

Sources and Causes of Inadequate Engineering Documentation for Application for No Objection Certificate (NOC) To Award Construction Project: A Case Study

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ABSTRACT: The study investigated the Sources and Causes of inadequate Engineering Documentation for Application for a No Objection Certificate (NOC) to Award Contract in the procurement process leading to the award of construction contract, using the Rivers State Ministry of Works, Nigeria, as a case study. The population of the study is 60. The sample of the study was 40 workers from Ministry of Works in Port Harcourt. The instrument used for the study was a structured questionnaire which was validated by three experts. Cronbach Alpha reliability method was adopted to determine the internal consistency of the instrument which yielded a reliability coefficient of 0.73. Research questions were answered using percentage and mean statistics while hypotheses were tested using Chi-square. Findings of this study showed that "poor consultancy" was ranked the highest as a major source and cause of inadequate engineering documentation with a mean score of 4.18; Capacity enhancement training for In-House Staff was ranked highest as a key solution to inadequate engineering documentation with a mean score of 4.33. It was also found that sources and causes of inadequate engineering documentation have negative influence on application for No Objection Certificate (NOC) to award construction contract; and solutions to inadequate engineering documentation have the capability of influencing application for No Objection Certificate (NOC) to award construction contract positively. It is therefore recommended that professional/capacity enhancement training should be routinely organized for the unit handling engineering documentation so as to improve on the efficiency in engineering documentation.

KEYWORDS: No Objection Certificate (NOC), Procurement, Documentation, Procuring Entities (PEs), Rivers State Bureau on Public Procurement (RSBoPP).

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I. INTRODUCTION

Knowing the role and advantage of public procurement in dealing with the challenges of corruption and mismanagement in governance, the Rivers State government of Nigeria in 2008 enacted the Rivers State public procurement law as a means of opening up government contracting space to transparency, accountability, fitness for purpose and value for money. Hence, delivering dividends of good governance to the citizens.

According to Public Procurement Regulatory Authorities (PPRA, 2005), The government of Tanzania acknowledged that public procurement accounts for about 75% of the government recurrent expenditure budget which is spent on goods, works, services and consultancy services. This is a big amount of money that needs to be effectively controlled to enhance accountability by measuring time value of money within procurements (Christian & Alemante, 2011).

Public procurement process is sure to be implemented within specified legal context while moving forward government goals (Murray, 1999). The procuring entities may have internal objectives such as cost, efficiency and timely delivery of services or goods. On the other hand, the entities have to serve the goals of the general public who are tax payers and may happen that all of them have contradictory goals (Schapper et al, 2006). This makes the procurement process more complex to the procuring entities (PEs) for attaining expected objectives. As a result, many PEs are suffering from huge losses due to poor management in the procurement processes (Shirima, 2009).

To award any contract above the monetary threshold of fifty million Naira (N50, 000,000.00), the PEs would require a “No Objection Certificate” (NOC) from the RSBOPP. Applying for the NOC, the PEs makes submission of documents to be interrogated by the RSBOPP and a NOC issued if the documents are deemed to be adequate else an objection raised and lots of back and forth to rectify the inadequacy.

Over the years, the RSBOPP had most of the time, received inadequate and deficient engineering documentation (Engineering Designs, Drawing, Bill of Engineering Measurement and Evaluation (BEME) etc.) for procurement of works from the PEs for NOC application, the process of rectifying the deficiency had led to increased lead time to contract award.

Statement of the Problem

Poor public procurement process results in greater cost to the government and the community. It results to delays in performing projects or supply of goods or services which result to price escalation, poor project performance/management and delays the delivery of dividends to the beneficiary of the procurement requirement (Shirima, 2009). The inability for the PE to produce documents (Mostly Engineering in Nature) that are adequate for the issuance of NOC cuts across all MDAs. Although PEs pursue the law by making application for NOC to the RSBOPP for the award of procurement contracts, the inadequacy of the documents ends up prolonging/complicating the lead time for obtaining NOC, as more back and forth surfaces. This ultimately impacts on the project management at the pre-contract award stage.

