PERCEPTION OF CONSTRUCTION PROJECT MANAGERSON MANAGERIAL FACTORS INFLUENCINGPRODUCTIVITY ON CONSTRUCTION SITES IN NIGERIA

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Abstract – Performance of construction project is measured based on certain criteria such as time, cost, and quality. The management of these measured play significant role in overall performance of a project This paper indentify and examines managerial factors influence productivity on construction in Nigeria with a view to providing a checklist of significant managerial factors influencing productivity for efficient project performance. Data were collected through questionnaire survey administered construction project manager in charge of the active construction site within the study area Mean score ranked the perception of the construction project manager on the significant factor influencing productivity on construction site. Factor analyzed was employed to reduce the identified managerial factor into major descriptive management functions. The top rated factors influencing construction sites productivity include disorganized project, poor project planning, shortage of materials and charged of instruction or design. Significant number of the top rated factors are associated with planning. It becomes evident that adequate site planning is needed for productive site operations and performance. This paper concludes that there are significant managerial factor influencing productivity on construction site and that adequate planning is essential for effective construction site management and productivity.

Keywords: Construction project manager, Construction productivity, Construction sites, Managerial factors, Perception

1.0   Introduction

The construction industry plays significant roles in any economics, in terms of employment and infrastructural development. The construction industry in Nigeria is of paramount importance for employment and economies growth (Ogusemi&Jagboro, 2006). In Nigeria,the construction industry was the dominant contributor to the nation's gross domestic products (GDP) in the 1980s,accounting for about 70% of the GDP (Planning Committee on the National Construction Policy, 1989 cited in Oladapo, 2006). This made the industry very strategic to Nigeria's development efforts. Unfortunately, the construction industry has been affected by consistent low productivity and poor performance over the years (Olomolaiye, 1987: Aniekwu, 1995;Okuwoga, 1998; Adeyemi et al: 2005 cited in Oladapo, 2006) the contribution of construction sector to GDP in Nigeria is below 5% against 5 to 10 percent as predicted by the United Nation and some developed countries like UK and America (Lowe, 2003: Odediran&Babalola, 2014). Improving productivity is a major concern for any profit oriented organization, as it represents the effective and efficient conversion of resources into marketable products and determining business profitability (Wilcox, et al, 2000) improving productivity and innovation is not necessary expensive, time – consuming, or overly difficult. However, it takes a commitment to identify area for improvement, working toward the improvement, and maintain the improvement over time

(Productivity Alberta, 2008). Therefore, effort made in improving the performance of the construction site will contribute to the productivity of the construction sector.

Productivity in a simple term is described as performing a task to the required specification. Specification is a standard set for the purpose of achieving specific requirement. High level productivity requirement is often needed at construction stage of any project compare to productivity requirement at the design or pre – contract stage. This is because majority of the construction activities are carried out on the site. Productivity is one of the most important factor affecting the overall performance of any organization, large or small, however, improving productivity decrease total cost and duration of production, improve quantity, growth in market share of product, increase employment and wages without inflationary pressure and enhance the purchasing capacities among employees. Employers and customer (Kazaz&Ulubeyli, 2007). Therefore, this paper examines managerial factors influencing productivity on construction site with a view to establish whether there are significant factors influencing construction site productivity.

2.0 Review of Literature

Factors Influencing Productivity in the construction Industry

Construction industry performance is under the control and influence of many factorand there are specific factors influencing activities on construction sites. Factors influencing construction productivity have been subject to inquiries (Enshassi, Mohamed, Mustafa &Mayer, 2007).Identification of factors influencing productivity at every stage of construction project is a significant step in the Management of construction site, because if all factor influencing productivity are known, efficient management of construction site becomes probable (Lema, 1995). Previous studies have investigated factors influencing labour productivity but limited numbers evaluate managerial factors influencing construction sites overall productivity from constructionproject managers' perspective. Earlier studies only measure the impact of these factor on labour productivity.

