COST REDUCTION OF CONSTRUCTION PROJECTS IN NIGERIAN: KNOWLEDGE MANAGEMENT AS AN ANTIDOTE

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ABSTRACT

Construction projects cost is one of main key parameter that is used in assessing the performance and success of any projects. Nigeria construction industry are facing the challenges of high cost of construction projects as a result of poor planning and management, dispute, claim, fluctuation, cash flow problems, variation etc. Many efforts have been made by the Quantity Surveyors Registration Board of Nigerian (QSRBN) to overcome these challenges in different approaches and strategies. This paper aim at contribute to the yearning of QSRBN to overcome these challenges of project cost reduction through KM practice. The paper outline the significance benefits of KM practice in the construction projects and suggest five possible methods of reducing construction projects cost through KM practice. These are knowledge sharing and re-using, use of information technology, retained of the specialists in the construction organisations; seeking for knowledge from external source; mentoring and coaching of the employees. Therefore, the paper suggest that the management of the construction organisations should encourage the practice of KM during the courses of the construction projects in order to enhance the organisational performance in terms of cost, time and quality.

Keywords: Cost Reduction, Knowledge, Knowledge Management, Construction Projects, and Construction Cost

INTRODUCTION

Cost is one of the main considerations throughout a project life cycle and thereby regarded as a significant parameter of a project and also as driving force of project achievement. Despite its proven significant, it is not rare to observe a construction project failing to accomplish its objectives within the specified or estimated cost. Construction projects plans are usually drawn to ensure that work is carried out to the desired quality within the stipulated time and cost. Divergences from the plan however, occur in the construction projects, as expected, as a result of the nature of construction works, especially in the areas of uncertainties associated with it. Pilcher (1994) asserted that the complexity nature of the work undertaken by the construction industry, project cost needs to be effectively monitored and controlled, if anticipated profit margin will be realised for the contractor and also for the project to be completed within the budgeted cost. The completion of the projects within the estimated cost and time are the major challenges in the Nigerian construction industry as a result of complexity, diversity and fragmentation. However, the construction projects usually involve various activities with different employee's right

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from the inception stage to the completion stage of the project. The employees of the construction projects usually comprise of various hierarchies and interconnected parties, for example, Architects, Engineers, Quantity surveyors, main Contractors, and Subcontractors. These employees have to work collectively to accomplish the task of construction projects. This involves sharing of ideas, talent, skills, knowledge and experiences that strengthens the accomplishment of multifaceted construction projects. The inter-relationship generate complex relationships in the project personnel and thereby adversely distress a project's output once they are not handled properly,(Walker, 2005).

Although, sharing of the Knowledge across a project is likewise significant, since the knowledge transfer from a present to subsequent project allow individuals to use current established knowledge to solve problems as an alternative of producing a brand new knowledge that can guzzle time and cost (Fernie *et al.*, 2003; Love *et al.*, 2005). Therefore, the whole competence is thereby improved, and thereby reduced the project's cost. The critical success factors for the achievement or failure of a construction project could be shared as a lesson learnt or post project reviews. This is vital for the construction industry, since they are working in a highly competitive environment. Construction industry involved people from various departments, professionals and contractors who work together to accomplish a project task. The duration of a construction project is usually several months and years. At the end of the construction project, this provisional congregation is dispersed and the employees may not work jointly again in another projects (Abdul-Rahman and Wang, 2010; Love *et al.*, 2003). The knowledge created by the professionals during the construction stage of the project, if not captured and stored in the database for future use are lost after the disengagement of the professionals. The Nigerian construction industry are facing challenges of cost reduction problems, and delay as a result of lack of management of its knowledge generated during the construction process and thereby led to huge wastage of the resource and dangerous effect on the standard of work. Therefore, this paper aimed at appraise the significant impact of KM practice on construction project cost. To accomplish this aim the followings objectives were set: these are the role of KM practice in the construction projects and the ways of reduce construction project cost through KM practice.

Cost Reduction

Cost reduction of the construction projects involves working out a plan of campaign or cost plan for a project and ensuring that it is completed either within the predetermine sum or less with good quality within the stipulated time. Construction project cost reduction also regarded as a process of looking for finding and removing unwarranted profits without having a negative impact on project quality (Abdul Azis, 2013). Many construction managers are engage in periodic cost reduction drives in order to make their construction firms employees more efficient and also to boost project profits.