The Aim of this Research Work

The aim of this research is to determine the Causes, Effect and Measures for Minimizing Time Overrun in the Award of Construction Project through adequate engineering documentations in the procurement process leading to the award of contract, using the Rivers State Ministry of Works, Nigeria as a case study. The objectives of this research work in regards to the aim are as follows:

- i. To identify the sources and causes of inadequate engineering documentation in the application for NOC to award construction contract.
- ii. To proffer solutions to address the problems of inadequate engineering documentation for NOC application to award construction contract.

Research Questions

The following research questions have been formulated to guide the study:

- i. What are the sources and causes of inadequate engineering documentation in the application for No Objection Certificate (NOC) to award construction contract?
- ii. What are the solutions to inadequate engineering documentation for the application of NOC to award construction contract?

Research Hypothesis

The following null hypotheses were formulated to guide the study

Ho₁: The sources and causes of inadequate engineering documentation do not have positive influence on application for No Objection Certificate (NOC) to award construction contract.

Ho₂: The solutions to inadequate engineering documentation do not have positive influence on the application of NOC to award construction contract.

II. LITERATURE REVIEW

Every application for a Certificate of No Objective to Award contract for goods, works or services shall be supported by: Reference to an agreed procurement plan; Budget certificate issued by the commissioner for budget and economic planning; Record of the process for selecting the consultant, contractor, or service provider; Statement of Purpose; Statement of Impact; Sustainability plan; Proposed Cost; Engineering Analyses and Designed Calculations (engineering analyses and design calculations predicated the drawings, detailed construction drawings and all preliminary matters that should predicate execution such as geotechnical investigations report duly signed by the relevant professional are required. For road construction projects, a statement of the design life of the road shall be included); Work Programme; and Anti-Bribery Compliance statement (PPL, 2008).

Lwitiko (2013) in a questionnaire survey of 119 respondents of procurement practitioners, undertook a research that was triggered by the fact that the government of his country Tanzania, has made number of efforts in addressing weaknesses in the public procurement process. Still there were complaints that public procurement processes are characterized by delays, poor quality and non-cost effective delivery. He sought to analyze procurement processes in achieving effectiveness of the public procurement system. The study revealed that

poor solicitation documents due to inadequate technical specifications, schedule of requirements, drawings, poor terms and conditions of contract among others are major factors of delays to the award of contracts.

Construction documentation undergoes an advancement process depending on the complexity and requirement of the projects. Some of these documentation include concept, feasibility studies, council planning, pretender, tender, and final completed construction documentation. Although the documentation undergoes a constant evolution process until it is complete, depending on the method of procurement, contractors and cost managers can be reviewing the documentation from any stage through the process (Flentje et al, 2014).

The bidding document for a construction project usually comprises: Architectural, Structural, Mechanical and Electrical drawings; Associated specification, Associated schedule, Instruction to tender, Forms of contract, Conditions of contract and Bill of Quantities/schedule of rates. Tender documents should contain all data pertinent to what the client wants to construct and that afford each service provider and sub-contractor with common and adequate data to offer an estimate. The documentation is produced by the consultant team which often includes Architects, Civil/Structural Engineer, Mechanical Engineer, Electrical Engineer etc (Laryea, 2011).

A questionnaire survey of 45 respondents from different user department in ZANZIBAR revealed that there is a significant and positive relationship between the procurement process and its effectiveness in the time delivery and quality of the procuring items (Abass 2014).

Oluwaseun (2018) established that one of the highly rated causes of poor performance is errors in contract documents. He further explored through the objectives of his study to investigate the prevalent errors in contract documents and their effects on construction projects. Questionnaire survey and 51 case study projects (mixed method) were adopted. The sample of the study consists of 985 consulting and 275 contracting firms that engaged in the construction of building projects that were completed between 2013 and 2016 and were above the ground floor. The findings of the study indicated that errors in contract documents were moderately prevalent. However, over measurement in bill of quantities was prevalent in private, institutional and management procured projects. Traditionally procured projects contain 68% of the errors in contract documents among the procurement methods. Drawings contain the highest number of errors, followed by bill of quantities and specifications. The severe effects of errors in contract documents were structural collapse, deterioration of buildings and contractors' claims among others. The result of the study implies that, management of procurement method is the route to error minimization in developing countries, but it may need to be backed by law and guarded against over measurement.

