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QUALITY MANAGEMENT PRACTICES AND CUSTOMER SATISFACTION ANTECEDENTS IN GOVERNMENT CONSTRUCTION PROJECTS

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ABSTRACT

The study investigated the effect of quality management practices (QMP) on customer satisfaction antecedents (CSA). The survey and correlational research designs were adopted for this study and mean, standard deviation and linear regression analysis were employed to analyse the data obtained. Random sampling was used to select the subjects. Two sections of a researcher designed instrument were used for data collection namely Quality management practices questionnaire (QMPQ) and Customer satisfaction antecedent's questionnaire (CSAQ). These measured the perception of management practices that affect the quality of the finished construction projects and the antecedents of customer satisfaction when engaging in construction projects respectively. The reliability indices of the instruments were found to be 0.71 and 0.83 for QMPQ and CSAQ respectively. Whereas the knowledge of quality management practices that influences customer satisfaction was above average, provision of skill development trainings, use of professional experts as well as adoption of international best practices were found to greatly enhance customer satisfaction. Also, there existed a strong positive and significant relationship between QMP and CSA. It was recommended among others that there is a dire need to maintain a high level of quality management practices for a an improved customer satisfaction

Keywords: Construction, Customer, Satisfaction, Quality Management.

INTRODUCTION

The issue of satisfaction in construction has continually gained popularity among practitioners and scholars in the construction management field. Obtaining satisfaction from a construction project is one of the customer / user requirement post-handover. Maloney (2002) posits that satisfaction entails recognition of customer needs and developing processes to meet such needs. Nzekwe-Excell (2010) describes satisfaction as a psychological phenomenon whereby expectations are met and further suggests that the ability to fulfil a particular construction need is a measure of satisfaction obtained. Similarly, Obunwo *et al.,* (2013) viewed satisfaction from a construction perspective as the feeling of contentment when one's expectations are met or exceeded in a constructed project. Consequently, delivering a project that fits purpose, is detailed to specifications and satisfies its customers or users becomes paramount (Palaneeswaran *et al*., 2006; Phillips *et al*., 2008). Customers in construction projects are seen as the users or payers for such project. Hence construction contractors are often able to rate their performance based on the measures of its customers' satisfaction.

Government construction projects are carried out mainly for infrastructural development and use by the citizens rather than for profit gains as experienced in the private sector. These projects are usually funded by the public through taxes and internally generated revenue. In the UK for example, the government construction strategy elucidates that 40% of the £110 billion pounds annual spend on construction is provided by the public sector (Cabinet office 2011). The government construction strategy however builds on the Lantham report (Constructing the team) and the Egan report (Rethinking construction) and affirms that obtaining value from public sector construction has remained a pertinent issue (Cabinet office 2011). This has been clouded by inconsistent construction practices, underperformance in satisfying construction customers as well as low levels of standardisation in the construction industry.

In Nigeria however, the construction industry, which accounts for approximately 1.4% of its GDP (6.6% in 2011), is perceived to still be at its infancy stage of development (Odediran *et al*., 2012). Despite the growth seen in the Nigerian construction industry, its contribution to GDP has remained at abysmally low levels in the past three decades (Oluwakiyesi 2011). Oluwakiyesi (2011) further highlights that barriers such as corruption, lack of technical expertise and general laxity were responsible for the inconsistencies in organizational performance as well as in the offering satisfaction to its customers.

The need to identify the antecedents of customer satisfaction has been identified in different sectors involving construction (Karna 2009; Hoonaker *et al.,* 2010). Issues such as the factors influencing customer satisfaction (Torbica and Stroh 2000; Obunwo *et al.,* 2013), construction project needs (Chinyio *et al*., 1998) and key drivers

to customer satisfaction (Conklin *et al.,* 2004) have been researched. These authors have succeeded in establishing the definitions of customer satisfaction, what causes such satisfaction, barriers and limitations of customer satisfaction as well as ways of measuring such satisfaction. Similarly, diverse quality management practices have been identified and employed on construction (Pheng and Teo 2004; Rekettye and Pinter 2005; Idoro 2010) and its effects on project quality highlighted. For example, Rekettye and Pinter (2005) elucidates that the provision of outstanding quality increased an organisation's competitive advantage and re-purchase intention. Palaneeswaran *et al.,* (2006) on the other hand stressed that quality encompassed the positive worth of a product or service and its potential to ensure satisfaction, and further identified certain quality practices that would encourage customer satisfaction.

