AN EVALUATION OF FACTORS AFFECTING THE PERFORMANCE OF CONSTRUCTION PROJECTS IN NIGER STATE

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ABSTRACT

The construction industry is multifaceted in nature because it encompasses large numbers of parties as owners or clients, contractors, consultants, stakeholders and regulators. Construction projects in Niger state suffer from many problems and complicated issues in performance such as cost, time and quality. The study aims to identify and evaluate the main factors affecting the performance of construction projects in Niger state. The objectives are to evaluate the most significant key performance indicators of construction projects and to formulate recommendations to improve performance of construction projects. In the study, factors affecting the performance of construction projects were identified from a literature search and subjected to the views and opinions of respondents using a structured questionnaire. Fifty seven (57) questionnaire representing 64% were received and analyzed using descriptive and inferential statistical tools. The results indicated that the most important factors agreed by the owners, consultants, and contractors as the main factors affecting the performance of construction projects in Niger State were: availability of personnel with a high experience and qualifications, quality of equipment and raw materials in project, conformance to specification, planned time for project construction, availability of resources as planned through project duration, average delay in payment from owner to contractor, information coordination between client and project parties. It was recommended that client should facilitate payment to contractors. All professional should participate in sensitive and vital decision-making. Continuous coordination and relationship between project participants are required for solving problems and developing project performance.

Keyword: Construction Performance, Cost, Time, Niger State.

INTRODUCTION

The construction industry is multifaceted in nature because it encompasses large numbers of parties as owners or clients, contractors, consultants, stakeholders and regulators. In spite of this complexity, the industry plays a major role in the improvement and attainment of society's goals. According to Chitkara (2004), the construction industry in many countries accounts for 9% of the Gross Domestic Product (GDP). Nigeria is no exemption, the local construction industry is one of the key economic engine sectors, and it has been a major source of employment for 70% of the labour force, supporting the country's national economy Amusan (2012). As a

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result the capital flow and labour resources are controlled which has cost implications. The overall success of project works is determined to a large extent by the Proper management of the resources which are considered as an essential aspect of project works. So also if the resources are adequately controlled, issues that relates to cost overrun would not arise which could result to variations and claims. However, many local construction projects report poor performance due to many noticeable project-specific causes, to ensure the construction cost is within the budget it is important to have control on cost performance of projects.

Mbugua *et al* (1999) describes Performance measurement as a systematic way of evaluating the inputs and outputs in construction activity or manufacturing operations and acts as a tool for constant improvement. Rose (1995) further added that measurement can steer a steady progression toward established goals and identify underperformance. It provides a sense of where we are and, more importantly, where we are going. Barkley and Saylor, (1994) believes that, project performance measurements are based on time cost and quality. Atkinson (1999) noted that these three predominant performance evaluation dimensions are referred to as the 'iron triangle'.

Kumaraswamy and Thorpe (1999) considered variety criteria in measuring and evaluating project using a large number of performance indicators such as meeting budget, user satisfaction, schedule, health and safety, the quality of workmanship, stakeholder's satisfaction, environmental performance, transfer of technology, actor's satisfaction and commercial value. In this article variable such as cost, time, quality, clients' satisfaction, productivity, health and safety, environmental, innovation and learning, and regular/community satisfaction have been identified for measuring project performance.

Aim and Objectives

The aim of this research is to analyze the factors affecting the performance of construction projects in Niger state. This was further broken down into the following objectives:

- To identify the factors affecting the performance of construction projects (Key Performance indicators) in Niger state.
- To evaluate the most significant key performance indicators of construction Projects in Niger state.
- To formulate recommendations to improve performance of construction Projects in Niger state

REVIEW OF PREVIOUS STUDIES

A number of studies have been conducted to examine factors impacting on project performance in various countries. Iyer and Jha (2005) identified project performance cost factors to include: project manager's competence, top management support, project manager's coordinating and leadership skills, monitoring and feedback by the participants, decision-making, coordination among project participants, owners'

competence, social condition, economic condition, and climatic condition, Coordination among project participants. Faridi and El-Sayegh (2006) established that lack of skills of manpower, poor supervision and poor site management, unsuitable leadership; lack and breakdown of equipment contribute to construction delays in the United Arab Emirates. Ogunsemi (2002) observed that the major performance factors causing cost and time overruns in Nigeria include price fluctuation, variation of works, financial difficulty. Hanson *et al.* (2003) investigated causes of client dissatisfaction in the South African building industry and establish that conflict, poor workmanship and incompetence of contractors to be among the factors which negatively impacted on project performance. Navon (2005) established that the major performance problem can be divided into two groups: (a) unrealistic target setting (i.e., planning) or (b) causes originating from the actual construction (in many cases the causes for deviation originate from both sources). Love *et al.* (2005) observed that project time-cost performance relationship, and their results showed that cost is a poor predictor of time performance. Elyamany *et al.* (2007) established a performance evaluation model for construction companies in order to provide an appropriate tool for the company's owners, shareholders and funding agencies to evaluate the performance of construction companies in Egypt. Enshassi *et al.* (2009) recognized that the major performance problem in Gaza Strip are; average delay because of closures leading to materials shortage, escalation of material prices, unavailability of resources as planned through project duration, unavailability of personnel with a high experience and qualifications, quality of equipment and raw materials in project, and leadership skills for project managers . The above examples demonstrate that there is large amount of factors which affect the performance of project. As such, this paper builds upon the vast amount of published study.

