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ASSESSMENT OF KNOWLEDGE MANAGEMENT AMONG CONSTRUCTION PROFESSIONALS IN NIGERIA

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Abstract
Knowledge management is a developing area in the construction industry that can contribute immensely to the success of any organisation. This research work therefore examined the areas of the construction industry that will improve as a result of the contributions of knowledge management. Data for the analysis were collected through questionnaires administered on construction professionals using convenient sampling method. The data were analyzed using percentiles and mean item score. The study revealed that the knowledge management adoption is being hindered the most in Nigeria by funding as there is no adequate fund to carry it out in construction organizations. Assessment of the level of sharing knowledge among construction professionals showed that Architects ranked first in sharing knowledge with other construction professionals while top managers, Quantity surveyors, Estate Surveyors, and Civil Engineers followed respectively. In conclusion, it was observed that colleague's experience was ranked first among the sources of knowledge available to construction professionals in Nigeria as most construction professionals in Nigeria don't read much and are not exposed to other methods of acquiring knowledge within the organisation, and fund is the highest ranked problem hindering the adoption of knowledge management among Construction Professionals. It was then recommended that Civil Engineers, Builders, Middle managers, Lower managers and Technicians should improve in the level at which they transfer and share knowledge with other construction professionals and that the Federal Government of Nigeria should inject more fund to the construction industry of the country as this is a very productive sector of the economy.

Keywords: Construction Industry; Construction Professionals; Knowledge management; Nigeria.

INTRODUCTION

According to Botha (2004), knowledge management (KM) is a process of systematic management of vital knowledge and its associated process of creating, gathering, organising, diffusion, use and exploitation. It requires turning personal knowledge into corporate knowledge that can be widely shared throughout the organisation. All organisations are awash with information and knowledge. The problem is that it is invisible and most people in organisations simply don't know what their colleagues know. The organisations don't know what their employees know, nor do they have any way to find out or organise it. They typically have fewer grips on the knowledge available outside – owned by competitors, suppliers, universities and the government.

Knowledge management is about getting the right knowledge to the right people at the right time. Knowledge management according to Blumentritt and Johnson (1999) is about sharing and acquiring knowledge in ways that can be translated into improved organizational performance. The intellectual capital of individuals and teams are presented in a tangible form that facilitates the adding of value to the organization and ultimately its customers (Ravishankar, Pan and Leidner, 2011). This process of added value is achieved through continuous recycling and creative use of shared knowledge and experience. This is followed by the structuring of shared competencies with the help of technology, process maps and descriptions, manuals, networks and so on, to ensure that competence remains in the organization even when staff leaves. The knowledge, once packaged, becomes part of the capital of the organization. This creates an environment for the rapid sharing of knowledge as well as sustained and collective knowledge growth. Lead times between learning and knowledge sharing are shortened and human capital becomes more productive through intelligent work processes. Knowledge management is about acquiring, structuring, and transmitting intellectual material for the benefit of the organization. One of the major misconceptions of knowledge management is that it is about information technology (Laudon and Laudon, 1998). Knowledge management application among construction professionals in developing economy is still an under chartered territory hence its role and application cannot be over emphasized.

Paul and Alain (2011) believed that the role of knowledge management is to identify what information and knowledge is important to the organisation, finding out where it is held, and mobilising it so that staff can apply it in their work.

However, it is now being recognised that the management of project knowledge (especially within the construction industry where projects are implemented by temporary 'virtual' organisations) is open to considerable improvement, both within construction organisations, and between firms in the supply chain (Gold, Malhotra and Segars, 2001). The emphasis on Knowledge Management according to Kamara, Anumba and Carrillo (2000) reflects the growing realisation that it is a core business concern, particularly in the context of the emerging knowledge economy, where the know-how of a company is becoming more important than the traditional sources of economic power (capital, land, etc.)

Given the relative importance of the construction sector to the Nigerian economy, this seems to present a fruitful area for investigation. KM has become an increasingly important issue due to rapid changes in market conditions, competition and technological developments, which have led to changes in the way work is organized. KM is considered vital for the survival of organizations. It is asserted that knowledge is fast overtaking capital and labour as the key economic resource in advanced economies (Edvinsson, 2000). Within the construction industry, it is increasingly being acknowledged that KM can bring about the much needed innovation and improved business performance the industry requires. The aim of this study is to examine the ways by which knowledge is being transferred among construction professionals and impact on project delivery.