Whereas authors have provided the definitions and antecedents of quality and customer satisfaction in construction, as well as the management practices that influence satisfaction (Chinyio *et al*., 1998; Torbica and Stroh 2000; Conklin *et al.,* 2004; Rekettye and Pinter 2005; Karna 2009; Hoonaker *et al.,* 2010; Idoro 2010 and Obunwo *et al.,* 2013), very little literature exists on the relationship between customer satisfaction and quality management practices in Government initiated projects. This article identifies the customer satisfaction antecedents from a client perspective and goes on to establish the relationship between quality management practices and its influence on customer satisfaction in construction. In order to achieve this purpose, three research questions were posed and one hypothesis tested to establish these relationships.

PURPOSE OF THE STUDY
The aim of the study was to investigate the influence of quality management practices on customer satisfaction antecedents. Specifically, some relevant objectives of the study were to:
1. Determine customer satisfaction antecedents while carrying out construction activities in Rivers State of Nigeria
2. Determine the quality management practices that influence customer satisfaction
3. Determine the relationship between quality management practices (QMP) and customer satisfaction antecedents (CSA).

RESEARCH QUESTIONS
The following research questions were raised to guide the study:
1. What are the key customer satisfaction antecedents in Government construction projects in Rivers State?
2. What are the key quality management practices that influence customer satisfaction?
3. What is the relationship between quality management practices (QMP) and customer satisfaction antecedents?

HYPOTHESIS
The following research hypothesis was raised to guide the study:
H_{01}: There is no significant relationship between quality management practices and customer satisfaction antecedents.

RESEARCH METHOD
A research method is seen as a process employed to collect information that aids decision making (Creswell 2003). With the different research methodologies available in research such as qualitative, quantitative, quasi experimental, etc, a quantitative research method is adopted for this research. Creswell (2003) highlights that quantitative studies usually entail closed end questions, generates numerical data that is analysed statistically, often relates variables in the study and tests, validates or verifies theories or explanations. Furthermore, quantitative research is characterised by the assumption that human behaviour can be explained using the deductive logic of natural science, especially to quantify quantities of "how much" or "how often" (Amaratunga *et al.,* 2002).

DESIGN
The survey and correlational research designs were adopted for this study (Kumar and Phrommathed 2005; Rea and Parker 2012). These designs were used because the study involved gathering, describing, tabulating and interpreting data as well as establishing relationships between two or more variables. The independent variable in this study entails the quality management practices, while customer satisfaction antecedents make up the dependent variable.

POPULATION

The target population for this study was employees in the Rivers State of Nigeria ministry of works within the grade levels 8 – 14. This category consisted of individuals with a minimum qualification of a bachelor's degree in Engineering or its related field, and possessed adequate working experience. Grade levels 13-14 consisted of assistant directors and directors in the ministry of works. These staff were targeted because they fell into the category of respondents that could give reliable information based on the purpose of this study. In total, there were 43 employees within the grade 8- 14 category.

SAMPLE AND SAMPLING PROCEDURE

A sample of 30 senior staff was selected for participation in the study. The random sampling technique was employed to select 30 senior staff for participation. Lewis, Thornhill, and Saunders (2007), highlight that random sampling involves respondent selection in a manner that there exists an equal probability of each member being selected from a statistical population.

