

Consultants' perception of major construction project performance measurement criteria in Nigeria

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Abstract

This paper discusses the view of consultants (Architects, Quantity Surveyors, Builders and Engineers) about cost, time and quality as principal construction project performance measurement criteria. It examines the consultants' opinion about these key construction project performance measurement variables with a view to determining the degree of importance attached to each of the variables by the consultants. Data were gathered via a well structured questionnaire administered on the respondents and analysis was done by adopting percentile, relative importance index and mean score. This study shows that cost, time and quality are paramount construction project performance measurement criteria among the consultants with high premium placed on quality over the other variables. Hence, quality of construction project determines the value for the money and time spent on it. Therefore, it concludes that quality is relatively dominant and preferred to cost and time as the appropriate construction project performance measurement criterion. Also, there is narrow difference in the consultants' perception of the influencing factors and slightly differ in their perception about the appropriateness of major construction project performance measurement criteria. Consequently, it recommends quality, time and cost order of preference when measuring construction project performance by construction project stakeholders. It also recommends total adherence to selected quality determining criteria by consultants when selecting contractors to be awarded construction contracts.

Keywords: Consultants, cost, time, quality, performance, perception, construction project

Introduction

The construction industry in the context of a nation economy cannot be treated with a wave of hand. This can be unarguably as a result of the significant roles the industry plays in the development process of a country contributing towards employment and economic growth (Dayang and Gloria, 2011). More specifically, the industry is dynamic and unique in nature been one of the largest industries that contribute about 10% of the gross national product (GNP) of industrialized countries (Navon, 2005). Furthermore, the

industry has recorded several accolades for itself being a very active and booming industry worldwide proceeding as one of the highest contributing industries towards the economy of a nation (Dayang and Gloria, 2011). In addition, Adnan, Sherif and Saleh (2009) acknowledge the work of Navon (2005) who also examined the construction industry and observed that the industry is more dynamic by its nature because it contains a large number of stakeholders, which include clients, contractors, consultants, shareholders and regulators.

Olawale (2006) opines that the economic growth of a nation can be measured by the development of projects. The construction industry generally focuses on the construction of projects, such as buildings and infrastructure, regardless of the construction being land or marine based (Omar, 2006). These construction projects are summarized as organized units of building or infrastructure that require time and effort to plan, design, construct and maintain for the improvement of the built environment and mankind. While contributing, Takim and Akintoye (2002) reveal that construction project development involves numerous parties, different phases with the major aim being to bring the project to a successful conclusion. In addition, this view of project success is supported in the study conducted by Takim and Adnan (2008). They affirm that projects are formed to accomplish objectives and success is measured in terms of how well these objectives are met. Criteria such as meeting project time, budget, technical specification and other project objectives are the top priorities to be accomplished. Project success is defined in the study by Pheng and Chuan (2006) as the completion of a project within acceptable time, cost and quality and achieving client's satisfaction. Besides, Arazi, Sodangi and Mohamad (2011) studied project success in the construction industry and concluded that the objective of every project is success and project success is an off shoot of project performance but the dynamic nature of the industry makes the concept of project success to remain ambiguously defined. They further emphasized that the concept of a successful construction project is wide in scope and project success means different things to different people. This opinion aligns with the submission of Idrus and Sodangi (2010) who asserted that the term performance can take on different meanings depending on the context in which it is being used. Arazi *et. al.* (2011) further stressed that the concept of project performance is being developed in many ways as criteria for evaluating the

success or failure of a project, identifying the performance measurement criteria as well as knowing the level of importance for each of the criterion is important to achieve the most favorable and desired outcome for clients, consultants and contractors.

