percentage
PhD	7	2.72
MSc	39	15.18
BSc	134	52.14
HND	77	29.96
Total	257	100

Source:- Field survey (2017)

Table 2 shows the respondents by qualification. (7) 2.72% managers hold PhD (39) 15.18% hold MSc (134) 52.14% hold BSc and (77) 29.96% hold HND. It could be seen in this research that professionals with Bachelor' 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 3: Distribution of Respondents by working experience

	Frequency	Percentage
1 – 5 years	59	22.96
6 – 10 years	119	46.30
11 – 15 years	67	26.07
Over 15 years	12	4.67
Total	257	100

Source: Field survey (2017)

Table 3 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 and other data obtained from a sample like this can be characterized as “informed” and have vast experience on area under study.

Table 4 Success factors for KM in building construction firms N = 257

Success Factors	SA	A	D	SD	Mean	Std. D	Rank	Decision
1 Creating knowledge sharing space	178	79	0	0	3.69	0.201	1	Agree
2 Willingness to share knowledge	165	84	8	0	3.61	0.196	2	Agree
3 Top management support	97	155	5	0	3.36	0.203	3	Agree
4 Mutual Trust	92	159	6	0	3.33	0.203	4	Agree
5 Evaluation of K M process	93	157	7	0	3.33	0.202	4	Agree
6 Active participation of employees	89	161	7	0	3.32	0.204	6	Agree
7 Establishment of a Reward Strategies	74	175	8	0	3.26	0.213	7	Agree
8 Application of IT	74	149	34	0	3.16	0.195	8	Agree
Average Mean					3.38			Agree

Source: Field Survey (2017)

Strongly Agree, Agree, Disagree and Strongly Disagree.

Table 4 shows that all the respondents agreed that items 1-8 (Mean ranged from 3.16 to 3.69) were the success factors for knowledge management practices in building construction firms given the average mean of 3.38. Creating knowledge management sharing space ranked 1 (mean = 3.69).

Concerning knowledge management success factors in building construction firms, a variety of factors determine significant success ingredients for knowledge management in construction projects in terms of these objectives. All the respondents agreed that creating knowledge sharing space (mean = 3.38); willingness to share knowledge (mean = 3.61); top management support (mean = 3.36); evaluation of knowledge management and mutual trust (mean = 3.36); active participation of employees (mean = 3.32); establishment of a reward strategies (3.26); and application if IT (mean = 3.16) are factors that contribute to the success of knowledge management. This agrees with (Yu-Cheng & Lee-Kuo, 2006).

The zeal to share knowledge involves ability of the project participants to be able to create knowledge sharing space that can considerably help and create adequate knowledge management process within the organization. Top Management support brings about the degree of top management involving and taking knowledge management seriously. Without their support, knowledge management will be very difficult to implement as this will require a huge sum of money to be able to carry out knowledge management successfully. The important of support from top management has also been suggested to be essential. The personnel function need to focus on top management to encourage processes that will promote

cross-boundary learning and sharing. This includes helping to set up and, possibly, fund knowledge networks, as well as defining and developing the skills of learning from other people.

For effective communication, there is the need for every member and party to trust, rely on, and understand other parties' decisions. There should be no weak links among team members if this occurs. The issues could be resolved in timely and responsive manner the fact that sharing of knowledge needs to be constantly communicated to the employee. Without trust, there will be no effective communication.

The need to create a system for evaluating the attempts that are made to use knowledge management is very important. The evaluation system can range from informal attempts, such as talking to people about how "best practice" is shared within the firm. Other management tool/measurements can also be adopted to measure the outcomes from KM usage in the organization.

One of the most important issues when working on a KM strategy is to create the right incentives for people to share and apply knowledge (Olatokun and Nwafor, 2012). Personnel reward system must support the culture of sharing knowledge. To improve this process, it is crucial to reward employees that contribute their expertise and to make sure employees understand the benefits of KM. but the problem with many reward systems and incentives for sharing knowledge is that useful knowledge comes from the lower cadre in the establishment, from people who are not on incentive systems and probably respond much more readily to the feeling that they belong to highly motivated, leading edge, innovative groups of people

If the construction manager is able to make employees to recognise the value added from the activities that they participate in according to (Du-Plessis, 2008), they should have known that KM is part of their daily work routine and not something extra that they do. Though, employees usually have no time to share and evaluate knowledge before going on to the next project, it is believed that if there has been tangible demonstration of value during the early days/months of the projects and more time were spared between projects, individuals would have more time to combine, collaborate and reflect on knowledge obtained from the last project, resulting in a higher quality of knowledge sharing that will keep knowledge gained from project.

Active participation of employees involves ability of project participant to actively involved in all activities that involve knowledge management in the organization. For participant not being actively involved in the process, sharing of knowledge gained by individual will be extremely difficult. The effectiveness of knowledge management can be evaluated through staff involvement and motivation in projects. The greater the staff involvement, the greater the potential for knowledge transfer. Without trust, there will be no honest communication.

Lei-Chi *et al.* (2010) observed that Information technology (IT) has long been recognized as crucial for successful knowledge management. Having Knowledge Repository that contain databases of codified knowledge assets that are systematically organized to facilitates searching, browsing, and retrieval is also essential. Knowledge repository may contain lessons learned, best practices, planning documents, project proposals, marketing presentations, etc. The implementation of mentoring programs is also important. The use of coaching and mentoring in organisations can facilitate informal sharing of knowledge. This involve the sharing of knowledge between a relatively experienced people and someone less experience.

