ASSESSMENT OF POST-PROJECT REVIEW SYSTEMS FOR CONSTRUCTION PROJECTS IN ABUJA, NIGERIA

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The purpose of this study is to assess the post-project review systems used by selected stakeholders on construction projects in Abuja, Nigeria. The study focuses on the post-project review techniques being used, benefits and obstacles affecting the post-project review process and the performance of these stakeholders. The research adopted the quantitative approach by conducting a field survey with a well-structured questionnaire administered to 168 participants with 101 returned. This was preceded by a literature review of previous studies identifying post-project review techniques and obstacles to carrying out post-project review on projects. Data was analyzed using descriptive statistical methods, a Five-Point Likert scale was used and analyzed using mathematical computations into mean item scores and ranked. The study established that the knowledge management technique is the post-project review system currently practiced towards capturing project knowledge and experiences. Ego and pride of team members towards participating in the process was found to be a major obstacle inhibiting the process despite the acceptance from participants that it facilitates collective learning, prevents knowledge loss and reduces reoccurring errors. The study recommended the consideration of other available post-project review approaches or techniques like the collective learning or cognitive (systematic) mapping to capturing project knowledge and experiences by stakeholders, and the expansion of the role of the prime consultant on projects to accommodate initiating and leading the facilitating of post-project reviews in line with global best practices.

Key Word: Post Project Reviews, Projects performance, Stakeholders, Nigeria.

INTRODUCTION

The Nigerian construction industry reported to be vibrant and one of the largest in Africa (Adebayo, 2002) is responsible for the execution of construction projects across the country. Like any construction industry across the globe it has been evidently plagued with poor performance of construction projects leading to time overrun, increased project cost, low quality of work, low productivity from project team members, amongst others (Odediran *et al.,* 2012). The need to improve the performance of construction projects in construction industries remains a worldwide concern. Takim *et al*. (2002) established the relationship between stakeholder's performance involved in a project and the overall performance of the project; and proposed a performance indicator framework in which the performance of stakeholders should be measured, evaluated and prioritized.

To improve performance, there is need to continually learn from the past, and to learn from the past one must have documented history of knowledge (Zedtwitz, 2002). Post-project reviews remain one of the most widely adopted approaches most especially in the industry to capture and transfer knowledge among participants on a project. It could be described as a process used to evaluate projects either during the construction phase or after completion to thoroughly examine and identify errors or mistakes that make projects fail or under-perform, so that lessons learned and knowledge gathered is made beneficial to future projects (Jimoh *et al*, 2016).

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Anbari *et al.* (2008) identified post-project review as a means to improving learning by developing historical data base obtained by profiling of customers, the work environment, and needs of the staffs involved on the project and the organization as a whole. Anbari *et al*. (2008) attributed the benefits of the post-project review process to linking effectiveness in achieving set goals, proper utilization of resources, and transfer of project experience and knowledge to future projects. The study further proposed two sets of primary and secondary project performance criteria. The primary performance measurement criteria to include initial budget cost, initial time and scope will be adopted for this study.

While the transfer of project knowledge to key decision makers in organizations by conducting post-audits and after-action reviews on projects in the Nigerian construction industry was brought to fore by scholars Martin and Ben (2012), the awareness of post-project review by professionals in the Nigerian construction industry was identified by Jimoh *et al.* (2016) where the importance, benefits and barriers of post-project review process were equally and extensively discussed.

However, the rate of occurrence of project failure and project under-performance coupled with the poor level of awareness of the post-project review process especially by professionals and key stakeholders in the Nigerian construction industry are the motivating reasons for this research as the study aims to carry out an assessment of the post-project review systems used on construction projects by selected stakeholders in Abuja, Nigeria. To achieve this, the following questions will be asked;

- What are the prevalent post-project review systems / techniques used by stakeholders?
- What is the level of performance of stakeholder's using the prevalent system in the past 5 years?
- What are the obstacles inhibiting the use of the prevalent post-project review systems?

LITERATURE REVIEW

Kerth (2000) defined Post – project review as a process that provides an opportunity for project participants to assess a project to ascertain both positive and negative aspects of the project and to use these learning points for future projects. In addition the discussion between participants or project members during the Post – project review process may lead to innovations and better solutions that can be captured from the various individuals. He further stressed this as a crucial factor as everyone of the project team member knows a bit of the whole story about the project.