Also Iyer and Jha (2005) studied project success and stated in their study that measuring the performance of any construction project is a very complex process because modern construction projects are generally multidisciplinary in nature and they involve participation of designers, contractors, subcontractors, specialists, construction managers, and consultants. The objectives or goals of all participants need not be same even in a given project. Hence they concluded that to measure performance of a project without specifying the participants and without specifying the criteria for judging the performance holds no meaning. Generally, cost, time and quality are recognized as the most important performance dimensions of construction projects (Xiao and Proverbs, 2002; Odusami, Iyagba and Omirin, 2003; Baloi and Price, 2003; Jian, George and Vaughan 2012). Evidently, cost, time and quality are the three most known, often cited, and mostly adopted criteria by clients to assess project success (Atkinson, 1999 and Storm and Janssen, 2004). However, construction project cost, time and quality targets are fixed by the consultants on behalf of the client. These construction project consultants are obviously products of different disciplines. The result of the research conducted by Arazi *et al.* (2011) indicates that there is no agreement among construction project stakeholders on the subject of construction project performance. This submission coupled with the impression that construction project performance mean different thing to different people (Idrus and Sodangi, 2010), there is need to determine the perception of construction project consultants in terms of cost, time and quality performance and to ascertain what criteria they employ to evaluate cost, time and quality performance of construction projects. Therefore, the specific objectives are to determine the prevalence of major construction project performance measurement criteria among construction project consultants; assess the criteria that influence consultants' choice of major construction project performance measurement criteria and compare consultants' perception of major construction project performance measurement criteria

Review of related literature

Omar (2006) defined the construction as economic activities that focus on the construction of physical projects, such as buildings and infrastructure, regardless of whether the construction is land or marine based. As Igor (2008) observes, the construction industry is a service industry and the share of the construction industry in gross domestic product (GDP) depends on the development level of the overall economy and mostly amounts to between 5 and 10% of GDP. This aligns with Arman, Mastura, Shardy and Samsiah (2009) finding that the construction industry is one of the important economic activities that contribute towards the economic growth of any nation and the industry is often seen as a very important generator of a nation's Gross Domestic Product (GDP). In addition, Rowlinson (2004) noted that the construction industry is a major supporter of employment in Nigeria and large employer in the economy, providing works for many people ranging from professionals such as architects, engineers and surveyors, main contractors, subcontractors, suppliers and ultimately manual laborers who are employed by contractors. (Arazi *et al.*, 2011). The construction industry as observed in the study by Omar (2006) is complex in nature because it comprises large number of parties such as owners (clients), contractors, consultants, other stakeholders, and regulators. Supporting this view, Eshofonie (2008) opine that the key stakeholders in the construction industry include the client, the consultant and the contractor.

Consequently, Pheng and Chuan (2006) describe project success as completion of a project within acceptable time, cost and quality and achieving client's satisfaction. Projects are formed to accomplish objectives and success is measured in terms of how well these objectives are met (Takim and Adnan, 2008). Adnan *et al.* (2009) sampled the work of Cheung, Suen and Cheung. (2004) who attested that project performance can be measured and evaluated using a large number of performance indicators that could be related to various dimensions (groups) such as time, cost, quality, client satisfaction, business performance, health and safety. This is related to the submission of DETR (2000) which states that time, cost and quality are however the three predominant project performance evaluation dimensions. While some project managers consider timely completion, cost of total expenditure on project as well as the quality of the construction, others suggest that success is something which is more complex and more than the three aspects. (Arazi *et al.*, 2011). However, cost, time and

quality are unarguably the three basic criteria to measure construction project success as they register recognition in several research works on project performance. For instance, the research conducted by William (2009) revealed that cost, quality and time criteria emerged as the three most important criteria for assessing project performance in the perspective of clients. On the other hand, Chan and Kumaraswamy (2002), stated that construction time is increasingly important because it often serves as a crucial standard for assessing the performance of construction projects and the efficiency of the project organization. Consequently, a review of literatures indicated that cost, time and quality appear in the following work.

S/N	Paper title	Author	Prominent measure of performance
1	Project management: cost, time and quality, two best guesses and a phenomenon, its time to accept other success criteria	Atkinson, R. (1999)	Cost, time and quality
2	KPI report for the minister for construction by the KPI working group	Department of the environment, transport and the regions (DETR) (2000)	Cost, time and quality
3	The performance of contractors in Japan, the UK and the USA: An evaluation of construction quality	Xiao, H and Proverbs, D (2002)	Cost, time and quality
4	Modeling global risk factors affecting construction cost Performance	Baloi, D and Price, A.D (2003)	Cost, time and quality
5	The relationship between project leadership, team composition and construction project performance in Nigeria	Oduami, K.T, Iyagba, R.R and Omirin, M.M (2003)	Cost, time and quality
6	PPMS - a web based construction project performance monitoring system	Cheung, S.O, Suen, H.C, Cheung, K. W (2004)	Cost, time and quality
7	High performance projects: a speculative model for measuring and predicting project success	Storm, M.P and Janssen, E.R (2004)	Cost, time and quality