RESEARCH INSTRUMENTS

Two sections of a survey instrument were used for data collection. They include:

Quality management practices questionnaire (QMPQ): The QMPQ was designed by the researcher to measure the subjects' perception of management practices that affect the quality of the finished construction project. The instrument was a 14- item questionnaire rated on a 5- point Likert scale ranging from 5 for strongly agree to 1 for strongly disagree. Sections A and B of the instrument elicited the subjects socio- demographic variables such as years or experience in the construction sector, portfolio, and number of projects handled. An estimation of the consistency of scores across repeated observations otherwise known as the reliability coefficient was calculated (Cronbach, 2004; Webb, Shavelson, and Haertel, 2006). The reliability coefficient of QMPQ was, $\alpha =0.71$.

Customer satisfaction antecedent's questionnaire (CSAQ): The CSAQ was also designed by the researcher to identify the antecedents of customer satisfaction when engaging in construction projects. The instrument consisted of an 11- item questionnaire rated on a 5- Point Likert scale of highly satisfied (5), satisfied (4), indifferent (3), partially satisfied (2), and not satisfied (1). The scores from the items on each component were aggregated to provide individual scores on each component. The Cronbach Alpha reliability coefficient (Cronbach, 2004; Webb, Shavelson, and Haertel, 2006) of CSAQ was, $\alpha =0.83$.

PROCEDURE FOR DATA COLLECTION

Data was collected from the participants on a voluntary basis. After a brief introduction 30 copies of QMPQ and CSAQ were self- administered by the researcher. The respondents were to use about 25 minutes to complete the instruments. Participants were told that they could withdraw participation any time during or after the data collection procedure. A total of 24 questionnaires were returned, indicating a return rate of 80%.

DATA ANALYSIS

Mean and standard deviation were used to analyse research questions 1 and 2. A criterion mean of 3.0 was used for decision making. Linear regression analysis was used on research question 3. Analysis of variance was used to test the hypothesis at 0.05 level of significance (Kumar and Phrommathed, 2005; Rea and Parker 2012). Montgomery, Peck, and Vining (2012) opine that linear regression analysis is mainly used to infer and predict variables. In addition, linear regression can be employed to establish the relationship between dependent and independent variables, statistical independence identifying the presence (or absence) of correlation between variables, the nature of variation between variables as well as the error of distribution between the variables as obtained from the data set. The statistical Package for Social Sciences (SPSS) version 20.0 was used to ease computations (Montgomery, Peck, and Vining 2012).

RESULTS

(a) Mean rating of respondents on the antecedents of customer satisfaction

Table 1:Mean and standard deviation on customer satisfaction antecedents

S/No	Item	Mean	SD
1	Skill development trainings are provided	4.7917	.58823
2	Professional expertise are utilised in handling construction jobs	4.4167	.77553
3	Communication interface exists between contractor and local community/ users of projects/ customers	4.1667	.86811
4	Employees worked in teams rather than individually	4.2500	1.22474
5	Project is executed within agreed budget	3.8750	1.22696
6	Conditions are in place to ensure honesty in communication flow	3.7917	1.35066
7	Consistency in top to bottom communication exists	4.0833	1.13890

8	Quality is considered in preference to price	3.6667	1.34056
9	The project is completed on time	3.7500	1.22474
10	Complaints are handled promptly and productive	4.0000	1.25109
11	Project design contains sufficient details	4.1667	1.00722
	Grand mean	3. 1852	1.3649

Table 1 shows that the respondents strongly indicated that the provision of skill development trainings would improve customer satisfaction (M= 4.7917, S.D= 0.58823). This was followed by the rating on the use of professional experts in handling construction jobs to enhance customer satisfaction. (M= 4.4167, S.D= 0.77553). The least rating was in the respondents' perception that quality was considered in preference to price. The grand mean score of 3.1852±1.3649 indicated that the respondents were strongly of the perception that the identified variables were measures of the antecedents to customer satisfaction. The grand mean was calculated based on the frequency of responses to individual questions and the deviation from the individual means. According to Montgomery, Peck, and Vining (2012) a clearer picture of the grand mean is achieved when calculated based on the frequency of responses and deviations from the individual means.