CONSTRUCTION PROFESSIONALS IN NIGERIA

The construction industry is made up of both the formal sector and informal sector, with the formal sector consisting of organized companies. Due to the multi-disciplinary nature of the industry the formal sector consist of the Architects, the Quantity Surveyors, the Estate Surveyors, the Civil Engineers and the Builders. All these professionals join forces together to promote the construction industry. The informal sector consist of trades and artisans; but for this purpose, knowledge is acquired transferred and managed within the industry with the construction professionals responsible for these.

The construction of a project of any kind be it building, civil or heavy engineering works involves the services of many people directly and indirectly (Fadamiro and Ogunsemi, 1996). These are people responsible for the overall design, construction and maintenance of a construction project from inception to completion. They are even involved in the sales and/or letting of the property on practical completion. Hence they carry the course of construction industry's workload and most of the construction project managers available today are construction professionals that have construction knowledge as background. However it is necessary to have a thorough knowledge of the professionals in the industry and the interrelationship that exist between them.

Bamisile (2003) affirms from observation that, there seems to be confusion and misinterpretation of the roles of these professionals within the construction industry in developing countries in general and in Nigeria in particular due to many factors. One of which is lack of proper working knowledge on the part of majority of people as to the roles of each professionals in the industry. He stressed further that the construction industry is unique when compared with other industries in terms of design and manufacturing of its product in which case the design phase is separated from the construction phase (except for some modern procurement method). While Architect and some sections of the engineering profession (civil engineers) carry out the design of the buildings, the cost control and the construction is the role of the Quantity Surveyors and builders respectively. The Estate Surveyors on the completion of the project is responsible for its marketing through outright sales, leasing or letting as appropriate.

Knowledge Management and the Construction Industry

Knowledge management has become an increasingly important issue due to rapid changes in markets conditions, competition and technological developments which have led to changes in work and the way work is organized. Knowledge management is considered vital for the survival of organization. It is asserted that knowledge is fast overtaking capital and labour as the key economic resource in advanced economies (Edvinsson, 2000). Knowledge management is particularly important for the construction industry, for at least three main reasons.

Firstly, the construction industry is widely perceived as an industry with low productivity and poor performance despite its importance in the national economy. Hence, there is a need for KM to improve the existing processes and management of construction companies (Preece, Moodley and Hyde, 2000). Secondly, the project-based nature of the industry has made it particularly important to record and transfer lessons from one project to another (Rezgui, 2001). Thirdly, construction companies today face various challenges and new solutions are necessary to meet the growing demand for new types of buildings and structures (Mior, and Abdul-Rashid, 2001).

It is widely accepted that the current market dynamics and the trends towards specialized and customer-oriented services in the construction industry demand a more efficient and effective application of knowledge within corporate as well as project organizations (Egbu, Sturgesand and Bates, 1999; Snyman, and Kruger, 2004; Moodley, Preece, and Kyprianou, 2001)). A number of researchers have acknowledged the limitations of current approaches to managing information and knowledge relating to and arising from a construction project (Preece, et al 2000; Mior, and Abdul-Rashid, 2001; Egbu et al., 1999; Snyman, and Kruger, 2004; Rezgui, 2001). Preece, et al (2000) states that the lessons learnt in SA construction projects are not organized well and are buried in details. This makes it difficult to compile and disseminate useful knowledge to other projects. The fragmentation of the construction industry has also been identified as a critical barrier to achieving efficient communication among parties (and individuals) within a project team working together on construction projects (Mior, and Abdul-Rashid, 2001; Egbu et al., 1999; Latham, 1994; Rezgui, 2001).

Reviewing the literature on knowledge management in construction reveals that knowledge can be captured, created, stored, used, protected and essentially managed, not unlike any other economic commodities (Geoff and Bart, 1994). Thus it can be put together as bits, bytes, and packages for ease of transfer through the use if ICT (Andawei, 2001). The initiative, explicit and factual nature of knowledge makes it amenable to ICT manipulation. However upon closer inspection it is not clear in what sense knowledge is different from information. Information represents data arranged in a meaningful pattern; where intellectual input has been added to raw data, data in turn represents raw numbers, images words and sounds which are derived from observation or measurements.

