CHAPTER ONE

INTRODUCTION

1.1 Background to the Study

Every organization is concerned with what should be done to achieve sustained high levels of performance through its workforce. This means giving close attention to how individuals can best be motivated through such means as incentives, rewards, leadership, and the organizational context within which they carry out the work (Amstrong, 2006). With positive motivation philosophy and practice in place, productivity, quality and service should improve because motivation helps people towards achieving goals, gaining positive perspective, creating the power for change, building self-esteem and capability, and managing their development and helping others (Adjei, 2009).

The role of management is to apply organizational resources which include human resources to achieve organizational objectives (Parkin, Tutesigensi and Buyukalf, 2009). For increased productivity which is one of the organizational goals, work force motivation is an influencing factor (Parkin et al., 2009). In order to ensure that people employed in the organization perform optimally towards the realization of organizational goals, they need to be motivated to work. An employee must be motivated towards his role and work in an organization, if no motivation is present in an employee, then that employee's quality of work or overall work performance will deteriorate (Agarwal and Agarwal, 2013).

Kirstein (2010), believes that motivation seems to be one of the most important tools of human resource management. Organizations design motivation systems to encourage employees to perform in the most effective way and also to attract potential candidates. Despite many studies on motivation, managers today are no closer to understanding employee's motivation more than their counterparts half a century ago (Kirstein, 2010). Some studies on motivation were of the views that such extrinsic factors like money, praise and quality of supervision and company's policy can motivate people to work, while others laid emphasis on intrinsic factors like advancement, quality of the job done by a person, recognition and growth as a way of motivating workers. In a study by Mojaheed (2005), it was established that involvement in decision making, recognition through financial rewards and job security are important motivational factors for

workers to work harder to give out their best. However, in the study of impact of non-financial incentives on bricklayers' productivity in Nigeria by Fagbenle, Adeyemi and Adesanya (2004), job security was assigned the least importance by both management and bricklayers.

Conceptually, motivation is that force which makes an individual abandon his own interests to pursue the interests of an organization. It is concerned with why people do what they do. It answers such questions as why do managers or workers got on job and do a good job. The motivation of employees depends on the strength of their motives. Motives are needs, wants, drives or impulses within the individual, and these determine human behaviour. Motivation is the process of arousing behaviour, sustaining behaviour in progress, and channelling behaviour into a specific course of action.

The traditional approach to motivation assumes that workers will work harder if they are paid enough. The human relations approach to motivation emphasizes that workers need to feel important and socially accepted, thus encouraging the view that these views are more important than money, on the other hand, the human resource's approach encourages employees or managers to create an environment where workers contribute to, and participate in the running and success of the business (Griffin, 1993).

According to Olomolaiye (1988), several incentives scheme which were introduced to motivate operatives were not effective, or best worked only when newly introduced. Construction industry's understanding and application of motivation concepts has remained largely the same, new schemes are being devised in seemingly endless continuum (Olomolaiye, 1988).

The construction industry is Labour intensive in nature. People often work long hours in relatively unpleasant environments far from their families (Mmphati, 2008). Even if workers are not happy to be working in a particular environment, they find themselves obliged to work. Fearing reprimands from their supervisors, they often find it difficult to express their ideas (Mmphati, 2008). According to him, supervisors generally do not involve the workers in the decision process as they feel it to be unnecessary and believe that their function is to instruct and direct their working teams.

It has been difficult for management to identify the factors of production that affect their worker's productivity in a work environment, thus the need for this

type of study. Labour productivity has a significant impact on time, cost and quality of a construction project (Kaza, Ulubeyli, Acikara and Bayram 2016). In the field of construction, a successful project is not that which was started and completed, but that which met the expectations of the client in terms of cost, time and quality. Especially, the competitive environment of the construction industry forces construction companies to increase their labour productivity values in order to keep their positions in the industry (Kazaz, et. al. 2016). Time, Cost and quality targets are recognised to be the major criteria used to measure project delivery level of success (Dissanya and Kumaraswamy, 1999). Abdulateef and Abdulganiyu (2015) assert that the clients of building projects are primarily interested in their projects being delivered within a short time for an effective lower cost, and at a higher quality.

But unfortunately, projects delivery in Nigeria is yet to be delivered effectively to meet these requirements. This fact was supported by Riverlamlan and Hall (1995), who argued that there exists little evidence of projects where these three factors have been successfully balanced. Newcombe (1990) stated that construction industry is being criticised globally for failure to deliver projects on time. Managers need to motivate operatives to obtain the desirable results for their construction project. Pike (2001), opined that if people are highly motivated to work, they produce more results and business flourishes, if people are less motivated, a downward spiral in the performance and quality of business develops, because there is a direct relationship between poor company management of people and the behaviour of workers. According to Brent (2010), the first question that arises is "why managers need to motivate employees"? And the answer is because of the survival of the organization. He argued that it is important that managers and organizational leaders learn to understand effectively and deal with their employee's motivation; since motivated employees are necessary to let the organization being successful in the next century. He also argued that unmotivated employees are likely to expend little effort in their jobs, avoid the work place as much as possible, exit the organization and produce low quality of work. In cases that employees are motivated, they help the 0rganizations survive in rapidly changing workplaces. Ugwudioha (2004), believes that employees in an organization are employed to expend their time, effort, energies and expertise in order to contribute to the attainment of organizational goals and that these employees expect adequate compensation and rewards for their contributions. He also argued that the

compensation and reward system will therefore enable the employees to satisfy their personal needs, which include economic needs, psychological needs, social needs and growth needs.

Tizazu (2015), stated that employees play an important role in the success or failure of any organization and that the importance of motivation in retaining core employees cannot be over emphasized. Tizazu (2015) believes that keeping the best employees has continued to be challenge for most managers. If employees are committed to an organization, they are less likely to leave or be absent and may also display other behaviours which are valuable to the organization (Maurer and Lippstrue, 2008). Even a single demotivated core employee in an organization can lead to low productivity in the organization (Ghandi, 2010). To be effective, managers need to understand what motivates employees within the context of the role they perform (Lindner, 1998). Kaye and Jordan (2005) indicates that managers must stop guessing what it is that keeps their stars home and happy- managers must not assume employees want the same thing, such as pay or promotion. A variety of factors motivate people at work, some are motivated with tangibles, such as money, and others are motivated with intangible, such as sense of achievement, recognition (Spector, 2003). Tizazu (2015), believes that some of the reasons for employee turnover include lack of promotion, insufficient pay, work overload, and some other motivation related issues such as opportunities for training and development. Dess and Shaw (2001), argue that turnover incurs significant cost, both direct and indirect, in terms of direct costs (replacement, recruitment and selection, temporary staff, management time) and indirect costs (morale, pressure on remaining employees, cost of learning, product/ service quality, organizational memory and loss of social capital).

The motivation, especially monetary rather than moral, has proven its influence on the productivity of workers, and the methods of motivating personnel to promote productivity have been demonstrated by Khan (1993) through applications of different human relations theories of motivation. Olomolaiye and Ogunlana (1988), asserted that earnings related factors were predominant for motivating construction operatives Nigeria, thus, not only are financial incentives necessary to enhance motivation at personal and organizational levels, but also to promote unified motivation across highly interdependent and contractually fragmented project teams. McKenzie and Harris (1984) claimed

that money was the only motivator for construction workers. Colvin (1998), agreed that financial incentives will get people to do more of what they are doing.

Most contracting organizations have tried using financial incentives like bonus system, allowances parks, and salaries to motivate their workforce, but all these have proved abortive. The complexity of the construction project delivery is one of the major challenges in applying financial incentives. Construction projects emerge in fragments (Mitropoulous and Tatum, 2000). Disjointed relationship between contracting parties, misalignment of objectives, and risk adverse behaviours characterized construction projects (Rahman and Kumaraswamy, 2004). Similarly, adversarial business environments in the construction industry are a major barrier to continued growth and diffusion of new innovation (Anderson, Cook, and Marceau, 2004). The difficulty in assessing performance in highly interdependent teams compounds the challenge as individual output may be almost indistinguishable from group output (Howard, Turban, and Hurley, 2002).

The study of the motivation of construction workers is still limited to a relatively small body of knowledge. Although there is considerable research available regarding motivation and productivity, few researchers have provided a comprehensive analysis on the motivation of construction workers (Borcherding and Garner, 1981). There is still need for further investigation into motivation of construction workers in the construction project delivery. There is need to undertake a survey that reveals exactly what motivates the operatives into performing within or above standard and then come up with a solution that yields maximum result. This research responds to that need and tries to examine how motivation can be used to improve tradesmen' performance and productivity in the building construction industry.

1.2 Statement of the Problem

Most widely used management style in the construction industry has involved management by threat. Construction workers are often abused by their supervisors but they continue to work when it is difficult to find other employment (Mphati, 2008). This fact was also supported by Ngwu and Ogunoh (2015), who opined that one of the major problems facing the building

construction industry in Nigeria is the inability of management to meet most of the vital conditions of labour at work site.

Losses in construction human resource productivity have often been attributed to poor management of construction projects and construction professionals (Sathe, Patil and Waghmare, 2017). Eldin and Eggar (1990) cited by Aiyetan and Olotuah (2006) noted that construction productivity has been declining steadily in spite of the rising cost and large labour intensive nature of construction projects. The decline in workers performance causes the failure of most building industries to deliver projects timely with the obvious consequences of cost overrun (Aiyetan and Olotuah, 2006). Despite all the motivational theories propounded by past philosophers, academicians, scholars and employed as motivational strategies by organizations, it has become increasingly difficult for projects to be completed within the scheduled budget, time and to meet up with the specified standard in Nigeria (Lawal and Okhankhuele, 2014).
All over the world, especially in developing countries like Nigeria, construction workers are becoming more and more displeased due to unsatisfactory working conditions occasioned by economic downturn (Lawal and Okhankhuele, 2014).

The present craftsmen who constitute about 60% of the direct construction workers in every project site, have not shown marked improvement in their performance since the exit of master craftsmen in 1970s (Chukwuji, 2012). This same author equally stated that many genuine developers, designers and construction managers have continued to indicate their serious concern on the low output and poor quality of work of this generation of craftsmen, especially on construction projects executed by indigenous contractors.

Sawczuk (1996:50) indicates that contractors should set the standard early in the contract and get the workforce motivated to continue work at the set standards. Despite these recommendations, time delays, time overruns and poor quality still occur in construction projects. The current research study seeks to determine if project objectives can be successfully achieved if they are aligned with motivation.

At the project sites in the south-eastern states, there is an observed low productivity (Umeadi, 2011, Chukwuji, 2012; Ngwu and Ogunoh, 2015;). There is also a high turnover rate and absenteeism among crafts workers employed by

companies and these factors have negative effects on the completion time, cost and quality of projects executed within the area, which most of the time lead to serious disputes and litigations among the project parties.

Unfortunately, in spite of the availability of a myriad of study recommendations from past works on motivational measures, including the existence of models on productivity of workmen, none of them is specifically directed to building tradesmen in the study area. Moreover, such models are generic in nature and do not take into consideration the peculiar nature of the needs and psychology of workers in the study area. This is due to the dearth of research in this very important area in Construction Management.

1.3 Aim and Objectives

1.3.1 Aim

The aim of this study is to develop a motivational model for improving the productivity of major building tradesmen at construction sites in South-Eastern States of Nigeria.

Objectives

To achieve the above stated aim, the objectives are to:

1. identify and rank the factors that motivate site tradesmen for effective project delivery.
2. identify the problems inhibiting management effort with respect to tradesmen's motivation.
3. determine the effect of poor motivation of tradesmen on project delivery.
4. develop a motivational model based on the factors that have the greatest positive impact on tradesmen's productivity.

1.4 Research Questions

The study intends to provide answers to the following questions:

1. What are the key factors that motivate tradesmen for effective project delivery?

2. What are the problems inhibiting management effort with respect to tradesmen's motivation?
3. To what extent does poor motivation affect tradesmen's performance in project delivery?
4. What motivational model will improve productivity of tradesmen in project delivery?

1.5 Research Hypotheses

H_o, 1: Poor motivation does not significantly affect tradesmen's performance.

$H_{o,}$ 2: There is no significant relationship between motivation and effective project delivery.

H_o, 3: Punishment does not significantly affect tradesmen's motivation.

1.6 Significance of the Study

The study will provide construction managers and decision makers with a motivational tool which will enhance project productivity. The tool can be used at the planning stage and serve as a checklist to guarantee a more productive completion of projects. It will help those who intend to set up their construction firms in future to be aware of the techniques they can use to motivate their workforce for improved productivity. The research can also serve as a database for future research. Other states and countries can adopt the motivational strategies developed by this research to improve their workers' productivity and performance. Government can also take advantage of this work to make policies that can favour employees in the construction sector which will finally benefit management at the long run. Indigenous contractors and other stake holders in the industry will also benefit from this work to ensure that their projects are highly successful. Students of construction management can equally benefit from this research as this will help them to make useful decisions concerning their future projects during and after graduation. Finally, construction clients can also take advantage of the research to make useful suggestions to their contractors on what best to do to get the workforce motivated in order to enhance successful completion of their projects. Cost estimators will also take

advantage of this work to make useful provisions for motivational issues during their cost estimates for their projects.

1.7 Scope and Delimitation

The research developed a model for improving productivity based on motivational variables significantly affecting tradesmen. The research model can only be used for managing the motivation and productivity of building tradesmen. The labour constants used by the research were the ones established from building processes. The research identified the key factors that motivate tradesmen; the financial and non-financial factors, the challenges inhibiting management efforts with respect to tradesmen' motivation, the effects of poor motivation on project success. The research focuses on two groups of respondents, firstly skilled labour comprising; Masons, Carpenters, and Steel Fitters and secondly the members of the management team of the various construction companies selected by the researcher. The three trades selected by the researcher was because of the fact these trades are common in every construction activity. The research is focused on the building construction industry, since that is the researcher's area of specialization.

Geographically, the research was carried out in the south eastern part of Nigeria. Out of the five states in the south east, the researcher selected three states for the study which include: Abia, Anambra and Enugu. These states were selected because there is a large volume of construction activities going on in those states during the research period, the researcher is also conversant with the environment in those states and this made it easier for the researcher to distribute and collect questionnaire for the research. In Abia state, the researcher selected Umuahia which is the capital city because the town has more number of construction activities going in it compared to the other towns. In Anambra state Awka, Aguleri, Nnewi and Okija were selected because of the location of construction companies in these towns. Lastly in Enugu state, the researcher selected Enugu because of the location of construction company in the town.

1.8 Assumptions of the Study

i. Construction companies with partially regular tradesmen in their payroll

were used for the study .

ii. The study model relies on established labour constants for masonry, carpentry, and steel fitting building processes which were calculated from past studies on productivity modelling in the study area.

iii. The labour constants were established based on the peculiarities of the local working conditions under which tradesmen work.

iv. Building tradesmen who work in building construction companies were used in the study.

v. Construction companies used by the research handle building projects.

1.9 Limitations of the Study

This research has its limitations which are:

i. The study findings cannot be used in making generalization for zones beyond the context of southeast geo-political zone of Nigeria.

ii. The study did not use any data outside building construction work.

iii. The study model cannot function in the absence of established labour constants which is used as basis for prediction.

iv. The study model may not be used in managing the motivation and productivity of building tradesmen outside the study area due to probable differences in need, psychology and working conditions.

v. The research did not consider other factors of improving productivity outside motivation related factors.

vi. The model developed by the research can only be used in predicting the productivity of three major groups of building tradesmen (Carpenters, Steel fitters and Masons).

vi. The research was limited to a sample size of two hundred and sixty six due to lack of time and other resources.