Enshassi et al. (2007)examine factor affecting labour productivity in building project in the Gaza Strip and out of 45 factor identified through review of literature, the study found established that the significant factors are material shortage, lack of labourexperience, lack surveillance, misunderstandings between labour and superintendent, and drawings and specification alteration during execution. Kazaz&Uleibeyli (2007) investigation the drivers of productivity among constructionworkers in developing country and established that monetary factors remain pre-eminent in influencing productivity and socio-psychological factors appear to be of increasing importance in developing economy. The economic factors investigated include timeliness of remuneration, amount of remuneration, social insurance, incentive payments, job security and union membership. However, socio-psychological factors include work discipline, health and safety conditions, work satisfactions, creating competition, relations with workmates, giving responsibility and sharing problems and their results. Other factors are social activity opportunities, cultural differences, worker participation in decision-making, and distance from home and distance from population centres. All these factors are significant. The last created states in the country in 1991. The state created 21 years ago is still having infrastructure deficits and change in the state democratic government in 2011 created a massive development in infrastructure projects across the state which include road works, culverts, bridges, airport, building works (schools, hospitals, markets etc).

Since the state has thirty (30) local government areas and three senatorial districts. Two local government areas were selected from each senatorial district which gave a total of 6 local government areas. A preliminary survey of active construction sites was carried out at the state capital (Osogbo) and five other capital cities which include Ede, Ile-Ife, Ilesha, Iwo and Ikirunrepresenting the capital cities in each senatorial districts. A preliminary investigation was conducted which gave a list of 80 active construction

sites across the state which form the study population. A total 80 copies of questionnaire were sent out to the construction project managers in charge of each of these active construction sites. The types of construction project managers in charge of each of these managers as at the time of conducting this study spanned across road works, culverts, bridges, airport, building works earlier highlighted. Majority of these projects are government initiated and financed by international organizations or domestic financial institutions. Out of the copies of questionnaire returned, twenty (20) were found appropriate and used for analysis. This is a response rate of 25% active construction sites. Stratified random sampling technique was adopted in the selection of the construction sites from the study area and administration of questionnaire. Stratified random sampling technique was adopted because adequate information on the active construction sites was not available. In other to collect an organized and closed data for this study, a list of questions was made on a well-structured and closed ended multiple choice questionnaire which was administered on construction project managers. Most of these construction project managers were contacted through site visits.

The construction managers' opinions on the identification and impact of the identified factors were examined using five-point Likert scale. The questionnaire was divided into two sections. The first section identified the background information of the construction project managers which include their academic and professional qualifications, designation and level of registration with professional institutions/bodies. The second section of the questionnaire addressed the specific objectives of this paper. The data obtained were imported into Statistical Packages for Social Sciences (SPSS) for analysis. Since the data collected are closed ended, both descriptive and inferential statistics were employed in analyzing the data collected. These include mean score, factor analysis and analysis of variance (ANOVA). The percentage shows the proportion of their demographic information while mean score shows the ratio of the responses among construction project managers. Factor analysis reduces list of the factors into minima class for easy description of data while ANOVA establishes the level of significance of the factor influencing productivity on construction sites. The mean scores (MS) were calculated using the mathematical model below: of worker training and education, cleanliness of construction site, lack of procedures for construction methods, subcontracting, change in foreman, lack of detailed planning and non availability of information, materials, tool and equipment.

Hewage (2007) conducted a research based on Liberda*et al* (2003) fifty-one factors affecting productivity. These factors were prioritized and clustered into nine categories. These categories are: design and changes, worker motivation, inadequate communication, worker skill, non availability of information, lack of planning, congested work areas, inadequate supervision, and adverse weather condition. Heizer and Render (1990) classified factors influencing site productivity into 3 group: labours character factors; project work conditions factors; and nonproductive activities. Olomolaiye*et al* (1998) stated that factors affecting construction productivity are rarely constant, and may vary from country to country, from project to project, and even within the same project, depending on circumstances. They classified factors influencing construction productivity into 2 categories: external and internal, representing those outside the control of the firm's management, and those originating within the firm. External factors included the nature of the industry, construction client knowledge of construction procedure, weather, and level of economic development. Internal factors included management, technology, labour, and labour unions. However, there is a paucity of researches on productivity in the Nigerian construction industry.