Literatures of Post – project review have identified a number of systems to the application of Post-project review concept. Oluikpe *et al.* (2008) was able to group these systems into four categories namely:

- Post – project review as a knowledge management technique;
- Post – project review as a systematic (cognitive) approach;
- Post – project review as a process for organization learning; and
- Post – project review as a means for collective learning.

Post-Project Review as a Knowledge Management Technique

Post – project review in this approach identifies that there are several approaches in capturing organizational knowledge. Researchers such as: Jordan and Jones (1997); Al Ghassani *et al*. (2002); Carrillo *et al.* (2004); and Benett (2000); in their works all pointed out that organizational knowledge could either be individual or group knowledge, internal or external knowledge, and tacit or explicit knowledge. However, one of the most practical distinctions is that between tacit and explicit knowledge. Tacit knowledge is the knowledge stored in the heads of individuals and it is difficult to communicate externally or to share. Explicit knowledge is captured or stored knowledge in organizations manuals, procedures or information systems, and it is easily communicated and shared with other people or parts of an organization. To use Post – project

knowledge also relates to knowledge about different client types, associated relationships and different market characteristics (Jordan and Jones, 1997). Process factors relate to the technical and management systems used in production. The technical process involves the use of rigorous and automated intensive labor, which could be tacit knowledge or explicit automated (codified) knowledge as found in computer systems. Management processes vary between problem solving ones to programmed organizations. Problem solving organizations depend on tacit knowledge to turn out innovative works (Carrillo *et al.,* 2004). This is necessary to fulfill client's designs and contractor obligations that cannot be met by traditional answers. While it is necessary to have the right management shape, capable teams (designers and contractors) are critical for the construction phase (Al Ghassani *et al*., 2002).

Post-Project Review as a Systematic (Cognitive Mapping) Technique

Post – project review in this approach suggests the use of cognitive mapping in capturing knowledge for project success and continuous improvement in performance. The technique is used to reflect and compare the different perspectives of the parties involved in a project, understanding what project performance and success might mean to stakeholders in the project. Atasoy (2007), cognitive mapping is defined as a strong visual tool that reflects the knowledge and beliefs of people about a situation and or domain identifying the causes, effects and relations between them. Cognitive mapping has been used in the construction industry to study construction management issues by Edkins *et al.* (2007); disruption and delay in projects by Eden et al. (2000); and cost – time integration in construction projects by Poh and Tah (2006). According to Village *et al*. (2013), the process to draw out the cognitive map is usually done using the interview techniques through results from open-ended questions about a specific issue or problem. Participants present their views which are "concepts". The concepts are noted down and developed through even more open-ended questions. Relationships between these concepts are highlighted. The concepts are considered "nodes" and the connection between these concepts are identified and considered "links". Links have arrowheads that show the causative direction. Typical individual maps are made up of about 100 nodes, and maps created for groups are done by combining maps from individuals could contain as many as 700 nodes. Every participant or stakeholder in a project is driven by their own individual goals and success to different degrees that should result in the overall success of the construction project as a whole.

Post-Project Review as a Process for Organization Learning

This approach of Post – project review involves the capture and learning of knowledge at the organizational level. Roth and Kleiner (1998), Sowards (2005), Branis and Christopolous (2005) are among the few researchers that identified the concept of learning histories which are applied by action investigative projects to improve organization learning capabilities. A learning history highlights reporting and capturing "significant results". Significant results are a link to the performance effects of learning. When something is achieved by an organization that exceeds or meets expectation, enhances results in business, carry out successful change in policy, alter patterns of behavior and so on – that is evident of significant change in performance.

According to Roth and Kleiner (1998) the learning history process is a technique which demands the review of an organization shift by a conscious effort towards the improvement of competence of the participants in a change process to appraise their program and its progress with the benefit of creating materials that should aid in disseminating knowledge to other participants. These process components of learning will ultimately generate a reaction or a reply cycle at the organizational level.