Although information is required for the creation of knowledge but knowledge makes information meaningful and guides to what data to be collected, thus the dynamic nature of knowledge (Kazi, Hannus and Charoenngam, 1999)

Role of ICT in Knowledge Management

Lei Chi and Goce (2010) observed that Information Technology (IT) has long been recognized as critical for successful knowledge management. This is probably a legacy of the growth in knowledge based systems (KBS) 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, the role of IT as a key enabler remains undiminished (Egbu, Botterill and Bates, 2001). Laudon and Laudon (1998) classify information systems for knowledge management into four main categories:

- Those for creating knowledge (knowledge work systems): these support the activities of highly skilled knowledge workers and professionals as they create new knowledge and try to integrate it into firms;
- Those for distributing knowledge (office automation systems): these help disseminate and co-ordinate the flow of information in an organization;
- Those for sharing knowledge (group collaboration systems): these support the creation and sharing of knowledge among people working in groups; and
- Those for capturing and codifying knowledge (artificial intelligence system): these provide organizations and managers with codified knowledge that can be reused by others in the organization.

Barriers to Knowledge Management in the Construction Industry

The typical construction organization does not encourage the culture of sharing knowledge. Wates Group, a medium sized UK building company, stated it took four and a half years before staff accepted the concept of sharing knowledge (Barlow and Jashapara, 1998). Primarily, the cultures of the organizations need to be addressed if KM is to be of benefit.

Each organization has its individual culture and only they can say what initiatives need to be set up to encourage a culture change. There are many other barriers to the successful implementation of KM within a construction enterprise. These according to Kazi, Hannus and Charoenngam (1999) include:

Lack of Time

Sharing knowledge demands additional effort. This effort may be minimized by work practices and the introduction of better knowledge sharing tools. Construction projects are always working to tight deadlines. Anything that detracts from the main business is seen as of diminished importance.

Trying to solve large problems

The various stages involves in KM are complex. It is easy to envisage the utopian world of delivering knowledge to different members of the project team as and when required for different stages of the construction process. However, in reality, for a company embarking on Knowledge Management, Richard (2011) believed that it is best to undertake very small projects that are self-contained with little input from external parties.

Converting Knowledge

One major obstacle is how organizations capture knowledge on projects that cuts across organizational boundaries. The industry is full of individuals, skilled trade workers and professionals who have years of experience of doing specific tasks (Oliver and Martin, 2008). Converting their tacit knowledge to explicit knowledge for the benefit of others is a problem, which is difficult to conduct within a reasonable period and at an acceptable cost.

Large number of SMEs

The UK construction industry consists of a large proportion of small to medium-sized enterprise (SMEs). These organizations have more pressing concerns than KM and in many cases do not see the need nor do they have the commitment and resources to undertake KM.

Multi-Disciplinary Teams

Some project team members may belong to different divisions or even different companies. Managing knowledge with such a team within a limited time period is difficult. Each team member will be working towards the agenda set by their employer. The benefits of KM may be seen as limited to the life of the individual project unless in long-term partnering type relationships.

Unique Projects

Despite efforts to encourage the UK construction industry to view itself as a manufacturing enterprise, it still regards each project as a one-off. This reinforces the view that KM on individual projects will be wasted as the next project may be quite different.

Lack of Learning

Because of the view of the industry producing unique projects, there has also been a failure to learn from past mistakes. In many circles, the UK construction industry is regarded as a national (rather than international) industry and there is an unwillingness to learn from internal and external sources.

Lengthy Time Period

KM is a long-term goal without any short cuts. If it is to bring long-term benefit to the organization, it will take a considerable period to have systems up and running with sufficient time to be validated and for benefits to percolate to the organization's performance.

Loss of faith

With KM systems available, employees may be tempted into thinking the data required is always easily accessible. In fact, it will take considerable time to get a spread of working KM systems. This may lead to employees losing faith in the system because it does not deliver immediate benefits in their own individual areas.