This paper examines managerial factors influencing productivity on construction sites in Nigeria with a view to provide construction site managers with the checklist of the significant factors influencing site productivity and improving construction project performance. Based on the findings of earlier studies reviewed on construction sites were identified and rewritten to align with the focus of this research. Hence, eighteen (18) managerial factors were identified for the purpose of this study and these include disorganized projects, poor project planning shortages of materials, changes in instruction or design, poor cash flow in construction process, lack of adequate skill and poor communication between workers and supervisor, non-availabilityof adequate project information, irregular payment of wages/low wages, lack

of right materials, tools and equipments and lack of cooperation and communication between different crafts. Others include congested work area, inadequate supervision, waiting for instructions from the superior, inadequate participation of workers in decision making process, adverse weather conditions, inadequate designs or design changes.

3.0   Methodology

The study assessed managerial factors influencing productivity on construction sites in Nigeria. The specific objectives indentified managerial factors and how significant they are to construction sites performance. The study area was Osun State. According to Odediran and Babalola (2014), Osun State is an inland state in Southwestern Nigeria. Its capital is Osogbo. It is bounded in the north by Kwara State, in the east partly by Ekiti State and partly by Ondo State, in the south by Ogun State and in the west by Oyo State. The state consists of 30 Local Government Areas, the primary (third tier) unit of government in Nigeria. Osun State is divided into three federal senatorial districts including Osun Central, Osun West and Osun East. Each senatorial district is made of 10 local government areas. Osun State was selected as the study area because it is one of the last created states in the country in 1991. The state created 21 years ago is still having infrastructure deficits and change in the state democratic government in 2011 created a massive development in infrastructure projects across the state which include road works, culverts, bridges, airport, building works (schools, hospitals, markets etc).

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$$MS = \frac{5n_5 + 4n_4 + 3n_3 + 2n_2 + 1n_1}{(n_5 + n_4 + n_3 + n_2 + n_1)}$$

Where n_5 = number of respondents who picked   5

       n_5 = number of respondents who picked   4

       n_5 = number of respondents who picked   3

       n_5 = number of respondents who picked   2

       n_5 = number of respondents who picked   1

4.0   Results and Discussion

The demographic information about the construction project managers in charge of these construction sites shows that significant numbers hold appropriate degrees such as Master of Science/Technology, Bachelor of Science (Honours), Higher National Diploma, and National Diploma in construction related disciplines including engineering, building, quantity surveying and architecture. Most of these construction project managers have been working in the construction industry for more than seven (7) years. The professional designations and registrations of the site managers-show that they are engineers (35%), builders (25%), quantity surveyors (20%) and architects (20%). Majority are registered members of the appropriate professional bodies. Certain number of these professionals had postgraduate certificate in level in the Nigerian universities and allied institutions.

From the list of factors obtained from the literature reviewed, it becomes obvious that some factors are repetitive. However, these factors were redrafted to provide clear understanding to the construction project managers within the context of the Nigeria construction industry and to reflect the focus of this paper. A list of major and often ranked factors by the earlier studies were made and eighteen (18) factors emerged through the synthesizing process. Table 1 shows therankingof the identified factors influencing productivity on construction sites and the top rated factors include disorganized projects (4.55) followed by poor project planning shortage of materials and changes in instruction or design with mean score 4.26, 4.09, and 4.06 respectively. The least ranked factor was unfair/excessive workload (1.94) followed by inadequate design or design changes (2.28). This shows that fourteen (14) out of eighteen (18) factors identified were ranked high with mean score more than 3.00 on a scale of 1-very low to 3-moderate and to 5-very high.