Construction Cost

Construction cost is considered as a client's irreversible commitment of money on his project from inception to completion stage(Ali and Kamaruzzaman, 2010). Construction cost is the amount the clients will spend for the construction projects

from the design stage to the completion stage. However, the traditional construction process is divided into two broad stages namely, the design stage and production stage(Olawale, 2010). Cost is incurred at each stage of the construction process. Obviously, construction cost can be traced to begin at the design stage and rises steadily at the production stage. At project conception, the decision of the client to build or not to build is mostly influenced by cost. In addition, the scope of construction projects is influenced by cost while, construction period is based on the availability of fund. Al-jibouri (2003) expressed that the extent of construction cost will depend on the size, type, form, location, complexity, level of specification, tendering, climate, predicted inflation, risks and procurement method. Therefore, it is important to consider the cost of significant items in the project at the early stage of the construction in other to serve as guide for planning and cost reduction procedures.

Knowledge Management

According to Davenport and Prusak (1998) KM is a procedure for collection, sharing and efficient utilization of the knowledge resources. Disterer (2003) added that KM is a method of creating, acquiring, capturing, discussing and using knowledge to improve the organisational performance. O'Dell and Grayson (1998) argued that KM is an approach employed by organisations to ensure that knowledge reaches the right people at the right time and those people share and use the knowledge at the right time to improve the organisational performance. Bhatt (2001) stated that KM is a procedure for knowledge creation, validation, presentation, distribution and application. Although, the above ideas of researchers vary within their description of KM, there appears to become a consensus to deal with KM as a process permitting use of knowledge as a key factor to generate and add value (Hillebrandt, 2000; Lin and Lee, 2012; love *et al.*, 2005). From the different definitions and ideas of the researchers highlighted above, KM can be described in this research as a process of creating, capturing, storing, sharing, re-using and updating the knowledge and professionals experiences in order to improve the organisational performance. Figure summarised the definition of KM. Figure 1 summarised the definition of KM.

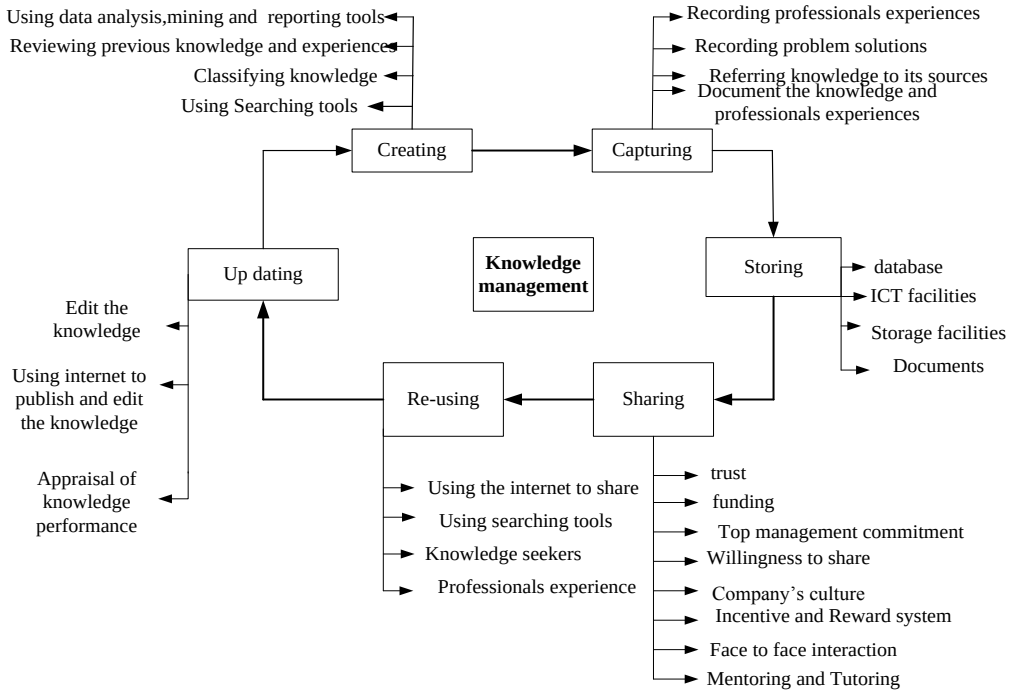

Figure 1: Concept of Knowledge Management.

