AN ASSESSMENT OF CRITICAL FACTORS INFLUENCING PRODUCTIVITY OF CRAFTSMEN ON CONSTRUCTION SITES IN KADUNA METROPOLIS.

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ABSTRACT

Productivity at both micro and macroeconomic level is a serious issue as far as the industrial sector is concerned and construction industry is one of such industries that make very high economic contributions in every nation. Consequently, productivity of labour is particularly important especially in developing countries where most of the building construction work is still on manual basis. This research assesses the critical factors influencing productivity of craftsmen on construction sites in Kaduna Metropolis with a view to; identify factors influencing productivity of craftsmen on construction sites, to measure the level of influence of these factors on labour productivity, and to establish tools for improving labour productivity of craftsmen on construction site. It was carried out by means of literature review and field survey entailing the use of a well-structured questionnaire. and descriptive analysis was employed .A total of seventy-eight (78) questionnaires were distributed with sixty-three (63) returned well filled giving a percentage response of 80.77%. The result of the analysis revealed that; the three most significant worker-factors that affect productivity are worker expertise, worker capability and worker morale and attitude, the most significant materials/tools related factors are material conditions, material applicability and material quantity, the most significant work characteristics related factors are work space, working field accessibility and work environment and the most significant Management and control related factors are management capability, drawing and specification alteration during execution and payment delay. Thus, the paper concluded that Construction sites in Kaduna Metropolis are faced by poor productivity of craftsmen leading to construction of substandard structure and abandonment of projects, in turn the following are recommended; the employment of workers with high skills and expertise should be adhered, motivation and training of workers should be encouraged as a vital tool in productivity improvement and capability and experience of craftsmen should be looked into before allocating a task to them.

KEYWORDS: *Productivity, Critical Factors, Craftsmen, Construction Site & Construction Industry*

INTRODUCTION

Productivity at both micro and macro - economic level is a stern issue as far as the industrial sector is concerned. Construction industry is definitely one of such industries that make very high economic contributions in every nation. The industry usually accounts for, between six to nine percent (6-9%) of Gross Domestic Product (GDP) and over fifty percent (50%) fixed capital formation of both developed and developing nations of the world(Chitkara, 2006).

Within this period, the leadership of Nigeria had changed hands thirteen times, each regime with different strategies of solving the economic problems. Therefore, the few workers that remain in the construction industry need to be properly managed if performance is to improve (Fagbele et el., 2011).

Labour is defined as a task that requires the exertion of body and mind or both. Labour is also regarded as an important resource in construction because it is the one that combines all the other resources namely materials, plant equipment and finance in order to produce the various construction products (Gide, 2011). According to Nunnaly (2005), the term productivity means the output of the construction goods and services per unit of labour input. The labour force can be broadly categorized into; skilled labour or craftsmen and Unskilled labour. However for example, productivity of masons is measured in terms of area in square metres of block/brick work built by a single mason per unit of time preferably a day normally 8 hours of work (Nalumansi and Mwesige, 2012).

However, Yates and Swagata (1993) argued that the productivity of workers is being influenced by factors which vary according to geographical locations. Olomolaiye, ,Jayawardane, and Harris (1998) Adnan, Sheriff, Zaid, and Peter (2007) studied labour productivity on construction sites in Nigeria. Their study suggested that there was a need for establishing output figures on various construction sites through time study techniques.

While Construction is a creative and developmental venture, more emphasis is placed on the productivity and quality of work produced by construction workers. Incidentally, in the past three decades, after the oil boom of 1970s, the construction industry in Nigeria has been facing serious problem of low productivity of craftsmen. A case study once indicated that except in Lagos and Abuja the former and new capital territories of Nigeria respectively, construction workers have performed poorly in every other state of the federation (Abdullahi, 2009). The disparity may be deduced from the efficiency of the multinational construction companies operating in the two territories. Also, when compared with the manufacturing sector, it was easy to observe that the productivity problem is more in the construction industry than in the manufacturing industry, which has continued to report rise in productivity of craftsmen for nearly two decades now.

The construction industry's fortunes fluctuate with that of the general economy and its organizational patterns change with time, sometimes become so varied that they are difficult to understand. Unfortunately, the current global economic situation and its negative impact on the construction projects have made construction productivity improvement to be more important. However, the current shortage of skilled manpower (craftsmen) is posing challenges of coping with the full workload that most construction firms now have. Therefore, the few ones that remain in the industry need to be motivated if productivity is to improve (Chukwuji, 2012).

Enshassi (2007) opined that for productivity to be improved, a study of factors affecting it, whether positively or negatively is necessary. If all the factors influencing productivity are known, it will be possible to make use of those affecting it positively and eliminating or controlling those factors that negatively affect it, thus improve the productivity (Lema, 1995).

