EFFECTS OF PROCUREMENT PROCEDURES ON PROJECT PERFORMANCE: A CASE STUDY OF LIGHT CONSTRUCTION PROJECTS AT KENYA PORTS AUTHORITY, MOMBASA.

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ABSTRACT: *Procurement procedures have increasingly played an important role in project performance. This study aimed to ascertain the effects of procurement procedures on project performance, and it was a case study of light construction projects at Kenya Ports Authority, Mombasa. Specifically the study sought to examine the effects of specification definition, bid invitation, bid evaluation and contract negotiation on project performance. The study was conducted through a descriptive design using a survey of 6 light construction projects at Kenya Ports Authority, Mombasa office. The study employed purposive sampling to select the sample and sample elements. This resulted to a sample size of 24 project management officers. Structured questionnaire was used as a data collection instrument. Data was analyzed using descriptive statistics and regression techniques. Regression analysis indicated that specification definition accounts for 29.4% of variations in project performance; bid invitation accounts for 6.7%; bid evaluation accounts for 58.5 % and contract negotiation contributes 29.4% of variations in project performance. The analysis revealed that the four independent variables in this study accounted for 76.8% of change in project performance. This study concluded that procurement procedures have a strong and positive correlation with project performance in KPA.*

KEYWORDS: Procurement Procedures, Project Performance, Procurement

INTRODUCTION

A project is a temporary endeavour undertaken to produce a unique outcome (Chua et al, 1999). The performance of a project has been described as the degree of achievement of project objectives with regards to quality, cost and time (Chitkara, 2005). Laedre et al (2006) contends that in order to enhance project performance, an increased understanding of how different procurement procedures affect aspects of project performance is vital. Wardani et al, (2006) assets that clients tend to choose those procurement procedures they have a habit of using, regardless of any differences between projects. Procurement procedures should be tailored to enhance the fulfillment of different project objectives and avoid unsatisfactory project performance (Laedre et al, 2006).

LITERATURE/THEORETICAL UNDERPINNING

Specification definitions are simply a definite description of what is needed or wanted for use by the user of a product or service. The overall purpose of a specification is to provide a basis for obtaining a good or service that will satisfy a particular need at an economical cost and to invite maximum reasonable competition (Lloyd, R. E. (2004). Specification sets limits and thereby potentially eliminates items that are outside the boundaries drawn. Specifications should be updated on the basis of market realities, should be part of the bid documents, should come before the preparation of bidding documents and should be prepared by those who know what is required or by a procurement agent or a consultant in case of complex specifications (PPOA, 2014).

In projects, the specification of requirements will lead to the identification of a deliverable or set of deliverables. A deliverable is a tangible output that must be provided under the contract (Ryan P.D, 2005). In project contracts, deliverables can be tied to milestones. A milestone is a measurement of progress toward an outcome. For a typical review project, milestones might be the completion of review and delivery of a draft report, then revision of draft report and delivery of the final report.

Where the nature of the procurement is such that the organization is able to define what the outcomes are, but not necessarily how they will be delivered, restricted bidding may be used as the bid invitation method. This is where performance is the driver and can be clearly articulated. Suppliers can offer different innovative solutions, so long as the performance meets the organization needs (Brown et al, 2001). In instances where the suppliers must offer a solution that exactly matches the organizations' specification, the organization may use restricted bidding method like Expression of Interest through which suppliers are shortlisted followed by a tendering process. The decision as to which is most appropriate will vary depending upon the nature, scope, value, level of risk and complexity of the project (Baily, P. et al, 2005). The two main bid invitation methods used in Kenya are open bidding and restricted bidding.

Selecting a capable contractor is one of the most important tasks performed by procurement committees when procuring for project. During bid evaluation, each offer must be carefully considered, on an equal basis, against the published evaluation criteria. The process must follow the approach and methodology set out in the procurement documents. The evaluation panel must determine the best supplier based on the information provided by suppliers in their offer. The evaluation should take into account capability, capacity and value for money over the whole-of-life of the procurement. Due diligence should be used to verify that the preferred supplier has the capacity and capability to successfully deliver against the specified requirements (Chua et al, 1997). Clear, concise and comprehensive notes are to be taken of all evaluation panel discussions and findings. The procurement function should keep a full record of how each offer was assessed against the criteria and demonstrate that each received due and fair consideration. Where an offer is rejected the reasons for the rejection must relate to the evaluation criteria, be justifiable, clearly explained and recorded in writing.