1.10 Study Area (South East States)

Southeast zone comprises the geographical location of the following states; Abia, Anambra, Ebonyi, Enugu and Imo. Though the research studies only three states from the southeast (Anambra, Abia and Enugu), a brief discussion of the five states is undertaken below:

1.10.1 Abia

The state share common boundaries to the north with Ebonyi state, to the South and South West with Rivers state and to the East and South East with Cross River and Akwa Ibom stats respectively to the west is Imo state, and to the North west is Anambra State. Abia state lies within approximately latitudes 4^0, 40' and 6^0, 14' north, and longitudes 7^0, 10' and 8^0 East. The State an area of about 5, 243: 59Km which approximately 5.8 percent of the total land area of Nigeria, with its capital at Umuahia, it has seventeen L.G.A. Each of the seventeen L.G.As in the state is headed by the Local Government Area Councils in the state have five departments which are: Administrative, Agriculture, Health, Education and Works. The Administration headquarters of the Local Government area. High courts are found in Aba and Ohafia Local Government Area as well as Umuahia, the state capital's Magistrate Courts are located in Aba, Arochukwu, Ohafia, Bende and Ukwa L.G.As, Customary courts are also found in Ukwa, Isiukwuato, Bende, Ohafia and Arochukwu L.G.As.The National census of Nigeria carried out in 2006, put in provisional population of Abia state at 2,833,999. Out of this figure, 1,430,298 are males and 1,451,082 are female.

Abia state has two main urban countries namely: Umuahia and Aba. Umuahia, the state capital has become the Administrative, Educational and Cultural centre of the state. In addition, the city is located at the centre of extensive Agricultural region which covers most of the central part of Abia state. It is also strategically located along a well-established north south trading and transportation routes. Of the two major towns in Abia state, Aba is the largest. It has largest concentration of people in the state. It is the largest commercial centre in the state. Abia state is inhabited by the Igbo, the Igbo language is spoken throughout the state. There are two seasons in the year namely: The rainy season and the dry season. The rainy season begin in March and ends in

October with a break in August. The dry season which last four months begins in November. Heavy thunder storm are characteristics of the onset of the rainy season. The total decreases from 2200mm in the south to 1960mm in the north. The hottest month are July to March when the mean temperature is above 27^0C. The relational humidity is normally high throughout the year, reaching a maximum during the rainy season when values above ninety percent are recorded.

1.10.2 Anambra

Anambra state is located between latitudes $05^0$40'N and 07^0 10'N and $06^0$35' E and $07^0$20'E. The state shares boundaries with Delta to the West, Imo to the South, Enugu to the East and Kogi to the North. It has a total land mass of 4,416 km and situated on the Eastern side of River Niger. The state has 177 communities (towns) in 21 Local Government Areas. It comprises of three major towns namely; Awka, its capital city, and the seat of Government, the commercial town of Onitsha and the industrial city of Nnewi. According to the NPC (2006) Anambra State has a population 4, 182, 032 made up of 2,007,391 and males 2, 174, 64 females, which makes it the most populous state nationwide. It also has estimated average population density 1500 – 2000 persons per square kilometre, making it the second most densely populated state in Nigeria, after Lagos state.With an annual population growth rate of 2.21 percent per annum, Anambra has over 60% of its people living in urban area making it one of the most urbanized places in Nigeria.

Anambra state is in the tropical zone of Nigeria, with the distinct seasons, dry and rainy seasons from December to April and May to October respectively while annual precipitation ranges from 15000mm to 2000mm rainfall with July as the rainiest month (Umenzekwe, 2000). According to him, humidity is relatively high between 65 – 80% throughout the year, daily temperatures up to 25^0 C are recorded on very hot days in January and March.

Anambra state has fairly good subsoil strata. It exhibit quality sub base foundation soil for buildings and construction work: extensive construction activities and concentration of industry participants such as clients, contractors and professional consultants are found in the state capital of Awka and other commercial towns such as Onitsha and Nnewi. The contribution of the

construction industry over the past few years represents a significant percentage of the state Gross Domestic Product (GDP) (Anambra State Bureau of Statistics, 2018). Construction activities also provide a substantial source of employment, especially unskilled labour.

1.10.3 Ebonyi

Ebonyi state is inhabited and populated primarily by Igbos. Its capital and largest city is Abakaliki. Afikpo is the second largest city. Other major towns are Onueke, Nkalagu, Uburu, Onicha, Ishiagu, Amasiri, and Okposi. The state shares boundaries with Benue to the North, Enugu to the Northwest, Abia to the South East and Cross River to the East. Ebonyi is divided into thirteen Local Government Areas. Agriculture is the major occupation of the people of the state.

Ebonyi state has a population of about 2,176,945 people on a total land area of 5, 935 Sq. km. This gives a population density of 286 persons per Sq. Km. Population concentration is highest in the urban areas. Abakaliki, its state capital has an impressive infrastructure network particularly in terms of road network and water supply anchored on the greater Abakaliki water scheme. Ebonyi state lies within longitude $7^0$30 and $8^0$30E' and latitude $5^0$40 and $6^0$45N. Ebonyi state is popularly known as the salt of the Nation because of the large deposits of salt water in the state.

Two main types of soil are found in Ebonyi state. These are silky clayey hydromorphic soil and clay hydromorphic soil. Two main seasons dominate the climate of the state. These are rainy season which usually brings in late April and ends in early October, and dry season which lasts from late November to early April.

1.10.4 Enugu

Enugu State is located between latitude $5^0$53' N to 7^0 05' N of the equator and longitude $6^0$46'E to $7^0$52'E of Green with meridian. Enugu state shares borders with Abia state and Imo state to the south, Ebonyi state to the East, Benue state to the northeast, Kogi state to the northwest and Anambra state to the west. Enugu is the capital of Enugu state. Enugu state had a population of 3, 267,837

people at the census in 2006 (estimated at over 3.8 million in 2012). Enugu state consist of 17 local government areas. Enugu and Nsukka are its major towns. The people of Enugu are typically Igbos.

Enugu lies partly within the semi tropical rain forest belt of the south and spreads towards the north through a land area of approximately 7, 171 Sq. km. The major streams in the state Adada River and Oji River. Enugu is noted for its coal deposit. Its main economy depended on coal before the discovery of oil in commercial quantities.

Besides coal, new mineral deposit have been recently discovered in Enugu state. This includes land stone, crude oil, natural gas and bauxite. A network of roads connects important sectors of trade and industry in the state. A rail line of the eastern district of the Nigerian railways runs through the state capital Enugu to Port Harcourt in Rivers state and Enugu Markurdi and Northwards.

The state also has an airport. Enugu state has good land climatic conditions all year round, sitting at about 223 meters (732 pt) above sea level, and the soil is well drained during rainy season. The mean temperature in Enugu state in the hottest month of February is about 87.16^0 F (30.64^0 C), while the lowest temperature occur in the month of November, reaching 60.54^0F (15.86^0C). The lowest rainfall of about 0.16 cubic centimetres (0.0098 CU) is normal in February, while the highest is about 35.7 cubic centimetres (2.18cuin) in July.

Economically, the state is predominantly rural and agrarian, with a substantial proportion of its working population engaged in farming, although trading (18.8%) and services (12, 9%) are also important. In the urban areas, trading is the dominant occupation, followed by services.

1.10.5 Imo

Imo state lies within latitudes $4^0$45N and $7^0$15N, and Longitude $6^0$50'E and $7^0$25E. It shares boundaries with Anambra state in the North, Rivers state in the South, with an area of around 5,100 sq km (4). Its capital is Owerri which is its largest city. Some major towns in Imo state are Okigwe, Oguta, Orlu, Mbaise, Uzoagba, Emekuku. Imo state is divided into twenty seven local government areas and three senatorial zones. Imo occupies the area between the lower River Niger and the upper and middle Imo River. The economy of the state depends

primarily on Agriculture and Commerce. Imo has a population of about 3, 927, 563 according to NPC (2006) population density varies from 230 to 1400 people per square kilometre. Due to over farming and high population density, the soil has greatly degraded. This deforestation has triggered soil erosion which compounded by heavy seasonal rainfall that had led to the destruction of houses and roads. The rainy season begins in April and last until October with annual rainfall varying from 1500 mm to 2200mm (goes to 80 inches). An average annual temperature above 20^0C (68.0^0F) create an annual humidity of 75% with humidity reaching 90% in the rainy season. The dry season experiences two months of harmattan for late December to late February. The hottest month are between January and March. The main streams draining the states are Imo, Otamiri, Njaba, Ulasi Rivers.

The building industry is a booming business in Imo state. Good residential houses abound everywhere, especially in the urban centres. The government executes its housing programme through the state housing corporation.

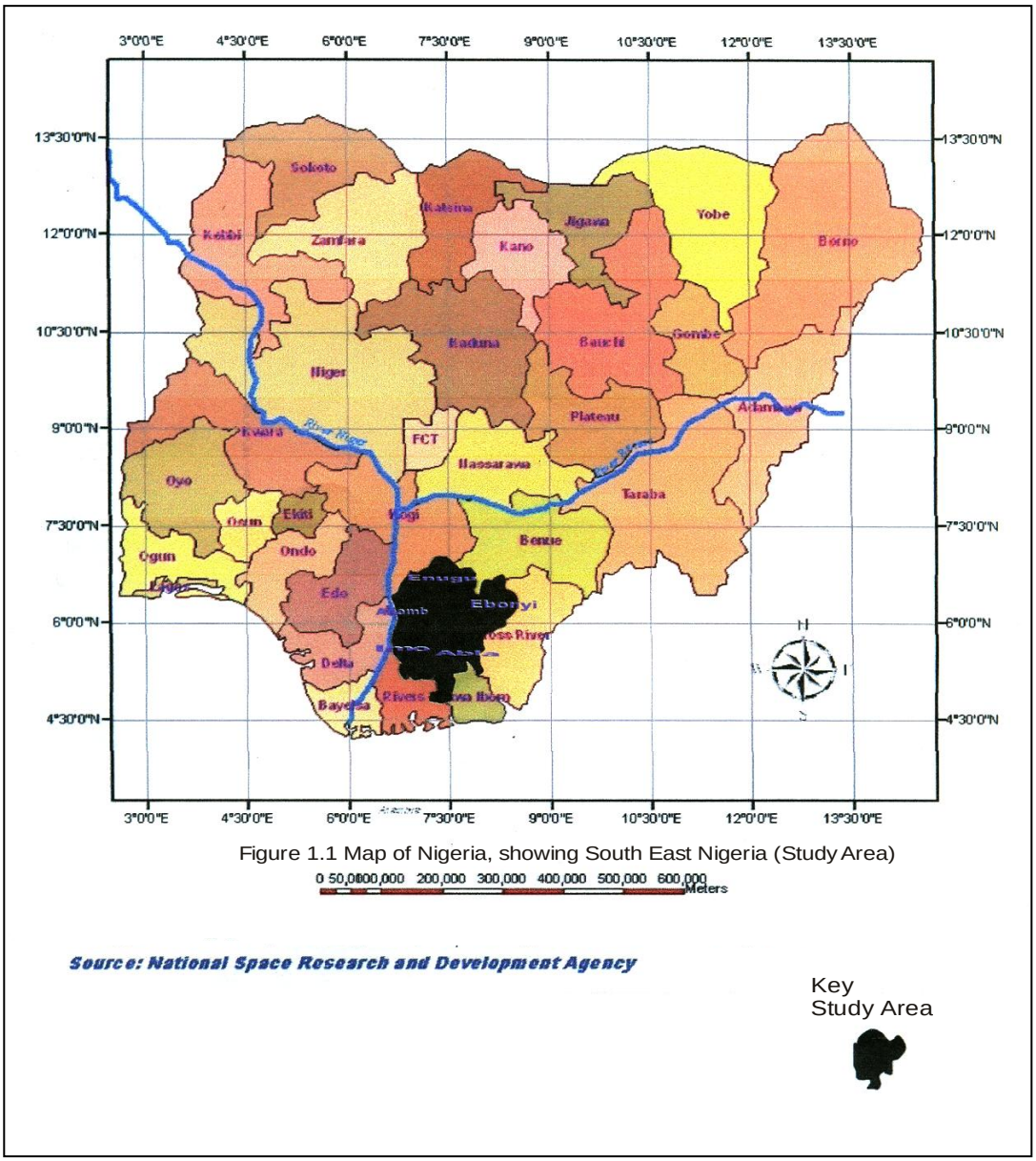


Figure 1.1 Map of Nigeria, showing South East Nigeria (Study Area)

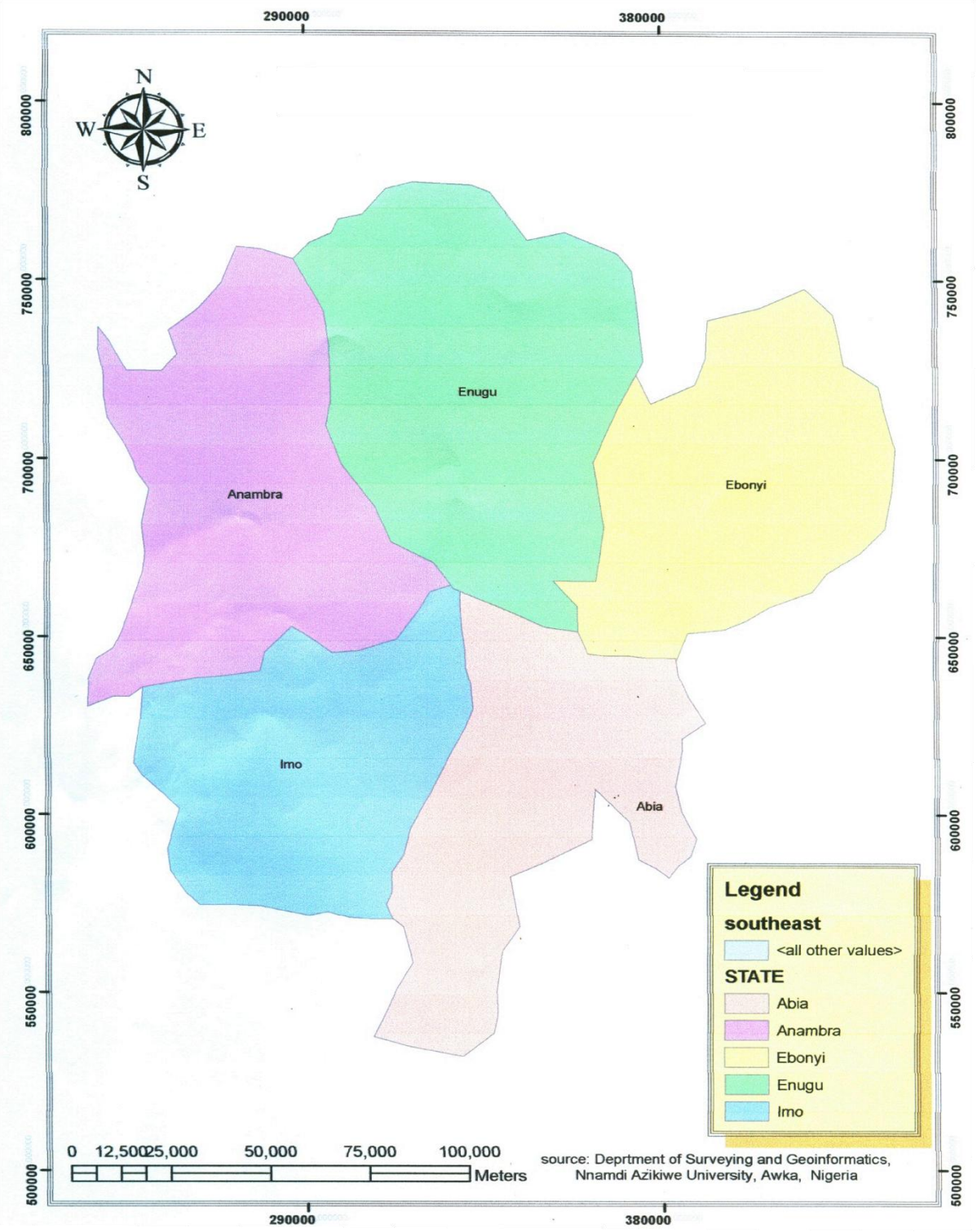


Figure: 1.2 Map of South-East Niagara the five states
Source: Department of Surveying and Geoinformatics
Nnamdi Azikiwe University, Awka, Nigeria

CHAPTER TWO

THEORETICAL AND CONCEPTUAL BASIS FOR THE STUDY/LITERATURE REVIEW

2.1.0 Theoretical Framework

A Theoretical Framework refers to the structure which holds or supports the research theory (Palm, 2007). It assists in the development of a conceptual model of how one makes logical sense of the relationship among variables or factors that have been identified as significant to the problem under investigation. In this regard, the theoretical framework presents the theory that explains why the problems highlighted in chapter one exist and the body of knowledge in which the theory can be located. A Theoretical Framework presents a theory that explains why a problem under investigation exists and explains the connection between certain factors and problem (Marcado, 1994).