METHODOLOGY

A questionnaire survey was used to assess the attitude of construction stakeholders towards the factors affecting the performance of construction projects in Niger State. Questionnaires were sent to randomly select stakeholders in the construction industry, the stakeholders are either client-based organizations such as representatives of government ministries and agencies, private corporations/real developers and contractor based organizations that have actively supervised and handled completed construction projects' supervision and execution. They included mainly site engineers/office engineers, architects, builders, project managers, quantity surveyors, construction managers and foremen at the top of their careers and who have had immense experience on construction projects. Eighty (80) questionnaires were distributed as follow, thirty (30) to client, twenty (20) to consultant and 40 to contractor. Fifty eight (58) were returned (rate of response 64%) as follows: 21(68%) from client, 13 (65%) from consultant and 23(60%) from contractor as respondents.

The questionnaire for the study is made up of two main sections. Section A was used to collect personal data of respondents, section B was used to identify sixty three (63) factors believed to affect project performance were considered and were listed under ten (10) groups based on the literature reviewed. The respondents were asked to indicate, based on their local experience the level of importance of each one of

the identified sixty three (63) factors of performance on a five-point Likert scale as: one (1) not important, two (2) slightly, three (3) moderately, four (4) very important, and five (5) extremely important. The main groups considered in this paper are: time, cost, quality, productivity, client satisfaction, regular and community satisfaction, people, health and safety, innovation and learning, and environment.

The relative importance index method (RII) is used to determine owners, consultants and contractors perceptions of the relative importance of the key performance factors. The relative importance index was computed as (Cheung *et al,* 2004; Iyer and Jha, 2005; Ugwu and Haupt, 2007; Enhassi 2009).

RII = [summation] W/A x N
Where: W is the weight given to each factor by the respondents and ranges from 1 to 5,
A = The highest weight = 5
N = The total number of respondents

RESULTS AND DISCUSSION

Factors affecting the performance of construction projects
Table 1 summarizes the computed RIIs and their ranks of factors affecting the performance of construction projects as perceived by the 3 responding groups.

Table 1: The Relative Importance Index (RII) and Rank of Factors Affecting the Performance of Construction Projects in Niger State According to All Categories

S/N	Factor Title	Group Title	Factor R.I.I.	Rank
1	Unavailability of personals with high experience and qualification	Quality	0.80	1
2	Quality of raw materials and equipments in project	Quality	0.78	2
3	Conformance to specification	Quality	0.74	3
4	Planned time for construction of project	Time	0.73	4
5	Availability of resources as planned through project duration	Time	0.73	4
6	Average delay in payment from owner to contractor	Time	0.72	5
7	Information coordination among owner and project parties	Client satisfaction	0.72	5
8	Cost of Material and equipment	Cost	0.72	5
9	Complexity of Project	Productivity	0.72	5
10	Recruitment of employees and competence development	People	0.71	6
11	Design cost of Project	Cost	0.71	6
12	Labour cost of Project	Cost	0.71	6
13	Level of managerial participation in decision making.	Quality	0.71	6
14	Employee attitudes in project	People	0.71	6
15	Learning from best practice and experience of others	Innovation and learning	0.70	7
16	Climate condition	Environment	0.70	7
17	Sequencing of work according to schedule	Productivity	0.69	8
18	Organization Quality assessment system	Quality	0.69	8
19	Site preparation time	Time	0.68	8
20	Learning from own experience and past history	Innovation and learning	0.68	8