IT Support

Many of the existing systems rely on IT for delivery. Construction offices may be port cabins in isolated environments with inadequate infrastructure. The IT support, a key element in KM systems, must be present to deliver the knowledge required. Based on current working practices and the barriers to KM, a discussion of the IT support required within the construction sector now follows.

Requirements of a Knowledge Management System

For any IT system to be classified as a Knowledge Management system according to Andawei (2001), it must fulfil a number of requirements:

1. It must support the full KM lifecycle – from knowledge creation through distribution and management to retirement – and not just a subset thereof.
2. There should be appropriate mechanisms for validation and authentication of the knowledge encapsulated in the system.
3. The system should be able to seamlessly integrate with existing legacy IT systems within a real or virtual organization.
4. Flexibility and ease of use are essential components of the system, as they are crucial for ensuring its acceptability and utilization.
5. The knowledge contained within the system must be well maintained and up-to-date. This is essential for building up user confidence in the system and ensuring that decisions are based on the latest information available.
6. The system must be designed in accordance with an organization's goals, culture and business processes. End-user involvement in the design and implementation of the system is crucial in this regard.

KNOWLEDGE MANAGEMENT, INTELLECTUAL CAPITAL AND INNOVATION

Innovation is a complex phenomenon. Despite diverse perspectives, many researchers are in agreement on the importance of innovation as a pre-requisite for competitive advantage.

Innovations come from many different sources and exist in many different forms. In order to create an environment conducive to innovation, it could be argued that there needs to be an effective management of this complex process (Stephen, 2009). Thus, increased attention is focused on KM and IC management as a possible pre-requisite to successful innovation. In the last decade there has been a shift in management focus from traditional accountancy practices where financial capital is paramount, to growing realization that intangible assets are of greater significance in our knowledge-based economy (Egbu et al. 2000, Egbu et al 2001). However, the Gottlieb Duttweiler Foundation found that only 20% of knowledge available to an organization is actually used (Barlow and Jashapara, 1998).

Knowledge can be a valuable resource for competitive advantage and harnessing its value is one of the pre-eminent challenges of management. Identifying and exploiting knowledge assets, or intellectual capital (IC), has been vastly documented. There are different types of knowledge in an organization from the tacit knowledge of individuals, which is unarticulated and intuitive, to explicit knowledge that is codified and easily transmitted (Nonaka and Takeuchi, 1995). Further distinctions have been made by academics and practitioners involved in the IC debate. Three components of IC have been identified comprising human, structural and customer capital (Edvinsson, 2000). Clearly, structural capital describes the internal structure of an organization, such as its strategies, core competencies and culture, which is always context specific. Customer capital encompasses the external intangible assets of an organization. External forces play a part in determining the market position and strength of an organization. Customers are the principal determinants of this position Barlow and Jashapara, 1998)

However, it is asserted that the human capital in an organization is the most important intangible asset, especially in terms of innovation (Edvinsson, 2000; Andawei, 2001). The unique tacit knowledge of individuals is of immense value to the organization as a whole, and is the "wellspring of innovation" (Andawei, 2001). Identification of the different types of knowledge available to an organization is the first step to understanding how to manage them.

Therefore, KM is intrinsically linked to IC as revealed by Sharimllah , Siong and Hishamuddin (2009). There are many definitions of KM. However, an operational definition has been developed for the purposes of this research. KM is about the processes by which knowledge is created, captured, stored, shared, transferred, implemented, exploited and measured to meet the needs of an organization. These processes lead to the establishment of a knowledge-based organization. A thorough review of the relevant literature and discussions with targeted researchers in the field would suggest that the development of successful knowledge management programmes involve due cognizance of many factors. They involve 'hard' (e.g. technology) and 'soft' (e.g. people, culture, leadership) issues.