In this paper, the critical factors influencing the productivity of craftsmen employed in some selected construction firms within Kaduna Metropolis has been investigated therefore, the aim is to assess factors that influence productivity of craftsmen on some construction sites in Kaduna Metropolis with a view of improving labour productivity, under the following objectives; to identify factors influencing productivity of craftsmen on construction site, to measure the level of influence of these factors on labor productivity and to establish factors that will serve as tools for improving labor

productivity of craftsmen on construction site.

Literature Review

Adrian (1982) said that extracting is very important to the construction industry, in order to achieve a good output there has to be a good estimate of work and all of these take time to achieve, in either way the output per unit of resource or labour leads to effective or ineffective output. However, productivity has different meanings to different persons which has to lead to giving people different perceptions of the concept which has limited a true estimate of individuals. In this case, productivity or non-productivity is subjective and can vary depending on the judgement of the person collecting the data.

Fryer (1990) believed that people's feelings about work affect their output and productivity, he said that some people see work as slavery while others see it as liberation, some work to make a living and others work even if they don't need to work.

Abdullahi (2009) argued that productivity could be limited as a result of so many external factors and added that these factors vary with individuals and personalities. The researcher advised that whoever is an employer, should check out for the interest of employees in order to know who of them will put his best in attaining the given task.

Arboleda and Abraham (2002) opined that accident on construction site affects productivity. Further stating, that accidents reduce workers' morale and hence their output and productivity. They went further to say that accident should be reduced on site to reduce both the cost of construction and for workers to perform their work effectively.

Horman and Kenley (2003) these people saw that wasted time on site also affects productivity. They identified areas where improvement could be made by ascertaining the proportions of time spent on non-productive activity.

Anson and Lu (2004) said that the cyclic natures of the productivity of construction resources, the number of units of production that can be generated over some unit of time are affected. They however added that recording and examining the construction operations production performance are to be taken seriously.

Ark and Ypma (2006) it is necessary to measure and inputs for the study of economic growth and productivity. He however, explained that input of labour does not always determine the output and productivity due to some factors and went further to say that it is necessary to integrate employment and hours worked in establishing a consistent measurement framework that supports both academic and policy analysis.

Udegbe (2007) discussed on the output of painting, where he said that no matter the output of the painters', since there is no standard of payment, the client pays how much he feels should be paid. The researcher also talked of the factors that affect labour output and found out that leadership affects both the productivity and quality of work.

Alan (2008) wrote on productivity and he suggested that to determine productivity it is necessary to work with the employee to identify the best candidate for a job in order to be able to have a desirable output. In doing this, it is necessary to assess both individual tasks and the skills needed to accomplish every task. He also went further to suggest that like tasks should be grouped alongside the skills required, so that jobs can be redesigned to maximise efficiency.

Harris and McCaffer (2008) argued that the key to raising the productivity level lies in improving the performance and proportional balance of the input factors. They also identified that productivity is synonymous to productivity. The went further to say that productivity improvement process reduces redundant labour and other resources to meet demands for new activities and

specialisations for the production of extra goods and services.

They went further to say that the government and the construction industry has the general interest of improving productivity. This could be achieved through eliminating of excessive labour in order to improve cost effectiveness which will result to a good output and productivity. They as well said that specialisation and division of labour also lead to better output.

Adrian (2009) stated that productivity of craftsmen is the determination of output hours of work and the output for those hours of work and that there are some factors that affect measurement of work on hourly basis.

Abdullahi (2009) explained that several factors are inherent in the accuracy of estimates; these factors go a long way in determining the output of a labour and went ahead to suggest that extracted productivity figures should be exploited in order to optimise the productivity of their workers and profitability. Chitkara (2009) said that labour productivity achieved on the site for a given work provides a measure of the labourers' efficiency. This efficiency shows the total time for which the labourer was employed at work, the time he was productive on the work and the time he remained unproductive. He went further to suggest ways by which productive and unproductive period could be determined. And he concluded by saying that it will lead to taking remedial measures in order to improve productivity.

METHODOLOGY

This research has been carried out within Kaduna state (Metropolis in particular) of Nigeria. Data sets were collected only from on-going construction projects within the geographical location for the purpose of this study. The fact that it is not economical to consider the entire population due to time and other logistic reasons, therefore, purposive sampling was used to select a sample size of only 40 Construction sites. A non-probability sampling method known as *purposive sampling* was strategically employed in selecting all the construction sites of the study. All the sites was selected on the basis of availability i.e. those willing to give access of their sites and construction workers to be observed. The sample characteristics would fully be captured as the true representation of the study population (construction sites). Consequently, from each construction site, the operations or activities on progress was fully observed accordingly. These activities included the followings; Carpentry, Masonry andSteel fixing.