21	Training the human resources in the skills demanded by the project	Innovation and learning	0.68	8
22	Average delay because of shortage of material	Time	0.68	8
23	Cost control system	Cost	0.67	9
24	Time required to implement variation orders	Time	0.67	9
25	Leadership skills	Client satisfaction	0.67	9
26	Ease access to the site (project location)	Health and safety	0.67	9
27	Review of failures and solve them	Innovation and learning	0.67	9
28	Project profit rate	Cost	0.66	10
29	Regular project budget update	Cost	0.66	10
30	Quality training/meeting	Quality	0.66	10
31	Escalation of material prices	Cost	0.66	10
32	Work group	Innovation and learning	0.66	10
S/N	**Factor title**	**Group title**	**Factor R.I.I.**	**Rank**
33	Overtime cost of project	Cost	0.65	11
34	Motivation of employees	People	0.65	11
35	Average delay in claim approval	Time	0.65	11
36	Rate of materials waste	Cost	0.63	12
37	Management-labour relationship	Productivity	0.63	12
38	Organization Liquidity	Cost	0.62	13
39	Percentage of orders delivered late	Time	0.62	13
40	Time needed to rectify defects	Time	0.62	13
41	Number of new projects / year	Productivity	0.62	13
42	Belonging to work	People	0.62	13
43	Application of Health and safety factors in organization	Health and safety	0.62	13
44	Rate of reportable accidents in project	Health and safety	0.62	13
45	Cost of variation orders	Cost	0.61	14
46	Speed and reliability of service to owner	Client satisfaction	0.61	14
47	Quality and availability of regulator documentation	Regular/community satisfaction	0.61	14
48	Noise level	Environment	0.61	14
49	Rate of project Assurance	Health and safety	0.61	14
50	Wastes around site	Environment	0.61	14
51	Air quality	Environment	0.60	15
52	Number of reworks	Client satisfaction	0.60	15
53	Neighbours and site conditions problems	Regular/community satisfaction	0.60	15
54	Number of non compliance to regulation	Regular/community satisfaction	0.59	16
55	Organization Market share	Cost	0.59	16
56	Cost of compliance to regulators requirements	Regular/community satisfaction	0.59	16
57	Motivation cost	cost	0.59	16
58	Rate of absenteeism through project	Productivity	0.59	16
59	Overhead percentage of project	Cost	0.58	17
60	Project cash flow	Cost	0.58	17
61	Cost of rework	Cost	0.58	17
62	Number of disputes between owner and project parties	Client satisfaction	0.56	18
63	Differentiation of currency prices	Cost	0.55	19

Source: Researcher's Fieldwork.

Table 2 illustrates the top significant factors affecting the performance of construction projects in Niger State. It can be inferred from this table that 3 most important factors according to the perception of owner, consultant, and contractor

are: unavailability of personals with high experience and qualification, Quality of equipments and raw materials in project and Conformance to specification.

Table 2: Shows the Top Ten Significant Factors Affecting the Performance of Construction Projects in Niger State According to All Categories

S/N	Factor Title	Group Title	Factor R.I.I.	Rank
1	Availability of personals with high experience and qualification	Quality	0.80	1
2	Quality of raw materials and equipments in project	Quality	0.78	2
3	Conformance to specification	Quality	0.74	3
4	Planned time for construction project	Time	0.73	4
5	Availability of resources as planned through project duration	Time	0.73	4
6	Average delay in payment from owner to contractor	Time	0.72	6
7	Information coordination among owner and project parties	Client satisfaction	0.72	6
8	Cost of Material and equipment	Cost	0.72	6
9	Recruitment of employees and competence development	People	0.71	9
10	Level of managerial participation in decision making.	Quality	0.71	9
11	Learning from best practice and experience of others	Innovation and learning	0.70	10
12	Climate condition	Environment	0.70	10

Source: Researcher's Fieldwork

1. Unavailability of Personals with High Experience and Qualification: Has been ranked by all response in the first position with RII equal 0.80. Availability of personals with high experience and qualifications will assist the project parties to implement their project goals with a professional and lead to better performance of quality, time, cost, productivity and safety of projects. Samson and Lema (2002), Cheung *et al* (2004) and Iyer and Jha (2005) are in agreement with our result as this factor is very important because it affects strongly on quality performance of construction projects.

2. Quality of Raw Materials and Equipments in Project: Has been ranked by all response in the second position with RII equal 0.78. Quality control is one of the most important duties for the consultant in the site of construction project. Contractor and consultants usually want materials applied in a project to be of good quality and this will lead to owner satisfaction and implementation of project according to specifications. Cheung *et al* (2004) and Iyer and Jha (2005) are in agreement with our result as this factor affects the project performance and the degree of owners satisfaction.

3. Conformance to Specification: Has been ranked by all response in the third Position with RII equal 0.74. This factor is significant to owners, as it is related to client satisfaction. The owner usually seeks to implement project according to specification. Iyer and Jha (2005) are in agreement with our result as this factor is important for owners because this factor is strongly related to client satisfaction.

4. **Planned Time for Construction Project:** Has been ranked by all response in the fourth Position with RII equal 0.73. This factor is more important for owners as they usually want their projects completed as early as possible. Completing project on time lead to client satisfaction for proper utilisation of property.

5. **Unavailability of Resources as Planned through Project Duration:** Duration has been ranked by all response in the fourth position with RII equal 0.73. This factor is considered as important for all parties as it affects directly on project performance such as time. If resources are not available as planned through project duration, the project will suffer from problem of time and cost performance. This result is in line with Enshassi *et al* (2009) as availability of resources as planned through project duration is an important factor for all response in Gaza strip construction projects. This is because resource availability as planned schedule can improve time performance of projects.

