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Analysis of Criteria for Measuring the Performance of Site Managers in Lagos State

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ABSTRACT

Construction project development involves numerous parties, various processes, different phases and stages of work with the major aim being to bring the project to a successful conclusion. The level of success in carrying out construction project development activities depends heavily on the quality of the managerial, financial, technical and organizational performance of the respective parties. The paper examines the criteria for measuring the performance of construction site managers in Lagos State and identifies the factors influencing the performance of construction site managers. These were with a view to enhancing project delivery. The target population for the study is mainly the construction site managers in the eighty-eight (88) construction firms registered under the Lagos State Tender Board. The construction firms were stratified to three sizes with sixteen (16) firms, thirty-nine (39) firms and thirty-three (33) as large, medium and small respectively. A total enumeration survey of these constructions was carried out and Two (2) construction site managers were surveyed in each of the construction firms to obtain a total of 176 respondents. The data were analyzed with the use of percentages, relative importance index (RII) and mean item score (MIS). Age of worker was found to be the most important criterion for measuring the performance of construction site managers in small firms, Medium firms are only concerned about the absence of defects and rework and Large firms require their site managers to serve as the face of the firm and the level of experience and education of site managers is a major criterion for measuring the performance of site managers in large firms. Overall, findings suggest that for the effective performance of a site manager in any of the firm categories management, leadership, negotiating skills, integrity cannot be overlooked.

Keywords: Performance-indicators, Performance-Measurement, Construction-Site-Management, Mean-Item-Score (MIS), Relative-Importance-Index (RII).

1.0 INTRODUCTION

The construction industry is vital to the development of any nation. The pace of the economic growth of any nation can be measured by the development of physical infrastructures, such as buildings, roads and bridges [1]. Construction project development involves numerous parties, various processes, different phases and stages of work and a great deal of input from both the public and private sectors, with the major aim being to bring the project to a successful conclusion. The level of success in carrying out construction project development activities depend largely on the quality of the managerial, financial, technical and organizational performance of the respective parties, while taking into consideration the associated risk management, the business environment, economic and political stability.

Construction is becoming more complex, therefore a more sophisticated approach is necessary to deal with initiating, planning, financing, designing, approving, implementing and completing a project [2]. Project performance remains a prominent issue in project delivery because projects involve defined objectives which must be achieved and numerous resources which need to be efficiently utilized [2]. Construction site managers are site agents or building managers responsible for the day-to-day on site running of a construction project. Site managers are required to keep within the timescale and budget of a project and manage any delays or problems encountered on site during the construction project. However, the criteria for success are in-fact much wider, incorporating the performance of the stakeholders, evaluating their contributions and understanding their expectations [2-3]. According to Atkinson (1997) [3], successful construction project performance is achieved, when stakeholders meet their requirements, individually and collectively. Since performance is an individual contribution to the execution of the task required in completing the construction project [4], the performance of each participant should be measured, evaluated and prioritized at

every stage of the phases in order to determine the extent to which a project has been successful. Improving Human Resource Management (HRM) through the application of performance measures has been recognized as one of the most critical elements for organizational competitiveness and improvements [5].

While construction represents one of the largest industries in developing countries, it has remained under-researched and underdeveloped in relation to the identification and development of performance measures for effective HRM practices [6]. Historically, the industry has adopted a passive (or at best ad-hoc) approach towards dealing with the bench-marking of site managers performance, resulting in the lack of a systematic framework towards the development of appropriate test practices [7]. Whilst project management competence represents only one of many criteria upon which project performance is contingent, it is also arguably the most significant as it is people who deliver projects and not processes and systems [8]. Indeed, effective project management can be seen to be dependent upon the site manager's competency and authority [9].
Perhaps surprisingly therefore, organizations and researchers have traditionally focused on the three traditional criteria of cost, time and quality [10-11]. However, these outturn measures appear overly simplistic when applied to the evaluation of site managers' performance. There are several reasons for the inadequacy of such outturn measures when applied to the evaluation of human performance: (1) program and financial metrics are based on estimates made at a time when the least is known about the project, whilst quality is an emergent property of different peoples' attitudes and beliefs which can change over the project life-cycle (Atkinson, 1999); (2) demands on construction site managers are far broader and multifaceted than in the past and can stretch well beyond project boundaries.

A performance indicator or Key Performance Indicator (KPI) is a tool employed in rating the performance of construction site manager on a project. KPIs evaluate the success of an organization or of a particular activity in which it engages and are intended for use as benchmarking indicators for the whole industry, whereby an organization can bench-mark itself against the national performance of the industry and identify areas for improvement. The KPIs also allow to trace which processes and capabilities must be competitive and distinctive, and which merely need to be improved or maintained. In order to define the KPIs throughout the lifetime of a project, five key stages have been identified by (DETR, 2000) as shown in Figure 1.0. Clearly these measures are specific to projects and offer very little indication as to the performance of the organizations themselves from a business point of view [12]. However, a review of the literature suggest that little attention has been paid to the development of appropriate performance measures for site managers which align with broader project requirements. This may be because identifying the critical management inputs and outcomes that lead to successful projects is problematic given the interplay of complex variables that impinge on the efficacy of management decision-making and leadership.

