An Investigation into Implementation of Project Quality Management Plan on Building Projects in Awka, Anambra State, Nigeria

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Abstract
The study is aimed at an investigating into the implementation of Project Quality Management Plan on Building Projects in Awka Anambra State, Nigeria, with a view to establishing the level of awareness and advocate the benefits associated with implementation of Quality Management Plan on building projects. This study adopted the use of structured questionnaires and literature reviews. The sample size was 250 building site managers, to elicit relevant data, and were analyzed by using simple percentage and Principal Component Analysis (PCA), using SPSS 23 software. The result indicate that construction practitioners are aware of PQMP in Awka, Anambra State and often apply the document to all building projects. The top benefits of implementing project quality management plan, are that it increases project efficiency and saves cost. At the end of the work, I recommend that Anambra State government should domesticate the national building code. Builders should be given the desired opportunity to manage the building production process in order to achieve efficient, cost saving, and quality projects in Anambra State.

Key Words: *Project; Quality; Plan; Implementation*

1.0 Introduction

The construction industry compared with other sectors of the economy, due to caliber of casualty suffered in execution of building projects across the globe, has made the construction industry the most dangerous or highly hazardous industry (International Labour Organization, 1999; Smallwood and Haupt, 2005).
Quality in construction in its widest definition affects everybody. Poor or bad design, non-conformity with the specified requirements and bad or inadequate maintenance, all come under the heading of quality in our structures (Bamisile, 2004).
In manufacturing, quality is a measure of excellence or a state of being free from defects, deficiencies and significant variations. It is brought about by strict and consistent commitment to certain standards that achieve uniformity of a product in order to satisfy

specific customer or user requirements. International Organization for Standardization defines quality as "the quality of features and characteristics of a product or service that bears its ability to satisfy stated or implied needs." If an automobile company finds a defect in one of their cars and makes a product recall, customer reliability and therefore production will decrease because trust will be lost in the car's quality. (ISO 8402-1986).
The absence of planning of our towns and cities; Incessant collapse of building, fire infernos, built environment abuse and other disasters; Dearth of referenced design standards for professionals; Use of non-professionals and quacks; Use of untested products and materials; Lack of maintenance culture. All these necessitated this study.

Aim and Objectives of the Study

The study is aimed at an investigating into the implementation of health and safety management plan on Building Projects in Awka Anambra State, Nigeria, with a view to establishing the level of awareness and the benefits associated with implementation of Quality Management Plan in the study area.

Research Questions

- What is the level of awareness of Quality Management Plan in the study area?
- What are the benefits associated with implementation of Quality Management Plan in the study area?

Literature Review

Quality Management in Construction Projects As cited in Tan and Abdul-Rahman (2011) the concept of quality management is to ensure efforts to achieve the required level of quality for the product which are well planned and organized. Harris and McCaffer (2001) explained that quality management has to provide the environment within which related tools, techniques and procedures can be deployed effectively leading to operational success for a company. The role of quality management for a construction company is not an isolated activity, but intertwined with all the operational and managerial processes of the company.
Project Quality Management Plan is a document that deals with the application of quality systems to the production of buildings (Bamisile, 2004). At the design stage it is the quality determined by the design team on behalf of the client, and subsequently guides the extent to which a building or part of the building conforms to the requirement of the client as contained in the production information issued to the contractor. The plan is aimed primarily to ensure an efficient quality control system at the construction site and take corrective actions, when necessary. The quality management plan has been established to achieve many objectives in the construction industry. It is geared towards solving the problems associated.
Laure (2000) highlighted the steps of implementing QMP as follows: Get the quality manager in place: His role is to design and manage the implementation of the quality policy. Plan the implementation, Analyze the existing processes, identify improvement sources Get staff to identify where they think processes can be improved, particularly for when things go wrong, Manage the QMP itself: A QMP tends to create its own documentation industry. Ulma (2023) highlighted that Quality management for building works and projects is essential, initially, to comply with the parameters and requirements demanded by regulations, and also to produce high-quality products that guarantee total client satisfaction. Aura (2019) looked at the benefits of quality management in construction this ensures that construction projects are successfully completed and within the constraints given, such as, specified period and at minimum possible cost. Projects are expected to find a balance between cost, quality and time. Mazlina; Marina; & Ahmed (2019) in the study of Benefits and implications of the

different types of quality management in the Malaysian construction industry found that, a common language for communicating quality assurance are gained, confidence of the owner is raised, satisfaction of the client is raised on quality and reduce the prices to make the correction for the problematic work, increased company communication, improve the documentation, improved the technique of operating, improved quality of labor done, bigger owner or client focus, improved worker morale, improved performance appraisal, and increased potency and productivity. External benefits: access to domestic market, higher competitive edge, higher perceived quality of labor done, improved profitableness, access to overseas market, having a valuable selling tool, improved consumer satisfaction, improved the relations with provider or the supplier.