2.1.1 Productivity Theories

There are many contemporary theories on productivity; here are a few of them considered to be relevant to the topic and will be examined in the context of motivation.

i. Equity Theory

Equity theory was developed by the American psychologist John Stacey Adams in 1963. It's about the balance between the effort an employee puts into their work (input), and the result they get in return (output). Input includes hard work, skill, and enthusiasm. Output can be things like salary, recognition, and responsibility. A proper balance between input and output ensures that an employee feels satisfied and motivated, contributing to their productivity. Even though Adam's theory is over 50 years old, it's still relevant today. Adams acknowledges that subtle factor influence how employees lose motivation when they think or feel that input is greater than the output. According to Adams (1963, cited by Mulder (2018), input includes both the quantity and quality of the contribution employees make to carrying out their work. They spend their time, energy, and engagement at work. They work hard, share ideas, trust their

supervisors and support their co-workers. It's about the effort they put into the organization. Output on the other hand can generally be divided into financial reward and may include salary, bonus, profit sharing, recognition, challenge, responsibility (Adam, 1963 cited by Mulder 2018).

The Equity theory suggests that individuals have a strong want to maintain a balance between what they perceive their inputs or contributions to be in relation to expected rewards (Dessler, 1988). In terms of the Equity theory, Robbins (1993) states that satisfaction is determined by an individual's input-outcome balance. The author further mentioned that satisfaction occur when perceived equity exists, and dissatisfaction results when perceived inequity exists. In terms of the theory, individuals regard a state of equity to exist when their job inputs in relation to their job outputs are equivalent to that of relevant others. In this regard a situation of fairness is said to exist (Robbins, 1993). Employees might assess their relation to friends, neighbours, co-workers, colleagues in other organizations or previous jobs they themselves have occupied (Robbins, 1993). Similarly, Robbins et al. (2003) concur that employees compare their job inputs (such as their contribution, experience, education and competence) to their job outputs (salary levels, salary increases and recognition) in relation to that of others. Similarly, inequity exists when there is a perception amongst employees that they are under-rewarded relevant to others or whether they are over–rewarded in relation to their job outputs. The resultant effect is that individuals might contribute less in the workplace if they are of the opinion that they are being underpaid. On the other hand, employees might offer more in terms of their expected job outputs as they may be more motivated to contribute if a job pays well in comparison to their job outputs (Dessler, 1988).

ii. Theory X and Y

McGregor (1960) postulates Theory X and Theory Y based on extreme assumptions about people and work. Theory X assumes that average employees dislike work, and that the only way to maintain or increase productivity is to simplify the production process, supervise the employees closely, and motivate them in short term through financial incentive schemes.According to McGregor (1960), the view of the nature of human beings is based on a certain grouping of assumptions, (people are generally lazy, dislike work and will avoid it if they

can). This theory believes that, generally man works for the need of substances and safety and only money could make him work hard. Theory Y assumes that average employees' desire for self-direction and self-control, seek and accept responsibility, enjoy physical and mental effort, and have the potential to be self-motivating

iii. Expectancy theory

This theory which was formulated by Vroom (1964) and it encompasses of three ingredients; value, belief and probability. The concept of expectancy was defined by Vroom as follows, „Where an individual chooses between alternatives which involve uncertain outcomes, it seems clear that his behaviour is affected not only by his preferences among these outcomes but also by the degree to which he believes these outcomes to be possible. Expectancy is defined as a momentary belief concerning the likelihood that a particular act will be followed by a particular outcome' (Armstrong, 2006, p.259). The strength of expectations may be based on past experiences (reinforcement), but individuals are frequently presented with new situations like a change in job, payment system, or working conditions imposed by management. In these circumstances, motivation may be reduced. Motivation is only likely when a clearly perceived and usable relationship exists between performance and outcome, and the outcome is seen as a means of satisfying needs. Expectancy theory suggested that employees constantly predict likely future rewards for successfully completing tasks, and if the rewards seem attractive, people become motivated to do the job to get expected rewards and suggested that the opposite is true as well. Expectancy theory argues that the strength of a tendency to act in a certain way depends on the strength of an expectation that the act will be followed by a given outcome and on the attractiveness of that outcome to the individual. In more practical terms, expectancy theory claims that people scrutinise three relationships: effort-performance, performance-rewards and rewards-personal-goals (Robbins and De Cenza, 2001:215). Their level of exertion hinges on the strengths of their expectations that these associations can be attained. According to expectancy theory, a worker will be motivated to apply a great level of exertion when he or she trusts that effort will lead to a decent performance appraisal; that a respectable appraisal will lead to

company rewards such as promotion, a salary increase or a bonus; and that the rewards will please the worker's own aims (Luthans, 1995:201).

Expectancy theory has delivered an influential description of worker motivation (Robbins and De Cenza, 2001:215). It assists to explain why a portion of workers aren't motivated in their trades and basically do what is required to complete the task (Nelson and Quick, 2000:232).This can be made clearer if we look at the theory's three relationships in a little more detail.

There has also been a great deal of research on expectancy theory and good review articles are available (Salancik and Pfeiffer, 1978:224). Although the theory has received substantial support, the terminology used by psychologists is often difficult to understand and apply. Rather than suggesting that the underlying theory is inadequate, researchers indicate that problems of method and measurement may cause their inability to generate more confirming data. Thus while awaiting the results of more sophisticated research, experts seem to agree that expectancy theory is a useful insight into work motivation (Salancik and Pfeiffer, 1978:224).

One of the more popular modifications of Vroom's original version of the theory distinguishes between extrinsic and intrinsic rewards as two separate types of possible work outcomes (Mitchell, 1982:81). Extrinsic rewards are positively valued work outcomes that the individual receives from some other person in the work setting. An example is pay. Workers typically do not pay themselves directly; some representative of the organisation administers the reward. In contrast, intrinsic rewards are positively valued work outcomes that the individual receives directly as a result of task performance; they do not require the participation of another person. A feeling of achievement after accomplishing a particularly challenging task is one example. The distinction between extrinsic and intrinsic rewards is important because each type demands separate attention from a manager seeking to use rewards to increase motivation (Mitchell, 1982:81). Expectancy theory identifies three major factors that determine a person's motivation: expectancy, instrumentality, and valence.

Expectancy - Expectancy, is a person's perception about the extent to which effort (an input) results in a certain level of achieved task performance (Schemerhorn et al., 2011:178). A person's level of expectancy determines whether he or she believes that a high level of effort results in a high level of performance (Jones and George, 2009:468). Supervisors can boost expectancies

through expressing confidence in their workers' capabilities (Luthans, 2005:206). Also, in addition to expressing confidence in workers, supervisors can also boost workers' expectancy levels and motivation by providing training so that people have all the expertise needed to perform (Jones and George, 2009:468). Training will also increase the workers' levels of autonomy and responsibility as they gain experience so that they have the freedom to do what it takes at a high level (Jones and George, 2009:468).

Instrumentality- Instrumentality, the second major concept in expectancy theory, is a person's perception about the extent to which performance at a certain level results in the attainment of outcomes (Jones, 2009; Schemerhorn et al, 2011:178). According to expectancy theory, workers are motivated to perform at a high level only if they think that high performance will lead to outcomes such as pay, job security, interesting job assignments, bonuses or a feeling of accomplishment (Maurer, Weissand Barbeite 2003:707).

Valence - The term valence refers to how desirable each of the outcomes available from a job or organisation is to a person (Jones and George, 2009:468). To motivate organisational members, supervisors need to determine the outcome each worker values, and make sure that those outcomes are provided when workers perform at a high level (Jones and George, 2009:468). Outcomes with high valance are those that give the worker a great deal of satisfaction – for example, praise from the supervisor, better assignments, and an increase in pay (Jones and George, 2009:468).

iv. Skinner's Reinforcement Theory

Reinforcement theory uses rewards and punishments that follow a person's behaviour as a way to shape that individuals future behaviour (Mosley et al., 2008:197). Reinforcement theory merely looks at the association among behaviour and its consequences (Rao, 2009:261). Consequently, positive reinforcement results from applying positive consequence succeeding a wanted behaviour (Nelson and Quick, 2000:180). Supervisors can use positive reinforcement to affect a worker's behaviour on construction sites

Positive Reinforcement- Positive reinforcement therefore is the use of rewards to increase the possibility that behaviour will be repetitive, like performance bonuses or praise (Phillips and Gully, 2012:147). A positive reinforcer is

instantly applied when performance improves (Betts, 2000:163). A positive reinforce is any one thing which reinforces the behaviour it follows and makes the behaviour more possible (Phillips and Gully, 2012:147). If a worker is given a bonus for finishing a certain significant task on time and, as a consequence, the worker finishes other significant tasks on time in the future, the reward to be paid to the worker would be said to be a positive reinforce (Phillips and Gully, 2012:147).

It should be stressed that what may function as a positive reinforcer for one person may not work the same way for another. (Schemerhorn et al., 2005:131). One worker may be motivated by a bonus or a raise while another may not. Also, it is imperative to remember that something that functions as a positive reinforcer at one point in time for a given worker may not at another point in time (Mcafee and Poffenberger, 1982:20).

Supervisors should be particularly cautious when trying to reinforce a crew of workers as opposed to one worker. The crew reinforcer will work only if most or all of the individuals in the group accept the reward given as a positive reinforcer (Schemerhorn et al., 2005:131). Intermittent reinforcement can be given according to fixed or variable schedules. Variable schedules typically result in more consistent patterns of desired behaviour than do fixed reinforcement schedules. Fixed-interval schedules provide rewards at the first appearance of a behaviour after a given time has elapsed. Fixed ratio schedules result in a reward each time a certain number of the behaviours have occurred. A variable-interval schedule rewards behaviour at random times, whereas a variable-ratio schedule rewards behaviour after a random number of occurrences. For example, as the concrete worker perfects his technique for a stage of pouring concrete, the astute masters switch to variable-ratio reinforcement. Positive reinforcement, when properly directed, can be a very powerful motivator. Unfortunately, one of the lowest-cost tools within positive reinforcement is also one of the least used – and least appropriately used. That is the simple "thank you" (Robbins and De Cenza, 2001:283). "Failing to use this simple tool sends a powerful message to people; just as effectively using it does…We spend lots of money trying to learn better ways to motivate people through the use of gift certificates, plaques, and tickets to sporting events given out to only a select group of people. At the same time, we fail to say thank you to each of our workers every day in a manner that means something to them. Saying 'thank you' is free and it is a form of recognition that can be distributed

at any time" (Robbins and De Cenza, 2001:283). Shaping is one method in which positive reinforcement can be used. In this technique, behaviour is steadily improved by selectively reinforcing behaviours that are effectively more similar to the kind of behaviour desired (Pettinger, 2006:267). A supervisor cannot assume that a worker's performance will promptly change from totally improper to totally acceptable (Mcafee and Poffenberger, 1982:20). Therefore, the supervisor must reward the worker for advancement made towards targets, not for excellence in performance (Phillips and Gully, 2012:147). Since improvement toward the goal is what is required, each occurrence of progress is rewarded.

Reinforcement Schedule Theory- The theory of reinforcement schedules denotes to the design in which needed behaviour must be reinforced. Two key reinforcement schedules are often debated: continuous reinforcement and intermittent reinforcement (Mcafee and Poffenberger, 1982:20).

Using continuous reinforcement, people obtain positive reinforcement each and every time their behaviour improves or changes in the desired way. With intermittent reinforcement, not every desired behaviour is reinforced (Phillips and Gully, 2012:147). Instead, behaviour is reinforced either unsystematically or according to a fixed ratio, such as reinforcing the worker for every five occasions of desired performance, or reinforcement (salary) every Friday (Mcafee and Poffenberger, 1982:20). Normally, continuous positive reinforcement would be used when a supervisor is first trying to alter a worker's behaviour. Intermittent reinforcement, on the other hand, is specified when the supervisor needs to maintain the worker's behaviour at a required level (Mcafee and Poffenberger, 1982:20). Positive reinforcement can be given according to either continuous or intermittent strategies. Continuous reinforcement administers a reward each time a desired behaviour occurs. Intermittent reinforcement rewards behaviour only periodically. These alternatives are important because the two schedules may have different impacts on behaviour. In general, continuous reinforcement elicits a desired behaviour more quickly than does intermittent reinforcement (Roa, 2009:215) Thus, continuous reinforcement would be important in the initial training of the apprentice casters. At the same time, continuous reinforcement is more costly in the assumption of rewards and is more easily extinguished when reinforcement is no longer present. In contrast, behaviour acquired under intermittent reinforcement lasts longer upon the discontinuance of reinforcement than those

behaviour acquired under continuous reinforcement. In other words, it is more resistant to extinction. Thus, as the apprentices master an aspect of the pouring, the schedule is switched from continuous to intermittent reinforcement (Phillips and Gully, 2012:147)

v. Incentive Theory

Bernstein (2013), stated that Incentive theory was developed in 1940s and 1950s. The theory suggests that people are moved into action by external incentives. Incentive theory states that people are drawn in the direction of behaviours that offer positive incentives and withdraw from behaviours connected with negative incentives. This means, differences in individual behaviour can be linked with the incentives offered to an individual and the worth the individual places on the incentives at the time they are offered to him or her**.**

Among all the theories reviewed, the research relies on equity, reinforcement and incentive theories; and central to those theories are the concepts of equitable wage and bonus which are relevant variables in building the final model in addition to the data collected from the field.

Reinforcement theory was also used in developing the concept of punishment as a motivational variable and also relevant in the stated hypothesis of the research.

2.1.2 Theoretical Framework for the Development of Appropriate Motivational Model in the Study Area

2.1.3 Labour Productivity Measurement in Nigeria

Productivity in construction is often times broadly defined as output or rate per labour hour. Since labour is the most susceptible to the influence of management than the other factors of production, this definition according Okereke (2014) is wrong because it does not also take into consideration other factors in management as an operating system in utilizing labour, materials and capital to convert labour efforts into useful output and as such it is not a true

measure of the capabilities of labour alone. Thus, the definition of labour output as rate or simply productivity is expressed as:

Productivity = Output Quantity/ hour

For example, by investing in a piece of new equipment to perform certain tasks in construction, output in labour may be increased for the same number of labour hours, thereby resulting in higher productivity.

A more explicit method of defining labour productivity in construction is by expressing the quantity of production output (goods produced, work done, etc.) in a given period of time, divided by the quantity of labour expended within the same period of time, that is, the quantity of goods produced in a unit time. Thus, the measure of labour productivity is expressed (Okereke, 2014) as :

$P = Q_{pr}./L_{ex.}$ …….. (2.1)

where

Q_{pr} is the quantity of produced goods or work done;

L_{ex}- quantity of expended labour (effort).