Contract negotiation in projects is a formal discussion between the parties involved in the project so as to reach an agreement. It is about reaching agreement on the essential terms of the contract

and the deliverables under the contract. It includes an exchange of offers, concessions and bargaining. For collaborative relationships the focus is on gaining a win-win solution, while for tactical relationships the approach is competitive. It is essential to record the exact terms of the negotiated agreement and reflects these in the contract. It is good practice to have an independent officer check and sign the contract. There should be a separation between the person signing the contract and the person who will have day-to-day responsibility for contract management. Where a contract adopts a milestone approach; payment to the supplier can be tied to the successful completion of each milestone. This allows for implementation to be tracked and monitored against budget. Sometimes a copy of the intended contract is attached to the bid invitation documents at the time of advertising. It may be a condition of the tender that suppliers state whether or not, if successful, they would be prepared to be bound by the terms and conditions of the contract (Alderman et al, 2007).

Objective of the Study
The objective of this study was to investigate the effects of procurement procedures on performance of light construction projects at Kenya Ports Authority, Mombasa.

Conceptual Framework
This study attempted to establish whether procurement procedures have any effects on project performance at Kenya Ports Authority. The aspects of specification definition, bid invitation, bid evaluation and contract negotiation are the independent variables while project performance is the dependent variable. The conceptual is summarized in figure 1 below.
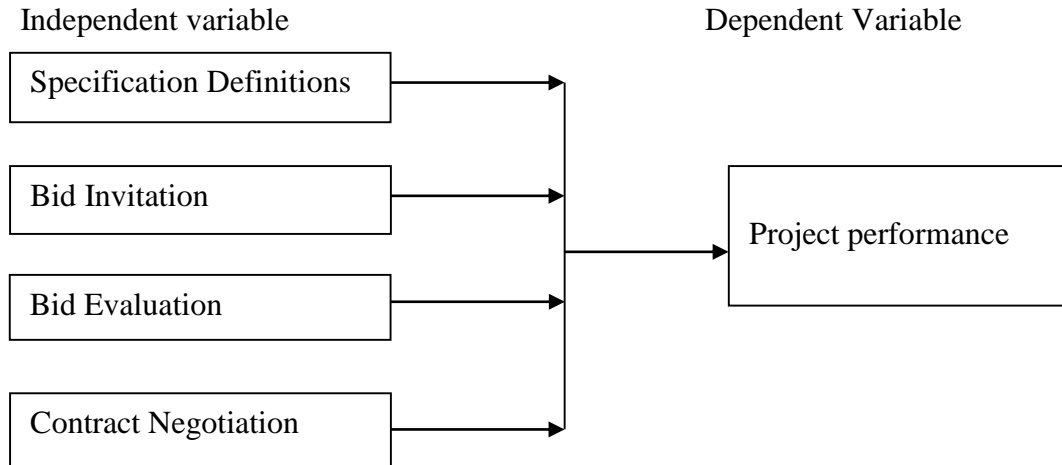
Independent variable   Dependent Variable

Figure 1 Conceptual Framework

METHODOLOGY

This chapter explains the research design and methodology of the study. It provides a broad view of the description and selection of the target population, sampling technique, sampling size and procedure for data collection and data analysis.

Research Design

Research design is an overall action-plan for the research. It constitutes the blue-print for the collection, measurement and analysis of data. Descriptive research design was used in this study. According to Mugenda and Mugenda (2003) a descriptive research is research that attempts to collect data from members of a population in order to determine the current status of that population with respect to one or more variables. Therefore, this research describes the characteristics of project performance in relation to the four independent procurement variables specification definition, bid invitation, bid evaluation and contract negotiation.

Target Population

A population is a group of individuals, objects or items having a common observable characteristic which a study is interested in (Mugenda and Mugenda, 2003). It is the entire collection of people or things the researcher is interested in. This study will be carried out in Kenya Ports Authority, Mombasa. The target population of this study shall be the project and infrastructure department staff at KPA.

Sampling Frame

A sampling frame is the list of all the items where a representative sample is drawn for the purpose of research (Mugenda and Mugenda, 2003). The sample frame of this study will be project management officers of light construction projects between December, 2013 and June, 2014. During the stated period, 6 light construction projects were completed.