Knowledge Management in the Construction Industry

The construction industry is a workplace that is dominated by heuristic construction firms and their staffs are likely to carry out their project management task based on their past experiences, rather than following a textbook approach, or established logical approaches (Maqsood *et al.*, 2006). Therefore, the construction project team has to work jointly to realize a successful construction project. Working jointly involves sharing ideas, lessons learnt, best practice and information which strengthen the successful execution of complex construction projects. Each construction employee contributes its knowledge in the form of people, processes and technologies at varying degree of strength to the construction process. The management of knowledge within the construction project setting is very essential, since the formation and knowledge are scattered over different processes, trades and people in different construction projects and also in different organisations (Fong and Chu, 2006; Haggie and Kingston, 2003). Chang *et al.* (2012) stressed that KM has a role in improving more collaborative behaviour among organisations and individuals involved in the construction processes. However, there are different organisations working on a construction project and the documents shared between these organisations vary from technical drawings, contract documents, project reports, and schedule (Dave and Koskela, 2009). Construction projects usually consist of temporary designed teams from different organisations to produce a unique product of a cheaper cost. The project team members may generally be new to each other and may possibly have not worked together before. Therefore, it is difficult to set up a channel to exchange skills and knowledge within the construction project teams. Edum-Fotwe and McCaffer (2000) expressed that, lack of common goals make

project workers focus only on their part of work and ignore the knowledge needs of the other project members, and thereby affects the project cost, time and quality.

Knowledge Management in Construction Projects

Construction projects are complex and time-consuming, which have usually been characterized by their complexity, diversity and the non-standard nature of the production (Anumba *et al.*, 2005). Whatever successful and unsuccessful projects have been executed by the general contractors, a valuable record of each one should be kept to identify best and worst company practices. During the construction phase of projects, an effective means of improving construction management is to share knowledge, which would help to prevent mistakes that have already been encountered in past projects. Drawing on experience avoids the need to solve problems from scratch: Problems that have already been solved do not need to be solved again. When the professionals complete projects or leave the company, they normally take domain knowledge with them and leave little or nothing that will benefit subsequent projects or the company. From the perspective of KM, this knowledge and experiences of professionals are the most valuable since their accumulation depends not only on manpower but also on the spending of much money and time(El-Gohary and El-Diraby, 2010).A typical example of knowledge sharing in the construction projects is shown in Figure 2.

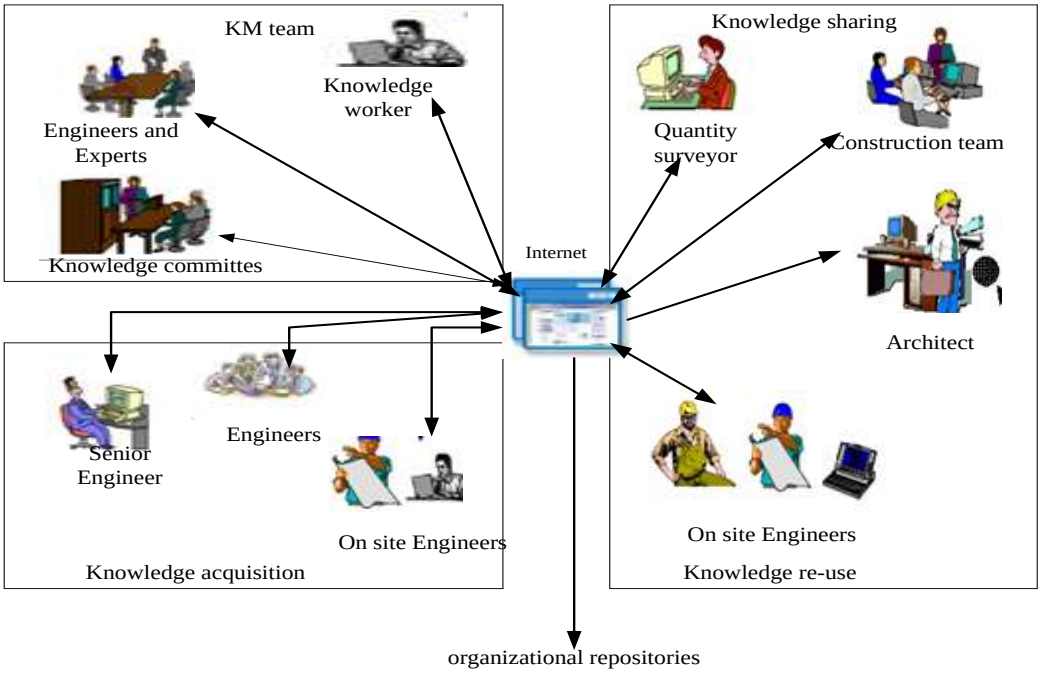

Figure 2: Knowledge Sharing in the CE Construction Projects

The Benefits of KM Practice in Construction Projects

Knowledge is considered as a fundamental resource and methods of achieving competitive advantages in daily life and changing environment (Burton-Jones, 1999). Robinson *et al.* (2004) stated that KM has been empirically recognised to improve the performance of the construction projects especially in the area of quality, time,