To further explore these factors and classified them into managerial functions for easy description due to the focus of this paper. The factors identified and ranked in Table 1 were subjected to factor analysis with each item treated as a variable with the aim of reducing them to few significant factors which will be used in the description of closely related factor and those sharing the same features. Table 2 illustrates the outcome of the factor loading which classified the factors into various groups sharing equal and relevant features. Factor analysis reduces a large number of factors to a smaller number of groups for modelling purposes. This gave four (4) major components of the factors influencing productivity on construction sites. Each of the factors was grouped as sub-factor under the four (4) components identified from factor loadings as shown in Table 2. The reduced managerial function groups include planning, communication, project information and financial. Component 1 from Table 2 is named planning related factor and the top ranked sub-factors under this component include disorganized projects, poor project planning, shortage of materials, lack of adequate skill, lack of right materials, tools and equipment, congested work areas and inadequate supervision while the least ranked include inadequate participation of workers in decision making process, adverse weather conditions and unfair/excessive workload. Component 2 is named communication related factor and there are two factors under this component comprising poor communication between workers and supervisor, and lack of cooperation and communication among crafts which were equally ranked high. The third (3) component was named project information related factor which comprises of four (4) factors and they were also ranked high which include changes in instruction or design, non-availability of adequate project information, waiting for instructions from the

superior and inadequate designs or design changes. Component 4 was named financial related factor with two high ranked factors including poor cash flow in construction process and irregular payment of wages/low wages.

Table 1: Identification of Managerial Factors Influencing Productivity on Construction Sites Factors Mean Rank

1	Disorganized projects	4.55	1
2	Poor project planning	4.26	2
3	Shortage of materials	4.09	3
4	Changes in instruction or design	4.06	4
5	Poor cash flow in construction process	3.96	5
6	Lack of adequate skill	3 .94	6
7	Poor communication between workers and supervisor	3.89	7
8	Non-availability of adequate project information	3.85	8
9	Irregular payment of wages/low wages	3.55	9
10	Lack of right materials, tools and equipment	3.45	10
11	Lack of cooperation and communication	3.36	11
12	Congested work areas	3.21	12
13	Inadequate supervision	3.19	13
14	Waiting for instructions from the superior	3.13	14
15	Inadequate participation of workers in decision making process		
	Adverse weather conditions	2.94	15
16	Inadequate designs or design changes	2.68	16
17		2.28	17

Source: Field Survey

Table 2: Reduced Managerial Factor

S/N	Component Group Factors	Sub-Factors
1	Planning Disorganized projects	Proper project planning Shortage of materials Lack of adequate skill Lack of right materials, tools and equipment Congested work areas Inadequate supervision Inadequate participation of workers in decision- making process Adverse weather conditions Unfair/ excessive workload
2	Communication	Poor communication between workers and supervisor Lack of cooperation and communication between different crafts
3	Project Information	Changes in instruction or design Non-availability of adequate project information Waiting for instructions from the superior Inadequate designs or design changes
4	Financial	Poor cash flow in construction process Irregular payment of wages/ low wages

Table 3 shows the reduced factors based on the outcome of the factor analysis and how significance these group factors are using one-way analysis of variance (ANOVA). The average mean shows that the top ranked was financial (3.76) followed by communication, planning and project information although all were ranked high with means score above 3.00 on a scale of 1-very low to 3-moderate and to 5-very high. The assessment of the level of significance of these classification also shows that all these factors were significant with $p<0.01$. The results from both descriptive (mean score) and inferential (ANOVA) show that the identified managerial factors are significant to construction sites productivity in Nigeria.