Barkow (2005) recognized inattention, lack of adequate design references, and lack of knowledge, poor teamwork, human error, inadequate design checks, poor communications and complexity of task as causes of errors in contract documents. While carelessness, lack of diligence, ineffective use of computer aided design, unrealistic client demands, low task awareness, overload, fatigue, lack of knowledge of changes in standards and not knowing what is required (Love et al, 2008) are other causes of consultants' errors.

Other causes of errors pointed out were poor design quality, lack of design standards, lack of constructability of designs, defects of individual specialists, changes introduced by owners and designers, inconsistencies between drawings and specifications, designer with little construction knowledge, non-technical specifications (Alarcon & Mardones, 1998). Also, deficient procedures, poor communication between workers, inadequately trained workers, conflicting interest of workers, inadequately labelled equipment and poorly designed equipment (Rooney et al, 2002).

Documentation quality remains a significant issue, contributing to the industries inefficiency and poor reputation. The level of satisfaction for individual attributes of documentation quality varies. Attributes that do appear to be affected by the choice of procurement method include coordination, build ability, efficiency, and completeness and delivery time. Similarly the use and effectiveness of risk mitigation techniques appears to vary between the methods, based on a number of factors such as documentation completeness, early involvement, fast tracking etc. the entire project team including the client and designers should carefully consider the individual projects requirements and compare those to the trade-offs associated with documentation quality and the procurement method. While documentation quality is definitely an issue to be improved upon, by identifying the projects performance requirements a procurement method can be chosen to maximize the likelihood that those requirements will be met. This allows the aspects of documentation quality considered most important to the individual project to be managed appropriately (Flentze et al., 2014).

Dosumu1 et al, (2017) suggest that the causes of errors in contract documents comprise of frequent design changes by clients, lack of adequate time to prepare documents and design management experience among others. The causes of errors in contract documents vary from one state to the other. Also, there is a difference in the causes of errors in contract documents based on types of building, services rendered by construction organisations and states in South West, Nigeria. However, there is no significant difference in the causes of errors in contract documents based on procurement method except where there is incomplete

documentation or contracting organisations have overlapping activities. The study recommended that the errors identified should always be prevented from occurring if cost and time overrun are to be minimized. Also since most of the causes identified are related to consultants, it was recommended that all designs should go through quality assurance process.

A questionnaire survey of 64 clients and 24 consultants in the Gaza Strip identified among others that experience & skill level of the consultant and clear, detailed drawings & specification are factors affecting the accuracy of pre-tender cost estimating or bill of quantities (Adnan et al, 2013).

Poor quality tender documents can lead to inaccurate estimates, higher margins in bids, claims and disputes. A questionnaire survey of 84 UK contactors identified “poor tender documents” as the second major cause of inaccurate cost estimates. Most respondents revealed that “...the quality of tender information provided by design teams is poor” (Akintoye & Fitzgerald, 2000).

Laryea (2011), suggest that tendering is one of the stages in construction procurement that requires extensive information and documents exchange. However, tender documents are not always clear in practice. He further explored the adequacy of tender documents used in practice. Findings showed that quality of tender documentation is still a problem in construction despite the existence of standards like Co-ordinated Project Information (1987) and British Standard 1192 (1984 & 1990) that are meant to help in producing clear and consistent project information. Poor quality tender documents are a source of inaccurate estimates, claims and disputes on contracts.