Post-Project Review as a Collective Learning Technique

The Post – project review through the collective learning technique is a specifically focused and targeted approach of conducting post – project reviews which links key stakeholders within the project (Oluikpe et al., 2005).

According to Carrillo (2005) the use of this approach was recommended for the construction industry identifying it as an extremely desirable action or activity that does not occur. The

These four techniques are all learning tools and are used to create knowledge histories on projects (Oluikpe et al., 2005). However, the knowledge management and organizational learning techniques focuses more on post-project reviews carried out internally within an organization and barely involves external participants from other organizations (Carrillo 2005; Anbari *et al.* 2008) while the use of cognitive mapping and collective learning technique focuses more on the involvement of major stakeholders (client, consultants and contractors) as external participants by comparing and evaluating their performance and perspectives of the project even as it may change over time (Carrillo *et al.* 2004; Atasoy 2007).

Obstacles to Post-Project Reviews

Conducting post-project reviews come with numerous benefits, Carrillo (2005) and Oluikpe *et al.* (2005) identified some of these to include improvement in project performance and success, provides utilizable knowledge, facilitates collective learning, prevents knowledge loss and minimizes repeated errors. However, there are equally barriers to the process, Zedtwitz (2002) highlighted some barriers to learning from post – project review which he grouped into four main categories;

- Psychological barriers
- Team based short comings
- Epistemological constraints
- Managerial problems

Busby (1999), Carrillo (2005), and Jimoh *et al*. (2016) summed up the following drawbacks experienced with the implementation of post-project reviews as follows;

- It could be time consuming
- It involves looking back at projects which could be embarrassing and seen as cynical
- Poor internal team communication
- Time and budget restrictions
- Lack of maintenance of data during project
- Fast track procurement nature of the project
- Political patronage to cover up inefficiency and corruption
- Poor organization culture
- Incompetence to carry out reviews
- Reluctance to blame

While researchers agree on the overall positivity and successes of carrying out post-project reviews, obstacles to learning could further enhance project team's shortcomings especially when it involves their personality (De Gans, 2010).

METHODOLOGY

The stratified sampling technique was adopted for this study as it is a process of dividing members of a population into homogenous sub-groups before sampling. A total of 119 Architectural firms, 62 Quantity Surveying firms, 9 Services firms as consultants, and 16 Large Construction firms were identified from the Architects Registration Council of Nigeria (ARCON), the Nigerian Institute of Quantity Surveyors (NIQS), the Council of Registered Engineers (COREN), and the Federation of Construction Industry (FOCI).
The simple random probability sampling technique was used to give all participants in each sub-group an equal chance of being selected. Data used for this study was collected through primary sources. Primary data was collected through the administering of a well-structured questionnaire.

A total of one hundred and sixty-eight (168) respondents were identified. One hundred and fifty-

rated on a five-point Likert type scale ranging from strongly disagree (1) to strongly agree (5). The data was analyzed using: Mean Item Score**.**

Table 1: Response rates of respondents

Respondents	Large Contractors	Consultants	Total
No of questionnaire administered	15	153	**168**
No of questionnaire returned	8	93	**101**
Rate of response	53.33%	60.78%	**60.11%**

Source: Researchers analysis (2017)

DATA ANALYSIS AND DISCUSSION

Figure 1 shows that out of the 101 returned questionnaires showed that 79% of the respondents have practice in the industry between 5 – 10 years while 21% have been practicing in the industry well above 10 years.

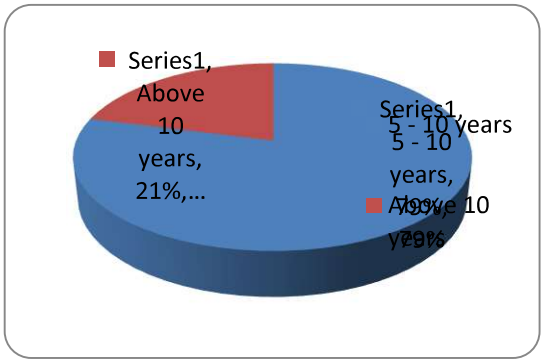

Figure 1: Years of Practice Experience in the Construction Industry.