RESEARCH METHODOLOGY

This research was designed to use survey to prepare a mental plan for solving the problem in systematic manner. It involved assessing the public opinion through the collection of detailed data of the existing circumstances on knowledge management sharing, transfer, sources, and problems and using the data collected to justify the current conditions in order to make improvement in the construction industry. The focus of interest of this study were the knowledge workers in the construction industry such as the Civil Engineers, Quantity Surveyors, Estate Valuers, Architects, Technicians and Builders in Nigeria. Structured questionnaires were self-administered to 65 construction professionals in the industry and 50 of them representing about 77% of the overall total number of questionnaires were suitable for analysis. The questionnaires were directed to all knowledge workers involved in the construction industry as they are expected to know how to respond to the questions being asked and identify most of the facts that will lead to reliable conclusions. Questions were asked in order to ascertain the ways they manage knowledge, the aspect of the construction industry that will improve as a result of improvement in knowledge sharing and transfer among construction industry. It is based on these responses and findings that conclusions were drawn using frequency and mean item score statistical tools.

RESULTS AND DISCUSSION

In order to assess the characteristics of respondents for the study, the following data were collected: respondents' profession; highest academic qualification; professional qualification of respondents; and the years of experience.

Table 1: Summary of characteristics of respondents

Characteristics	Frequency	Percent
Respondents Profession		
Quantity Surveyor	13	26
Architect	20	40
Estate Surveyors	8	16
Civil Engineers	6	12
Builders	3	6
Total	50	100
Respondents' Qualification		
HND	22	44
B.Tech	18	36
M. Tech	9	18
PhD	1	2
Total	50	100
Professional qualification		
Graduate	37	74
Corporate	13	26
Total	50	100
Years of Experience		
0-5	31	62
6-10	12	24
11-15	3	6
16-20	2	4
21 & Above	2	4
Total	50	100

Table 1 shows the characteristics of the respondents used for the study, as shown in the table, 40% of the questionnaire was administered among the architects and 26% among the Quantity surveyors. Among the respondents 37% were graduates in their various professions. Thus, with the information provided in the Table 1, the data provided by the respondents can be relied upon for the purpose of the analysis.

Table 2: Awareness of Knowledge Management

Awareness of knowledge management.	Frequency	Percent
Yes	50	100
No	0	0
Total	50	100

As shown in table 2, all the respondents used in this study have heard of knowledge management at one time or the other. For the data used to be relevant the respondents must have heard of knowledge management before or have it in place in their organizations.

Table 3: Extent of awareness of Knowledge Management

Awareness Level	Frequency	Percent
Very low	2	4
Low	7	14
Undecided	3	6
High	28	56
Very high	10	20
Total	50	100

Table 3 revealed that some of the respondents have a low level of awareness of knowledge management while about 76% are aware on a high or very high level. This implies that knowledge management is still a new and under-explored area in the Nigerian construction industry as well as among construction professionals.

Table 4: Knowledge sharing among construction workers

Professionals	Mean	Rank
Builders	4.19	1
Quantity surveyors	3.98	2
Technicians	3.96	3
Architects	3.94	4
Top managers	3.94	4
Civil engineers	3.93	6
Middle managers	3.91	7
Estate surveyors	3.86	8
Low managers	3.79	9

It could be observed in table 4 that the respondents ranked the builders as professionals that share knowledge the most with them with a mean score of 4, Quantity Surveyors and technicians were ranked second and third respectively implies that they are the most that share knowledge with other professionals in the industry. The Top Managers also rank the 4th position which tied with the Architect showing that these set of respondents also share and transfer knowledge with construction professionals on a high rate.

Table 5: Sources of Knowledge Available to the Respondents in Their Organizations

Sources of Knowledge	Mean	Rank
Colleague's experience	4.14	1
Books	4.10	2
Interaction with outside party	3.98	3
Supervision	3.84	4
Phone	3.82	5
Peer tutoring	3.69	6
Lesson learned	3.68	7
Emails	3.58	8
Journals	3.58	9
Report	3.55	10
Internet	3.54	11
Seminars	3.47	12
Conference and events	3.39	13
Training on regular basis	3.31	14
Library	3.28	15
Reward	3.19	16
Regular meetings &training	3.16	17
Research	3.16	18
Internal course	3.14	19
External course	3.04	20
Databases	2.96	21

Table 5 show that the respondents believe that learning from their colleagues' experience is the highest source of knowledge available to them within their organizations with a mean score of 4.14. The use of Databases is the lowest source of knowledge available to them with a mean score of 2.96 and it could be deduced from this that the level of knowledge sharing and transfer among the colleagues is high.

