Significant Effect of Major Factors Performance on Public Building Projects in Osun State

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ABSTRACT

The construction industry is highly competitive and a job creator for different groups of expertise such as owners, consultants, contractors, and other shareholders. General objectives are to assess the effects of issues determining the presentation of public building construction project in Osun State, Nigeria. The research used quantitative design; the data was collected from owners, consultants, and contractors using questionnaires and interviews. The performance problems of which the respondents were asked to rank each according to the five-point Likert scale.

The results of this research identified 36 factors influencing the performance of public building construction projects. From among factors escalation of material prices, unavailability of resources as planned through project duration, sequencing of work according to schedule, differentiation of currency prices, leadership skills of project manager, are the top five significant factors in Osun State. To accomplish the public building construction projects without delay, the clients should hire specialized engineers and the consultants should give training for the project organization. The contractors should use qualified employees with good experience to avoid any problems during construction of the project.

(Keywords: performance factors, respondents, public building construction projects, material prices, schedule, engineering management)

INTRODUCTION

The construction industry is complex in its nature and as a result, it contains an oversized variety of parties such as clients, contractors, consultants, stakeholders, shareholders, and regulators. These parties influence the performance of the building construction as well as factors like time, cost, quality, client satisfaction, productivity, and health and safety [13].

The construction industry plays a significant role in development and achievement the goals of society. The performance of the development industry in Nigeria is suffering from national economies. Therefore, performance is related to many factors such as time, cost, quality, client satisfaction, productivity, and health and safety.

In the building construction project, the perception of key stakeholders, including client/government officials, consultants, and contractors regards the failure in construction projects over their different stages that are, conceptual, planning and tender, production, and operation [3]. Akomolafe and Ayegbokiki (2009) state that different stakeholders may have different viewpoints about project success as well as the success factors. Hence, as the nature of the construction company's participants is different for different projects. It is not easy to make a comprehensive list of success factors. As such, it was concluded that different performance factors are involved to achieve different objectives for each project. Among the participating groups the most significant factor affecting performances of construction projects will vary [6].

The survey findings indicate that the most important factors impacting the performance of construction projects are improper planning, improper designing, site management, decision-making, construction methods, shortage of labor and technical personnel, quality, shortage of materials, construction mistakes and defective work, and productivity [12]. Strategic decisions on client satisfaction, financial stability, efficiency, and effectiveness of the internal business process, and project teams, sustainable projects and delivery of innovative projects to clients are required to optimize building project performance.

The main objectives of this research are to assess the effects of factors determining the performance of the public building construction projects in Osun State, Nigeria.

LITERATURE REVIEW

Construction projects can be considered as one of the largest industries in the world. Growth in this industry, in reality, is an indicator of the economic conditions of a country. Most construction projects exhibit value overruns, time extensions, and conflicts among parties and dereliction in the safety and quality sector. Design to control practical information for reaching the project objectives is a significant component of project management. The project management is the planning, organizing, directing, and controlling of company resources to achieve specific goals and objectives. In the project management which are cost, time and performance are the main objects, but in the construction project management its cost, time, and quality which did not change fundamentally. Therefore, in the construction industry management is one of the most important factors affecting the performance of works.

Construction Management and Performance

In the construction industry, delay of construction projects depends mainly on the poor performance in the projects. Inappropriately managed estimations and coming up with scheduling, value management, budget management, resource allocation, collaboration packages, communication plans, quality management, documentation or administration system, and the overall quality of field data are essential issues influencing the performance of the public-funded construction projects [15].

The effect of construction project performance on economic development in Nigeria is improvement in technology, the extension of infrastructures, increase in employment opportunities, and government expenditure [14]. The essential factors influencing the success of projects are known and unremarkably associated with the subsequent areas: project (e.g., clear goal, realistic schedule, adequate funds, resources, size, and complexity), project manager and leadership (e.g., leadership, management of changes, effective conflict resolution, communication), project team members (e.g., communication, technical background, qualified team), organization (e.g., high management support, responsibility and authority chart). and external setting (client, technological setting, political setting, social setting, physical environment) [9]. The factors affecting the performance of construction project that were agreed upon by the owners, consultants, and contractors in Libya were escalation of material prices; availability of resources as planned through project duration; average delays thanks to closures and materials shortages; convenience of personals with high expertise and qualification; quality of equipment and raw materials in project; and leadership skills for project managers [7].