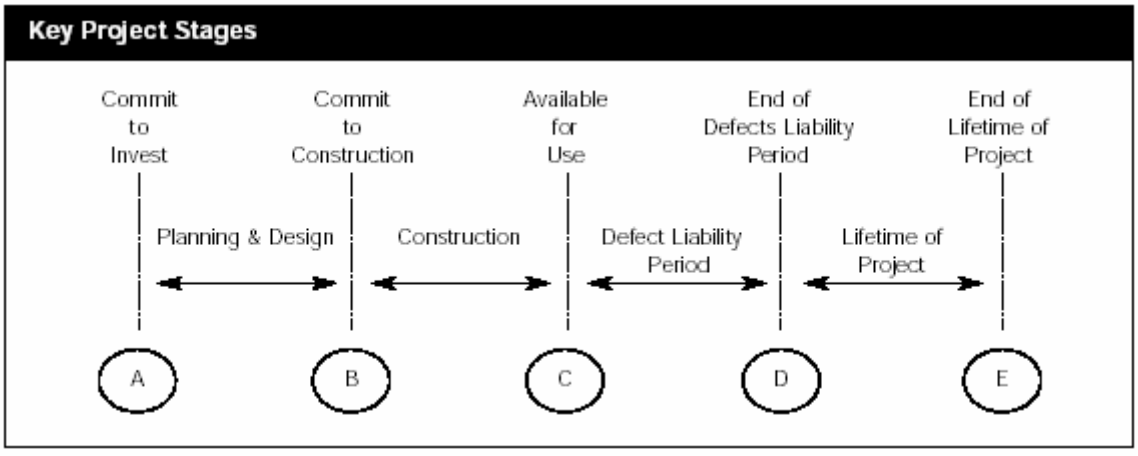

Figure 1. KPIs throughout the Lifetime of a Project. Source: DETR, (2000)

According to Idrus and Sodangi (2010) [12], the Nigerian construction industry produces nearly 70% of the nation's fixed capital formation yet its performance within the economy has been, and continues to be, very poor. For example, Nigerian construction industry contribution to the employment has remained consistently at 1.0% over the last decade against the World Bank's average observation of about 3.2% in developing countries The last decade however exposed the declining level of client's satisfaction from the built facilities as a result of poor quality performance of site managers in addition to the perennial problems of time, quality and cost overruns in the Nigerian construction industry [12]. This has necessitated a radical change in industry practice in order to improve quality of construction processes and the level of client's satisfaction arising there from by devising methodology for evaluating the quality performance of the contractors in order to assist construction clients in selecting quality-oriented organizations that will provide higher quality services and product within budget and on schedule [12].

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The findings of Ali et.al, (2012) [13] indicated that the traditional financial measures can no more be the sole determinant of firm success and that other performance indicators such as external customer satisfaction, safety, business efficiency, and effectiveness of planning are increasingly becoming important. They observed that these indicators differ from country to country. Chan and Chan (2012) [13] stated that much is yet to be done on the key performance indicators for construction site managers in the construction industry. Previous studies particularly from the developed countries suggest that performance indicators are locational and there seems to be no agreement on which of the criteria is key; hence the essence of this study is to determine key performance indicators for measuring construction site manager's performance in Lagos State, Nigeria. It has been observed that construction site managers are important to the success of a project and their performances need to be appropriately measured. The criteria used for measurement seems not to be adequate. Although project performance measurement for site managers have received substantial attention from researchers over the past few decades, the construction industry still has a preference for measuring project performance of site managers in terms of time and cost [13]. These traditional (results-based) performance preferences measured in projects, specifically costs and schedule, are not appropriate for continuous improvement because they are not effective in identifying the root-causes of quality and productivity losses [14].

This study therefore identified criteria for measuring the performance of construction site managers, examined the factors that influences the performance of construction site managers and the factors influencing the choice of the performance measurement for construction site managers. The need to measure the performance of site managers in the Nigerian construction industry cannot be overemphasized. This study determines the performance indicators for construction site managers in Lagos State, Nigeria with a view to enhancing project delivery. The research also illustrates the relationship of the measures to strategy, providing indicators for effective performance management. KPIs is the most commonly used criteria for measuring the performance of construction site managers and the determination of key performance indicators for site managers which will help in enhancing effective and efficient project delivery in the Nigerian construction industry. Karim and Marosszeky (1999) [13] identified the importance of KPIs as to enable comparison between different projects and enterprises in order to identify the existence of particular patterns. Other criteria for measuring the performance of site managers were identified aside the traditional methods of measurement of cost, time and quality. Meeting project overall performance, absence of defects and reworks, meeting owners' requirement .etc. were the other criteria developed in this study. KPIs is the most commonly used criteria for measuring the performance of construction site managers and the determination of key performance indicators for site managers which will help in enhancing effective and efficient project delivery in the Nigerian construction industry. The study will provide information on key performance indicators for construction site managers that could be used for site managers' performance measurement in the construction industry For the Purpose of this study, a list of 23 Performance Indicators is compiled from that could be relevant to the Nigerian construction industry as follows; Accident; Business Performance; Change; Client Satisfaction; Constructability; Contractors Experience; Contractors Satisfaction; Defects; Environmental Conditions; Health and Safety; Innovation; Predictability-Cost; Predictability-Time; Productivity; Profitability; Rework; Quality; Managing Resources; Scope; Site Management; Social Indicators; Staff Experience and Variance. DETR, (2000). In summary, most of the measurement approaches above, if not all focus on measuring project performance across project phases, by identifying key indicators at each project phase [13]. Performance measurement (PM) is a significant management tool that construction industry use to compete in an ever changing environment. It supports decision-making processes by providing information about how well a set of targets have been met and how precisely predictions have been made [13-14], asserted that what cannot be measured cannot be managed. Performance measurement also helps in demonstrating, promoting a productive construction environment and shaping accountability [14].