Table 3: Significance of Managerial Factors

Reduced Factors	Average mean	Rank	F-Stat.	Sig.	Remark
Planning	3.43	3	4.814	.000	Significant
Communication	3.67	2	5.016	.000	Significant
Project Information	3.33	4	4.345	.000	Significant
Financial	3.76	1	5.250	.000	Significant

Source: Field Survey

Based on the quantitative approach (questionnaire survey) adopted in this study on construction project managers' perception of factors influencing productivityon construction sites in Nigeria. this paper presents the findings and related it to the existing theories on productivity in the construction industry. The top rated and significant factors were grouped under four (4) components/groups relevant to construction sites management functions (planning, controlling, coordinating, forecasting) and these include planning, communication, project information and financial. These classifications agreed with works of Herbsman et al. (1990) and Liberda et al. (2003) who classified factors influencing productivity into either management or administrative aspects. The classification of factors into management functions and significance of the finding of this paper were also supported by earlier studies (Diwaker&Subramanina, 2009); Young et al. 2009).

Financial Factor

These are factors related to construction sites cash flow, expenses, payment and funding. The top rated were poor cash flow in construction process and irregular of wages/low wages. These are supported by Kazaz and Ulubeyli (2007) who established that monetary factors remain pro-eminent in influencing productivity and the financial/economic factors investigated include timeliness of remuneration, amount of remuneration, social insurance, incentive payments, job security and union membership.

Communication Factors

The communication factors are those related to inter-personal interaction among permanent and mobile construction sites workers and project stakeholders and these include site managers/supervisors, consultants, informal workers (carpenters, masons, iron benders, painters, plumbers and electricians) and site support services. The only two factors under this group were significant and they include poor communication between workers and supervisor, and lack of cooperation and communication among different crafts. This agreed with previous studies as Lim and Alum (1995) reported that communication problems with foreign workers was a significant factor influencing productivity in Singapore (Lim and Alum, 1995) while in Australia, poor communication or relationship between workers/different crafts and management are significant to site productivity (Productivity Alberta, 2008).

Planning Factors

The planning factors identified were associated with site organization, material inventory management, supervision, site communications and skill supply. Enshassiet al. (2007) identified the significant factors in Gaza strip to include material shortage, lack of labourexperience, lack of labour surveillance, misunderstanding between labour and superintendent, and drawings and specification alteration during execution. This supported the finding of the study where the top ranked and significant factors influencing productivity on construction site include disorganized projects, poor project planning, shortage of materials, lack of adequate skill, lack of right materials, tools and equipment, congested work areas and inadequate supervision. Difficulty with recruitment of supervisors and workers, absenteeism from work were raked high in Singapore (Lim & Alum, 1995). Five specific problems identified in Indonesia were lack of materials; rework; absenteeism; lack of equipment; and tools (Olomolaiye et al., 1996). In participation in decision making process (Productivity Alberta, 2008).

Project Information Factors

The project information factors are changes in instructions or designs, non-availability of adequate project information, waiting for instructions from the superior and inadequate designs or design changes. However, Dozzi and Abourizk (1993) equally identified that technical problems like inadequate designs or incomplete engineering work: restrictive and redundant procedures also affect the effectiveness of a projects and can also lead to backlog in productivity.

5.0   Conclusion

This paper examines management factor influencing productivity on construction sites in Nigeria with a view to establish whether there are significant management factors affecting construction sites productivity. It classifies these factors according to management functions. This was based on the perception of construction project management in Osun State, in the western part of Nigeria. out f eighteen (18) factors identified from literature, the top rated include disorganized projects, poor project planning, shortage of materials, changes in instruction/design, poor cash flow in construction process, lack of adequate skill, poor communication between workers and supervisor and non-availability of adequate projects information. The classifications of all factors were made into financial, planning, communication and project information. The most significant numbers of these factors are associated with project planning showing that the foundation of construction sites performance is good planning as "a good planning prevents poor performance, and he who fails to plan has planned to fall". The paper concludes that there are significant managerial factors influencing productivity on construction sites in Nigeria. itemerges that a close attention on adequate construction site planning is needed of any influence of all the identified factors on constructions and performance. Although, the significant by construction site managers, this paper concludes that adequate planning and productivity. A future study is proposed on the influence of construction project management demographic characteristics on managerial functions/factors.

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