This measure is known as natural or, quantitative expression of productivity. Depending on the unit of time used in determining productivity, it is referred to as hourly, daily (shift), weekly, monthly or yearly productivity. Transformed into a unit as against the other, these measures do not translate into an absolute value. In a yearly productivity for example, are reflected leaves of absence, absence due to illness, daily breaks, routine disruptions of work, and others which are not included in the productivity. The definition of other measures of labour productivity is meaningful in the context that such definitions will permit the establishment and analysis more correctly, of the influence of the different forms of losses in time over levels of labour productivity. For practical needs, the most significant is the monthly and yearly measure of productivity.

Depending on the unit used to express the quantity of goods produced, three methods of measuring productivity are natural, cost and labour methods.

In the ***natural method,*** both the quantity of goods produced (Q_{pr}) and the measure of productivity (P) are expressed in their natural units thus:

$$P = Q_{pr}/L_{ex} \ (m^3/m\text{-}d;\ kg/m\text{-}d, \text{ and so on}); \qquad \ldots\ldots\ldots\ldots (2.2)$$

where
$L_{ex.}$ is the quantity of labour expended in man-day for the production of Q_{pr} quantity of goods.

Natural method of expressing productivity is seldom used in project scheduling and operational planning. The method among other things is simple, easy to use and comparatively accurate. The expression for productivity by this method is quite explicit and shows clearly the relationship between the expended labour and the produced goods and services. However, the disadvantage of this natural method of expressing productivity is that it is governed by natural units of measure which are specific for each type of construction work. Because of this, natural method of expressing productivity can only be applied when defining the level of productivity of labour separately for each type of the construction works.

In ***the cost method***, labour productivity is identified with value of construction (in constant naira) per labour hour and is expressed mathematically as:

$$P_c = C/L_{ex} \ (N/m\text{-}d) \qquad \ldots\ldots\ldots\ldots (2.3)$$

where
C is the value of the produced goods and services in naira ($C = Q_i c_i$);
L_{ex} - the quantity of labour in man-day (m – d), used up (expended) in the production of goods and services Q_{pr}.
The value of construction in this regard is not measured by the benefit of constructed facilities, but by the construction cost. Labour productivity measured in this way requires considerable care in interpretation. For example, wages in construction have been on the decline globally since the last financial crisis that hit the US and some European countries in the past couple of years, and since wages are an important component in construction costs, the value of construction put in place per hour of work will decline as a result, suggesting lower productivity (Shehata and El-Gohary, 20111).

In the face of numerous types or forms of construction works, cost as a universal denominator, translates them (various types of construction) into a

common form of measure for comparison. It is used equally for all sectors of the construction industry, be it among groups, construction firms, or the building sub-sector.

Cost as a method of expressing productivity, has some inherent disadvantages, that reduce its degree of accuracy (Smith, 1987). In the course of conversion into cost value, all things being equal, it will be affected by the material inputs for the various types of construction works, changes in the price rates as well as other factors. The reasons for these shortcomings is the fact that cost method tends to define the productivity of human labour, whereas the estimation of the value for determining the productivity of labour from the produced goods and services (construction works) also includes expenditures for both labour and service costs. This mix up may result in incorrect conclusion about the real level of labour productivity, and the actual changes made within a given period.

In order to obviate the enumerated disadvantages or shortcomings in expressing labour productivity through cost value and at the same time preserve the positive aspects in the method, it may be necessary to adopt the net-cost or conditional net method is recommended (Thomas, 1991), as described below.

Net production method of expressing labour productivity consists of removing the costs of raw materials, energy, over heads and running costs, and other service-related (utility costs, cost of capital, etc.), leaving only those costs connected with the direct application of human labour. Thus, net product consists only of newly added value achieved in the course of construction work. By expressing this value added cost as a ratio of the labour time expended in man-hour in the production of the net product, the net productivity of labour is obtained.

By this way, the influence in the costs due to the different level of material inputs is completely eliminated while the average production is directly related to the effect of the application of human labour, since the volume of net product depends only on the quantum of work done and the productivity of human labour alone.The measure of productivity expressed on the basis of net production, reflects the influence of mechanization, innovative technology, and improved organizational framework, without being affected by the changes in

the structure of construction work, differences in prices, etc. It stimulates the economy of individual as well as social labour (materials, energy, etc.). Since the calculation of construction cost precludes overhead and running costs, average production is enhanced, resulting in increased labour productivity.

The use of the net product method in expressing labour productivity is however very cumbersome as it entails much calculation work. As a result of this, in practice, the method is reduced to the use of approximate methods in determining construction cost which does not fully reflect all the cost components. That is the essence of net product method. The enormous advantages reeled out in support of this method does not preclude the application of other methods in expressing the productivity of labour, particularly the natural methods.

In the case of ***labour method***, the productivity of labour is not measured directly, but relative to a known level of productivity which is used as a basis for comparison. Thus, the measure for labour productivity (P) has relative character and is expressed with the formula (Okereke, 2014):

$$P = L_b/L_a \times 100\% \quad \text{.....(2.4)}$$

where

L_b is the quantity of labour in man-hour (m-h), or man-day (m-d) for the production (accomplishment) of a give quantity of product (work) at a known level of productivity at a previous period , or any other period accepted as the base period;

L_a – the actual quantity of labour measured in man-hour (m-h), man-day (m-d) for the production of the same quantity of products or accomplishing the same quantity of construction work.

If the quantity of labour L_b was determined using existing standard (norm), then labour method in expressing productivity of labour is known as ***standard method.*** In which case, the measure of productivity is transformed into an indicator or a measure of accomplishing standards, and is expressed mathematically as:

$$P_s = L_s/L_a \times 100\%; \quad \text{..... (2.5)}$$

where

L_s is the standard quantity of labour used for the accomplishment of various types of construction works. ($L_s = S_t^i x Q_i$);

Where, Q_i is the volume of i^{th} category of construction works;

S_t^i – the standard time for i^{th} construction work (usually obtained from standard technological constants) for i^{th} category of workman involved.

The accuracy of the result from this calculation by the labour method and in fact the application of this method depends to a large extent on the level of the existing technological constants (rates) and on the degree of reliability of the measured volume of labour input. Usually, this is the objectives of work study and work measurement. In countries like Nigeria, where these constants have not been scientifically developed, rule of thumb approach is usually resorted to, with attendant inconsistencies in their values. The end result is the high degree of variability in determining the optimal composition of the work force, and of variability in tendering prices among contractors.

There is need for individual construction firms to establish own standards for labour, materials and machine output (rates) in the absence of unified national standards. It is very obvious that this is a serious national assignment to professionals in the building sub-sector in particular and the construction industry in general. Details of the procedure to be followed will be explained later. It usually follows the following order:

1. Carrying out work study and work measurement exercise of key construction activities with measurement of all necessary parameters;
2. Observation of the scope and characteristics of the construction process, through activity sampling to determine the performance rating of the operatives;
3. Collation and analysis of obtained data for machine and labour outputs;
4. Determination of necessary parameters using appropriate formulae;
5. Verification of established values of standard time against those obtained practically at the site;
6. Approval or rejection of obtained values for labour, and machine productivity rates.

Work study of construction activities may be carried out in two ways, either by carrying out a study of the conditions under which the activities are carried out and the identification of the necessary job conditions for the successful

completion of the task at hand or, through a generalisation of the result from observations randomly carried out on a wide spectrum of tradesmen (usually of first-class proficiency). On the basis of the study carried out, the necessary parameters are measured and the working operations constituting the activity clearly defined before establishing standards.

i. Work Study and Measurement- Work study is the totality of all scientific techniques which are used for the critical examination and measurement of work carried out by the workmen in order to examine in detail all the activities (manipulations, movements, etc) undertaken by a workmen in accomplishing a specific task with a view to improving on their performance. Two important factors in work study are: implements of labour and conditions under which the task was carried out.

The two main elements in work study are:

1. Method study and
2. Work measurement.

Method study- Method study the systematic recording and analysis of existing methods of doing work as against proposed new methods, while work measurement is concerned with establishing the time it takes a qualified workman to do a specific job at a defined level of performance. Work study has as its main objective, a comparative study of more than one method (technique) of doing work in terms of easiness and effectiveness. Method study (time study) involves the use of chronometer (stop watch) in observing series of operations in a given work or process in order to establish:

1. The character and quantum of time used up for every operation and generally for the entire process;
2. Volume of accomplished work for the duration of the observed time for each operation and generally for the entire process;
3. Wasted time and their causes;
4. Exact description of the actual condition under which the observation was carried out.

Depending on the purpose of the work study, observations may be with the use of chronometer, photo registration device (video recording) and photography for the entire work day.

Chronometric observation is usually adopted in the study of cyclic processes with time recording to the nearest 0.2 to 1 second. There are two different possible applications of this method – selective and continuous clocking. Because of the amount of work involved in the later, the selective method is more popular. In the selective method, use is made of a stop watch with a single hand. The stop watch is timed from the start of an observed action (operation) and stopped at the completion. The duration is read off and recorded in a special chart (See Table 2.1). The hand of the clock is returned to the zero position in readiness for the next observation.

In the case of the continuous method, use is made of a stop watch but with two hands- one for clocking the entire cycle process and the other the various intermittent operations which make up a work cycle. Points of clocking of the intermittent operations are determined in advance. They lie on the limit (changing) points from one operation to the next. This method results in more reliable recording due to the measurement of the time between adjoining operations.

For more reliable data on the time used up for each operation and for the entire process, it is necessary to make enough number of observations. The minimum number of observations n for every operation is dependent on the duration of the operations and may be estimated from Table 2.1.

Table 2.1: Minimum Number of Measurements in one observation

Duration of working operation (s)	60	120	300	600
Minimum number times to be observed (n)	15 – 20	11 – 15	9 – 11	7 – 9

Source: Okereke (2014)

Video recording is the most commonly adopted method in use these days in work study of construction activities. With it, it is possible to observe all the entire duration of an operation, process or work and measure to the nearest 5 to 60 seconds. It involves the observation of the entire work process with the registration by photographic means of the start and end of each component operation. Unlike chronometric method where the observation is done

separately for each operation, video recording covers the entire work process at the same time while the duration of each operation is interpreted.

Among the merits of video method of work study are:

1. It is possible to observe the performance of more than one workman at the same time;
3. It could be replayed and analysed over and over again;
4. It allows the workmen to subject themselves to self-evaluation for the purpose of improved performance;
5. Data from photo registration may be recorded in form of tables, diagrams or a combination of the two.

In tabular form, the observed performance of two workmen could be done at the same time by one recorder with the time of the two workmen recorded as numerators and denominator respectively. Generally, results from video recording may be represented in the form of bar charting. The combined method of recording makes it possible to observe at the same time more than three workmen. Thus, while the time spent in one operation or process is represented with bar lines, the number of workmen involved in the operation is written in figures atop bar lines.

Photographic recording involves the continuous observation and measurement of all wasted time in a working shift. It is adopted when it is necessary to determine time loss and their causes among workmen and machines with a view to taking appropriate measures to preventing such losses in the future. Photographic recording in work study helps to establish the relationship between useful time of a workman in accomplishing a task and his qualification or level of proficiency. It provides a clear picture of the work day. Along with the observation of time, it is also very necessary to record at the same time the volume of work accomplished. Through this, it is possible to compare the actual performance against existing standards. Result from photographic recording of the day's work helps in establishing standards for necessary time loss for preparatory and concluding operations at the start and end of the day's work respectively.

Data collected from work study by any of the methods which have been described above are subjected to analysis by method of arithmetic means. The advantages of this method of analysis are due to its following properties:

1. The arithmetic means of all accurate measurements of the same observed event tends to its most probable value for an unlimited number of such measurements.
2. The arithmetic means of a limited number of measurements of one and the same value is the most probable value of that event.

On the bases of the above properties of the method of arithmetic means, it is customary before subjecting the obtained measurements to data analysis to first of all eliminate all values which contrast sharply with the mean. An example of this preliminary operation is shown in Table 1.2 where readings Nos. 2 and 11 from the first and second rows in the chronometric series of observations have been eliminated. This operation results in improved series, and the mean of such series – improved arithmetic mean. The process of eliminating uncharacteristic values to obtain improved series is continued after cross-checking every improved series for acceptability.

The determination of the degree of acceptability of each improved series is by finding the value of D – a coefficient characterizing the degree of disparity of the series. It is expressed as

$$D = \frac{X_{max}}{X_{min}} \qquad \ldots\ldots\ldots\ldots\ldots (2.6)$$

where

X_{max} is the largest recorded value in the series

X_{min} – the smallest recorded value in the series.

For $1 < D < 1.3$, there will be no need for further elimination of unrealistic values in the series; but for $1.3 < D < 2$, there is need to subject the improved series for further check by method of limit values in which case the maximum and minimum acceptable values $A(A_{max})$ and $A(A_{min})$ are established respectively.

$$A_{max} = X + D\ (X_{max} = X_{min} \qquad \ldots\ldots\ldots\ldots\ldots (2.7)$$

$$A_{max} = X - D\ (X_{max} - X_{min}) \qquad \ldots\ldots\ldots\ldots\ldots (2.8)$$

where
X is the arithmetic mean of the improved series;
A_{max}, X_{min} – the highest and smallest value in the series;
D – a coefficient which value depends on the number of readings in the series. The values of D are as given in the Table 1.3 below.

Table 2.2: Values of D as a function of n

No. of readings (n)	4	5	6	7 – 8	9 – 10	11 – 15	16 – 30	> 30
Value of D	1.4	1.3	1.2	1.1	1.0	0.9	0.8	0.7

Source: Okereke (2014)

If after establishing the limit values A_{max} and X_{min} in the series of readings, and there are still values which fall outside these limits, such readings are eliminated, and the improved series cross checked again, until an acceptable series is obtained.

In a situation where D > 2, it is better to cross-check the series by a comparison of the relative mean square error of the arithmetic mean of the series (e) which permissible value range is calculated with the formula:

$$e = \sum_{i=1}^{n} \pm \frac{1}{X} \sqrt{\frac{(X_i - \overline{X})^2}{n(n-1)}} \qquad \text{..... (2.9)}$$

where
X_i is the i^{th} reading in the series;
$\overline{X}$ – arithmetic mean of the series;
n – number of readings in the series.
The permissible values of the relative means square (S) are given in Table 2.3.

Table 2.3: Values of relative Mean Square S

No. of working operations involved	Up to 5	Up to 10	Above 10
Value of S in ± %	7	10	12

Source: Okereke (2014).

Should the actual value of e as determined by Eq. (2.9) be different from that contained in Table 2.3, then there should be further elimination of the readings in the series until an improved series with acceptable e value is obtained.

With the final elimination of unacceptable readings complete, the value of the most probable and thus acceptable arithmetic mean of the observed time is:

$$\overline{X} = \frac{X_i}{n_0} \qquad \ldots\ldots\ldots\ldots\ldots\ldots (2.10)$$

where

X_i is the readings as contained in the final improved series of observations (i = 1, 2,., n_0).

Work Measurement- Work measurement is the measurement of the time required to accomplish the task of producing a standard output of production by a worker and or machine. Work measurement, also known as Time Study involves assessing the time a job should take to be done. This was the theoretical basis on which field measurements were carried out in the course of this study which were later used to establish standard rates (Technological constants) to develop the motivational model.

Technological constants (rates) for a construction activity included all the factors which characterise the activity and influence its performance. Thus, it included the following data: description of the work and its quality, the composition of the work crew in terms of trade and qualification, types and quantity of materials needed, a description of the site conditions and organisational structure of the labour force, methods t adopted in carrying out the activity, the technological requirements of the resulting product and safety measures adopted.

The basic procedures, irrespective of the particular measurement technique adopted in this study consist of the following three stages:

Stage I: Analysis stage- the stage at which the job or work is divided into convenient, discrete components, known as elements;

Stage II: Measurement Stage- the stage at which the specific measurement technique is used to establish the time required by a qualified workman of a defined level of competence (grade) to accomplish a unit element of work;

Stage III: Synthesis Stage- the stage at which the various elemental times are added together with appropriate allowances made to establish the standard time for the complete job.