RESULTS AND DISCUSSION

Administration of Questionnaires

TABLE 1: Administered questionnaires and responses

Status	Number	percentage%
Distributed	75	100
Retrieved	67	89.33
Not retrieved	8	10.66
Total valid response	63	84

Source: Field Survey, 2018

Table 1 above shows the distribution of questionnaire for the purpose of the paper. A total of 75 questionnaires were administered to sites within Kaduna States. A total of 67

questionnaires were subsequently retrieved, 4 were incorrectly completed and were therefore considered invalid for use in the survey. 63 were considered and subsequently used for data analysis, signifying 84% response rate. The 84% response rate is considered reasonable in relation to Ellhag&Boussabaine (1999) and Idris & Newman (2002) both cited in Oladapo (2007), a response rate of 30% is good enough in construction management based studies. More so, going by Moser and Kalton (1971) 's cited in Olamilokun (2012) the result of a survey could be considered as biased and of significance if the return rate is within the range of 30-40%, the number of questionnaires completed and returned were therefore considered adequate for analysis.

Respondents Position

TABLE 2: Respondents Position

Position/Craft	Frequency	Percentage%
Supervisors	23	36.51
Masons	16	25.40
Carpenters	15	23.81
Steel fixers	9	14.28
Total	63	100

Source: Field Survey, 2018

Table 2 shows that 36.51% of the respondents are supervisors, 25.40% are masons, 23.81% are Carpenters and 14.28% steel fixers therefore, representing a good number of supervisors/craftsmen on construction sites.

Nature of Construction

TABLE 3: Nature of construction/Sites

Nature of construction	Frequency	Percentage%
Residential	31	49.21
Commercial	13	20.63
Institutional	19	30.16
Total	63	100

Source: Field Survey, 2018

This table shows the nature of construction carried out at the site 49.21% of are residential buildings, 20.63% are commercial buildings and 30% are institutional buildings

Respondents Experience

TABLE 4: Respondents experience

Years of experience	Frequency	Percentage%
0-5 years	14	22.22
6-10 years	21	33.33
11-15 years	18	28.58
16-20 years	7	11.11
Above 20 years	3	4.76
Total	63	100

Source: Field Survey, 2018

The researcher considered it necessary to find out the experience of the respondents in the Construction Industry in order to have a fair view of their experience of construction and those factors influencing productivity in construction. From the table 4 above, the majority of the respondents representing 33.33% have been working for 6-10 years, whiles 28.58% spent 11–15 years in the industry. 22.22% spent 1 -5 years. While 11.11% spent 16-20 years and 4.76% spent above 20 years. This result implies that most of the respondents had relatively an average years of experience in the industry and therefore are conversant with the various issues of productivity in relation to construction.

RANKING FACTORS INFLUENCING PRODUCTIVITY

Worker Factors

TABLE 5: Worker factors influencing productivity

FACTOR	**Number**	**Mean**	**Standard Deviation**	**Ranking**
Worker expertise	63	4.06	0.59	1
Worker capability	63	4.00	0.86	2
Worker morale and attitude	63	3.97	0.69	3
Worker motivation	63	3.84	0.72	4
Worker education	63	3.81	0.74	5
Worker experience	63	3.78	1.17	6
Worker team work	63	3.78	0.75	6
Worker sense of responsibility	63	3.75	1.06	8
Worker communication	63	3.59	0.82	9
Worker training	63	3.57	0.50	10
Worker health	63	3.44	0.67	11
Security (crime, theft and disorder)	63	3.35	0.85	12

Source: Field Survey, 2018

Table 5 above shows the mean, standard deviation and the ranking of the workers factors affecting productivity, worker expertise has the mean of 4.06 and standard deviation of 0.59, worker capability has the mean of 4.00 and standard deviation of 0.86, worker morale and attitude has the mean of 3.97 and standard deviation of 0.69, worker

motivation has the mean of 3.84 and standard deviation of 0.72, worker education has the mean of 3.81 and standard deviation of 0.74, worker experience has the mean of 3.78 and standard deviation of 1.17, worker team has the mean of 3.78 and standard deviation of 0.75, worker sense and responsibility has the mean of 3.75 and standard deviation of 1.06, worker communication has the mean of 3.59 and standard deviation of 0.82, worker training has the mean of 3.57 and standard deviation of 0.50, worker health has the mean of 3.44 and standard deviation of 0.67, and security has the mean of 3.35 and standard deviation of 0.85.