Figure 2 shows the response on respondents' involvement in any project that has conformed to initial time, and within initial scope given their years of experience in the construction industry. 85% of the respondents indicated 'no' while 5% of the respondents indicated 'yes'. 10% responded 'never' and do not believe it is possible to have such a building project. Findings from the study to research question three revealed that 85% of the stakeholders have not been involved in any project that has been completed within initial budget, initial time and within scope in the past 5 years, thereby failing to meet the primary triple constraint of performance measurement criteria as proposed by Anbari *et al.* (2008) for initiating a post-project review process.

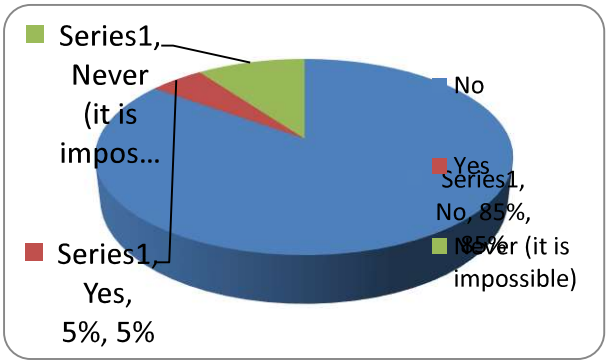

Figure 2: Respondents Projects that Conforms to Initial cost, Time and Scope.

Respondents were asked to indicate their level of participation in any such post-project

review process a few times. 29.09%, 65.62%, and 66.66% stated that they have never participated in any post-project review process on any project.

Table 2 Level of participation in post-project review process.

Frequency of participation in PPR process	Consultants			Contractors
	Architects	Quantity Surveyors	Services Engineers	
A lot (Almost on every project)	10.90% (6)	6.25% (2)		100% (8)
Only a few times	60% (33)	28.13% (9)	33.33% (2)	
None (Never participated in any	29.09% (16)	65.62% (21)	66.66% (4)	
Total	100%	100%	100%	100%

Source: Researchers analysis (2017)

Respondents were asked on the post-project review systems used on projects to capture knowledge, lessons learned and experiences with the intent for these knowledge to be passed on to other projects. Eight respondents representing one hundred percent (100%) of large construction companies indicated that knowledge and lessons learned are put in writing and the procedural manual are made accessible for participants for future projects. Table 3 shows that 16.36% and 9.38% representing 12 and 3 respondents from Architecture and Quantity surveying firms acknowledge of an available manual which is updated and made available for participants moving to new projects. 78.18%, 90.62%, and 100% being respondents from the consultants indicated that project knowledge and experience is carried on to other project and shared by the individual participant. These post-project review systems were highlighted by Oluikpe et al. (2005) and Carrillo (2004) as internal learning process within an organization, and could be described as individual tacit knowledge management and group explicit knowledge management. The two styles fall under the use post-project review as knowledge management technique identified by Jodan et al. (1997) and Al-Ghassani (2002). Eluifoo (2017) stated that the post-project review process encompasses knowledge management and is contemporary to organizational learning. Such a process could begin from individuals, groups and finally through the entire organization.

Table 3: Post-project review techniques / systems used on projects.

Project knowledge and experience transfer	Consultants			Contractors
	Architects	Quantity Surveyors	Services Engineers	
Knowledge is put in manual writing and made accessible to participants of future projects	16.36% (12)	9.38% (3)		100% (8)
Knowledge and experience is shared by individual participant moving to a new project	78.18% (43)	90.62% (29)	100% (6)	
Visualization and analysis of project success factors of stakeholders pre and post project (cognitive mapping of project)	-	-	-	-
Collective meeting of major stakeholders involved in projects at post-project phase	-	-	-	-
Total	100%	100%	100%	100%

organization structure' ranked third (SD = 0.602, M = 4.762); 'poor team internal communication' and 'fast track procurement nature of many construction projects' ranked fourth and fifth respectively (SD = 0.433, M = 4.752) (SD = 0.577, M = 4.742). The least ranked factor 'expensive/high cost due to company overhead' ranked twenty fourth (SD = 0.547, M = 2.613); 'it overloads project as the need to close project and move on to another' ranked twenty third (SD = 0.944, M = 2.782); 'lack of organization awareness about post-project review' ranked twenty second (SD = 0.748, M = 2.802); 'manpower intensive', and 'time and budget restrictions' ranked twenty first and twentieth respectively (SD = 0.424, M = 2.802) and (SD = 0.848, M = 2.980).. Jimoh *et al.,* (2016) and Anbari *et al.,* (2008) highlighted these barriers and the need for the right structure and stages from normimg to performing. Carillo (2005) also identified the need to develop it as a culture in organizations to reduce ego and pride of participants.