Work Measurement technique was used here as the instrument for:

1. Determining the labour productivity level in construction activities on-site;
2. Setting standards of machine utilization and labour performance;
3. Providing the basis of setting realistic financial targets;
4. Providing the basis for cost control by fixing standard performance targets;
5. For establishing the most economic from alternative methods or technological options.

In work study exercise, the measurement of the quantum of time spent for a given process or operation (element) is subject to uncertainties that are probabilistic variables. In order therefore to eliminate inaccuracies beyond tolerable limits, the duration of an activity consists of the following notations:
a- the earliest time for accomplishment if nothing goes wrong – t_e
b - the latest time for accomplishment if everything possible goes wrong – t_l; and
c - the most likely time for accomplishment – t_o (usually the most recurring time from recorded severally repeating of the same process).
Using the above notations for the three components of the process duration time, the expected time t is:

$$t = \frac{a + 4b + c}{6} \qquad \ldots\ldots\ldots\ldots\ldots\ldots (2.11)$$

Equation (2.11) is obtained from mathematical statistics and represents the most probable duration time for each operation. Since the observations made represent chronological series, they are subjected to statistical analysis.

In verifying the validity of the obtained values for each standard time, labour and machine, it is advisable that they are allowed to operate for at least three months and in use in not less than three different sites before they are finally adopted for application.

For manually executed activities, the duration time of the key (major) activity is determined from the formula

$$t_{ka} = t_1 + t_2 + \ldots t_m \ (m = l, 2 \ldots) \qquad \ldots\ldots\ldots\ldots\ldots (2.12)$$

where

t_1, t_2 … t_m are observed duration of the individual operations which make up the activity relative to a unit quantity of work performed.

The standard time is obtained by adding up the duration of the key activity (t_m), the time spent for preparatory- rounding up activities, supportive activities, break time and the workmen's personal needs or rest.
Hence in this case, the standard time is expressed thus:

$$s_t = t_{ka} + \frac{p_1 s_t}{100} + \frac{p_2 s_t}{100} \qquad \text{…….…. (2.13)}$$

where
P_1 is the duration time for preparatory (rounding up) time as well as for other supportive activities expressed as a percentage of the standard time – s_t;
P_2 – the duration of intermittent breaks and time offs for the workmen's personal need also as a percentage of the standard time – s_t.
In rewriting the expression in Eq.(2.13), a more convenient for practical – use formula for the standard time is obtained:

$$s_t = \frac{100 t_{ka}}{100(p_1 + p_2)} \qquad \text{…….. (2.14)}$$

In determining the technological standards for mechanized construction activities, the first and foremost thing is to determine the numerical strength and grades of plant operator in the work team and later, the output of the machine in 1 hour. The right number and grades of the operator in the work team is vital if the highest level of productivity is to be ensured. The standard output of continuous (uninterrupted) operated machines in 1 hour is determined by measuring the quantity of work done. For intermittent action machines, their productivity in 1 hour is dependent on the number of cycles and the quantity of work done in a unit cycle, that is,

$$P_{int} = N_c Q_c \qquad \text{…….…. (2.15)}$$

where;
N_c is the number of working cycles of the machine measured through chronological observations;

Q_c – the volume (quantity) of work accomplished by the machine in one working cycle.

In practice, the productivity (output) of a machine depends on the efficiency of the operator, that is, how effective he makes use of the work time. For example, if we denote with T_{sh} the duration of a work shift in hours, and with T_{us} - the duration of useful time (time spent in actual productive activities) within the shift, the ratio of the useful time to the duration of the shift is known as the coefficient of time utilization, thus:

$$K_t = \frac{T_{us}}{T_{sh}} < 1 \qquad \text{..... (2.16)}$$

Hence, the shift productivity of the machine is calculated as

$$P_{(sh)} = P_{int.}\, T_{sh}\, K_t = S_p(mch) \qquad \text{..... (2.17)}$$

iii. Activity Sampling

Activity Sampling is defined as a technique in which a large number of observations are made over a period of time machines, processes, or workmen. Each observation records the on-goings at the material time and the percentage of observations recorded for a particular activity or delay which occurs.

For a not – too large organization, the adoption of the work study method may prove too expensive, time-consuming and cumbersome. In such a situation, a more simplified method- Activity Sampling may be adopted. Through Activity Sampling, a project manager/site supervisor can conveniently and speedily determine the performance rating (level of productiveness) of those working under him – the operatives with a fairly accurate result.

All that is required is to conduct a field count. That is, to take a quick count at random intervals of the number of operatives working and those not working at any given time. An indication of the performance rating of the workers is then expressed as:

$$\textbf{\textit{Activity rating}} = \frac{\text{Number observed working}}{\text{Total number of works observed}} \times 100\% \qquad \text{..... (2.18)}$$

If the average activity rating from 3 consecutive random observations is low (i.e. < 40%), there may be need to carry out a full-blown investigation.

The number of such observations necessary to establish a realistic performance rating at the site will depend on the level of confidence desired, the limit of accuracy required and the percentage of activity observed. A simple and easy to use formula in this regard is:

$$N_{0b} = \frac{F_e P(1-P)}{L^2} \qquad \ldots\ldots\ldots\ldots\ldots (2.19)$$

where

N_{ob} is the required number of observations necessary to establish a realistic performance rating;

P – the percentage of activities observed (usually established from a preliminary study) to reflect approximately the situation at the site;

L – level of accuracy desired (in %);

F_e – Fisher statistical value (F_e = 2 usually for 95% level of confidence).

In carrying, out an Activity Sampling, a planned timetable of observations is required with observation times fixed randomly, and with identification of the workers to be observed. At every observation, the activity of each of the workers being observed is noted e.g. “Not working” (NW) or “working” (W) as the case may be (Table 1.5).

From the percentages of the activities being observed, a selection is made of the activity or set of activities in which the workers performance is unsatisfactory; such activities are marked out and investigated with a view to improving on the techniques or methodologies adopted in their operation. Usually, the identity of the workers under observation is kept secret to avoid any subjective influences which may lead to unrealistic results.

2.1.4 Technological Standards (Rates, Constants)

In project implementation, be it the erection of a building, the construction of a road or water scheme, the project manager or supervisor not only need to have good knowledge of the necessary skills required, but in addition should be able to determine the optimal composition of the various skills needed, that is, the respective number of each category of skilled manpower (craftsmen, technicians/foremen, etc.) in order to accomplish a given task at the shortest possible duration and at reduced cost.

Table 2.4 **Planned Timetable of Observation in Activity Sampling**

Date	Time	Workers' Identification					
		M_1	M_2	C_1	C_2	P_1	P_2
31-10-15	8am	-	-	-	X	-	X
31-10-15	1pm	X	√	-	-	√	√
31-10-15	4pm	-	X	√	√	x	-
1-11-15	8am	-	-	X	X	-	-
1-11-15	1pm	√	√	-	-	-	-
1-11-15	4pm	X	-	X	X	√	√
2-11-15	8am	X	√	-	-	x	X
8-11-15	1pm	√	-	-	X	√	√
8-11-15	4pm	√	-	-	-	-	X

Legend: M_1 = mason 1; M_2 = mason 2; C_1= carpenter 1
C_2 = carpenter 2; P_1 = painter 1; P_2 = painter 2
√ = working; x = not working; - = unobserved

Source: Adopted from Okereke (2014)

This is possible by establishing "**technological standards"** for labour, materials and plants. Such standards or rates (constants) are usually established for manual or mechanical operations for the completion of a defined quantity and quality of work, expressed usually in the form of unit output for a specified working time, example,

In view of the peculiarities of each construction site in terms of climatic conditions, differences in the level of technological development, organizational structure of contracting firms and the quality of available machines and materials, it is recommended that every construction organization should establish its own standards.

The benefits to be derived include among others:

i. Increase in individual and collective productivity rate;
ii. Objective tendering
iii. Rational use of available resources;
iv. Adoption of more effective planning techniques.

The cumulative effect of the above mentioned benefits in having, technological standards is that the contract time is realistically predetermined on the basis of available human and material resources.

They enable the project manager to estimate accurately, the quantities of materials, labour and plants required, and with them, to draw up work calendar (schedule) for materials, labour and plant which will enable the project manager monitor the progress of work on a daily basis. The methods use in establishing the various constants for labour, material and plants have been previously described in proceeding sections, while values of some constants were given in Table 2.7.

2.1.5 Determination of Equitable Productivity Rates and Wages

Wages and remunerations of workers in the construction industry play a major role in determining the level of labour productivity in the sector. It serves as motivating factor for the workers aspiration towards self- improvement through education; in capacity building towards the adoption and application of modern technology and innovations; towards the sustenance of labour discipline, improving the effective use of materials and implements of labour and the attainment of economic use of resources (energy, materials, funds, etc.) for overall cost effectiveness in construction projects delivery. The role of wages and remunerations in the construction industry would better be appreciated from the fact that it contributes significantly in the number of employment in the sector and its contribution to the Gross National Product (GDP), which according to the Central Bank of Nigeria (CBN, 2003) stands at more than 12 percent.

Construction workers are of diverse trades and qualifications (grades). Each trade is defined by the nature of work which a workman is competent to perform, for example – carpenters, bricklayers, masons, welders, concreters' etc. using appropriate implements. Carrying out a set of a complex construction works and processes will require workmen with different training and skills.

The qualification and grade of a tradesman is categorized by Federal Ministry of Labour and Productivity and certified by the award of the Trade Tests Certificate. For construction and other trades, the criterion for such certification is success in both practical and theoretical examinations usually conducted by the Ministry of Works, Housing and Urban Development which is the highest employer of such tradesmen. The determination of the wages of these cadres of workmen is still a subject of controversy among the various grades and trades.

In an egalitarian society, equitable wages of workers should be determined based on the principle of the quantity and quality of the worker's labour input. Depending on the nature or characteristics of the labour, its quantity could be measured by the time spent or the volume of the goods produced or accomplished work over a time frame.

The amount of physical or mental energy expended in a unit time is dependent on the working condition. That is why in realistic work measurement, it is necessary to also state the condition under which the work was accomplished, for example, during rainy or dry season; in high altitude, or underground, in conditions unhealthy to the worker, etc.

The quality of work is assessed by its degree of complexity and significance to the national economy. The complexity of work on the other hand is dependent on the complexity of construction process or activity and the implements of labour used in accomplishing it as well as the required qualification and competence of the workmen. Qualification is the level of know-how and work experience. Its enhancement is promoted through training (education) and industrial experience. The economic significance of any labour input is the extent to which the result of such labour input (work or goods) contributes to national development. In practice, this is realised through a system of labour of tariffs which expresses the qualitative characteristics of labour inputs.

Generally speaking, this system of labour tariffs ensures that remuneration for labour should be as high as the quantity and quality of the labour input, the more difficult the work, more risky the working conditions are to the worker and more significant to the national economy (Okereke, 2014). In Table 2.5 is shown an example of tariff system of payment based on proficiency rating.

Table 2.5: Wage Tariffs for Different Grades of Tradesmen

Category of workmen	**01**	**02**	**03**	**04**	**05**	**06**
Salary grade level:	I	II	III	IV	V	VI
Proficiency of rating (wage tariff)	1.000	1.031	1.111	1.23	1.419	1.652

Source: Federal Ministry of Labour and Productivity (2000) in Okereke (2014)

Wage tariffs vary depending on the degree of technological complexity (skill) involved in carrying out a construction work. The productivity rate of a construction worker is measured by the quantum of good quality work he is able to perform within a unit time (hour, day, month, or year).

Payment of equitable wages to construction workers is based either on the quantum of time spent or the quantum of work done. Wages are determined on the basis of wage rates (tariffs) taking into consideration basic salary of a workman. Below is ideal wage rate for respective salary grade levels 01 – 06 as shown in Table 2.6

Table 2.6 Wage Rates for Grades of Tradesmen in Public Service

Grade level	I	II	III	IV	V	VI
Wage rate (w_i)	0.406	0.419	0.451	0.520	0.581	0.671

Source: Federal Ministry of Labour and Productivity (2000) in Okereke (2014)

Using these wage rates for example, the equitable individual share of a gang of workmen comprising one from each grade level from I-VI who have collectively executed a job worth for example N1000 will be as follows respectively; (0.406/3.047 x1000 =133.25; (0.419/3.047x1000) = 137.47; 147.96; 170.60; 190.62; 220.15. (3.047 is the summation of the wage rates of the respective grades of tradesmen involved in the execution of the work). The above is calculated according Okereke (2014) from the formulae:

$$w_i = R_i S_t \qquad \ldots\ldots\ldots\ldots (2.20)$$

or

$$w_i = \frac{R_i}{S_{op}} \qquad \ldots\ldots\ldots\ldots (2.20)$$

where

R_i is the hourly wage rate in N/hour for i^{th} category of worker;

S_t and S_{op} - standard time and standard output respectively.

2.1.6 Standardization and Wage determination

Standardization in construction is primarily aimed at establishing standards (norms, rates, constants) in the use of materials, labour and machines. These

three elements in standardization are sometime referred to as technological standards or constants. For the comparison of the productivity rate of construction workers, the unit of measure usually adopted is the standard time (S_t) and standard output (S_{op}). Standards in the use of labour are standard time (S_t) and standard output (S_{op}).

Standard time (S_t) is the quantum of time which it takes a workman or group of workmen of a defined level of proficiency to produce a unit of good quality product under an ideally organised labour force and working condition. Its unit of measure is man-hour (m – h) and man-day (m – d). It can be determined using the formula

$$S_t = \frac{t}{Q} = \frac{t}{q} \qquad \text{.....(2.21)}$$

where

t is the time taken to accomplish q or Q- the quantum of work. In an 8-hour working day, t = 8.

Standard output (S_{op}) is the quantum of good quality work accomplished by a workman or group of workmen in one working shift or working day under an ideally organised labour and working condition.

The unit of standard output is usually m^2/day or m^3/day, etc. It is determined by using the formula

$$S_{op} = \frac{8}{St} \qquad \text{..... (2.22)}$$

From Eq. (2.21) and Eq. (2.22) it can be established that the interdependence between standard time and standard output is reciprocal, thus,

$$S_{op} = \frac{8}{S_t}(\text{unit/}) \qquad \text{..... (2.23)}$$

The ***labour content*** (L_c) for a given quantity of work is determined from the relationship

$$L_r = \frac{Q}{S_{op}} \qquad \text{..... (2.24)}$$

while the number of workmen P given the duration T_w is calculated from

$$P = \frac{L_r}{T_w} \qquad \ldots\ldots\ldots\ldots (2.25)$$

An "Appropriate model on the productivity of tradesmen" in the study area will be built based on the Theoretical Framework enunciated above, relying most on the formulae postulated in Okereke (2010, 2014), which reflect mostly on the experiences in the study area, as well as from other past studies on productivity modelling. Thus, it intends to develop a model using the mathematical relationship:

$$Y = F(\sum_i^n Xi) = \max. \qquad \ldots\ldots\ldots (2.26)$$

where

Y is the level of labour productivity of building tradesmen determined from the impact of the motivational variables which have the most relative positive preponderance on labour productivity expressed as $F(\sum_i^n Xi)$. The level at which Y yields maximum result is said to be optimum or appropriate.