Table 6: Problems of Knowledge Management in Construction Organizations

KM militating factors	Mean	Rank
Funding	4.09	1
Lack of time and understanding of KM	4.04	2
Lack of proper technical expertise	4.02	3
Lack of adequate and up to date data	3.96	4
Lack of successful KM model in the construction industry	3.89	5
Lack of effective communication among construction professionals	3.86	6
Difficulty in capital valuing intellectual	3.86	6
Lack of cooperation among Construction professionals	3.82	8
Misunderstanding KM with information management	3.80	9
Government policies	3.67	10
Difficulty generalizing & storing knowledge	3.65	11
Unwillingness to change current operating system	3.64	12
Difficulty in capturing knowledge	3.49	13
Unwillingness of employee to share knowledge	3.41	14
Difficulty locating knowledge	3.33	15

From table 6, the problem of fund poses the highest hindrance to the adoption of knowledge management to construction organizations and this is followed by lack of time and understanding of knowledge management among professionals. Difficulty in locating knowledge and unwillingness of employee to share knowledge were ranked 14th and 15th respectively.

Table 7: Benefits Derived from the Adoption of Knowledge Management

Benefits of KM	Mean	Rank
Improvement in job analysis and specification	4.96	1
Improvement in communication skills	4.21	2
Training benefits of new employee	4.16	3
Improvement in productivity	4.13	4
Increased customer satisfaction	4.12	5
Enhance professionalism	4.06	6
Increase employee's morale creativity and ingenuity	4.02	7
Maintain competitiveness	3.98	8
Improvement in leadership control	3.94	9
Raise company professional Image	3.88	10
Increase Innovation	3.78	11
Rapid and effective in enterprise wide Problem solving	3.77	12

Market research	3.60	13

As shown in table 7, the respondents believe that all the stated areas of construction work will improve but with the most improvement seen in job analysis and specification with a mean score of 4.96 and the least to be in market research though it is all the areas that will improve if knowledge management is in place in any organisation.

Table 8: Factors Affecting Success of KM in the Construction Industry

Factors	Mean		Rank
Active participation of employee	4.22		1
Top Management Support	4.18		2
Application of IT	4.12		3
Creating Knowledge sharing space	4.00		4

Table 8 shows that the respondents ranked active participation of employee as the most important factor for Knowledge Management success followed by top management support. Creating Knowledge is the least important factor just below application of information technology.

DISCUSSION OF RESULTS

Awareness level of knowledge among Construction Professionals

The result have shown that all the respondents have heard of knowledge management at one time or the other as it is only those that have had the understanding of the topic that are eligible to respond to the questionnaire, so as to have a true and reliable output. The extent to which each one have heard of it differs but more than average of the respondents claimed to have average knowledge of knowledge management. However, knowledge management first established itself as a distinct area of management science in the early 1990s (Botha, 2004). Being a new area, one can say that the awareness level is improving, though it can be better. Knowledge management is considered vital for the survival of organization. It is asserted that knowledge is fast overtaking capital and labour as the key economic resource in advanced economies (Edvinsson, 2000). The project-based nature of the industry has made it particularly important to record and transfer lessons from one project to another (Rezgui, 2001).

Sources of Knowledge Available In the Construction Industry

The analysis revealed that learning from respondent's colleagues experience is the highest source of knowledge available to them within their organizations, while books, interaction with outside party, the use of phones followed respectively, and the use of Databases as the lowest source of knowledge available to them.

A research carried out by Kazi, Hannus and Charoenngam (1999) revealed that knowledge for construction professionals can be sourced through the following ways; personal experience, colleagues' experiences, internal courses, external courses, interaction with outside party research and development departments, company libraries, and other sources includes; internet, journals books etc. but this study revealed that personal experience and colleagues experience is very important, internal and external courses is moderately important, interaction with outside party as important, company libraries and internet/journals as least important, while others as not important. based on this data it was agreed that the listed sources for knowledge management is based on human, meaning that the staff needed to acquire through personal experience, linkages with others and interactions. Thus colleague's experience is still a very vital source that is readily available to the construction professionals as they rely much on interaction among themselves. Ricky and Eric (2010) also believed that personal knowledge management should be enhanced.