8	Environmental factors and work performance of project managers in the construction industry	Pheng, I. S and Chuan, Q. T (2006)	Cost, time and quality
9	Analysis of effectiveness measures of construction project success in Malaysia.	Takim, R and Adnan, H (2008)	Cost, time and quality
10	Assessing construction project performance in Ghana: Modeling practitioners' and clients' perspectives	William, G (2009)	Cost, time and quality
11	Project culture in the Chinese construction industry: perceptions of contractors	Jian, Z, George, Z, and Vaughan, C (2012)	Cost, time and quality

Research method

This research work presents consultants’ perception of cost, time and quality performance of construction projects. In order to ensure that adequate and reliable data to investigate the research objectives were generated, it is important that population for the study gives a true representation of the construction industry. However, the focus of the study is not industry wide, but rather on four principal target groups within the Nigeria construction industry. This comprises Architects, Builders, Engineers and Quantity surveyors. However, questionnaire was adopted to gather data from respondents and used in this study. The tools adopted in the analysis of the data include percentile and mean score. Percentile was used to assess consultants’ perception of cost, time and quality performance of construction projects while mean score was adopted to determine the preferential level attached to cost, time and quality as construction project performance measurement criteria by consultants. This tool, which involves assigning numerical values to respondents’ rating of factors, is a relatively stable measure of central tendency (Kothari, 2004). This method of analysis had been employed by many construction management researchers (Kululanga, Kuotcha, McCaffer, Edum-Fotwe, 2001; Wong, Holt, Harris, 2001 & Akintoye, 2000). The result was ranked and the formula adopted is as follows.

$$\text{Mean (or } \bar{X}) = \frac{\sum X_1}{n} = \frac{X_1 + X_2 + \dots + X_n}{n} \dots\dots\dots (ii)$$

$$\frac{\quad}{n} \quad \frac{\quad}{n}$$

Where:

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- \bar{X} = The symbol used for mean
- \sum = Symbol for summation
- X_i = Value of the i th item $X, i = 1, 2, \dots, n$
- n = Total number of items

For the purpose of this study, the mean score of the consultants’ responses was ranged and comparison level assigned accordingly as shown in the table below. This becomes imperative in other to have a basis for comparing the perception of the consultants.

Consultants' responses grading	
Mean Score range	Comparison level
1.0 0 - 2.00	Very low
2.00 - 3.00	Low
3.00 - 4.00	High
4.00 - 5.00	Very high

Data presentation and results

Introduction

Table 1 presents the result of the question posed to investigate into respondents’ profession and their professional qualification. It can be observed that majority (28%) of the respondents are Architects while about 26% are Quantity Surveyors. Furthermore, the table depicts that approximately 21% and 25% of the respondents are Engineers and Builders respectively. This result show varying degree of response from the professionals. In view of this, it can be inferred that the responses were dictated by their willingness, availability and accessibility during the course of carrying out this study. The results from the table also indicate that all the respondents are corporate members of their respective professional body indicating that they are all professionally qualified in their chosen profession. Hence, their professional status is considered appropriate to justify their competence to provide the expected reliable data required for this study.

Table 1 – Respondents’ profession and professional qualification

Profession	Profession		Professional qualification	
	Freq	%	Prof. Qua	Freq %

Architecture	35	28.23	NIA	35	28.23
Quantity Surveying	32	25.81	NIQS	32	25.81
Engineering	26	20.97	NSE	26	20.97
Building	31	25	NIOB	31	25
Total	124	100		124	100

Prevalence of major construction project performance measurement criteria.

This section seeks to identify the prominence of major construction project performance criteria employed by consultants to measure construction project performance. The result in table 2 indicate that considerable number of the consultants, amounting to about 26% perceive that time is the mostly used construction project performance measurement criterion. Remarkable number of the respondents, resulting to 29% prefers cost to the other construction project performance measurement criterion listed in this study while about half (45%) of the respondents believe that quality is the most commonly used criterion for measuring construction project performance. The table shows that quality polled the highest result indicating that it is more prominent among the consultants relative to cost and time as construction project performance measurement variables.