III. METHODOLOGY

This research adopted descriptive research design. The study adopted both primary and secondary data that was collected through a structured questionnaire intended to prompt specific responses for qualitative and quantitative analysis. Secondary data was obtained from audited archived records of the ministry. The respondents chosen for this study are the Accounting Officer, Directors, Project Architects, Project Engineers, Project Quantity Surveyors, Project Designers, Procurement and User Department etc. This category of the respondents were chosen because they are deemed to understand the procurement proceedings in the pursuit of NOC. In this study, primary data was obtained using structured questionnaires. Questionnaires were designed on operational basis to get information about personal data of the respondents to depict their profile that may let them have experience on issues relating to application for NOC. The sample of the study was 40 workers from Ministry of Works in Port Harcourt. The structured survey questionnaires were administered to the Accounting Officer, Directors, Project Quantity Surveyors, Engineers, Architects and other procurement/user departments in the Rivers State of Nigeria Ministry of Works. The instrument used for the study was validated by three experts. Cronbach Alpha reliability method was adopted to determine the internal consistency of the instrument which yielded a reliability coefficient of 0.73. The instrument for the study utilized five-point Likert scale as follows: The values of not important (1- point), fairly important (2 – points), important (3 – points), more important (4 – points), and very important (5 – points). The data collected was analyzed using the Statistical Package for Social Science (SPSS). Descriptive, narrative, inferential analyses and deductive/inductive approach was deployed. The primary data analysis was done using Percentage, Mean and Chi-Square. Mean was used to answer the research questions while Chi-Square was used to test the null hypotheses. The two null hypotheses were tested at 0.05 level of significance.

The arithmetic mean of the values is given by:

Arithmetic mean

$$\bar{(x)} = \frac{\sum fx}{n} \quad (3.1)$$

where,

n = number of individual values

$\sum fx$ = sum of individual values

Chi Square Formula:

$$X^2 = \sum (O - E)^2 \quad (3.2)$$

where,

O = Observed frequency

E = Expected frequency

Σ = Summation

IV. RESULTS AND DISCUSSION

Research Question 1

What are the sources and causes of inadequate engineering documentation in the application for No Objection Certificate (NOC) to award construction contract?

Table 1 shows 12 items that were used to answer research question 1 and their grand mean is 3.73 which is above the criterion mean of 3.00. item 6 which is “Poor Consultancy” has the highest mean score of 4.15 and respondents agreed that poor consultancy is one of the sources and causes of inadequate engineering documentation in the application for No Objection Certificate (NOC) to award construction contract. Meanwhile, item 11 which is “Economic Inflation” has the lowest mean score of 3.23.

However, Poor procurement planning had a mean score of 4.08, while “weak In-House Capacity” had a mean score of 3.88 and they are both considered sources and causes of inadequate engineering documentation by the respondents.

Table 1: Respondents’ Responses to Research Question 1.

S/N	Items	\bar{X}	SD	Remarks
1	Poor Procurement Planning.	4.08	1.02	Moderately Important
2	Weak In-House Technical Capacity	3.88	0.94	Important
3	Political Interference	3.65	1.19	Important
4	Corrupt In-House Staff	3.98	0.92	Important
5	Poor Organisation Structure	3.85	1.14	Important
6	Poor Consultancy	4.15	1.05	Moderately Important
7	Poor Recordings	3.63	1.10	Important
8	Poor Design	4.00	1.01	Moderately Important
9	Under/Over Scoping	3.55	1.32	Important
10	Under/Over Costing	3.43	1.20	Important
11	Economic Inflation	3.23	1.27	Important
12	Poor Scheduling	3.40	1.13	Important

Criterion Mean = 3.00, Grand Mean Score = 3.73

Furthermore, “Political interference” had a mean score of 3.65 and “Poor Organisational structure” had mean score of 3.85. Also, from the SPSS output, the mean score of 3.98 is accorded to “Corrupt In-House Staff”, 3.63 to “Poor Recording”, 4.00 to “Poor Design”, and 3.55 to “Under/Over Scoping”. Furthermore, respondents also agreed that “Under/Over Costing” and “Poor Scheduling” which scored the mean of 3.43 and 3.40 respectively, are also some of the sources and cause of inadequate engineering documentation.

The total responses in Table 1 showed that items 1 - 12 were rated important by respondents and are believed to be the sources and causes of inadequate engineering documentation in the application for No Objection Certificate (NOC) to award construction contract.