2.0 RESEARCH METHODOLOGY

The focus of this study was on the performance indicators of construction site managers in Lagos State, Nigeria.

2.1 Data Collection

Primary data used for the study was obtained through a structured questionnaire survey approach. The information elicited from the respondents included the factors influencing the performance of construction site managers and the criteria for measuring the performance of site managers.

The target population for the study was mainly the construction site managers in the eighty-eight (88) construction firms registered under the Lagos State Tender Board. This was because Lagos is a fast growing developing city in Nigeria. The firms were stratified by size as follows: sixteen (16) were large firms, thirty-nine (39) were medium firms and thirty-three (33) were small firms. A total enumeration survey of these construction firms was carried out. Two (2) construction site managers were surveyed in each of the construction firms to amount for a total of 176 respondents. However, a total of 172 questionnaires were successfully retrieved and were found to be consistent without errors as shown in Table 1. The rate of return for the administered questionnaire was 97.7% which is within acceptable limits.

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Table 1: Sampling Frame

Size of firm	No. of firm	No. of construction managers selected per firm	Total number of surveyed respondents	Number of Responses
Large	16	2	32	29
Medium	39	2	78	78
Small	33	2	66	65
Total	88		176	172

2.2 Method of Data Analysis

Data collected for this study was analyzed using Relative Importance Index (RII) and Mean Item Score (MIS) as expressed by equations 1 to 3. The Likert scale of 1-5 was used to rate the criteria for measuring the performance of construction site managers, the factors influencing the performance of construction site managers, and also the factors influencing the choice of the performance measurement for construction site managers in Lagos State. Summarized in Table 2 are the methods of analysis used in this study.

In this study, the respondents were requested to rate their level of agreement with the identified attributes on a 5-point Likert scale (1= strongly disagree, 2= disagree, 3= neutral, 4= agree and 5= strongly agree). The designated value of 1,2,3,4 and 5 were used to allot weight to the options in the course of analysis.
The ranking indexes for the attributes were computed from the results of the ratings generated from the analysis.

Table 2: Methods of Data Analysis

Objectives	Data Required	Method of Data Analysis
1. Examine the criteria for measuring the performance of construction site managers.	• Criteria for measuring the performance of construction site managers	Relative Importance Index
	• Ratings of criteria for measuring the performance of construction site managers	
2. Identify and examine the factors influencing the performance of construction site managers.	• Factors influencing the performance of construction site managers	Mean Item Score
	• Ratings of Factors influencing the performance of construction site managers	

3.0 DATA ANALYSIS AND DISCUSSION OF RESULTS

The tables presented in this chapter emanated from the field survey of 2016.

3.1 Factors Influencing the Performance of Construction Site Managers

Thirty-five (35) factors were identified from literature and respondents were asked to identify and rate the factors as 'Strongly disagree', 'Disagree', 'Neutral', 'Agree' and 'Strongly agree' with designated values of 1, 2, 3, 4 and 5 respectively. Table 2 to Table 6 show the perception of respondents on the factors influencing the performance of construction site managers in large, medium and small firms.

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Table 3: Factors Influencing the Performance of Construction Site Managers in Large Firms