2.0 Methods

The design for this study is a descriptive survey, the population of this study comprises 2756 Built Environment Professionals and the sample size of this study is three hundred and fifty-six (250) which was derived using Taro Yamane method of calculating sample size. The instrument for primary data collection was the use of questionnaire. Methods to be used for data analysis includes:

a) The simple percentage method whereby the responses obtained from respondents are converted into percentage using the formula below:

$$\frac{\text{Number of responds (positive or negative)}}{\text{Total number of respondents}} \times \frac{100}{1}$$

b) Principal Component Analysis (**PCA**), using Statistical Package for Social Science (**SPSS**) Software.

3.0 Results

Table 1: Awareness of Quality Management Plan in Awka Anambra State

Options	Response (f)	Percentage (%)
YES	221	88.4
NO	29	11.6
TOTAL	**250**	**100**

Table 2: KMO and Bartlett's Test of benefits associated with implementation of *Quality Management Plan* Awka Anambra State

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.916
Bartlett's Test of Sphericity	Approx. Chi-Square	5833.548
	df	91
	Sig.	.000

As presented in Table 2, the KMO measure of this study achieved a high value of 0.916 suggesting the adequacy of the sample size for the factor analysis. The Bartlett's test of sphericity was also significant suggesting that the population was not an identity matrix.

Table 3: Communalities

Benefits associated with implementation of Quality Management Plan	Initial	Extraction
Increased Efficiency	1.000	.684
Cost Saving	1.000	.899
Enhanced Safety	1.000	.893
Better communication	1.000	.911
Increased productivity	1.000	.757
Better quality product	1.000	.870
Saves Time	1.000	.817
Reduced Human Error	1.000	.951
Increased Profit	1.000	.888
Client Satisfaction	1.000	.821
Standard Compliance	1.000	.832
Regulation Compliance	1.000	.709
Prevents Defective Products	1.000	.899
Consistency in Expectation	1.000	.841
Extraction Method: Principal Component Analysis.		

As indicated in Table 3, the average communality of the variables after extraction was above 0.60. The conventional rule about communality values is that; extraction values (eigenvalues) of more than 0.50 at the initial iteration indicates that the variable is significant; and should be included in the data for further analysis or otherwise removed