Table 4: Obstacle Factors to Post-Project Review Process.

Factors	Respondents (N)	Mean (M)	Standard deviation (SD)	Rank
Ego and pride of team members	101	4.861	0.347	1
Lack of management support	101	4.841	0.366	2
Poor organization structure	101	4.762	0.602	3
Poor team internal communication	101	4.752	0.433	4
Fast track procurement nature of many construction projects	101	4.742	0.577	5
Lack of management support	101	4.732	0.545	6
Political patronage to cover up inefficiencies and corruption	101	4.514	0.701	7
Reluctance to blame game	101	4.475	0.794	8
Inability to reflect on past experiences	101	4.415	0.652	9
Lack of interim reviews	101	4.376	0.892	10
Lack of expertise / incompetence to carry out reviews	101	4.376	0.858	11
Lack of maintenance of data during project progress	101	4.336	0.827	12
It involve looking back at problems	101	4.326	0.825	13
The beneficiaries are future project	101	4.267	0.676	14
Lack of resources to act on the outcome of the reviews	101	4.217	0.729	15
Immaturity of project management systems	101	3.247	0.817	16
Lack of incentives	101	3.059	0.967	17
Objectives are ambiguous	101	3.029	0.805	18
Time consuming	101	3.000	0.824	19
Time and budget restrictions	101	2.980	0.848	20
Manpower intensive	101	2.802	0.424	21
Lack of organization awareness about Post-project reviews	101	2.802	0.748	22
It overloads project as the need to close project and move on to another	101	2.782	0.944	23
Expensive / High cost due to company overhead	101	2.613	0.548	24

Source: Researchers analysis (2017)

Findings from the study revealed that the prevalent post-project review techniques used to capture lessons learned on projects is the knowledge management technique. Despite acknowledging the benefits and advantages of initiating and carrying out post-project

review techniques and systems used to capture project knowledge and lessons learned like the use of cognitive mapping and collective learning technique which according to Carrillo (2005) and Oluikpe et al. (2005) provides for more external participants of major stakeholders for constructive criticism of performance and perspectives of the project. Construction business is very profitable and at the same time comes with lots of risks, every knowledge gained on a project is an added advantage to the stakeholders involved especially when used on future projects.

CONCLUSION AND RECOMMENDATIONS

The research study has assessed the post-project review system used on construction projects by selected stakeholders in Abuja, Nigeria.

The study established that despite the awareness of stakeholders in the use of post-project review process as an important and necessary tool that helps improve project performance over time, the performance of stakeholders on project has continuously witnessed a decline and not met the required performance criteria of initial budget cost, time and scope.

The study also established that the current post-project review system being used on projects by these stakeholders is the knowledge management techniques where project experience and knowledge are either captured solely by the participant involved on the project and passed on in future projects, or it is captured in a manual and made available for future participants on future projects in an explicit form which remains an internal process within the organization.

The study equally revealed that the post-project review system is mainly inhibited by the ego and pride of project participants, lack of management support and structure, poor team communication and the fast track nature of project contracts.

As a result of the findings from this research the following recommendations are made;

i. That a conscious effort should be made by stakeholders to consider the use of other post-project review techniques / systems like the cognitive mapping approach or the collective learning technique. This could provide the perfect environment for most key stakeholders to come together and share their knowledge and experiences from an internal and external point of view while making sure that implementation, dissemination and documentation of the process are done in line with global best practices.

ii. It is recommended that efforts should equally be made towards improving team communication, and providing the right environment and structure to determine when and how often a post-project review should be carried out on projects with the involvement of external participants. This could be done by expanding the role of the prime consultant as the initiator of the process as he / she remains the link between major stakeholders involved on a project no matter what phase of the project they are engaged.

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