Factors	Number of Frequency and Percentage of Respondents				
	1	2	3	4	5
Problem solving ability	0(0.0)	0(0.0)	1(3.4)	3(10.3)	25(86.2)
Results orientation	0(0.0)	0(0.0)	9(31.0)	13(44.8)	7(24.1)
Energy and initiative	0(0.0)	0(0.0)	3(10.3)	24(82.8)	2(6.9)
Self confidence	0(0.0)	0(0.0)	1(3.4)	4(13.8)	24(82.8)
Communication	0(0.0)	0(0.0)	0(0.0)	2(6.9)	27(93.1)
Negotiating ability	0(0.0)	(0.0)	1(3.4)	9(31.0)	19(65.5)
Drive and ambition	0(0.0)	0(0.0)	5(17.2)	14(48.3)	10(34.5)
Honesty and integrity	0(0.0)	0(0.0)	1(3.4)	1(3.4)	27(93.1)
Intelligence	0(0.0)	0(0.0)	0(0.0)	5(17.2)	24(82.8)
Technical knowledge	0(0.0)	0(0.0)	0(0.0)	15(51.7)	14(48.3)
Experience	0(0.0)	0(0.0)	0(0.0)	2(6.9)	27(93.1)
Cash flow of project	0(0.0)	0(0.0)	0(0.0)	2(6.9)	27(93.1)
Project labour cost	0(0.0)	0(0.0)	4(13.8)	20(69.0)	5(17.2)
Cost of rework	0(0.0)	0(0.0)	4(13.8)	25(86.2)	0(0.0)
Material cost	0(0.0)	0(0.0)	6(20.7)	20(69.0)	3(10.3)
Site preparation time	0(0.0)	0(0.0)	0(0.0)	9(31.0)	20(69.0)
Availability of resources	0(0.0)	0(0.0)	0(0.0)	0(0.0)	29(100)
Planned time for construction	0(0.0)	0(0.0)	0(0.0)	8(27.6)	21(72.4)
Conformance to specification	0(0.0)	0(0.0)	0(0.0)	1(3.40)	28(96.6)
Availability to competent workers	0(0.0)	0(0.0)	1(3.4)	7(24.1)	21(72.4)
Quality training	0(0.0)	0(0.0)	6(20.7)	12(41.4)	11(37.9)
Project complexity	0(0.0)	0(0.0)	9(31.0)	19(65.5)	1(3.4)
Management /labour relationship	0(0.0)	0(0.0)	3(10.3)	21(72.4)	5(17.2)
Sequencing of work according to schedule	0(0.0)	0(0.0)	0(0.0)	2(6.9)	27(93.1)
Information coordination between owner and project parties	0(0.0)	0(0.0)	0(0.0)	1(3.4)	28(96.6)
Reduced rework	0(0.0)	0(0.0)	8(27.6)	12(41.4)	9(31.0)
Incidents	0(0.0)	3(10.3)	10(34.5)	12(41.4)	4(13.8)
Speed and reliability of service to Owner	0(0.0)	0(0.0)	1(3.4)	22(75.9)	6(20.7)
Compliance to regulators requirements	0(0.0)	0(0.0)	0(0.0)	3(10.3)	26(89.7)
Quality and availability of regulator documentation	0(0.0)	0(0.0)	1(3.4)	17(58.6)	11(37.9)
Site condition	0(0.0)	1(3.4)	11(37.9)	17(58.6)	0(0.0)
Air quality impact	3(10.3)	7(24.1)	12(41.4)	6(20.7)	1(3.4)
Noise level impact	0(0.0)	4(13.8)	18(62.1)	6(20.7)	1(3.4)
Waste management around the site	0(0.0)	1(3.4)	11(37.9)	17(58.6)	0(0.0)
Climate condition	0(0.0)	1(3.4)	7(24.1)	20(69.0)	1(3.4)

[1.] Number (Percentage)

Table 4: Factors Influencing the Performance of Construction Site Managers in Medium Firms

Factors	Number of Frequency and Percentage of Respondents				
	1	2	3	4	5
Problem solving ability	0(0.0)	2(2.6)	1(1.3)	16(20.5)	59(75.6)
Results orientation	0(0.0)	2(2.6)	2(2.6)	27(34.6)	47(60.3)
Energy and initiative	0(0.0)	1(1.3)	45(57.7)	22(28.2)	10(12.8)
Self confidence	0(0.0)	1(1.3)	1(1.3)	10(12.8)	66(84.6)
Communication	0(0.0)	2(2.6)	1(1.3)	11(14.1)	64(82.1)
Negotiating ability	0(0.0)	0(0.0)	9(11.5)	48(61.5)	21(26.9)
Drive and ambition	0(0.0)	1(1.3)	3(3.8)	55(70.5)	19(24.4)
Honesty and integrity	0(0.0)	1(1.3)	2(2.6)	8(10.3)	67(85.9)