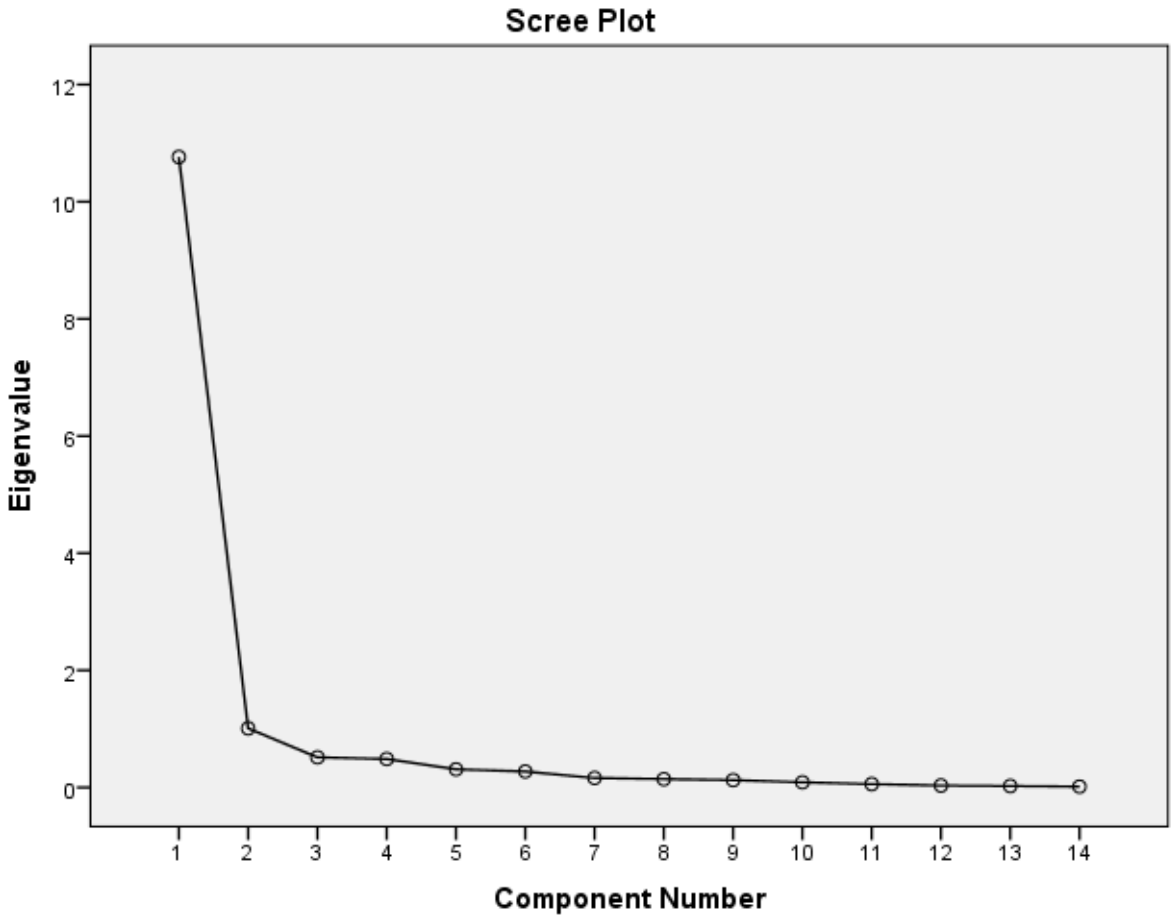

Figure 1: Scree plot

Table 4: **Total Variance Explained**

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total
1	10.763	76.878	76.878	10.763	76.878	76.878	9.745
2	1.009	7.210	84.087	1.009	7.210	84.087	8.949
3	.514	3.668	87.756				
4	.486	3.469	91.225				
5	.310	2.211	93.436				
6	.273	1.949	95.384				
7	.161	1.148	96.532				
8	.143	1.020	97.552				
9	.126	.899	98.451				
10	.088	.626	99.077				
11	.057	.405	99.482				
12	.033	.236	99.718				
13	.025	.177	99.895				
14	.015	.105	100.000				
Extraction Method: Principal Component Analysis.							

As demonstrated in Table 4 and supported by the scree plot in Figure 1; two (2) components with eigenvalues greater than 1.0 were extracted using the factor loading of 0.50 as the cutoff point. The total variance explained by each component extracted is as follows: The first principal component (component 1) accounted for 76.88 % of the total variance whilst the second principal (component 2) component, explained 7.21% of the remaining variation not explained by the first component. The cumulative proportion of variance criterion, which says that the extracted components should together explain at least 50% of the variation, shows that the 2 extracted components cumulatively explained 84.087% of the variation in the data set. Scores are numbers that express the influence of an eigenvector on a specific sample

Component Correlation Matrix		
Component	**1**	**2**
1	1.000	.714
2	.714	1.000
Extraction Method: Principal Component Analysis. Rotation Method: Oblimin with Kaiser Normalization.		

The eigenvalue and factor loadings were set at conventional high values of 1.00 and 0.50 respectively. Applying the latent root criterion on the number of principal components to be extracted suggests that 2 components should be extracted as their respective eigenvalues are greater than one.

Conclusion

The complex nature of building projects nowadays has placed renewed emphasis on the need for project Quality management planning and implementation. It is factual that, studies on Quality implementation have been evolving eccentrically on issue that affect project performance. Application of project Quality management Plan (PQMP) is essential to ensure an efficient quality control system at the construction site and take corrective actions, when necessary.

The implementation project Quality management Plan (PQMP) has a number of benefits including: client satisfaction, improved quality of products and services, promotion of corporate image. It also has several indirect benefits to identify, which give opportunities to review business goals and assess how well the organization is meeting those goals, identify processes that are unnecessary or inefficient, and then remove or improve them, improves self-morale by identifying the importance of their output to the project.

It is recommended that Projects should be properly planned to include the Project Quality Management Plan in order to achieve a quality delivery of construction projects.

Skilled contractors especially Builders should be given the desired opportunity to manage the building production process in order to achieve an efficient, cost saving, and quality project.

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