Material/ Tool Factors

TABLE 6: material/ tool factors influencing productivity

FACTOR	Number	Mean	Standard Deviation	Ranking
Material conditions	63	3.87	0.55	1
Material applicability	63	3.79	0.79	2
Material quantity	63	3.62	0.71	3
Tool and equipment shortage	63	3.27	0.77	4
Material transportation	63	3.16	0.60	5
Material procurement	63	3.16	0.79	5

Source: Field Survey, 2018

Table 6 above shows the mean and standard deviation of the materials/tools related factors, material conditions has the mean of 3.87 and standard deviation of 0.55, material applicability has the mean of 3.79 and standard deviation of 0.79, material quantity has the mean of 3.62 and standard deviation 0.71, tools and equipment shortage has the mean of 3.27 and standard deviation of 0.77, material transportation has the mean of 3.16 and standard deviation of 0.60 and material procurement has the mean of 3.16 and standard deviation of 0.79.

Work Characteristics Factor

TABLE 6: Work characteristics influencing productivity

FACTOR	Number	Mean	Standard Deviation	Ranking
Work space	63	3.83	0.77	1
Working field accessibility	63	3.70	0.64	2
Work environment	63	3.52	0.80	3
Work method	63	3.40	0.66	4
Work quality	63	3.35	1.09	5
Poor weather condition	63	3.14	0.56	6
Work difficulty	63	3.06	1.08	7

Source: Field Survey, 2018

The table 6 above shows the mean and standard deviation of work characteristics related factors, work space has the mean of 3.83 and standard deviation of 0.77, working field accessibility has the mean of 3.70 and standard deviation of 0.64, work environment has the mean of 0.82, work method has the mean of 3.4 and standard deviation of 0.66, work quality has the mean of 3.35 and standard deviation of 1.09, poor weather condition has the mean of 3.14 and standard deviation of 0.56 and work difficulty has the mean of 3.06 and standard deviation of 1.08.

Management and Control Factor

TABLE 7: Management and Control factors influencing productivity

FACTOR	Number	Mean	Standard Deviation	Ranking
Manager capability	63	4.10	0.73	1
Drawing and specification alteration during execution	63	3.97	0.80	2
Payment delay	63	3.84	0.87	3
Information technology	63	3.84	1.02	3
Slow local authority approval	63	3.75	0.62	5
Poor scheduling and coordination	63	3.73	1.00	6
Inspection delay	63	3.67	0.65	7
Management system	63	3.65	0.83	8
Work order	63	3.52	0.50	9
Lack of periodic meeting with workers	63	3.33	0.48	10
Rework due to construction error	63	3.30	1.19	11
Lack of labour surveillance	63	3.17	0.55	12
Work continuity	63	3.11	0.67	13
Safety/ accident	63	3.08	0.77	14
Work delay	63	3.06	0.93	15

Source: Field Survey, 2018

The table 7 above shows the mean and standard deviation of the Management and control related factors and the site supervisors are the respondents, management capability has the mean of 4.1 and standard deviation of 0.73, drawing and specification alteration during execution has the mean of 3.97 and standard deviation of 0.8, payment delay has the mean of 3.84 and standard deviation of 0.87, information technology has the mean of 3.84 and standard deviation of 1.02, Slow local authority approval has the mean of 3.75 and standard deviation of 0.62, Poor scheduling and coordination has the mean of 3.73 and standard deviation of 1, Inspection delay has the mean of 3.67 and the standard deviation of 0.65, Management system has the mean of 3.65 and standard deviation of

0.83, Work order has the mean of 3.52 and standard deviation of 0.5, Lack of periodic meeting with workers has the mean of 3.33 and standard deviation of 0.48, Rework due to construction error has the mean of 3.3 and standard deviation of 1.19, Lack of labour surveillance has the mean of 3.17 and the standard deviation of 0.55, Work continuity has the mean of 3.11 and standard deviation of 0.67, Safety/ accident has the mean of 3.08 and standard deviation of 0.77 and Work delay has the mean of 3.06 and standard deviation of 0.93.

CONCLUSION

This paper concluded that the major factors influencing productivity as shown by the findings of this research under worker factors are: Worker expertise, Worker capability, Worker morale and attitude, Worker motivation, Worker education, under material/ tool factors: Material conditions, Material applicability, Material quantity, Tool and equipment shortage, Material transportation, under work characteristics: Work space, Working field accessibility, Work environment, Work method, Work quality, and under management and control: Manager capability, Drawing and specification alteration during execution, Payment delay, Information technology. The factors identified above are the most critical among the factors reviewed from literature.

RECOMMENDATIONs

For the improvement of productivity of craftsmen in the construction industry, the following are recommended:

i. The employment of workers with high skills and expertise should be considered
ii. The capability, experience of a worker should be looked into before allocating a task to him.
iii. Motivation and training of workers is also vital for the improvement of productivity
iv. Before the supply of any material to the site the materials should be checked properly to confirm its condition, quality and applicability.
v. Each section of the site should be accessible for easy movement of materials around the site.
vi. The introduction of planning and scheduling should be done during the pre-contract stage and all steps should be followed as scheduled.

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