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Intelligence	0(0.0)	1(1.3)	2(2.6)	9(11.5)	66(84.6)
Technical knowledge	0(0.0)	1(1.3)	4(5.1)	45(57.7)	28(35.9)
Experience	0(0.0)	0(0.0)	2(2.6)	15(19.2)	61(78.2)
Cash flow of project	0(0.0)	1(1.3)	4(5.1)	20(25.6)	53(67.9)
Project labour cost	1(1.3)	1(1.3)	8(10.3)	55(70.5)	13(16.7)
Cost of rework	0(0.0)	0(0.0)	24(30.8)	48(61.5)	6(7.7)
Material cost	0(0.0)	5(6.4)	33(42.3)	25(32.1)	15(19.2)
Site preparation time	0(0.0)	1(1.3)	8(10.3)	18(23.1)	51(65.4)
Availability of resources	0(0.0)	1(1.3)	3(3.8)	12(15.4)	62(79.5)
Planned time for construction	0(0.0)	1(1.3)	2(2.6)	14(17.9)	61(78.2)
Conformance to specification	0(0.0)	2(2.6)	3(3.8)	18(23.1)	55(70.5)
Availability to competent workers	0(0.0)	1(1.3)	6(7.7)	45(57.7)	26(33.3)
Quality training	0(0.0)	1(1.3)	31(39.7)	30(38.5)	16(20.5)
Project complexity	0(0.0)	2(2.6)	19(24.4)	50(64.1)	7(9.0)
Management/labour relationship	1(1.3)	0(0.0)	11(14.1)	49(62.8)	17(21.8)
Sequencing of work according to schedule	1(1.3)	3(3.8)	6(7.7)	13(16.7)	55(70.5)
Information coordination between owner and project parties	0(0.0)	1(1.3)	10(12.8)	16(20.5)	51(65.4)
Reduced rework	0(0.0)	1(1.3)	53(67.9)	20(25.6)	4(5.1)
Incidents	0(0.0)	1(1.3)	45(57.7)	23(29.5)	9(11.5)
Speed and reliability of service to owner	0(0.0)	5(6.4)	10(12.8)	43(55.1)	20(25.6)
Compliance to regulators requirements	0(0.0)	1(1.3)	5(6.4)	28(35.9)	44(56.4)
Quality and availability of regulator documentation	0(0.0)	3(3.8)	5(6.4)	61(78.2)	9(11.5)
Site condition	0(0.0)	3(3.8)	19(24.4)	50(64.1)	6(7.7)
Air quality impact	3(3.8)	8(10.3)	47(60.3)	19(24.4)	1(1.3)
noise level impact	2(2.6)	5(6.4)	55(70.5)	15(19.2)	1(1.3)
Waste management around the site	0(0.0)	2(2.6)	48(61.5)	26(33.3)	2(2.6)
Climate condition	0(0.0)	12(15.4)	16(20.5	46(59.0)	4(5.1)

[1.] Number (Percentage)

Table 5: Factors Influencing the Performance of Construction Site Managers in Small Firms

Factors	Number of Frequency and Percentage of Respondents				
	1	2	3	4	5
Problem solving ability	0(0.0)	0(0.0)	0(0.0)	11(16.9)	54(83.1)
Results orientation	0(0.0)	0(0.0)	2(3.1)	48(73.8)	15(23.1)
Energy and initiative	0(0.0)	3(4.6)	15(23.1)	42(64.6)	5(7.7)
Self confidence	0(0.0)	0(0.0)	0(0.0)	6(9.2)	59(90.8)
Communication	0(0.0)	0(0.0)	0(0.0)	9(13.8)	56(86.2)
Negotiating ability	0(0.0)	(0.0)	15(23.1)	32(49.2)	18(27.7)
Drive and ambition	0(0.0)	2(3.1)	6(9.2)	37(56.9)	20(30.8)
Honesty and integrity	0(0.0)	0(0.0)	0(0.0)	6(9.2)	59(90.8)
Intelligence	0(0.0)	0(0.0)	0(0.0)	9(13.8)	56(86.2)
Technical knowledge	0(0.0)	0(0.0)	3(4.6)	32(49.2)	30(46.2)
Experience	0(0.0)	0(0.0)	1(1.5)	10(15.4)	54(83.1)
Cash flow of project	0(0.0)	0(0.0)	1(1.5)	22(33.8)	42(64.6)
Project labour cost	0(0.0)	1(1.5)	10(15.4)	42(64.6)	12(18.5)
Cost of rework	1(1.5)	1(1.5)	17(26.2)	43(66.2)	3(4.6)
Material cost	1(1.5)	1(1.5)	20(30.8)	28(43.1)	15(23.1)
Site preparation time	0(0.0)	0(0.0)	5(7.7)	22(33.8)	38(58.5)
Availability of resources	0(0.0)	0(0.0)	0(0.0)	6(9.2)	59(90.8)
Planned time for construction	0(0.0)	0(0.0)	2(3.1)	18(27.7)	45(69.2)
Conformance to specification	0(0.0)	0(0.0)	3(4.6)	12(18.5)	50(76.9)

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Availability to competent workers	0(0.0)	0(0.0)	2(3.1)	36(55.4)	27(41.5)
Quality training	0(0.0)	0(0.0)	13(20.0)	25(38.5)	27(41.5)
Project complexity	0(0.0)	1(1.5)	30(46.2)	23(35.4)	11(16.9)
Management/labour relationship	0(0.0)	0(0.0)	4(6.2)	42(64.6)	19(29.2)
Sequencing of work according to schedule	0(0.0)	0(0.0)	4(6.2)	8(12.3)	53(81.5)
Information coordination between owner and project parties	0(0.0)	0(0.0)	3(4.6)	15(23.1)	47(72.3)
Reduced rework	0(0.0)	6(9.2)	24(36.9)	29(44.6)	6(9.2)
Incidents	0(0.0)	6(9.2)	26(40.0)	27(41.5)	6(9.2)
Speed and reliability of service to owner	0(0.0)	1(1.5)	5(7.7)	39(60.0)	20(30.8)
Compliance to regulators requirements	0(0.0)	0(0.0)	4(6.2)	23(35.4)	38(58.5)
Quality and availability of regulator Documentation	0(0.0)	0(0.0)	6(9.2)	50(76.9)	9(13.8)
Site condition	0(0.0)	3(4.6)	13(20.0)	38(58.5)	11(16.9)
Air quality impact	1(1.5)	11(16.9)	30(46.2)	19(29.2)	4(6.2)
Noise level impact	1(1.5)	2(3.1)	38(58.5)	21(32.3)	3(4.6)
Waste management around the site	1(1.5)	1(1.5)	26(40.0)	36(55.4)	1(1.5)
Climate condition	0(0.0)	8(12.3)	17(26.2)	30(46.2)	10(15.4)