Table 3.1 Sampling Frame and Sample Size

Project	Project Cost / Ksh[millions]	Target Population	Sample Size
KPA/089/2012-13/IT – Construction of Underground Water Tank at the Fire Station	25	20	6
KPA/096/2012-13/BC – Supply, Installation and Commissioning of Commercial Refrigeration Trainer	11.8	8	2
KPA/128/2012-13/EE – Supply, Delivery and Installation of Voltage Stabilizers	26.32	22	7
KPA/137/2012-13/DYD – Supply and Installation of Westafalia Fuel Separator	4.665	6	2
KPA/129/2012-13/DYD – Refurbishment of Dockyard Electronic Workshop	18.35	12	4
KPA/118/2012-13/EE – Supply, Installation and Commissioning of 2 No. 70 Tonne Chillers at KPA Headquarters	17.9	10	3
Total Target Sample		78	24

Source: Project Development and Infrastructure Department, KPA.

Sample and Sampling Technique

A sample is a smaller group obtained from the accessible population to represent the whole population while sampling is the process of selecting the individuals for the study from the population (Mugenda and Mugenda, 2003). It is a set of respondents selected from a larger population for the purpose of a survey. The purpose of sampling is to gain an understanding about

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some features or attributes of the whole population based on the characteristics of the sample. In this study, the researcher will use purposive sampling to selects those respondents who shall best suit the purposes of the study and those believed to have the information being sought. According to Mugenda and Mugenda, (2003) a sample size of between 10 and 30 % is a good representation of the target population and is adequate for analysis. Therefore, in each project, a sample size of 30% of the total population was sampled. All the respondents had sufficient knowledge on how procurement procedures could influence the performance of a project. The Sample size and sample frame is shown on Table 3.1

Data Collection Instruments and Procedure
Secondary data was collected from reports, manuals and other relevant procurement materials. Primary data was collected through questionnaires which were administered to the respondents by the researcher. A questionnaire is a data collection instrument that sets out in a formal way the questions designed to elicit the desired information. Both structured and un-structured questions relating to the field of inquiry were used. Questionnaire was preferred because it is efficient, cheap and easy to be administered (Mugenda and Mugenda, 2003). The questionnaires were administered personally by the researcher and the researcher waited as the respondent filled in the questionnaire. There was a brief explanation on the purpose and importance of the research.

Data Processing and Analysis.
The objectives of data analysis are testing the goodness of the data and answering the research question. Establishing the goodness of data leads to credibility to all subsequent analysis and findings because it measures the reliability and the validity of the measures used in the study (Sekaran, U. 2005). At the end of every field data collection day, the filled questionnaires were checked for completeness and consistency of information before storage. The data from the completed questionnaires was cleaned, coded and entered into the computer using the statistical packages for social sciences (SPSS) for Windows for analysis. The software packages enabled the researcher to analyze the data into percentages, means and standard deviations. Multiple regression analysis was used to determine whether the group of factors proposed influence project performance.

RESULTS/FINDINGS

Response Rate
The study distributed 24 questionnaires to sampled officers who worked on the targeted light construction projects at Kenya Ports Authority. Out of those, 22 sample respondents filled in and returned the questionnaire while 2 respondents did not fill the questionnaire contributing to 92% response rate. This commendable response rate was attributed to the data collection procedure, where the researcher personally administered questionnaires and waited for respondents to fill in, then picked the questionnaires once fully filled. The response rate demonstrates a great willingness of the respondents to participate in the study.

Table 4.1 Response Rate

Project	Sample Size	Frequency	Percent
KPA/089/2012-13/IT – Construction of Underground Water Tank at the Fire Station	6	6	25
KPA/096/2012-13/BC – Supply, Installation and Commissioning of Commercial Refrigeration Trainer	2	2	8.3
KPA/128/2012-13/EE – Supply, Delivery and Installation of Voltage Stabilizers	7	6	25
KPA/137/2012-13/DYD – Supply and Installation of Westafalia Fuel Separator	2	2	8.3
KPA/129/2012-13/DYD – Refurbishment of Dockyard Electronic Workshop	4	3	12.5
KPA/118/2012-13/EE – Supply, Installation and Commissioning of 2 No. 70 Tonne Chillers at KPA Headquarters	3	3	12.5
Total Target Sample	24	22	91.6