Factors Affecting of Performance in Construction Projects

Cost Factor: Cost has been addressed by many researchers as a very important success criterion, whereas budget plan and proper cost estimation has been mentioned as prominent success factors. As suggested by the experts, the four areas that are highly relevant to project cost control are interim payments, variation orders, cost and prolongation claims, and final account forecasts [2].

Time Factor: Time or schedule as one of the most important project success criteria for any project. Time has been self-addressed as a criterion by that to gauge a project's degree of success [5]. It has conjointly been mentioned as an element, which may facilitate the opposite factors/criteria be met. It is found in this study that the definition of “Time” is of great importance. "Time" as the date when a project is most likely to end can be criteria, but "Time" as a manageable component might be considered as a factor.

Quality Factor: Quality management method as a project success issue that facilitates the success of alternative criteria and factors [1].

Client Satisfaction Factor: It is worthwhile to note that stakeholders' satisfaction is sometimes paraphrased as satisfying stakeholders' needs or meeting stakeholders' expectations. A major contribution to unsuccessful projects is the lack of understanding or defining project and product scope at the start of the project. A properly defined and managed scope leads to delivering a

quality product, at a controlled cost and within specified schedules to the stakeholders [10].

Productivity Factor: Inconvenience of materials, late payment of salaries and wages, suitability/adequacy of plant and instrumentation, superior incompetence, and lack of workforce skills, at the highest five most vital factors striking on labor productivity in Zimbabwe [4]. An adequate work coming up with, economical resource procurable systems, timeouts payment of salaries and continuous skilled development for employees, area unit amongst the counseled intervention methods to enhance on-the-scene labor productivity.

Environmental Factor: External environmental factors, that embrace political surroundings, economic surroundings and social surroundings, have an effect on the success of housing construction in developing countries. The construction professionals who work as developers, consultants, or contractors, and those working in public housing agencies [11].

METHODOLOGY

Measures

Several factors have direct and indirect effect on the progress of construction projects and were identified in literature research. Those factors were then filtered to 36 most relevant factors through interviews held with experienced professionals having construction project management experience of 5 to 15 years. The filtered factors highly influence the construction projects of contractors, clients and consultants. The survey was limited to the public building construction projects of Osun State, Nigeria.

Development of Questionnaire and Data Collection

The identified factors were transformed into a research questionnaire to gather the data from contractors, clients, and consultants. A total of 16 (sixteen) construction projects consisting of 10 educational schools and 6 health centers or public service buildings were visited for the purpose of onsite feed-back and to get the required data from the professional engineers working at different building projects. Questionnaires were sent to different professional engineers working with construction firms by post, through email and through engineers working on site. Thirty-three responses were collected from the professionals out of whom five responses were discarded for not being valid responses. The respondents were asked to tick (√) the appropriate item according to their projects.

Quantitative data analysis of 33 responses of the professionals engaged in construction projects for 36 different factors were analyzed on Likert's scale. "1" Not Significant, "2" Slightly Significant, "3" Moderately Significant, "4" Very Significant, and "5" Extremely Significant.

DATA ANALYSIS

The following tests were carried out for data analysis:

1) Cronbach's Alpha
2) Relative Importance Index.

Cronbach's Alpha

For internal reliability, Cronbach's Alpha was calculated for each scale. Cronbach's Alpha for 33 samples was collected as 0.734. Thus, the results indicate internal construct consistency and reliability of the data. Cronbach's coefficient alpha is designed as a measure of internal consistency [8]. Cronbach's coefficient alpha can be used to check the reliability of the questionnaire. The normal range of Cronbach's coefficient alpha values between 0.0 and + 1.0.

The closer the Alpha is to 1, the greater the internal consistency of items in the instrument is assumed.

RII Ranking Results

The data included 74 factors that were to be analyzed. Strength of index familiarity, frequencies and agreements were computed through the technique of Relative Importance index (RII). Ranking carried out through the Likert's Scale and top five factors were identified.

$$RII = \frac{\Sigma W}{A * N} = \frac{5*n5*n4+3*n3+2*n2+1*n1}{5*N} \quad (1)$$

Where, W is the weight given to each factor by the respondent, ranging from **1 to 5**, (**n1** = number of respondents for Not Significant... **n5** = number of respondents for Extremely Significant) **A** is the highest weight (i.e., 5 in the study) and **N** is the total number of respondents. Analyzing the data from the gathering information and ranging by using RII value between ***0<RII ≤1***, the highest value of RII, the most significant performance factors. The importance of the indices and overall ranking the factors calculated are shown in Table 1.