[1.] Number (Percentage)

Findings revealed that 10.3% of the respondents agreed that accidents could influence the performance of site manager in large firms; while 3.4% agreed that site condition could be an influencing factor on the performance of site managers. Other factors that could affect the performance of site managers as agreed to by respondents are air quality impact (24.1%), noise level impact (13.8%), and climate condition (3.4%).

In medium firms, respondents agreed that material cost (6.4%), work sequence (3.8%), speed and reliability of service to owner (6.4%), quality and availability of regular documentation (3.8%), site condition (3.8%), air quality impact (10.3%), noise level impact (6.4%), and climate condition (15.4%) are factors that can influence the performance of site managers.

In small firms, (4.6%) of the respondents agreed that energy and initiative of the site managers can influence their performance. (3.1%) agreed that drive and ambition as a factor can influence the performance of site managers. Other factors as agreed to by the respondents are site condition (4.6%), air quality impact (16.9%), and climate condition (12.3%). This shows that site managers in small firms are influenced by ambition and energy because they are young and are still building their carrier. Their performances are influenced by the need to initiate new ideas and methods on site to make do with the available resources and technology. In medium firm, the performance of site managers could be influenced by material cost. This could mean that unlike small firms that make use of inexperience site managers and large firms that normally buy materials in bulk, site managers are expected to be sensitive to inflation and schedule material supply wisely and economically. In large firms construction site manager's performances are expected to be influenced by the nature of construction activities. As observed by [15], the shortage of resources can affect the performance of site managers. However, for construction site managers who are well educated and trained on the management of resources, their performances are not expected to be affected by inadequate resources and other controllable conditions. Their performances can only be limited by site conditions and occurrences that are beyond human control or that are unforeseeable. This finding is consistent with the study by [16] which indicated that site related issues affect the performance of construction site managers. The factors influencing the performance of construction site managers for individual firm categories were ranked using Relative Importance Index (RII) as shown in Table 6

Table 6: RII of Factors Influencing the Performance of Construction Site Managers

Factors	**Type of Firms**					
	Large firm		**Medium firm**		**Small Firm**	
	RII	**Rank**	**RII**	**Rank**	**RII**	**Rank**
Problem solving ability	0.966	5	0.938	6	0.966	4
Results orientation	0.786	16	0.905	9	0.84	27
Energy and initiative	0.793	15	0.705	23	0.751	20
Self confidence	0.959	6	0.962	2	0.982	2
Communication	0.986	3	0.951	4	0.972	3
Negotiating ability	0.924	9	0.831	14	0.809	17

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Drive and ambition	0.834	12	0.836	13	0.831	16
Honesty and integrity	0.979	4	0.964	1	0.982	2
Intelligence	0.966	5	0.959	3	0.972	3
Technical knowledge	0.897	10	0.856	11	0.883	12
Experience	0.986	3	0.951	4	0.963	5
Cash flow of project	0.986	3	0.921	8	0.926	10
Project labour cost	0.807	14	0.8	22	0.8	24
Cost of rework	0.772	18	0.754	19	0.742	21
Material cost	0.779	17	0.728	21	0.769	19
Site preparation time	0.938	8	0.905	9	0.902	12
Availability of resources	0.998	1	0.946	5	0.984	1
Planned time for construction	0.945	7	0.946	5	0.932	9
Conformance to specification	0.993	2	0.923	7	0.945	7
Availability to competent workers	0.938	8	0.846	12	0.877	13
Quality training	0.834	12	0.756	18	0.843	15
Project complexity	0.745	19	0.759	17	0.735	22
Management/labour relationship	0.814	13	0.808	15	0.846	14
Sequencing of work according to schedule	0.986	3	0.903	29	0.951	6
Information coordination between owner and project parties	0.993	2	0.9	30	0.935	8
Reduced rework	0.807	14	0.669	26	0.708	24
Incidents	0.717	20	0.703	24	0.702	25
Speed and reliability of service to owner	0.834	12	0.8	31	0.84	27
Compliance to regulators requirements	0.979	4	0.895	10	0.905	11
Quality and availability of regulator documentation	0.869	11	0.795	16	0.809	17
Site condition	0.71	21	0.751	20	0.775	18
Air quality impact	0.566	23	0.618	28	0.643	27
Noise level impact	0.628	22	0.621	27	0.671	26
Waste management around the site	0.71	21	0.672	25	0.708	24
Climate condition	0.745	19	0.708	22	0.729	23

RII- Relative Importance Index

Table 7: Aggregate RII of Factors Influencing the Performance of Construction Site Managers by the Firms