Research Question 2

What are the solutions to inadequate engineering documentation for the application of NoC to award construction contract?

From Table 2, 5 items were used to answer research question 2 and their grand mean is 4.00 which is above the criterion mean of 3.00. The item 13 which states “Capacity enhancement training for In-House Staff” has the highest mean score of 4.33 and respondents agreed that capacity enhancement training for In-House Staff is one of the solutions to inadequate engineering documentation for the application of NOC to award construction contract. The item 14 which states “Adoption of Service Order Agreement to ease consultant engagement” has the lowest mean score of 3.78. However, respondents were also of the view that “Adoption of electronic means for transmission of documents for fast, easy and unmutilated transmission of documents”; “Organizational restructure into work units for easy assigning of who does what, when and how?”; and “Sanctioning of erring staff and reward for hard work” with the mean scores of 3.95, 3.83 and 3.93 respectively were also part of the solution to inadequate engineering documentation.

Table 2: Respondents' Responses to Research Question 2

S/N	Items	\bar{X}	SD	Remarks
13	Capacity enhancement training for In-House Staff	4.33	0.97	Moderately Important
14	Adoption of "Service Order Agreement" to ease consultant engagement.	3.78	1.00	Important
15	Adoption of electronic means for transmission of documents for fast, easy and unmutilated transmission of documents.	3.95	0.78	Important
16	Organisational restructure into work units for easy assigning of who does what, when and how?	3.83	1.01	Important
17	Sanctioning of erring staff and reward for hard work	3.93	1.10	Important

Criterion Mean = 3.00, Grand Mean Score = 4.00

The total responses in Table 4.2 showed that items 13 - 17 were rated important by respondents and are believed to be the solutions to inadequate engineering documentation for the application of NOC to award construction contract.

V. HYPOTHESES TESTING

Research Hypothesis 1

The sources and causes of inadequate engineering documentation do not have positive influence on application for No Objection Certificate (NOC) to award construction contract. From Table 3, Chi-Square Test was used to test the influence of sources and causes of inadequate engineering documentation on application for No Objection Certificate (NOC) to award construction contract.

Table 3: Chi-Square Test on the sources and causes of inadequate engineering documentation in the application for No Objection Certificate (NOC) to award contract

	Value	Df	Asymp. Sig. (2-sided)
Pearson Chi-Square	54.785(a)	44	.128
Likelihood Ratio	58.461	44	.071
Linear-by-Linear Association	15.709	1	.000
N of Valid Cases	480		

The test statistic is not statistically significant: $\chi^2(44) = 54.785$, $p > 0.05$. Hence, the null hypothesis one was accepted. Therefore, the sources and causes of inadequate engineering documentation have negative influence on application for No Objection Certificate (NOC) to award contract.

Research Hypothesis 2

The solutions to inadequate engineering documentation do not have positive influence on the application of NOC to award contract.

From Table 4, Chi-Square Test was used to test the influence of solutions to inadequate engineering documentation on application for No Objection Certificate (NOC) to award contract.

Table 4: Chi-Square Test on the solutions to inadequate engineering documentation for the Application of NOC to award contract

	Value	Df	Asymp. Sig. (2-sided)
Pearson Chi-Square	45.246(a)	20	.001
Likelihood Ratio	48.608	20	.000
Linear-by-Linear Association	2.568	1	.109
N of Valid Cases	240		

The test statistic is statistically significant: $\chi^2(20) = 45.246$, $p < 0.05$. Hence, the null hypothesis two was rejected. Therefore, solutions of inadequate engineering documentation have positive influence on application for No Objection Certificate (NOC) to award contract.

VI. SUMMARY OF MAJOR FINDINGS

The total responses in Table 1 showed that items 1 - 12 were rated important by respondents and are believed to be the sources and causes of inadequate engineering documentation in the application for NOC to award construction contract. The sources and causes of inadequate engineering documentation have negative influence on application for NOC to award construction contract.