Table 2.7: Labour Constants for Selected Construction Processes

Job Description	Unit	Standard Time-St (h/m^3)	Standard Out-put (So)(m^3/md) (unit/m/-d)
1. Excavation (manually) a. Vegetable (Top) soil n.e 150mm			
b. Surface (Normal soil)		1.5 1.75 to 2.0	2 to 4. 5/md 5.33
c. Foundation trenches			40. 00 to 4. 60
n. e. 200mm max depth		2.50	3.50
d. Basement (Normal soil)		3.00	2.67
2. Excavate (mechanically)		. 05	150 to 200
3. Wheel n. e. 50m deposited and returned empty		0.75	10.67
4. Spread and level –		00.4 0	20.0
throw every 1 stage of 1.5m		1.0	8.0
- re- excavate from spoil heap		2.5	3. 50
- re- fill and ram		1.5	5. 30
5. Excavate (rocky soil)	m^3	10.00	0. 80
- basement	m^3	12.50	0. 60
- trenches	m^3	2.40	22.33
6.. Mixing Concrete	m^3	2.40	5.0
a. manually	m^3	1.59	1. 5 to 3. 0
b. mechanically	m^3	2.67	5 to 7
7. Placement of Concrete			18 to 40
- manually with barrows	m^2	1.14	8.20
- mechanically with crane		0.20	9.60
- mechanically with pump			11.43
- spreading and compacting		1.83	4.50
by hand		0.97	12 to 16. 00
8. Preparation of formwork	m^2	0.83	
- for column			28 to 38
- for slab		0.70	
- for beam			
9. Blocklaying		1.8	
10. Plastering		0.67	
- manually		0.20	To be determined empirically by the researcher in the site
- mechanically			

Source: *Adopted from Okereke (2014)*

Table 2.8:Productivity Rate of Manual Transportation of Certain Materials on the Site for an 8- Hour Working Day

S/N	Transportation Process		Horizontal Distance in Metre				
			10	20	30	40	50
1	2	3	4	5	6	7	8
1.	A. Using bare hand or on heads						
	Clay bricks (including staking)	100/set	2. 9	2.6	2.4	2.2	2.0
2.	Cement, line (in sacks of 50kg)	ton	8. 9	6.8	5.6	4.7	4.0
3.	Timber up to 3cm thick	m^3					
	a. used previously		9. 4	7.4	6.2	5.3	4.6
	b. new (unused)		10. 4	8.3	6.8	5.8	5.1
4.	Timber above 3cm thick	m^3					
	(a) used previously		12.7	9. 9	8.1	6.8	5.9
	(b) unused (new)		14.0	10.9	9.0	7.6	6.6
5.	Metal sheets	t	6. 2	5.1	4.3	3.8	3.4
6.	Metal profile	t	6. 6	5.3	4.4	3.8	3.4
7.	Reinforcement rods	t	6. 2	4.7	3.7	3.1	2.7
8.	Cast and steel pipes	t	5. 9	4.6	3.7	3.1	2.7
9.	Asbestos cement pipes	t	4. 3	3.4	2.7	2.3	1.6
10	Scaffold pipes up to 50mm diam. Sundry materials (nails, bolts, nuts, tiles, etc. in packets (boxes) Masonry	t	4. 9	3.8	3.1	2.6	2.3
11	stones and builders weighing above 18okg/m3 Concrete in head pan /buckets	t m^3	8.4 3.	6.6 2.9	6.1	2.01.6	4.1 1.8
12 13.	Mortar in head pan/bucket	m^3 m^3	72.5 3. 0	2.1 2.5	2.4 1.8 2.2	1.9	1.4 1.7
14.							
15.							
	B. In Wheel Barrow	m^3					
1	Normal soil	-					
	i. Category	-	-	-	-	-	-
	ii. Category	-	4.4	7.6	6.4	5.5	4.9
	iii. Category	-	3.9	7.1	6.0	5.2	4.6
	iv. Category		12.3	6.0	5.1	4.4	4.0
2	Difficult soil (sandy rocky)	m^3	11.0	4.9	4.3	3.9	3.7
3.	v. - vii Category		8.0	4.2	3.7	3.3	3.0
4.	Bricks in set of 1000 units	1000 units	12.7	3.8	3.3	3.0	2.7
	a. without stacking	-	-6.7	3.4	3.0	2.7	2.4

Productivity Rate of Manual Transportation of Certain Materials on the Site for an 8- Hour Working Day contd.

5.	b. with stacking	-	9.5	9.7	8.1	6.9	6.0
6.	Sand	m^3	8.4	9.0	7.5	6.4	5.7
	Ballast (Gravel)	m^3	12.0	7.0	6.3	5.6	5.1
7.	Broken stones and Chippings			9.9	7.6	6.5	5.6
8	Cement, lime, Marble Chippings in sacks of 50kg	m^3		- 5.3	- 4.5	- 3.8	-
	Concrete	m^3		7.0	5.5	4.6	3.3
	a. Loaded with spade	-		7.0	5.9	5.2	3.9
	b. Loaded with shovel	-		9.3	7.5	6.4	4.6
	Cement mortar						5.5
	a. Loaded with spade						
	b. Loaded with shovel	-					
		-					

Source: *Adopted from Okereke (2014)*

Table 2.9. Construction workers average output in Nigeria

Concrete work	**Output per 8hr/day**
Concretor	
1. Hand mixing and placing of concrete to a height not exceeding 3.0m above ground level	0.5m/day (Unskilled)
2. Machine mixing and placing of concrete to a Height not exceeding 3.00 ground level	0.6m/day (Unskilled)
3. Spreading and tampering of concrete in columns and walls, Beams	10Cu.m/day (unskilled)
4. Spreading and tampering of concrete in floor roof or slabs	80.00sq m/day
Blockwork	
1. Laying 100mm block wall (1 No Mason + 1 No labour)	8.00sq.m/day (Gang
2. Laying 150mm block wall (1 No Mason + 1 No labour)	8.00sq.m/day (Gang)
3. Laying 230mm block wall (1 No Mason + 1 No labour)	7.00sq.m/day (Gang)
4. Laying pre-cast concrete screen wall (1 Mason + 1 labour)	10.00sq.m/day(Gang)
5. Laying clay block screen wall (1 No Mason + 1 No labour)	12.00sq.m/day(Gang)
6 laying glass block wall (1 No Mason + 1 No labour)	10.00sq.m/day(Gang)

Source: Consol's Nigeria Building Price Book (2010) Fourth Edition.

Table 2.10. Construction workers average output in Nigeria

Finishing	Output per 8hr/day
1. Plastering wall	18.00sq.m/day (Skilled)
2. Plastering ceiling soffit not exceeding 3.5m high	10.00sq.m/day (Skilled)
3. Plastering 4 sided columns 600-1000mm girth n.e. 3.50m h	6.00metre/day (Skilled)
4. Plastering 3 sided beams not exceeding 3.50m high	6.00metre/day (Skilled)
5.Screeding of floor 50mm thick 25sq.m/day (Skilled)	
6. Floor tiling with screed bed 300mmx 300mm 1	0sq.m/day (Skilled)
7. Wall tiling with 300mm x 300mm	8sq.m/day (Skilled)
8. Building in and dressing of single door frame	2No./day (Skilled
9. Building in and dressing of double door frame	1No /day (Skilled)
10. Building in and dressing of window from, 1200mm x 120mm	2. No/day (Skilled)
11. Building in and dressing of window frame 1800mm x 1200mm	1 No/day (skilled)

Source: Consol's Nigeria Building Price Book, 2010 (Fourth Edition)

Table 2.11: Labour Constants for carpentry, masonry and steel fitting building processes

S/N	BUILDING PROCESSES	Unit	St(h/unit)	Sop(unit/m-h
1.	Fixing 16mm diameter high yield bars in column (450x450x5000mm) first floor.	Kg	0.025	40.09
2.	Fixing 16mm diameter high yield bars in column in column (450x450x5000mm) second floor.	Kg	**0.025**	**40.02**
3.	Fixing 10mm diameter high yield bars in stirrups in columns	Kg	0.208	4.81
4.	Cut and bend 10mm diameter high yield bars as stirrups	No	0.059	16.89
5.	Sawn formwork to suspended floor slab (first floor)	M^2	0.145	6.50
6.	Sawn formwork to suspended floor slab (second floor)	M^2	0.136	6.19
7.	Sawn formwork to sides of columns (450x450x3000mm) first floor.	M^2	4.27	0.23
8.	Sawn formwork to sides of columns (450x450x3000mm) second floor	M^2	4.27	0.23
9.	225mm thick hollow sandcrete block work bedded and jointed in cement mortar (1:3) (first floor)	M^2	0.39	2.57
10.	225mm thick hollow sandcrete block work bedded and jointed in cement mortar (1:3) (second floor)	M^2	0.40	2.53
11	150mm thick hollow sandcrete block work bedded in cement mortar (1:3) (first floor)	M^2	0.38	2.64
12.	150mm thick hollow sandcrete block work bedded and jointed in cement mortar (1:3) (second floor)	M^2	0.39	2.59

Source: Adopted from Ngwu (2014).

2.2.0. Conceptual Framework

A Conceptual Framework is a structure of what has been learned to best explain the natural progression of a phenomena that is being studied (Camp, 2001). Conceptual Framework is used by researchers to guide their inquiries and presents the research in relation to the relevant literature. Conceptual Framework is the researcher's own position on the problem and gives direction to the study. Miles and Huberman (1994), defines conceptual framework as a written or visual presentation that explains either graphically, or in narrative form, the main things to be studied- the key factors, concepts or variables and the presumed relationship among them. Conceptual framework is the basis on which any theory about the object of research could be postulated.

2.2.1 The Concept of Effective Project Delivery

Time, cost and quality are three major variables that are of primary concern to the main parties involved in the procurement of building project (client and contractor). This fact was pointed out by Dissanaya and Kumaraswamy (1999). According to the authors, Time, cost and quality target are recognized to be the major criteria used to measure project delivery level of success. The clients of building projects are primarily interested in their projects being delivered within a short time, for an effectively lower cost, and at a higher quality (John, Abdulateef and Abdulganiyu, 2015). On the part of the contractor, executing projects at an effective time and at a given standard of quality in relation to a given cost gives him an edge ahead of others when bidding for subsequent contracts (ebhohiem et.al, 2015). For the purpose of successful planning, management and execution of projects, these aforementioned major parameters (Time, Cost and Quality) have to be taken into consideration. Hughes and William (1991), in their opinion concerning how the aforementioned parameter are considered so as to meet requirements of the client, proposed that the parameters can be simply identified as three points comprised in a triangle. Underestimating any of them will definitely cause resultant negative effects on the remaining two. But, Rwelamila and Hall (1995), argue that there exists little evidence of projects where these three factors have been success fully balanced. The need arises therefore, to embrace Time, Cost, and quality relationship through appropriate motivation.

According to Charles and Andrew (1990), Construction clients are increasingly perplexed with the general level of effectiveness and accountability of projects. Cost overrun in connection with project delays have more often than not, been recognized as one of the prime factors that leads to high cost of construction. According to Jagboro (1987), the Nigerian Institute of Quality Surveyors in 1981 conducted a survey which showed that costs of construction in Nigeria were about 40% higher than similar types in Brazil and Kenya 35% higher than Britain and 30% higher when compared to construction in United States of America. This was further but stressed by Newcombe (1990), who opined that there exists global criticism of the construction industry's failure to deliver projects on time. The Nigerian construction industry is of overriding significance in terms of providing employment and economic growth. Efforts geared towards the improvement of construction competence in terms of timeliness, cost-effectiveness and quality efficiency will be meaningful and contribute to cost savings for the country at large. In Nigeria, besides investigating cause and consequences of time overrun, little research was identified to have been done on the relationship between motivation and effective project delivery which is measured on the basis of Time, Cost and Quality of building projects.

2.2.2 The Concept of Time in Effective Project Delivery

Time in the execution of building projects is the duration from the date of site possession to the date of practical completion of that particular project, usually considered in weeks. Effective time control is one of the basic goals of parties involved in construction projects. Timely completion of a construction project is frequently seen as a major criterion of project success by clients, contractors and consultants alike (Bowen, Cattell, Hall and Pearl, 2002:48). There is no single definition that denotes what time is in construction projects. In the construction project context, time is referred to as the planned duration of works. It is also known as the schedule of works; however, whenever the planned schedule is not adhered to, it means something has gone wrong and then the terminology changes to 'delays'. From the initial stage, the client is interested in the time required for the project to be delivered. The client goal is shorten as much as possible, the time needed for each phase of the project, beginning from the initial planning stage to the completion stage.

Time, it is said is money. The Economic significance of time is why clients assert that "time is of the essence" in many contract. The construction contract contains many aspect where time can be controlled by the building project owner indirectly through contract clauses and contracting procedures.

The contractor is in the best position of exercising the most direct control over construction duration. Contractors use network schedules to control project durations, which are mostly a contract agreement between the two parties. Clients may stipulate contract durations based on economics, weather, or other considerations. The project executor (the contractor) only generates a detailed network schedule after signing the contract. The initially scheduled duration might be longer than the actual time re33quired in the contract, hence, there is need for adjustments to meet contracts requirements. The contractor might want to finish the project earlier in order to avoid winter season, to take advantage of bonus payments, or to free up resources for different projects, and as a result require action to get back on track. In these cases, the contractor needs to define the project duration at which construction costs are minimized. According to Newcombe (1990), there exists global criticism of the construction industry's failure to execute projects on time. Chan and Kumaraswamy (2002), are of the opinion that construction is of increasing importance due to the fact that it serves as a vital bench mark for assessing project performance and project organization efficiency. It is therefore, observed that the timely completion of projects is commonly regarded as one of the major criteria by which the success of the projects is commonly regarded as one of the major criteria by which the success of the projects are measured by building owners, consultants and contractors alike. This calls for the need to develop a strategy for the timely completion of projects by contractors in order to ensure that the project is effectively delivered, hence, the need for motivation of operatives, since they are key players during project delivery.

Delay in the completion of a construction project can be a major problem for construction companies, leading to costly and adverse relationships amongst project participants (Alwi and Hampson, 2003:1). There are many factors causing delays in construction projects. Fugar and Agyakwah-Baah (2010:109) identify ten factors of delays in construction projects in Ghana as the following: delays in honouring payment certificates, un3derestimation of cost of projects, underestimation of complexity of projects, difficulty in accessing bank credit, poor supervision, underestimation of time for completion by contractors,

shortage of materials, poor professional management, fluctuation of prices, and poor site management. Apolot et al. (2012:309) identify the following ten causal factors of delays in Uganda's public sector construction projects: delayed payment to contractor/subcontractors and/or suppliers, inadequate/inefficient equipment, tools and plant, rework due to poor work/wrong materials by the contractor, bureaucracy, for example, rules regarding the approval of changes, contractor's work load, unreliable sources of materials on the local market, poor schedule management, poor monitoring and control due to incompetent/unreliable supervisors and poor communication. While the research studies on delays provide an endless list of causal factors, it is anticipated that a comprehensive breakdown of causal factors of time overruns, especially those related to construction team, would provide the insi3ght to adopt incentives in any given construction project.

2.2.3 The Concept of Quality in Effective Project Delivery

Apart from time, quality is another criterion for effective project delivery. Quality and controlling standards for quality are fundamental in both the design and construction phases of a project (Barrie and Paulson, 1978:309). The South African National Standards (2004:6) defines quality as the totality of features and characteristics of a product or service that impacts on the ability of the product or service to satisfy stated or implied needs. Quality is defined as the attainment of a desired level of excellence which has been clearly defined in terms of requirements for the people, processes and finished product of the client's building (Cornick, 1991). Quality in construction is defined as meeting or exceeding the needs of the customer (Knutson, Schexnayder, Fiori and Mayo, 2004:505). Freeman-Bell and Balkwill (1996:208) state that the definitions of quality have been coined as 'fit for purpose' and 'satisfying customer needs'. Cornick (1991:31) indicates that if quality means conformance to requirements, then there must be some 3333means of ensuring that an unbroken chain of conformance to requirements exists throughout every phase of the total project process. Cassillas (2012:138) contends that there is no single universal definition of quality; thus the definition of quality depends on the role of the people defining it.