Table 2 – Major construction project performance measurement criteria

Options	Frequency	Percentage
Cost	36	29.03
Time	32	25.81
Quality	56	45.16
Total	124	100.00

Comparison between consultants’ perception of major construction project performance measurement criteria

Table 3 presents the result of the analysis carried out for the purpose of comparing the consultants’ perception about cost, time and quality as the appropriate construction project performance measurement criteria. It is revealed that the individual and collective

mean score for all the consultants range between 3.00 and 4.00, indicating that the consultants’ rating of these major construction project performance measurement criteria falls within high range. Despite this, quality polled the highest overall mean score (3.92) and ranked first compared to the other construction project performance measurement criteria. This infers that quality is the most preferred construction project performance measurement criterion. Moreover, time and cost ranked second and third respectively with overall mean score of 3.91 and 3.86. This indicates that time is more preferred while cost is least preferred construction project performance measurement criteria. It can be deduced from Table 3 that there is narrow margin between the overall mean score for the major construction project performance measurement criteria, showing that Architects, Builders, Quantity Surveyors and Engineers slightly differ in their perception about the suitability of cost, time and quality as construction project performance measurement criteria. Hence, it can be inferred that consultants’ collective main goal is meeting cost, time and quality targets on construction projects.

Table 3 - Consultants' Perception of major performance measurement criteria

Major criteria	Mean score				Overall MS	Rank
	Arc	Bldr	QS	Engr		
Cost	3.92	3.79	3.94	3.77	3.86	3
Time	3.95	3.92	3.9	3.88	3.91	2
Quality	3.95	3.91	3.96	3.85	3.92	1

Findings

It can be deduced from the result that the respondents, which comprised Architects, Builders, Quantity Surveyors and Engineers, belong to appropriate professional body in the construction industry and are corporate members of their respective professional body. Consequently, cost, time and quality are common among consultants as construction project performance measurement criteria with quality polling the highest percentage indicating that quality is the most recognized construction project performance measurement criterion used by consultants. This shows that construction project quality is more important to Architects, Quantity Surveyors, Builders and Engineers. The preference given to quality as the predominant criterion used for

construction project performance measurement can be attributed to quality as the criterion that possesses the characteristics that portrays the ability of construction project to meet prescribed standard. This agrees with the definition by Willis and Willis (1996) cited in Arazi *et al.* (2011) which describes quality as ability of completed projects and processes to conform to established requirements of the client. It should be noted that ability of a construction project to stand the test of time is determined by its quality. Moreover, there is a narrow difference between the consultants rating for cost and time as construction project performance measurement variables. This shows that there is no significant difference in the level of importance attached to cost and time as far as construction project performance measurement is concerned. However, it is imperative to submit that quality is considered the most capable criterion to measure construction project performance by consultants. The existence of little divergence in the preference attached to these major construction project performance measurement criteria indicates that there is slight difference in the consultants' opinion about them.

Conclusion

The construction project performance measurement yardstick mostly used by consultants is quality. Therefore, the amount of money and time spent on a construction project is not as important as the quality of the end product. Moreover, quality of construction project is undoubtedly more instrumental to achieving value for the money spent by the client and the time expended by the consultants on the construction project. Also, every construction project is expected to serve its owner and remain fit throughout its expected life span. The ability of construction project to possess this attribute depends on its quality which portrays and determines the satisfaction to be derived from the money and time spent on it. Hence, quality is the most appropriate criterion for measuring construction project performance while the quality performance of construction project depends on meeting expected quality standard determined by the consultants.

Recommendation

Construction project quality should be prioritized by construction project stakeholders over cost and time when measuring construction project performance. The order of preference for these three major construction project performance measurement variables

should be quality, time and cost. In view of this, construction contractors should be enlightened that quality is the criterion given the top priority by consultants in measuring the performance of a construction project. All consultants' and other construction project stakeholders' efforts should be geared towards full implementation of quality determining factors when measuring construction project performance.

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