Conclusion and Recommendation

In the assessment of the success factors for knowledge management practices in building construction firms, it was concluded in this study that creating knowledge sharing space; willingness to share knowledge; top management support; evaluation of knowledge management and mutual trust; active participation of employees; establishment of a reward strategies and are factors that contribute to the success of knowledge management practices. Though it was admitted that most construction workers are competitive by nature and would be less inclined to share the knowledge they possess, the need for knowledge sharing among the construction workers in construction firms could never be overemphasized. Besides, building construction firms need to introduce system that appreciate and recognize worker's contribution towards the knowledge management practice. Human Resource Management (HRM) practices can also impact on workers' attitude towards and participation in KM activities. The use of HRM practices can be seen to be concerned not only in attempting to create a positive towards, and a willingness to participate in organisational KM activities but also with making employees committed and loyal to their employer, this is fundamental, because if employees are not committed and loyal to their organisations, there is a risk of losing knowledge possessed by the employees through staff turnover. Moreover, the study recommends teamwork building in the presence of top management support and trust without which there will be no honest communication. Since these success factors have significant effect on knowledge management practice senior management should recognize and plan for these needs so as to keep from losing valuable project knowledge.

References

- Abdul’Azeez, A. D. (2012). *Development of a Prototype Electronic Document and Record Management System (EDMS) for small and medium building firms*. A PhD dissertation. Faculty of Environmental design, Ahmadu bello University, Zaria.
- Bashir, D. S. Hashim, N. A. and Aliyu, O. A. (2014). Knowledge Management and organizational Performance of Mobile Service Firms in Nigeria. A proposed Framework. *Journal of Information and knowledge Management* ISSN 2224-5758 4(11).
- Dave, B. and Koskela L. (2009). *Collaborative knowledge management – A construction case study*. Scaford Center for Research and innovation, University of Salford, Maxwell Building Creater Manchester, M5 4WT, UK.
- Chihab B. M. (2009). *Barriers to Knowledge Management: A Theoretical framework and a Review of Industrial cases*. World academy of science, Engineering and technology.
- Du Plessis, M., (2008). What bars organisations from managing knowledge successfully? *International Journal of Information Management*. 28 (4).
- FIRS (2015). Federal Inland Revenue Service.
- Hislop, D. (2013). *Knowledge management in organization: A critical introduction*. 3rd Ed. UK: Oxford University Press.
- Ibrahim, K. (2011). Procurement methods on clinets’ objectives of Time and Cost in Construction Industry. *Journal of financing management in construction*.
- Kanagasabapathy, K. A. Radhakrishnan, R. and Balasubramanian, R. (2012). *Empirical investigation of critical success factor and knowledge management structure for successful implementation of knowledge management system: A case study in process industry*. Available:[http://www.knowledgemanagement.ittoolbox.com.../empirical- investigation of crit...](http://www.knowledgemanagement.ittoolbox.com.../empirical-investigation_of_crit...)
- Kamlesh, P. (2010). *Knowledge Management Tools and Techniques* published by the Asian Productivity Organization Tokyo 102-0093, Japan (92):833-7093-7
- Kasimu, A. M., Roslan, A., and Faghlin, A. (2013). The Significance of Knowledge Management in Civil Engineering Construction Firms in Nigeria. *Journal of Applied Sciences Research*, 9(6):3484-3491.
- Lei Chi, T. R. and Goce, A. (2010). Information Technology, Network Structure, and Competitive Action, *Information Systems research*, 21(3): 543-570.
- Mukherjee, A. (2007). Impact of Knowledge Management Strategy on Organisational Learning: A Stimulation Study. *AMCIS 2007 Proceeding Paper* 426. <http://aiste.org/amcis/426>.
- Naoki, O. (2010). *Knowledge Management Tools and Techniques* published by the Asian Productivity Organization Tokyo 102-0093, Japan (92): 833-7093-7

Odediran, S. J. Adeyinka, B. F., Opatunji, O. A., and Morakinyo, K. O. (2011). Business structure of indigenous firms in the Nigeria construction industry: *International Journal of business research & management*. (IJBRM). 3(5): 255-264.

Oke, A. E. Ogunsemi, D. R. and Adeek, O. C. (2013). Assessment of Knowledge Management Among Construction Professionals in Nigeria. *Journal of Construction Project Management and Innovation*. 3(2): 660-679. ISSN 2223-7852.

Olatokun, W. and Nwafor, C. I. (2012). The effect of extrinsic and intrinsic motivation on knowledge sharing intentions of civil servants in Ebonyi state, Nigeria, *information Development*, 28(3): 216-234

Omotola, F. O. (2015). "Knowledge Management as an important tool in Organisational Management: A Review of Literature" *Library Philosophy and Practice (e-journal)* 1238. <http://digitalcommons.unl.edu/libphi;prac/1238>.

Riege, A. (2007). Actions to overcome knowledge transfer barriers in MNCs. *Journal of Knowledge Management* 11(1): 48-67.

Yu-Cheng, L. and Lee-Kuo, L. (2006). *Critical Success Factors for Knowledge Management Studies in Construction*. National Taipei University of Technology, Taipei, Taiwan. ISARC 768-772.

Zuofa, T. Burns, A. and Ochieng, E. (2015). *Appraising knowledge management perceptions among construction practitioners*. Management Procurement Law 168 issue MP2.