speed, steadfastness and reducing construction costs. Both organisational and individual knowledge are important for the construction projects to attain its task (Koskinen and Pihlanto, 2008; Nonaka and Takeuchi, 1995). The potential benefits of KM in construction projects have been reinforced by many researchers, as a main competence that can reduce the cost of construction projects and also enhance competitive benefits (Davenport*, et al.*, 1998; McCampbell *et al.*, 1999; Skryme and Amidon 1997; Soliman and Spooner, 2000).KM improves individual, group and organisational knowledge and skills; improve information circulation; as well as support innovation. KM in construction projects is viewed as an easy method of determining and exploiting corporate individual knowledge resources: individual experiences, lessons learnt and best practices (Mohammed and Anumba, 2005; Whetherill et al., 2002). From the previous researches, the followings are benefits of KM practice in the construction projects:

- Cost and time reduction
- Reduce repeated mistakes and duplication of works
- Improve personnel quality, satisfaction and motivation
- Encourage effective teamwork
- Improve the client satisfaction
- Enhance construction project delivery in terms of time, cost and quality
- Enhance decision making
- Boost productivity of employees and processes
- Improve modernisation
- Enhance organisational competence
- Improve flexibility to adopt and alter
- The process cycle duration reduced
- Distribution of best practices
- Enhance management of knowledge and skills
- Boost the construction project performance
- The smooth exchange of knowledge through a variety of project boundary
- Improve intelligent resources
- Enhanced the rate of responses to client's needs and other external factors
- Risk minimisation

The methods of Reducing the Construction Project Cost through KM Practice

KM plays important roles in the area of control and management of construction cost. The practice of KM in the construction site or organisation gives opportunity to the employees and client to avoid the reinventing of the wheel. This is because all the mistakes, errors, disputes and claims that are occurred in the previous construction projects, if properly capture, store, share and re-use in the subsequent project will not re-surface again. However, the followings are methods of reducing the construction project cost through KM practice:

Knowledge Sharing and Re-Using

The construction projects engage large number of employees, which comprises of various professionals, skilled and unskilled workers to accomplish the project task. These employees have different background of knowledge, skills and areas of specialisation and thereby brought together to accomplish the clients goals. As a result of differences in the knowledge and areas of specialisation of these employees,

the social interaction of the employees is significant to share knowledge and skills among each other to overcome the challenges of construction problems. The construction projects are well known with the problems of variations, disputes, political interference, poor planning and management, poor estimation, ineffective communication, poor financial control on site, cash flow problems during the construction, mistakes and errors during the construction stage, design problems, delays in materials supply and unanticipated situations etc, (Kasimu *et al.*, 2013a). These problems and their solutions are rarely documented, store and share among the employees of construction projects for future re-use and thereby the lesson learnt is restricted in the minds of professionals who experienced them. Abdul-Rahman and Wang, (2010) added that construction organisation has a bad record in the management of its knowledge generated during the construction project process that led to huge wastage of assets and dangerous effects on the standard of work. In a situation, where these problems that occurred during the course of construction projects are documented, store and share among the other employees of construction organisation for future re-use. It will save the time and cost of resolving problems and also enhances the quality of resolutions during the course of the construction stage of the project (Lin and Lee, 2012). This is because when the knowledge is shared among colleagues, previous problems and mistakes not necessary to be resolved again (Love*, et al.*, 2005). Therefore, adequate documentation, storage, and sharing of knwoledge and experiences of professionals engage in the costruction projects among the other colleagues improve the construction projects performance in terms of cost, time and quality.Newell *et al.*, 2006 and Ribeiro, (2005)asserted that knowledge connected with previous construction project success or failure, services, customers and products are assets that can produce a long term and sustained competitive benefits for construction organisations