Areas that will improve with the adoption and application of KM

The result has shown that all the stated areas of construction work will improve but with the most improvement seen in job analysis and specification with a mean score of 4.96 and the least to be in market research with a mean score of 3.6. This is in agreement with a survey of Malaysian contractors, on the level of knowledge management application in the construction organization and areas of construction management that can be improved by its application (Mohamed, Abdul-Rahman, Otham, Yahya and Zakaria, 2001). The study revealed that knowledge management application is at a below par level and that the level of knowledge among middle and front-line workers needed improvement especially in the areas of communication and technical skills.

The analysis on the feedback showed that job knowledge and skills are important in making good and reliable decisions. Budgetary control, contract management, material planning and control, manpower planning and control, and negotiating with other involved parties were identified as important areas that knowledge management can help to improve. The study also revealed that KM can improve individual performance in response to Dong-Gil and Alan (2011).

Factors Affecting the Success of KM in the Construction Industry

The application of IT as a factor to the success knowledge management in the construction industry is only average, as most of the construction workers still confuse information management with knowledge management, and do not have an in-depth understanding of Knowledge Management.

However, Information Technology (IT) has long been recognized as critical for successful knowledge management. This is probably a legacy of the growth in knowledge based systems (KBS) in the eighties and early nineties, and has led to much of the early work on knowledge management focusing on the delivery of technological solutions. It is now recognized that good knowledge management does not result from the implementation of information systems alone (Andawei, 2001).

CONCLUSION

According to construction professionals, colleagues' experience is the ready source of knowledge that is available to them in Nigeria as they rely mostly on what their colleagues share with them. The study concluded that Architects are the construction professionals that share and transfer knowledge the most with other professionals in the industry. It was also revealed that all elements of the construction industry will improve with effective Knowledge Management. The result also revealed that the problem hindering the adoption of Knowledge management the most in the construction industry is funding while the least is difficulty in locating knowledge. It revealed that top management support, employee active participation, application of IT and creation of knowledge sharing space are factors that contribute to the success of knowledge management in the industry.

Based on the findings of this study, it was recommended that there is a need for construction professionals to embrace the use of ICT since the application of ICT to knowledge management would make their jobs easier and facilitate good and instant result. More so, the government and other construction professionals should inject fund into knowledge management aspect of the construction industry so that the benefits that are derived from this area can be harnessed.

REFERENCES

Andawei, M. M. (2001). Application of Network based Techniques in the cost control and management of Construction works. The Quantity Surveyors, 37(4), 24-27

Bamisile, A. (2003). Project management and its application in housing development. The Professional Builder, 47-52

Barlow, J. & Jashapara, A. (1998). Organizational learning and inter-company partnering in the UK construction business. The Learning Organization, 5(2), 86-98

Blumentritt, R & Johnson, R. (1999). Towards a strategy for knowledge management. Technology, Analysis and Strategic Management, 11(3), 287-300

Botha, D.F. (2004). Towards an instrument for surveying knowledge management practices. South African Journal of Business Management 36(1) 1-6.

Dong-Gil K. & Alan R. D. (2011). Profiting from Knowledge Management: The Impact of Time and Experience, Information Systems Research, 22(1), 134-152

Edvinsson, L. (2000). Knowledge is about people, not databases. Industrial and Commercial Training 31(7) 262-266.

Egbu, C. O, Botterill, K., & Bates, M (2001). The influence of knowledge management and intellectual capital on organizational innovations. In: Akintoye, A (Ed.), 17th Annual ARCOM Conference, 5-7 September (2001), University of Salford. Association of Researchers in Construction Management, Vol. 1, 547-55.

Egbu, C., Sturgesand, J & B. Bates (1999). Learning from Knowledge Management and Trans-Organisational Innovations in Diverse Project Management Environments, Proceedings of the 15 Annual Conference of the Association of Researchers in Construction Management (ARCOM), Liverpool, 15-17 September, pp. 95-103.

Fadamiro, J.A. & Ogunsemi, D.R. (1996). Fundamentals of Building Design, Construction and Materials, 1st Edition. Fancy Publication Limited. Ile-Ife.

Geoff M. & Batt van A. (1994). Vocational Training and Productivity Performance: An Anglo-Dutch Comparison. International Journal of Manpower, 15 (5), 55-69.