Reliability and Validity

Reliability is the extent a measuring procedure yields consistent results on repeated administrations of the scale. To determine how consistent the items produce the same measures if repeated, reliability of the items of each predictor variables was performed. To achieve this objective, Cronbach's Alpha measure of reliability was used for the four variables in this study. An alpha value less than 0.6 ($\alpha < 0.6$), indicates unsatisfactory internal consistency reliability (Malhotra & Birks, 2007). The empirical result in table 4.1 revealed that all the four items showed a satisfactory level of internal consistency since all were above the threshold level of $\alpha = 0.6$

Table 4.2 Reliability Statistics

Study Variables	Specification Definition	Bid Invitation	Bid Evaluation	Contract Negotiation	Project Performance
Cronbach's Alpha	0.610	.694	.816	.667	0.784
No of Items	6	5	5	5	4
Comment	Reliable	Reliable	Reliable	Reliable	Reliable

4.3.2 Correlation between Specification Definition and Project Performance

Table 4.3 indicates that specification definition was positively and significantly correlated with a linear correlation coefficient, r of 0.570 at a p-value of 0.004. P-value is the probability of obtaining a test statistic result at least as extreme as the one that was actually observed; assuming that the null hypothesis is true. The Beta regression coefficient was significant and positive implying that there is a positive and significant relationship between the project specification definition and project performance. The adjusted R^2 was 0.294 meaning that project specification definition contributes to 29.4% of the change in project performance at KPA holding all other factors constant.

Table 4.3: Coefficient of Determination - Specification Definition

	Correlation, R	R^2	Beta	S.D Error	t	Sigma
Constant			1.625	0.811	2.003	0.058
Specification Definitions	0.57	0.294	0.622	0.191	3.256	0.004

Correlation between Bid Invitation and Project Performance

The simple regression result revealed that bid invitation efforts and project performance were positively related. However; the correlation was weak as indicated by correlation coefficient, r value of 0.326 at p-value of 0.119. The R^2 was 0.066, which indicated that the bid invitation, the independent variable in this study, accounted for only 6.66% of the change in project performance if all other factors are held constant.

Table 4.4 Coefficient of Determination - Bid Invitation

	Correlation, R	R^2	Beta	S.D Error	t	Sigma
Constant			2.818	0.890	3.166	0.004
Bid Invitation	0.326	0.066	0.340	0.210	1.620	0.119

Correlation between Bid Evaluation and Project Performance

The regression analysis was performed to determine the correlation between bid evaluation and project performance.

Table 4.5 Coefficient of Determination – Bid Evaluation

	Correlation, R	R^2	Beta	S.D Error	t	Sigma
Constant			1.394	0.480	3.166	0.008
Bid Evaluation	0.777	0.585	0.625	0.108	5.782	0.001

Simple regression result in table 4.5 revealed that at 5% level of significance and 95% level of confidence, bid evaluation criteria and project performance were positively correlated as indicated by correlation coefficient value of 0.777 at a p-value of 0.001. The adjusted R^2 was 0.585 revealing that bid evaluation accounted for 58.5% change in project performance; when all other factors are kept constant.

Correlation between Contract Negotiation and Project Performance

The regression analysis of contract negotiation on project performance was done and the result tabulated as shown in the table 4.6. This was done purposely to establish how contract negotiations, as the independent variable; and project performance as the dependent variable relate so as to achieve the last objective of this study. From the result; the two variables are positively correlated and the correlation is significant with correlation coefficient value of 0.551 at p-value of 0.005. The coefficient of determination R^2 is 0.272.This indicates that contract negotiation accounted for a 27.2% change in project performance when all other factors are held constant.

Table 4.6 Coefficient of Determination - Contract Negotiation

	Correlation, R	R^2	Beta	S.D Error	t	Sigma
Constant			2.825	0.469	6.024	0.001
Bid Evaluation	0.551	0.272	0.380	0.123	3.094	0.005

DISCUSSION

Regression Analysis
The study conducted a multiple regression analysis so as to determine the combined effect all the independent variables on project performance at KPA. Multiple linear regression analysis is a general statistical technique used to model the relationship between a single dependent variable and several independent variables. The main purpose of multiple regressions is to learn more about the relationship between several independent variables and a dependent variable.