Factors	1	2	3	4	5	SWV	RII	Rank
Problem solving ability	0	2	15	176	610	803	0.934	5th
Results orientation	1	4	66	468	150	689	0.801	15th
Energy and initiative	1	2	135	464	45	647	0.752	17th
Self confidence	1	12	177	292	165	647	0.752	17th
Communication	0	2	39	196	545	782	0.909	8th
Negotiating ability	0	2	9	72	750	833	0.969	1st
Drive and ambition	0	2	12	160	635	809	0.941	3rd
Honesty and integrity	0	4	18	124	665	811	0.943	2nd
Intelligence	0	2	27	352	370	751	0.873	10th
Technical knowledge	0	2	150	268	270	690	0.802	14th
Experience	0	6	174	368	95	643	0.748	17th
Cash flow of project	1	0	54	448	205	708	0.823	11th

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Project labour cost	1	6	30	92	675	804	0.935	4th
Cost of rework	0	2	39	128	630	799	0.929	6th
Material cost	0	14	255	244	95	608	0.707	19th
Site preparation time	0	20	243	248	95	606	0.705	20th
Availability of resources	0	12	48	416	230	706	0.821	12th
Planned time for construction	0	2	27	216	540	785	0.913	7th
Conformance to specification	0	6	36	512	145	699	0.813	13th
Availability to competent workers	0	14	129	420	85	648	0.753	16th
Quality training	7	52	267	176	30	532	0.619	23th
Project complexity	3	22	333	168	25	551	0.641	22th
Management/labour relationship	1	8	255	316	15	595	0.692	21rd
Sequencing of work according to schedule	0	42	120	384	75	621	0.722	18th
Information coordination between owner and project parties	0	2	15	176	610	803	0.934	5th
Reduced rework	1	4	66	468	150	689	0.801	15th
Incidents	1	2	135	464	45	647	0.752	16th
Speed and reliability of service to owner	1	12	177	292	165	647	0.752	16th
Compliance to regulators requirements	0	2	39	196	545	782	0.909	8th
Quality and availability of regulator documentation	0	2	9	72	750	833	0.969	1st
Site condition	0	2	12	160	635	809	0.941	3th
Air quality impact	0	4	18	124	665	811	0.943	2rd
Noise level impact	0	2	27	352	370	751	0.873	10th
Waste management around the site	0	2	150	268	270	690	0.802	14th
Climate condition	0	6	174	368	95	643	0.748	17th

From Table 6, availability of resources ranked first, closely followed by conformance to specification, information coordination between owner and project parties, communication, experience and cash flow respectively were the top ranked factors influencing the performance of construction site managers in large firms. In medium firms, the top ranked were honesty and integrity, self-confidence, intelligence, communication, intelligence and problem solving ability. This shows that management and leadership skills can influence the performance of site managers in small and medium firms. The more management and leadership skills they possess, the more improved their performances are expected to be. This also means that a well-educated site manager will perform well in small and medium firms.

However, in large firms, site managers are employed based on their level of experience and education. This could explain why young and upcoming construction managers usually start out with small or medium firm where they can put to use their knowledge and gather experience to function at higher level, In large firm, inexperience construction managers are always attached to experienced ones, while they are put on site to learn by trial and error or from the experienced foreman or artisans on site especially in small firms. The high rank of conformance to specification as one of the top ranking factors influencing the performance of construction site managers in large firm is supported by the findings of [17] which reported that specification is an important factor that can affect the performance of construction site managers. The finding of this study is consistent with that of [17].

Table 8 shows the grouping of factors influencing the performance of construction site managers.

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Table 8: Grouping of Factors Influencing the Performance of Construction Site Managers

Group	Factors	Percentage of variance explained
1.	Problem solving ability	
	Results orientation	
	Self confidence	
	Communication	
	Honesty and integrity	
	Intelligence	
	Experience	
	Cash flow of project	
	Site preparation	
	Availability of resources	18.746
	Planned time for construction	
	Conformance to specification	
	Sequencing of work according to schedule	
	Information coordination between owner and project parties	
	Compliance to regulators requirements	
	Quality and availability of construction materials	
2.	Negotiating ability	
	Availability of competent workers	
	Reduced rework	
	Incidents	
	Speed and reliability of service to owner	9.054
	Site condition	
	Climate condition	
3.	Energy and initiative	
	Drive and ambition	
	Technical knowledge	7.604
	Quality training	
	Waste management around the site	
4.	Project labour cost	
	Cost of rework	
	Material cost	
	Project complexity	7.151
	Management and labour relationship	
	Air quality impact	
	Noise level impact	

As presented in Table 8, the principal factors accounted for (18.746%) of the observed variance shared by the thirty-five variables. The principal factors are problem solving ability, results orientation, self-confidence, communication, honesty and integrity, intelligence, experience, cash flow of project, site preparation time, availability of resources, planned time for construction, conformance to specification, sequencing of work according to schedule, information coordination between owner and project parties, compliance to regulators requirements and quality and availability of construction materials. These findings gave a new insight into the examination of the factors influencing the performance of construction site managers. The factors as given in group one of Table 8 can be described as management and leadership related factors. This suggests that the major factors influencing the performance of construction site managers are management and leadership related factors.