(b) Mean rating of respondents on quality management practices that influence customer satisfaction.

Table 2: Mean and standard deviation on quality management practices influencing customer satisfaction.

S/No	S/No	Mean	SD
1	Quality control is a collective responsibility	4.0000	1.06322
2	Quality assurance is restricted to an independent department	3.0417	1.33447
3	Adoption of international best practices (Benchmarking)	4.0417	1.19707
4	Separate teams exist for carrying out quality control and assurance	3.1667	1.37261
5	Adherence to quality standard implementation	3.7917	1.10253
6	Knowledge of relevant construction standards	3.8333	1.27404
7	Employee flexibility in carrying out duties	3.2917	1.26763
8	Partnership with supply chains	3.2083	1.38247
9	Availability of adequate information on construction regulations	3.5833	1.41165
10	Adherence to requirements from construction regulation	3.7500	1.45213
11	Legislation to checkmate construction corruption	3.2083	1.28466
12	Regular auditing of construction projects	2.9583	1.39811
13	Spontaneous inspection exercises on construction sites	3.4167	1.55806
14	Post project customer satisfaction surveys	2.9583	1.54580
	Grand Mean	3.1607	1.33175

Table 2 on the other hand presents the quality management practices that influence customer satisfaction. From the table, respondents strongly indicated that the adoption of international best practices / benchmarking would greatly influence customer satisfaction (M= 4.0417, S.D= 1.19707). This was followed by the indication by the respondents that working with the mind-set that quality control is a collective responsibility had the potential to enhance customer satisfaction (M=4.0000, S.D= 1.06322). From the table, the respondents opined that regular auditing of construction projects as well as post project customer satisfaction surveys lacked the potential to influence customer satisfaction (M= 2.9583, 2.9583 and S.D= 1.39811, 1.54580), respectively. However, the grand mean score of 3.1607 is an indication that the respondents were strongly of the perception that the identified variables were a measure of quality management practices that could influence customer satisfaction in construction.

(c) The relationship between CSA and QMP.

Table 3a: Summary of regression analysis.

R	R^2	Adjusted R^2	SDE	Decision
0.7280	0.5290	0.5080	8.24673	Strong

Table 3a shows a summary of the regression analysis on the association between quality management practices and the antecedents of customer satisfaction. The table shows that there is a positive and strong relationship between quality management practices and customer satisfaction antecedents (R= 0.728). The R^2value of 0.529 indicated a 52.9% contribution of quality management practices to enhancing customer satisfaction.

Table 3b: Regression coefficients

Model		Unstandardized coefficient		Standardised coefficient	t	significance
		B	Standard error	β	4.052	.001
Constant		21.431	5.289		4.975	.000
Quality	Management	0.491	0.099	0.728		

Practices(QMP)

CSA= 21.431+0.491QMP ……………………………………………………….……(1)

The regression equation on Table 3b shows that any increase in the value of the quality management practice, will yield a simultaneous increase in the value of customer satisfaction antecedents. Hence the overall relationship between customer satisfaction antecedents (CSA) and quality management practices (QMP) is given by the equation 1.

Table 4. Summary of ANOVA on the relationship between QMP and CSA

Model	Sum of squares	*df*	Mean square	F	Sig.
Regression	1683.438	1	1683.438	24.753	0.0000
Residual	1496.187	22	68.009		
Total	3179.625	23			

The summary of ANOVA on the relationship between quality management practices and the antecedents of customer satisfaction as presented in table 4 would be employed when testing the hypothesis $H0_1$ which proposes that there is no significant relationship between quality management practices and the antecedents of customer satisfaction. The analysis from table 4 shows that there is significant relationship between quality management practices and the antecedents of customer satisfaction ($F1, 22= 24.753$, $p< 0.5$). Hence the null hypothesis was rejected.