Use of Information Technology

The use of information technology (IT) in construction projects facilitates the speed search, access and recovery of knowledge, and encourages teamwork and communication between construction personnel which in turn improves the construction project performance. IT and KM are prudently tight together, since both propagate the structure of knowledge vertically and horizontally in the construction organisation. Davenport*, et al.* (1998)stated that the use of information technology in the construction projects site produce a common controlled atmosphere to ensure that knowledge are shared among the employees to enhance its performance. The IT plays four major roles in KM practice in the construction projects to reduce the project's cost and improve the performance, these are: acquiring knowledge, describe, store, classify, index, and connecting knowledge-related digital products; seek and smooth the information flow in line with the various skills. Kasimu *et al.*, (2013b) further added that IT has four various roles to facilitate project cost reduction through KM practice, these are:

- Providing channels to acquire necessary information,
- Precise flow methods,
- Discovering the position of knowledge of the company, and
- Knowledge seeker.

Retaining of the Specialists in the Construction Organisation

The constructions organisations have characters of disengage the specialists after the completion of the projects. The problems and solutions that occurred during the course of construction projects are in the mind of this specialist, and if there are not retain within the organisation they left with their domain knowledge and experiences to other organisation. In a situation where these specialists are retaining to share knowledge and experiences among other colleague for future re-use, it would improve the efficiency of the construction organisation and thereby reduces project cost and time. The knowledge connected with previous construction project success or failure, services, customers and products are assets that can produce a long term and sustained competitive benefits for construction organisations (Newell *et al.*, 2006; Ribeiro, 2005). The critical success factors for the achievement or failure of a construction project can be share as lesson learnt or post project reviews. This is vital for the construction organisations, since they are working in a highly competitive environment.

Seeking for Knowledge from External Source

In construction project site, seeking for knowledge from the external source is a method of employ a specialist from another construction organisation to share its experiences, and knowledge among the employees in order to improve the construction performance and also organisational efficiency in terms of project cost reduction. Since construction industry builds up lots of intellectual knowledge that may later be utilised by the same firms to gain advantages, improve competition and subsequent project performance (Alashwal *et al.*, 2011). The construction industry is a powerful knowledge-based industry that depends deeply on knowledge contribution through various personnel in a project team. Therefore, to accomplish the construction projects task in terms of cost reduction, there is need to seek for knowledge from external source where there are not available within the organisation to improve the efficiency of the construction organisation. Seeking for knowledge from the external source reduces the followings in the construction projects:

a. Wastage of the materials
b. Project cost and time
c. Unforeseen problems
d. Repetition of construction works as a result of mistakes and errors
e. Poor financial control on construction site
f. Disputes
g. Claims
h. Lapse in management and control
i. Late deliveries of materials and equipment's etc.

Mentoring and Coaching of the Employees

Construction projects involved people from various professionals, contractors and stakeholders who work together to accomplish its task. In each of the construction project site have project manager, construction manager and other unit head, these are professionals that have experiences and knowledge in their areas of specialisation. The roles of these sectional heads and other specialist employees is to mentoring and coaching the other employees by sharing their tacit knowledge and

experiences to avoid the reinventing of the wheel and also improve the organisational efficiency in terms of productivity and output. The mentoring and coaching of employees during the course of construction projects reduce the project cost in the followings areas:

- Materials management
- Labour cost and utilization
- Plant output
- Site management and control.

CONCLUSION

The construction projects cost control and management has been identified as the main challenges of the effective project delivery in Nigeria construction industry. Several efforts have been made by previous researchers to eliminate or mitigate this challenge through different approaches and strategies and yet absolute resolutions have not been made. Therefore, this paper examines these challenges through KM practice and it was observed from the previous researches that KM improves the construction organisational efficiency and performance. This paper outlines five (5) methods of cost reduction in construction project. These are knowledge sharing and re-using, use of information technology, retaining of the specialists in the construction organisation; seeking for knowledge from external source; mentoring and coaching of the employees. The paper also appraised the benefits of KM practice in the construction projects as shown in section 2.5. As a result, the paper recommend that, management of the construction organisations should encourage the practice of KM during the courses of the construction projects in order to enhance the organisational performance in terms of cost, time and quality. There should be an advocacy by Quantity Surveyor Registration Board of Nigeria (QSRBN) to enlighten the professionals on the needs to practice KM as it was done in developed country like UK, US, Japan, Singapore, Canada and other few developing countries like China, Taiwan, Malaysia, and Sweden etc.

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