Cassillas (2012:138) compiles some more common definitions from various points of view:

i Conformance to specification: measuring how well the product or service meets the targets and tolerances determined by its designers. For example, the dimensions of a machine part may be specified by its design engineers as 3 ± ,05 mm. This would mean that the target dimension is 3 mm but the dimension can vary between 2,95 and 3,05 mm. As this example illustrates, conformance to specification is directly measurable, though it may not be directly related to the customer's idea of quality.

ii Fitness for use: focusing on how well the product performs its intended function or use. Fitness for use is a user-based definition in that it is intended to meet the needs of a specific user group.

iii Value for price paid: being a definition of quality that consumers often use for product or service usefulness. This definition combines economics with consumer criteria; it assumes that the definition of quality is price sensitive.

iv Support services: judging how the quality of the service is provided. Quality does not apply only to the product or service itself. It also applies to the people, processes, and organisational environment associated with it.

v Subjective criteria: being a subjective definition that focuses on judgemental evaluation of what constitutes product or service quality. Different factors contribute to the evaluation, such as the atmosphere of the environment or the perceived prestige of the product.

Barrie and Paulson (1978:310) suggest three key aspects of quality, and these relate to engineering, control, and assurance:

i Quality engineering: this term often describes procedures used to ensure that the engineering and the design for a structure proceed according to recommended and mandatory criteria set by related professional and trade associations, building code authorities and federal, state and local organisations such as the Environmental Protection Agency, the Nuclear Regulatory Commission, the Occupational Safety and Health Administration and others (Barrie and Paulson, 1978:310).

ii Quality control: this process includes: (1) setting specific standards for construction performance, usually through the plans and specifications, (2) measuring variances from the standards, taking action to correct or minimise adverse variances, and (3) planning for improvements in the standards

themselves and in conformance with the standards. Quality control is about the inspection of the work to ensure it meets the quality standards specified in the contract (Knutson et al.,2004:507).

iii Quality assurance: although its definition is not well standardised, quality assurance is generally a broader, more nearly all-encompassing term for the application of standards and procedures to ensure that a product or a facility meets or exceeds desired performance criteria. Quality assurance refers to the management systems employed by construction companies to produce high-quality work consistently; and those systems consist of many programmes, such as hiring highly qualified employees, safety programmes, training programmes, incentive and recognition programmes that reward high-quality performance, procurement systems designed to identify the best quality suppliers, and personnel policies designed to reduce turnover and promote retention (Knutson et al., 2004:507).

It is imperative that firms develop their own quality management procedures. Langdon (2010:9) refers to quality management as a policy of the firms which explains quality management procedures that are utilised to control and maintain the high level of professional service provided to clients and, additionally, to promote continuous improvement of the services. The DTI (online) stipulates that an appropriate quality management system helps an organisation not only to achieve the objectives set out in its policy and strategy, but also, and equally importantly, sustain and build upon them. A more comprehensive quality management system is the total quality management concept which encompasses people (internal, external), product and services. Total quality management is an integrated organisational effort designed to improve quality at every level (Cassillas, 2012:137). According to McCabe (2001:54) quality management comprises:

1. Obsession with customer satisfaction;
2. Involvement of every person (including suppliers and subcontractors);
3. Improvement of every aspect of production/service;
4. Teamwork; and
5. Measurement and improvement of processes.

Comité Euro-International du Béton (CEB) (1998:3) advises that quality management of construction activities requires the development of procedures

for each particular construction project. Given that construction projects differ markedly not only in size and in the time to be taken for construction, but also in the complexity of the erection procedures and logistics, quality management has to be tailored to each particular project (CEB, 1998:3). Langdon (2010) indicates that the system should be developed, established and documented to ensure that:

1. Processes needed for the quality management system, their sequence and interaction, are identified and addressed;
2. These processes are effectively controlled;
3. The resources and information needed to support those processes are monitored, measured, analysed and continually improved;
4. The system is fully documented by means of a quality manual containing policies, objectives and system procedures supported by additional documentation, incorporating operational work instructions, practice notes and standards;
5. All records necessary for demonstrating conformance to requirements and for analysis are held in safekeeping.

2.2.4 The Concept of Cost in Effective Project Delivery

Cost is another factor that affects project delivery success. The concept of cost in executing building projects entails every constituent incurred in relation to that particular project right from the inception to practical completion and occupation stage. There is no single definition of cost in the construction industry. Langdon (2010) indicates that the meaning of the words 'building cost' depends on the application thereof in context. From the contractor's point of view, the definition of cost is limited to the cost of labour, materials and overheads for producing a building. A building cost is referred to as the cost of labour, material, plant, fuel and supervision (Langdon, 2010:48).

From the client's point of view, cost is referred to as the total amount used for producing a building from inception to completion. The developer may refer to building cost as either tender price from the contractor or the ultimate cost of the project, which includes professional fees, plan approval fees, escalation, loss of interest, etc. (Langdon, 2010:48). Throughout the construction process of building projects, cost is seen as one of the major considerations. The importance and significance of cost is portrayed when a proposal project with estimated cost significantly higher than the budgets is either redesigned or

abandoned. An on-going project can also suffer abandonment as a result of cost overrun. These go a long way in proving that no matter how important a proposed building project might be to the client, cost is one of the major determinants as to whether the project will be realistic or not. It is important to note that cost has continuous influence on building projects. It dictates the major characteristics of the building embryo (height, plan, shape and type of finishing) throughout the design development stage. Cost will be inescapable even after completing the building project; this is because uneconomical distribution of cost at the inception can adversely impact on lifecycle costs. Cost is what must be given in order to obtain something valuable, that is to say it is a measure of the utility of the items. Cost is also seen as the total financial liability of the client (Douglas and Peter, (1980).

Ashworth (1991), sees the cost sensitivity of an element in a building as independent upon its total cost in relation to the total cost of the building. A structural component is said to be cost sensitive, if a substantial change in its cost or quantity has a significant effect on the total cost of building. Ambrose (1991), stated that dealing with cost is a painstaking but necessary operation in construction process. For the building structure itself, the bottom line cost is the delivered cost of the finished structure, which is measured usually in cost per square meter units of the building. Cost factors such as cost of materials, labour, transportation, testing and inspection must be combined to produce a single unit cost for the structure. William and Chapin (1992) opined that an effective means of representing cost is necessary to keep cost of jobs in line with original estimates. They further pointed out that adequate cost recording and control systems provide opportunities for saving in future jobs. While the client would prefer the delivery cost not to exceed the budgeted one, cost overruns have negative implications for various construction project stakeholders (Mbachu and Nkado, 2004:2): to the client, cost overrun implies added costs over and above the cost agreed upon at the outset, resulting in less returns on investment. To the end-user, the added costs are passed on as higher rental cost. To professionals, cost overruns imply inability to deliver value for money and could well tarnish their reputations and result in loss of confidence attributed to them by clients. To the contractor, it implies loss of profit through penalties for non-completion, and negative 'word of mouth' that could jeopardize chances of winning further jobs, if at fault.

In order to deliver projects within budgeted cost, within the estimated time and of proper quality standards, the management of construction project should align the project objectives with motivation, since time and cost overrun as well as low quality standards can have negative effects on the project being delivered and may result in disputes and litigations.

2.2.5 Pay for Performance Concept

The concept of pay for performance offers a deceptively simple solution to complex performance problems. The logic behind pay for performance suggests that poor performance is more likely to occur when people are paid the same amount regardless of their performance; conversely, performance improvement is more likely to result when pay and performance are effectively linked (Lawler, 1990, 2000b). In addition, several meta-analyses support the conclusion that strengthening the connection between pay and performance can be an effective method of improving performance (Jenkins, Mitra, Gupta, and Shaw, 1998; Locke et al., 1980). Hence, making pay and rewards contingent upon performance should motivate employees to perform at higher levels. Several psychological theories support the premise that linking rewards to performance can stimulate performance improvement by increasing employee motivation. Expectancy theory offers the strongest support for linking pay to performance as a motivational incentive. First proposed by Victor H. Vroom (1964) and refined by others (e.g., Porter and Lawler, 1968), expectancy theory states that work motivation is determined by a perceived probability between effort, performance, and outcomes (e.g., rewards). Motivation to perform is maximized when an individual believes that personal effort will lead to better performance (effort-performance expectancy) resulting in rewards (performance-outcome expectancy) that are highly valued (valence). Motivating better performance with pay also requires that performance standards be achievable and accurately measured, the relationship between pay and performance be clearly defined, and employees have opportunities to demonstrate and improve their performance (Heneman and Werner, 2005). Over the years, expectancy theory has received empirical support from a large body of research (see reviews conducted by Ambrose and Kulik, 1999; Van Eerde and Thierry, 1996) and gained acceptance among scholars (Bartol and Locke, 2000; Lawler, 2000b; Miner, 2005; Pinder, 1998).

Reinforcement theory also supports the pay for performance concept (Heneman and Werner, 2005; Kellough, 2006; Perry, 1991). Derived from B.F. Skinner's (1953) work on operant conditioning and later tested in the workplace by several researchers (Luthans and Kreitner, 1975, 1985; Luthans and Stajkovic, 1999), reinforcement theory posits that behaviour is determined by its consequences. Behaviour tends to be repeated if it leads to a positive outcome and avoided if it leads to a negative outcome (Skinner, 1953, 1969). The reinforcement effect is strengthened when the desired performance is clearly defined, when a valued reward is made contingent upon performance, when the timing of rewards is immediate and directly linked to performance, and when the size of rewards matches the magnitude of increased performance. Current research on behavioural management and organizational behaviour modification support the use of reinforcement theory as a method of improving performance in the workplace (Luthans and Stajkovic, 1999; Stajkovic and Luthans, 1997, 2001, 2003).

Equity theory directly addresses the issue of money in the workplace and plays a key role in determining the impact of pay for performance programs. Equity theory states that individuals assess their work contributions and rewards relative to other employees and alter their behaviour according to their perception of equitable treatment (Adams, 1965). To have a positive impact on work motivation, reward systems must be perceived as fair by employees. Perceived equity exists when employees feel they and those around them get the rewards they deserve for their contributions to the organization. Inequity is perceived whenever employees feel themselves or others to be overcompensated or undercompensated for their work. Such perceived inequity prompts employees to adjust their work behaviour to reduce the inequity or avoid it altogether by leaving the organization. If employees see top performers receiving the same pay and rewards as poor performers, this creates a sense of inequity which tends to have a demoralizing and demotivating effect on the best performers (Thompson and Rainey, 2003).

In order to achieve its maximum motivational potential, employees must believe they will receive the rewards they think they deserve under a pay for performance system. Several reviews of equity research indicate strong support for the theory (Ambrose and Kulik, 1999; Greenberg, 1990; Miner, 2005; Mowday, 1996), but it's not without limitations. Research consistently supports equity theory predictions regarding the impact of under-compensation and

under-reward leading to reduced effort, diminished performance, increased absenteeism and turnover (Bartol and Durham, 2000; Greenberg, 1982; Summers and Hendrix, 1991), but findings on the effects of overcompensation have been less consistent (Mowday, 1991).

Equity theory is also criticized for being vague as to which type of behaviour is most likely to occur within a particular context (Greenberg, 1990). Because of these limitations, the theory fell out of favor for a while in the organizational behaviour literature (Ambrose and Kulik, 1999). A resurgence of equity theory research has occurred over the past 20 years due to its expansion into the area of organizational justice (see Greenberg, 1986, 1987a, 1987b, 1990, 2001; Greenberg and Colquitt, 2005). Current organizational behavior research on equity theory utilizes a justice framework which suggests that both process (procedural justice) and outcomes (distributive justice) influence employee behaviour in the workplace (Greenberg, 1990). Further research investigates whether some employees are more sensitive to equity or justice issues than others (Huseman, Hatfield, and Miles, 1987; Miles, Hatfield, and Huseman, 1994; Sauley and Bedein, 2000). Overall, equity theory highlights the importance of fairness perceptions and social comparisons in motivating work-related behavior (Gerhart and Rynes, 2003; Heneman and Werner, 2005). If the volume of research on equity theory in an organizational justice context is any indication, the usefulness of this theory has yet to reach its full potential.

2.2.6 Concept of Punishment as a Motivator

Miltenberger (2004), defined punishment as something meted out to a person who has committed a crime or other inappropriate behavior Applying this definition means that the punisher not only intends to end the behavior but also seeks retribution and hurt to the wrongdoer. The person being punished is seen, to deserve the negative effects caused by the use of punishment. Punishment, by this definition, is therefore used as a device to end the unacceptable conduct and as a tool of retribution. The negative aura triggered by the use of the word punishment is a result of this definition. Understanding this characterization is important when considering its use in a professional setting. The behavior modification definition of punishment is the process in which the consequence of a behavior leads to a decline in occurrences of that behavior in the future.

According to this definition the intent of punishment is to prevent future episodes of a particular behavior (Miltenberger, 2004).

There are two ways punishment can be carried out--positive punishment and negative punishment. Positive punishment presents the *addition* of an aversive stimulus. If an employee commits a rule infraction, the first response according to a common discipline system in business, is a verbal warning. The verbal warning is an example of an aversive stimulus that was imposed as a result of a rule infraction. On the other hand, negative punishment removes a reinforcing stimulus. An example of negative punishment can also be derived from a common business practice. Some businesses will suspend a problem employee without pay. The removal of pay constitutes an exclusion from the reinforcing stimulus of being paid and therefore is a form of negative punishment (Barth, 2002).

There are four main factors that influence the effectiveness of punishment. The first is *immediacy:* "For punishment to be most effective, the consequence must follow the behavior immediately" (Miltenberger, 2004). For example, if an employee makes an inappropriate comment and receives an angry glare from a co-worker, he would know that the glare was for the comment. On the other hand, if this same glare were given 30 minutes later, it is not as likely that the employee would realize why the other person is glaring at him. Secondly, *contingency* plays a large role in the success of punishment procedures. A punisher must follow a behavior every time in a consistent manner or risk diminishing the effect of the punishment system. If an employee is punished only one out of every 10 times he is late, he is not as likely to stop that behavior as he would be if the punisher were implemented every time. *Establishing operations* is the third identified factor in the effective use of punishment. An establishing operation is an event that changes the value of a stimulus as a reinforcer or punisher. A common punishment for an employee is when he is asked to stay late and finish work that has not been completed. Most employees would grudgingly oblige, fearing bad reviews from the boss later on. However, if the employee knew that a friend frequently stays late and would be staying late that night, it would weaken the force of this aversive stimulus and thus an establishing operation would be formed. Conversely, if the employee would be missing an event that was particularly important to him, for instance his child's sporting event, the aversive stimulus of staying late would be much more

powerful. The final factor for effective punishment is the *difference in individuals and the magnitude of the punishers* being used. Some intended punishers may not affect some employees because of the chosen stimulus or the extent of the punishment itself Consequences that function as punishers vary from person to person. An event may be established as a conditioned punisher for one person but not for another. The magnitude and intensity of a punishment also affect whether a stimulus will function as a punisher. Generally, the more intense the aversive stimulus, the more likely it will serve as a punisher (Miltenberger, 2004). Based on experimental evidence, punishment seems to be most effective when it is immediate, firm, consistent, delivered in a variety of settings, and accompanied by a clear explanation (Appelbaum, Bregman, and Moroz, 1998).