Gold, A. H., Malhotra, A. & Segars, A. H.(2001). Knowledge management: an Organizational capabilities perspective. Journal of Management Information Systems 18(1) 185-214.

Kamara, J. M., Anumba, C. J & P.M. Carrillo (2000). Integration of Knowledge Management within Construction Business Processes, in Faraj, I and Amor, B. (eds.), Proceedings of the UK National Conference on Objects and Integration for Architecture, Engineering a 13-14 March, Building Research Establishment Ltd., pp. 95-105.

Kazi, A. S., Hannus, M. & Charoenngam C. (1999). An Exploration of Knowledge Management for Construction., in M. Hannus et al. (eds.), Proceedings of the 2nd International Conference on CE in Construction (CIB Publication 236), Espoo, Finland, 25-27 August, pp. 247-.256.

Latham, M. (1994). Constructing the team. Final report on Joint Review of Procurement and Contractual Arrangements in the UK Construction Industry, HMSO, London, UK.

Laudon, K. C. & Laudon, P. L. (1998). Management Information Systems, 4th edition, Prentice-Hall Publishers, New Jersey, USA

Lei Chi, T. R. and Goce A. (2010). Information Technology, Network Structure, and Competitive Action, Information Systems Research, 21(3), 543-570

Mior, A. M. & Abdul-Rashid, A. (2001). Knowledge transfer in quantity surveying firms, the role of information technology. Proceeding of Leading through innovation, Malaysian Institute of Quantity Surveyors.

Mohammed, O., Abdul-Rahman, H., Othman, M., Yahya, I. A. & Zakaria, N (2001). Knowledge management application and implementation in the Malaysian construction industry. Proceeding of Leading through innovation, Malaysian Institute of Quantity Surveyors.

Moodley, K., Preece, C. & Kyprianou, R. (2001). An examination of knowledge management implementation within civil engineering consulting organizations. In: Akintoye, A (Ed.), 7th Annual ARCOM Conference, 5-7 September 2001, University of Salford. Association of Researchers in Construction Management, Vol. 1, 587-96.

Nonaka, I. & Takeuchi, H. (1995). The knowledge Creating Company, Oxford, Oxford University Press

Oliver H. & Martin S. (2008). The Impact of Information Diffusion on Bidding Behavior in Secret Reserve Price Auctions, Information Systems Research, 19(3), 351-368

Paul P. T. and Alain P. (2011). Competing Perspectives on the Link between Strategic Information Technology Alignment and Organizational Agility: Insights from a Mediation Model, MIS Quarterly, 35(2), 463-485.

Preece, C, Moodley, K, & Hyde, J. (2000). Knowledge management strategies to improve in construction business development processes: a preliminary case study. In: Akintoye, A (Ed.), 16th Annual ARCOM Conference, 6-8 September (2000), Glasgow Caledonian University. Association of Researchers in Construction Management, Vol. 1, 325-34.

Ravishankar M. N., Pan S. L. & Leidner D. E. (2011). Examining the Strategic Alignment and Implementation Success of a KMS: A Subculture-Based Multilevel Analysis. Information Systems Research, 22(1), 39-59

Rezgui, Y. (2001). Review of information and knowledge management practice state of the art in the construction industry. The Knowledge Engineering Review Journal 16(2) 125-142.

Richard P. B. (2011). Measurement and Meaning in Information Systems and Organizational Research: Methodological and Philosophical Foundations, MIS Quarterly, 35(2), 261-292.

Ricky K.F. and Eric T. (2010). The roles and values of personal knowledge management: an exploratory study, Journal of Information and Knowledge Management Systems (VINE), 40(2), 204 - 227.

Sharimllah D. R., Siong C. C. and Hishamuddin I. (2009). The practice of knowledge management processes: A comparative study of public and private higher education institutions in Malaysia, Journal of Information and Knowledge Management Systems (VINE), 39(3), 203 - 222.

Snyman, M. M. & Kruger, C. J. (2004). The interdependency between strategic management and strategic knowledge management. Journal of Knowledge Management 8(1) 5-19.

Stephen M. (2009). Six tenets for developing an effective knowledge transfer strategy, Journal of Information and Knowledge Management Systems (VINE), 19(6), 153-182.