The total responses in Table 2 showed that items 13 - 18 were rated important by respondents and are believed to be the solutions to inadequate engineering documentation for the application of NOC to award construction contract. It was found that the solutions to inadequate engineering documentation have positive influence on application for NOC to award construction contract. See Table 5 for summary of tested hypothesis.

Table 5: Summary of Tested Hypotheses

H ¹	The sources and causes of inadequate engineering documentation do not have positive influence on application for No Objection Certificate (NOC) to award contract.	Accepted
H ²	Solutions to inadequate engineering documentation do not have positive influence on the application of NOC to award contract.	Rejected

VII. DISCUSSION OF FINDINGS

Sources and Causes of Inadequate Engineering Documentation and NOC Application

The finding of the study revealed that the sources and causes of inadequate engineering documentation have negative influence on application for NOC to award construction contract. The sources and causes of inadequate engineering documentation in the application for NOC to award contract according to the findings of this study are as follow:

- Poor Procurement Planning,
- Weak In-House Technical Capacity
- Political Interference
- Corrupt In-House Staff
- Poor Organisation Structure
- Poor Consultancy
- Poor Recordings
- Poor Design
- Under/Over Scoping
- Under/Over Costing
- Economic Inflation
- Poor Scheduling

In agreement with the findings of this study, some other scholars enumerated the cause of inadequate engineering documentation to include: inconsistency (Norman, 1983), similar project details and reuse of notes, inexperience, lack of clarity, poor interface co-ordination, low standard practice, poor management practices, poor communication, inadequate quality management, lack of design verifications, poor design leadership, and poor project leadership (Palaneeswaran, et al. 2007). Low quality staff, Low design fees, quality control, clients' briefs, design time allowances, and constructability (Tilley, et al. 2005), incompetent staff and unreliable, low design fee acceptance (Love et al. 2011).

Solutions to Inadequate Engineering Documentation and NOC Application

It was revealed in the study that the solutions to inadequate engineering documentation have positive influence on application for No Objection Certificate (NOC) to award construction contract. The solutions to inadequate engineering documentation in the application for No Objection Certificate (NOC) to award construction contract according to the findings of this study are as follow:

- Capacity enhancement training for In-House Staff
- Adoption of "Service Order Agreement" to ease consultant engagement.
- Adequate Remuneration of In-House Staff
- Adoption of electronic means for transmission of documents for fast, easy and unutilated transmission of documents.
- Organisational restructure into work units for easy assigning of who does what, when and how?
- Sanctioning of erring staff and reward for hard work

VIII. CONCLUSION AND RECOMMENDATIONS

Conclusion

The study investigated the Sources and Causes of inadequate engineering documentation for application of No Objection Certificate to Award construction Project using Ministry of Works Port Harcourt, Nigeria as a case study. In line with the findings of this study, the following conclusion are made:

- I. That sources and causes of inadequate engineering documentation have negative influence on application for No Objection Certificate (NOC) to award construction contract.
- II. That solutions to inadequate engineering documentation have the capability of influencing application for No Objection Certificate (NOC) to award construction contract positively.

IX. RECOMMENDATIONS

Based on the results and findings of this study, the following recommendations are made to foster effective engineering documentation as to reduce to the barest minimum, the lead time to obtaining a No Objection Certificate from the Rivers State Bureau on Public Procurement for the award of construction contracts:

1. Professional/capacity enhancement training should be routinely organized for the unit handling engineering documentation so as to improve on the efficiency in engineering documentation.
2. The management of the Ministry of Works and the Rivers State Bureau on Public Procurement should adopt a standard template for deliverables of engineering consultancy service.
3. The management of the Ministry of Works should adopt a “Service Order Agreement” as a means to ease consultancy service engagement.
4. The unit handling engineering documentation should be adequately incentivized as to reduce to the barest minimum corrupt activities.
5. The management of the Ministry of Works and the Rivers State Bureau on Public Procurement should adopt electronic means for document/correspondence transmission as to save time and risk of document tampering in NOC application process.
6. The Management of the Ministry of Works should enforce adequate and proportionate sanction on erring staff to serve as deterrent to unethical professional practice as necessary.

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