DISCUSSION

The results on table1 indicated that there existed a strong perception by the respondents that the identified variables were measures of the antecedents of customer satisfaction in construction. Mean scores were above the criterion mean of 3.0 (3.1852 ± 1.3649). Webb, Shavelson, and Haertel (2006) opine that when mean scores are above the criterion mean, it can be generalised and therefore is an indication that the data set are in agreement with the upper scale of the Likert or the chosen measurement scale. Considering the items with the strongest indication, the respondents highlighted the positive effect of skill development trainings and the use of professional experts while carrying out construction jobs as they had a high potential for improving customer satisfaction.

The results from table 2 indicated that the outlined variables were measures of quality management practices that could influence customer satisfaction in construction. Although Nilsson *et al*., (2001) argue that quality management practices work differently in product or service environments, they affirm that generally, quality management practices enhance organisational performance in both product and service environments. Respondents strongly opined that the adoption of international best practices as well as developing the orientation that quality control is a collective responsibility was essential in enhancing customer satisfaction from construction projects. Respondents however pointed out that regular auditing of construction projects and post project customer satisfaction surveys were not sufficient measures of quality management that would influence customer satisfaction. This could be attributed to the fact that both processes could only be carried out after the project has been completed, although they could assist in the planning and execution of subsequent construction projects.

The result in table 3a indicated that there was a positive and strong relationship between quality management practices and customer satisfaction antecedents (R= 0.728). The R^2 value of 0.529 indicated a 52.9% prediction of customer satisfaction offered by quality management practices. The R^2 value, also known as the coefficient of determination or the multiple correlation coefficient is a proportion of the variance which serves as a source of predicting the dependent variable from the independent variable (Nagelkerke 1991).

The regression equation under table 3b indicated that any increase in the quality management practices would yield a concomitant increase in customer satisfaction. This supports the result in Table 3a, as the dependent variable is predicted and therefore influenced by the dependent variable. When put to statistical test, the result in table 4 shows that there was significant relationship between quality management practices and the antecedents of customer satisfaction ($F1, 22= 24.753$, $p< 0.5$). This indicates that the QMP is a strong predictor of CSA in construction.

CONCLUSIONS

The findings from the study indicate that there exists a relationship between the outlined quality management practices and customer satisfaction while handling government construction projects. Analysis of the empirical data obtained shows that the antecedents of customer satisfaction are greatly influenced by the adopted strategy to

implement quality management. Attention should be paid to issues relating to offering skill development trainings for construction employees as well as the use of professional experts to handle key aspects of the construction as the data showed a high potential of these for obtaining customer satisfaction. Also, a constant update on international best practices applicable to the construction industry should be provided for adoption while handling government construction projects. Furthermore, the knowledge of quality management practices that enhance customer satisfaction within the Rivers State ministry of works, and consequently other related government establishments in general is slightly above average, and the research has revealed areas that can be exploited to optimise customer satisfaction. Moreover, the relationship between quality management practices and customer satisfaction antecedents was strong, positive and significant. Hence, an increase in the quality management practices yields a corresponding increase in the achievement of customer satisfaction and vice versa.

Limitations

The main limitation encountered in the course of this research was the difficulty in accessing the respondents in the ministry of works due to bureaucracy and information confidentiality. In addition, although the sample size for the research was relevant to the particular ministry, the sample seemed inadequate for direct generalisation to other ministries or developing economies.

RECOMMENDATION

Based on the findings of the study, the following recommendations were made

1. The Ministry of works needs to enforce modalities to ensure customer satisfaction from its construction projects by restructuring the available quality management practices.
2. There is a dire need to maintain a high level of quality management practices for an improved customer satisfaction. This could be achieved by focussing on the provision of skill development trainings for construction employees, the use of professional experts to handle key aspects of the construction as well as the adoption of international best practices applicable to construction. However, other aspects of quality management such as adherence to quality standards implementation, the provision and adherence to information on construction regulations and legislation, as well as spontaneous inspection exercises on construction sites amongst others should not be overlooked.
3. Emphasis should be placed on quality management practices while handling Government construction projects as this has the potential to improve customer satisfaction.

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