The results presented in Table 8 shows that management and leadership skills can influence the performance of construction site managers, this finding is strongly supported by the results presented in Table 6 Possession of management and leadership skills by construction site managers can improve their performances. Also, construction site managers can be trained on management and leadership skills so as to improve their performances.

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3.2 Criteria for Measuring the Performance of Construction Site Managers in all Firms

To identify the criteria for measuring the performance of construction site managers in the study area, twenty-three (23) performance measurement criteria were identified from literature and the respondents were asked to identify and rate the importance of the criteria as 'Not Important', 'Not Very Important', 'Averagely Important', 'Important' and 'Very Important' with designated values of 1,2,3,4 and 5 respectively. The mean ranking of the criteria for measurement as indicated by the respondents for large, medium and small firms are presented in Table 9.

Table 9: Mean Ranking of Criteria for Measuring the Performance of Construction Site Managers in Large, Medium and Small Firms

Criteria	Types of Firms								
	Large firms			Medium firms			Small firms		
	MIS	DM	Rank	MIS	DM	Rank	MIS	DM	Rank
Meeting project overall performance	4.000	0.440	2	3.590	0.228	7	3.523	0.168	11
Absence of defects and reworks	3.690	0.130	8	2.692	-0.670	19	2.846	-0.509	18
Absence of accident	3.138	-0.422	13	2.744	-0.618	18	2.677	-0.678	19
Meeting owners requirement	3.966	0.406	2	3.679	0.317	5	3.600	0.245	8
Innovation	3.138	-0.422	13	2.885	-0.477	17	2.954	-0.401	17
Scope	3.897	0.337	4	3.551	0.189	9	3.569	0.214	9
Community satisfaction	3.310	-0.250	11	2.962	-0.400	14	3.031	-0.324	16
Adequate communication	4.000	0.440	2	3.538	0.176	10	3.662	0.307	7
Technology transfer	3.241	-0.319	12	2.949	-0.413	15	3.338	-0.017	13
Project viability	3.483	-0.077	10	3.564	0.202	8	3.677	0.322	6
Adherence to drawing and technical specification	4.034	0.474	1	3.859	0.497	1	3.892	0.537	1
Cost maximization	3.862	0.302	6	3.821	0.459	2	3.554	0.199	10
Maintaining quality standard	4.034	0.474	1	3.821	0.459	2	3.723	0.476	2
Meeting project completion time	3.552	-0.008	9	3.590	0.228	7	3.338	-0.017	13
Absence of chaos	3.034	-0.526	15	2.897	-0.465	16	2.846	-0.509	20
Daily site record keeping	3.966	0.406	2	3.705	0.343	4	3.831	0.368	5
Adequate availability of construction materials	4.000	0.440	7	3.731	0.369	3	3.738	0.383	4
Absence of environmental pollution/hazard	3.241	-0.319	12	3.192	-0.170	13	3.277	-0.078	14
Wages the workers receive	3.793	0.233	7	3.603	0.241	6	3.769	0.414	3
Educational qualification of supervisor	3.103	-0.457	14	3.462	0.100	12	3.169	-0.186	15
Supervisor level of experience	3.931	0.371	4	3.474	0.112	11	3.492	0.137	12
Age of workers	1.897	-1.663	16	2.654	-0.708	20	2.292	-1.063	20

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As explained by Table 9, the top ranking criteria for large firms are adherence to drawing and technical specification (Mean = 3.901), maintaining quality standard (Mean = 3.820), meeting project overall performance (Mean = 3.634), adequate availability of construction materials (Mean = 3.779), daily site record keeping (Mean = 3.797), meeting owner's requirement (Mean = 3.698), supervisor level of experience (Mean = 3.558), and absence of defects and reworks (Mean = 2.919)

4.0 CONCLUSIONS AND RECOMMENDATIONS

4.1 Conclusions

The study concluded that; in large firms, construction site managers are expected to avoid defects and rework, avoid accidents on construction sites, be innovative, apply appropriate technology on site and to be qualified academically for site management. Large firms require their site managers to serve as the face of the firm and to be able to grant interview to members of the press and have experience in public relation. The level of experience and education of site managers is a criterion for measuring the performance of site managers in large firms.

Medium firms still measures performance of site managers using traditional criteria of cost, time and quality and are only concerned about absence of defects and rework. In small firms, the age of workers is the most important criterion for measuring the performance of construction site managers. The level of experience and training of workers decides the performance of site managers in small firms.

Overall, adherence to drawing and technical specification and maintaining quality standard (cost, and time), project performance, owner's requirement, scope of project, communication, viability of project, are important criteria for measuring the performance of construction site managers. Management and Leadership skills are important key performance indicators across all the various categories of firm.

4.2 Recommendations

- Construction site managers should avoid defects and reworks, avoid accidents on construction sites, be innovative, apply appropriate technology on site and be qualified professionally and academically for site management.
- Construction site managers should refrain from using only traditional criteria of cost, time and quality to measure construction site managers' performance, there are other key criteria to be considered in determining their performance.

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