Table 1: RII and Ranking of Factor Affecting the Performance of Public Building Construction Projects.

S/N	FACTORS	RII	RANK
1	Escalation of material prices	0.922	1
2	Unavailability of resources as planned through project duration	0.860	2
3	Sequencing of work according to schedule	0.856	3
4	Differentiation of currency prices	0.849	4
5	Leadership skills for project manager	0.818	5
6	Material and equipment cost	0.750	6
7	Employee attitudes in projects	0.748	7
8	Project location is safe to reach	0.745	8
9	Quality of equipment and raw materials	0.748	9
10	Technology advancement	0.745	10
11	Management-labor relationship	0.739	11
12	Cost of variation orders	0.729	12
13	Training the human resources in the skills demanded	0.725	13
14	Quality training/meeting	0.698	14
15	Motivation cost	0.694	15
16	Application of health and safety factors in organization	0.694	15
17	Cost of rework	0.687	16
18	Recruitment and competence development	0.678	17
19	Conformance to specification	0.639	18
20	Implementing effective safety system	0.612	19
21	Average delay in regular payments	0.608	20
22	Regular project budget update	0.597	21
23	Percentage of orders delivered late	0.594	22
24	Unavailability of competent staff	0.565	23
25	Communication system	0.534	24
26	Site preparation time	0.529	25
27	Planned time for project construction	0.498	26
28	Project labor cost	0.492	27
29	Work group	0.456	28
30	Project design cost	0.455	29
31	Cost of compliance to regulators requirement	0.427	30
32	Overhead percentage of project	0.423	31
33	Waste rate of materials	0.366	32
34	Profit rate of project	0.323	33
35	Wastes around the site	0.270	34
36	Project complexity	0.263	35

Five most important factors identified are discussed below:

1. *Escalation of Material Prices*

It was obtained that the escalation of material prices results from unexpected rise in the market prices of key construction materials was the most important performance factor, 92% participants (30/33) strongly agreed. This agreement between all target groups is traced to the political situation from which affects the Osun state. Public building construction projects in Osun State are suffering from a number of problems because of the unexpected rise in the market prices of key construction materials. These problems can be considered as an obstacle for the cost performance of projects as this affects the rate at which projects are executed. All clients, consultants, and contractors feel such a sensitive problem in their projects. The current political situation in Ethiopia is the result of the increment of the market price of construction material.

2. *Unavailability of Resources as Planned through Project Duration for the Construction Projects*

This factor can be considered as important for three parties and it has an approach rank for all parties, 86% participants (29/33) strongly agreed as it directly affects the completion of a construction project such as time performance. If resources are not available through construction projects as planned through project duration, the project will suffer from the problem of time and cost performance. Hence the progress of construction projects is not finished according to the schedule. This is because the availability of resources as a planned schedule can improve the time performance of the construction projects.

3. *Sequencing of Work According to Schedule*

This is mainly because cash flow affects the project budget and project cost performance problems, 86% participants (29/33) strongly agreed.

4. *Leadership Skills for Project Manager*

This factor is considered as more important for contractors and clients than for consultants, 82% participants (27/33) strongly agreed. This is mainly because if a project manager has strong leadership skills, then the project performance can be able to plan and execute their construction projects to maximize the project's chances of success with quality and in the scheduled.

RECOMMENDATIONS

Based on the findings of this study, it is recommended that the client must determine project duration by their professional engineers to avoid a change in the schedule and request everything they need in the contract from the beginning and avoid any requirements or change-orders after the implementation of works and develop a clear vision for projects. The client is recommended to provide clear criteria for the selection of contractors according to the nature of the project and to have a good reputation and great experience. The client is recommended to provide the consultant with sufficient time to prepare bidding documents to avoid any mistakes or misunderstandings. The governmental security and the project organization must work together to produce the projects within a schedule.

CONCLUSIONS

The reliability of data was checked by using Cronbach's Alpha, the internal consistency of performance factors in the research was high-reliability consistency. From the survey conducted and analysis, seventy-four factors of performance influencing were identified from the response questionnaire. From the identified factors the top five significant factors affecting of performance of public building construction projects were: 1) escalation of material price, 2) unavailability of resources as planned through project duration, 3) sequencing of work according to schedule, 4) differentiation of currency prices, and 5) leadership skills for project manager.

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