Table 4.7 ANOVA

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	4.924	4	1.231	12.310	.002
Residual	.190	19	.1000		
Total	5.114	23			

The F critical at 5% level of significance was 12.31. Since F calculated is greater than the F critical (value = 12.310), this shows that the overall model was significant. From table 4.7 above, the significance value is 0.002 which is less that 0.05 thus the model is statistically significance in predicting how specification definition, bid invitation, bid evaluation and contract negotiation affects project performance of light construction projects at KPA.

The study conducted a multiple regression analysis to determine the relationship between independent variables and dependent variable. The multiple linear regression model for this study was:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + error$$

Where:-
   Y is project performance (response variable)
   β_0 is the regression intercept
   β_1 to β_4 are the regression coefficients
   X is the predictor variables; X_1=Specification definition, X_2= Bid Invitation, X_3=bid Evaluation and X_4= Contract Negotiation

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Table 4.8: Significance of the Variables in the Model

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	-.980	.108		-9.079	000
Specification Definitions	.796	.092	.210	8.663	000
Bid Invitation	1.017	.069	.270	14.674	000
Bid Evaluation	.887	.068	.281	12.999	000
Contract Negotiation	.941	.051	.440	18.440	000

Therefore the fitted multiple linear regression equation for this study is:

$$Y(project\ performance) = -0.98 + 0.796X_1 + 1.017X_2 + 0.887X_3 + 0.941X_4$$

From the regression equation established, taking all the factors (Specification definition, bid invitation, bid evaluation and contract negotiation) constant at zero, project performance at KPA would be -0.980.

Further, if all the other variables are kept constant, a unit increase in specification definitions will lead to a 0.796 increase in project performance at KPA. Likewise, a unit increase in bid invitation will lead to a 1.017 increases in project performance; a unit increase in bid evaluation will lead to a 0.887 increase in project performance and a unit increase in contract negotiation will lead to a 0.941 increase in project performance at KPA. These results imply that of the four variables studied; bid invitation contribute more to the project performance at the KPA followed by contract negotiation, then bid evaluation and lastly specification definition.

At 5% level of significance and 95% level of confidence, specification definition had a 8.663 level of significance, bid evaluation had a 14.674 level of significance, bid evaluation had a 12.999 level of significant and contract negotiation had a level of significance of 18.440. The t critical at 5% level of significance at k = 4 degrees of freedom is -9.079. Since all t calculated values were above -9.079, all the variables were significant in affecting project performance.

6.0 Implication to Research and Practice
From the fitted regression model, it was noted that procurement procedures had a positive and significant effect on project performance with a correlation coefficient of 0.898 at p-value of .001.

Table 4.13: Coefficient of Determination

Model	R	R^2	Adjusted R^2	Std. Error of the Estimate
1	.898[a]	.806	.765	.034

The overall coefficient of determination R^2 was 0.765 signifying that the four independent variables in this study (specification definition, bid invitation, bid evaluation and contract negotiation), collectively account for 76.5% of change in project performance at KPA. The other

remaining percentage of 23.5%, being accounted for by other factors not considered in this study. Further research should therefore be conducted to investigate the other factors (23.5%) that affect project performance in KPA.

CONCLUSION

From the regression result, there was a significant positive relationship between project specification definition and the ultimate project performance in terms of cost and time reduction, quality deliverables as indicated by a regression coefficient of 0.796 at p-value of 0.001. This implies that clear and effective specification definitions would be accompanied by improved project performance. This reconfirms that careful consideration of specification definitions of a project at the very outset of the project is important (Chitkara, 2005)

In summary all the four independent variables of procurement procedures in the conceptual framework had a positive effect on the performance of projects as noted. Indeed, from the research model procurement procedures accounted for a significant percentage, 76.8%, of the change in KPA project performance, holding all other factors constant. This supports the statement that procurement procedures are one key improvement area that can contribute substantially to project success (Cheung *et al.*, 2003, Eriksson, 2007)

FUTURE RESEARCH

It is recommended that further research be undertaken to investigate the other factors in procurement that affect project performance purposely to ascertain how these other factors also contribute to project overall performance. Similar research should also be carried out on other public procuring entities.

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