6. **Average Delay in Payment from Owner to Contractor:** Has been ranked by all response in the sixth Position with RII equal 0.72, this agreement between parties is traced to disagreement that will take place between project parties, when the payment from owner is delayed. This will affect project performance, especially time performance. Karim and Marosszeky (1999) are in agreement with our result, as the average delay in payment from owner to contractor affects the time performance.

7. **Information Coordination among Owner and Project Parties:** Has been ranked by all response in the sixth Position with RII equal 0.72. This factor is considered as important for all parties as it affects directly on project performance such as client satisfaction. Information coordination between owner and project parties is very important for the success of the project. Proper communication between various parties must be established during the construction process. Any difficulty with communication can lead to severe misunderstanding and therefore, affects strongly on client performance of construction projects.

8. **Cost of Material and Equipment:** Has been ranked by all response in the sixth position with RII equal 0.72. This is one of the project cost components that affects owners' liquidity and project budget. Escalation of material and equipment prices can lead to projects been finished with poor cost performance. Our results is not in support with those of Ugwu and Haupt (2007) as materials and equipment cost rarely affect the cost performance in South African construction projects. This can be ascribed to different economic and political conditions.

9. **Recruitment of Employees and Competence Development:** Has been ranked by all response in the ninth position with RII equal 0.71.This factor is considered as important for all parties as it affects directly on project performance such as client satisfaction, If competent and well developed employees are recruited, the project performance can be monitored, controlled and managed with high quality.

10. **Level of Managerial Participation in Decision Making:** Has been ranked by all response in the ninth position with RII equal 0.71. This is because participation of managerial levels with decision-making will lead to better implementation and performance of a project and will satisfy the three parties to a greater degree. Iyer and Jha (2005) are in agreement with our results as this factor is important to three parties because it will improve overall performance of a construction project.

11. **Learning from Best Practice and Experience of Others:** Has been ranked by all response in the tenth position with RII equal 0.70. This is because learning from best practice and experience of others can improve and develop performance of current and future projects of the various parties.

12. **Climate Condition:** Has been ranked by all response in the tenth position with RII equal 0.70. This factor is the most important for all parties, because it affects the productivity and time performance of project. This result is not in conformity with Iyer and Jha (2005), as climate condition is not important for the three parties. This might be because of different location and weather condition.

CONCLUSION

A questionnaire survey was used to assess the attitude of owners, consultants, and contractors towards the factors affecting the performance of construction projects in Niger State. 80 questionnaires were distributed as follow, 30 to client, 20 to consultant and 40 to contractor. 64% were returned as follows: 21(68%) from client, 13(65%) from consultant and 23(60%) from contractor as respondents. The respondents were asked to indicate, based on their local experience the level of importance of each one of the identified 63 factors of performance in Niger State as: not important, slightly, moderately, very important, and extremely important.

The results indicated that the most important factors agreed by the owners, consultants, and contractors as the main factors affecting the performance of construction projects in Niger State were: availability of personnel with a high experience and qualifications, quality of equipment and raw materials in project ,conformance to specification, planned time for project construction, availability of resources as planned through project duration, average delay in payment from owner to contractor, information coordination among client and project parties, cost of material and equipment, recruitment of employees and competence development, level of managerial participation in decision making.

RECOMMENDATIONS

It is recommended that proper and continuous training programs on construction projects performance should be organised to develop human resources in the construction industry. These programs can assist participants' to be more familiar with project management techniques and can update participants' knowledge. Greater applications of health and safety factors are necessary to overcome problems

of safety performance and improving the productivity performance of construction projects.

Owners: In order to overcome delay, disputes, and claims, owners/client are advised to facilitate payment to contractors. All professional should participate in sensitive and vital decision-making. Continuous coordination and relationship between project participants are required through project life cycle for solving problems and developing project performance.

Consultants: In order to improve performance and to increase owners' satisfaction consultants should be more interested in design cost by choosing the most economical criteria. In addition, consultants are advised to accelerate and facilitate orders delivered to contractors to obtain better time performance and to minimize disputes and claims.

Contractors should allowed sufficient amount as contingency in order to cover increases in material and equipment cost. Contractors should be more interested in conformance to project specification to engulf disputes, time, and cost performance problems. Contractors should be more interested in ordering for Quality materials to improve cost, time, and quality performance. This can be achieved by organising quality training and meetings that are necessary for performing an improvement Contractors are advised to prepare a work plan in accordance to project schedule. Furthermore, a professional or cost engineer of high experience and who is compete should be attached in projects to help in the monitoring, managing and controlling of project costs to achieve high quality.

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