Now with the definition and aspects of effectual punishment understood, it is possible to analyze how punishment is currently used in professional settings. Most companies and professional businesses have a disciplinary policy. Wachusett Regional School District (2004), for example, exhibits regulations covering too much time on the phone or Internet, overextending break times, tardiness, smoking in prohibited areas, sexual harassment, or theft. These same prohibitions can be found in employee handbooks in corporate headquarters, private entrepreneurships, and virtually any business around the world. These types of rules are common, and they seem to be necessary to prevent inappropriate behavior. If further scrutiny is used, however, it is discovered that punishments for these actions are not always specifically stated. The threat of suspension or termination is usually coupled with a lesser punishment disciplinary action" If an employee were to break a rule and perform an act against the conduct code of the company, when would the punishment be carried out? It may be days or even weeks later. This answer is not as promising as many managers could hope. If an employee is doing something wrong or hurtful to the company, the manager most likely will not know about it immediately, if at all. This severely limits his opportunity to administer a punishment soon after the offense in order to make sure the employee knows that the behavior was wrong and to administer a punishment which would in turn decrease the behavior. If a manager cannot punish a behavior immediately or consistently, then using punishment is not as effective

Punishment is sometimes wrongly appropriated as a motivational tool by managers to prod employees into work. One author wrote, "Controversy surrounding the significance of punishment with respect to its role and effectiveness in behavior control as well as society's acceptance for this traditional method has encouraged many people in positions of power to use punishment as a means of control" (Appelbaum et aI.,1998). It has been noted that this technique can achieve positive results in the short term. It is used because managers find it effective to pit employees against each other in an attempt to form competition motivation. The main problem associated with this type of management is that, as noted before, the results are only short term and discourage relationships among front-line employees. Positive relationships form productivity that is more sustained, but when a manager needs quick results, most turn to fear motivation (Maccobyet aI., 2004).

Using punishment as a control tool may foster an environment of fear in the workplace. One side effect of using punishment inappropriately is that employees become afraid to take risks. Risks allow companies to grow and gain competitive advantage in the industry. An employee that works in an environment characterized by the use of punishment may have problems dealing with the pressure and focus on what he could lose if he failed instead of what he could gain if he succeeded. Appelbaum et al. (1998) identified five main types of risks that keep employees from taking chances, four of which apply directly to the fear instilled by the use of punishment in a workplace. The first of these is the "fear of failure", which is common in many employees and is even more extensive in employees under a manager practicing "fear motivation"(Appelbaum et al., 1998). Experiencing competitive failure even once by an employee can be detrimental to his future effectiveness. If an employee works up the courage to try something new and then is punished for the results, this employee is far less likely to experiment in the future. Employees experiencing the fear of failure usually tend to avoid attention and maintain the status quo. This employee will let opportunities pass by and instead settle for doing what he feels he does well. In fact, risk-taking opportunities that could result in big gains for the company are seen as a source of fear instead of an exciting prospect. The "fear of success", though not thought of in the same light as the fear of failure, has the same effect as the fear of failure (Appelbaum et aI., 1998). Employees will hold back because the more

successful a person is the more isolated he may become. Being successful, in the eye of this employee, only increases the distance to the ground when he falls and allows others to see the fall. This type of fear produces the same results as the fear of failure; the employee holds back and avoids taking a risk. "Fearing what others think" has been a problem for many workers because they do not want to be singled out and targeted because of success or productivity (Appelbaum et at, 1998). If an employee is constantly worrying whether others have been offended by his success, he will tend to try to fit back in the group by suppressing his own talent. The opinions of others often control this employee's thoughts or even his actions. These employees tell others exactly what they want to hear and suggest answers that are apparent. This leads to a lack of creativity in solutions and an employee without an opinion.

Finally, the "fear of uncertainty" troubles managers and front line employees alike (Appelbaum et aI., 1998). If the outcome of the event is not completely known before hand, an employee may be tentative to go through with the plan. This person is not willing to risk the comfort and stability of his current situation by taking on more responsibility or promotions. He will work on only concrete issues and decline anything that might alter his present position. Obviously this lack of determination and fear of risk-taking could be very harmful to the company. It is known that punishment can create fear in the workplace. A negative effect of this is that creating a fearful environment does not serve to motivate employees. In fact, as a result of managers that use punishment and fear tactics, companies may experience declines in productivity, poor morale, high turnover, and lost profits (Casison, 2002).

Punishment techniques serve to increase a supervisor's role ambiguity while also having a negative effect on employee job performance and job satisfaction (Challagalla and Shervani, 1996). Extensive punishment and fear tactics lead to a negative workplace. Brenda Anderson, executive director for SITE, stated, "Once people get negative, it spreads like wildfire" (Casison, 2002). Can punishment work? The answer is still, surprisingly, yes. Does punishment work? In most cases, when intending to find a motivator or change a behavior in a business setting, no.

To understand when punishment works, a survey conducted by KPMG Peat Marwick asked employees various questions on the topic of fraud, among other things. Sixty-five percent of the respondents cited that fraud was a problem in their companies, and 62% declared that the major cause of this was inadequate punishment for acts of insubordination; the employees were more willing to take the risk because the punishment was not severe. According to the employees themselves, it seems that punishment is not severe enough in businesses. Common logic would infer that punishments would need to be increased in businesses (Trends, 1999). However, punishment alone for disciplinary reasons will not work: "Punishment won't work for you because you can never punish in a way that meets the requirements for the effective use of punishment that psychologists have defined-immediacy, severity, and consistency" (GoSmallBiz.com, *2002*).

Punishment, in a sense, is reducing unwanted behavior by means of adding aversive stimuli or taking away positive reinforcers. Punishment can result in negative side effects including anger, aggression, and punishment effect (Appelbaum, et al., 1998). Punishment effect is essentially performing at a level barely sufficient to avoid punishment. For example, if a person were asked how fast he was driving in a 55 mile per hour speed zone, he would most likely answer at a number above 55 that he has established as a safe speed not warranting a ticket. This is because the individual has established a number that he can comfortably travel over the speed limit which he feels will not merit a speeding ticket (GoSmallBiz.com., 2002). A worker will do the same. When punishment is used extensively, it tends to backfire as employees try to get back at their managers and hide information to shield themselves from retribution (Maccoby, Gittel, and Ledeen, 2004). In fact, the employee will not usually terminate the behavior, finding alternate ways of engaging in the behavior. In most instances, punishment in a business setting only leads to a brief restraint of the behavior because the methods of effective punishment, as discussed earlier, are not properly utilized. Punishment, therefore, will only work if the right environment and tools for effectiveness are developed to the fullest extent. Any consideration to use punishment must be carefully thought out, planned, and carried out. Punishment, by its nature, evokes resentful behavior from the individual receiving the punishment, especially when each of the terms of effectiveness is not properly put into practice (Appelbaum et al., 1998).

Punishment can never meet the requirements of effective punishment that psychologists have defined, (GoSmallBiz.com., *2002).* If punishment is going to be used, it has to be immediate, contingent, and applied to all employees equally or it will not be accepted. It can also result in anger, aggression, and punishment effect (Appelbaum, et aI., 1998). Punishment does not seem to be a successful solution to the discipline problems present in the workplace environment. If punishment is not the right choice for maintaining desirable behaviors in the workplace, other alternatives must be sought.

2.2.7 Concept of Building Tradesmen

Akindoyemi (2005), defined tradesman as a person – male or female who has been instructed in the fundamental theory of a particular trade, and trained for an adequate period in the intricate practice of that trade.

Abdulgafaru (2003), defines artisan or tradesman as a person skilled at manually creating beautiful things or a person who does something very well and with great attention to details, aesthetic, creativity; such as basketry, wood working, blacksmith.

A tradesman is a skilled worker who practices some trade or handicraft; a creator of skill in the manual arts; a professional whose work is consistently of high quality. Economically and socially, a tradesmen status is considered between a labourer and a professional with a high degree of both practical and theoretical knowledge of their trades. In cultures where professional careers are highly priced, there can be a shortage of skilled manual workers leading to lucrative null markets in the trades. The training of trades in European culture has been a formal tradition for many centuries. Tradesmen typically begins as an apprentice, working for the learning from the master and after a number of years, he is released from the master and work for himself.

Eventually, taking on his own apprentices, since the 20th century, this process has been changed in many ways. Tradesmen skill begins as an apprentice but the apprenticeship is carried out partly through working for qualified tradesmen and partly through an accredited trade school for a definite period of time (usually around four years) after which he/she is fully qualified.

The Nigerian Institute of Building has defined building tradesman as a person who has attended a standard of vocational education and training in a building

craft either formally or in formally and works on building projects. Such a person must hold certificate of apprenticeship from a master tradesman or vocational training centre Akindoyemi (2005) cited by Ngwu (2014), identified twenty one sundry trade groups in the building construction industry namely: demolisher, excavators, concreter, steel benders, structural steel workers, carpenters, joiners, asphalters, brick/block layers, natural stone masons, iron mongers, metal workers, plumbers, drainers, electricians, plasters/ pavement decorators. It is obvious from the listing that virtually all the basic requirements of a building are directly or indirectly impacted by the activities of these trade groups. Furthermore, each trade group derives its name directly from nature of contributory role it performs towards the actualization of effective building project delivery.

2.2.8 Concept of Tariff Coefficient (Rates)

Salary is one of the most controversial categories of payments to employees of an enterprise. In practice, there are several basic methods for calculating payroll payments. The most popular are the following:

i. Piece work

ii. Time based

iii. Combined type

In order to understand how salaries are paid to state employees, it is necessary to determine what the tariff scale and tariff rates are. The coefficient of the tariff rate by categories is applied not only in budgetary organizations, many enterprise have such additional tariff coefficients by categories.

Tariff coefficient is a multiplier that is applied to the wages of first class employees. This is an indicator that increases the salary of an employee taking into account such indicators as the tariff rate, the tariff coefficient. Enterprises usually use a digitized tariff rate, consisting of six categories. Thus the employee of the first category has the lowest salary index, and the sixth respectively the highest tariff coefficient (Atomiye, 2018). Tariff coefficient of the last category corresponds to minimum wage equal to 1.0. To apply the wage tariff system, there is need to have a table with tariff coefficients. At different enterprises, they can differ.

All employees of the enterprise cannot receive wages at the same level, since their level of qualification is different; the laboriousness of the work performed by each of them is different. In this regard, it is expedient to apply a tariff scale. The main purpose is to distribute workers by category, depending on the level of specialization and the qualification of the work performed by them. Each employee must receive a salary in the amount corresponding to his qualification (Okereke, 2014). Compensation of labour in the tariff method provides that an employee of a certain category must perform work that corresponds to its level in complexity. If it happens that a low-level worker is involved in the work that a specialist of higher level must perform, in situations where he does it successfully, he accordingly, can be assigned a higher rank (Atomiye, 2018). Payroll tariff method is a good motivator for employees. The higher the discharge, the higher the salary level.

Tariff coefficient is a component part of the category of qualification characteristics. It characterizes the level of complexity of work (Okereke, 2014). Tariff category is one of the most important components of the tariff scale. It can be viewed in a special handbook of the characteristics of workers by skill level. In the tariff grid, the countdown always begins with first class workers. They as a rule, have the lowest salary and skill level. Typically, the salary level of first-class workers corresponds to the minimum wage level determined at state level.

To obtain the highest level of qualification level, it is necessary to carry out the work of the highest level of qualification. In addition, there are also conditions that are mandatory for fulfilment allowing the employee to receive a higher qualification rank.

i. Perform the work of the highest level for three months, and do it successfully, that is, without rework and violations.

ii. Just before receiving the highest level, you need to pass a test to check the skill level.

In the above processes, the owner of the enterprise, as well as the representative of the trade union organization of employees, should participate. The level of qualification category can be increased in those cases when the employee strictly follows the norms and requirements that are defined in the enterprise.

Tariff rank, tariff coefficient and tariff rates are used when planning the wage fund at the enterprise. This allows the determination of level of earnings for certain categories of workers. This coefficient is important according to Atomiye (2018) in the following areas:

1. during planning of the budget of the basic salary to workers on categories

2. during the distribution of the wage fund by categories of workers

3. when planning to raise the level of tariff rates.

2.3.0. Literature Review

2.3.1. Introduction

This section takes an exhaustive review of related previous works on the contemporary issues of workmen's productivity, motivational factors and existing models aimed at enhancing the productivity of building tradesmen globally and in Nigeria. At the end of the review, research gaps which this study intends to fill will be identified and highlighted. It will be discussed under the following sub-headings:

i. Definitions of motivation

ii. Types of motivation

iii. Factors Enhancing Employee Motivation

iv. Motivational Techniques in Construction Industry

v. Challenges of Management with Respect to Workers' Motivation

vi. The Impact of Low Motivation Level on Project success

vii. Motivational Models

viii. Productivity in Construction

ix. Factors affecting the productivity of building craftsmen

x. Historical Perspective of Labour Laws in Nigeria

xi. Skill Development and Certification for Tradesmen in Nigeria

2.3.2. Definition of Motivation

Motivation is defined as "the forces within a person that affects his or her direction, intensity and persistence of voluntary behaviour (Mcshane et al., 2000). Robbins and Coulter (2005) further suggest that motivation refers to the "process that account for an individual's willingness to accept higher levels of effort to each organizational goals conditioned by the effort's ability to satisfy some individual need". If managers today are to assume responsibility to lead employees towards attaining organizational goals, it is then crucial for them to comprehend the psychological process of motivation. Other researcher such as Kreitner (1995), Buford, Bedeian and Linder (1995), Higgins (1994) all cited in Linder (1998) define motivation as "the psychological process that gives behaviour a purpose and direction, a predisposition to behave in a purposive manner to achieve specific unmet needs, an unsatisfied need, and the will to achieve, respectively.

The above definitions can be summarized in one definition, according to Greenberg and Baron (2000) indicated that motivation can be divided into three main parts. The first part looks at arousal that deals with the drive, or energy behind individual (s) action. People tend to be guided by their interest in making a good impression on others, doing interesting work and being successful in what they do. The second part refers to the choice people make and the direction their behaviour takes. The last part deals with maintaining motivated behaviour which clearly defines how long people have to persist at attempting to their goals. It can be observed from the above definitions that, motivation in general, is more or less basically concerned with factors or events that moves, leads, and drives certain human action or inaction over a given period of time given the prevailing conditions.

Furthermore the definitions suggest that there need to be an" invisible force" to push people to do something in return. It could also be deduced from the definition that having a motivated work force or creating an environment in which high levels of motivation are maintained remains a challenge for today's management. This challenge may emanate from the simple fact that motivation is not a fixed trait but rather a dynamic phenomenon as it could change with changes in personal, psychological, financial or social factors.

In this research, the definition of motivation by Greenberg and Baron (2003) is adopted, as it is more realistic and simple as it considers the individual and his

performance. That is, motivation is “the set of processes that arouse, direct, and maintain human behaviour towards attaining some goal”. (Greenberg andBaron, 2003).

2.3.3. Types of Motivation

Motivation present in workplace is of two types: intrinsic and extrinsic (Adam 2007). This implies that job related variables affecting motivation have intrinsic and extrinsic motivational values that drive the employees to perform. Given that most employees are intrinsically and extrinsically motivated simultaneously, hence a conclusion can be made that intrinsic and extrinsic motivation are not mutually exclusive (Deci and Ryan, 2000).

i Intrinsic Motivation- Intrinsic motivation stems from the word “internal” which implies motivation comes from within the individual or from the activity itself and positively affects behaviour, performance, and well-being. In other words, this type of motivation is self-generated when intrinsically motivated, the individual will also strive to satisfy three innate psychological needs: namely needs for autonomy, competence, and relatedness (Deci and Ryan, 2000). Such employees like to have a substantial amount of freedom to make decision, or empowering a channel to impress creativity, opportunities for advancement, recognition for good work, to be treated in a polite and thoughtful manner, and possess the position to take on tasks that are both challenging and meaningful of which he/she would feel an inherent sense of accomplishment upon successful completion. For instance an employee who has encountered an intriguingly difficultly problem is unlikely to surrender just because the problem appears to be unsolvable. Instead the employee will put forth his /her rest efforts, say by investing more time of taking the task home; as he/she views the problem as challenging and worthwhile to complete. In fact, many researchers have acknowledged and proven that intrinsic motivation does have a positive long-term effect and is regarded as the “true motivation” (Lai, 2009). Taking into account of the above discussion, an authoritative management style is no longer practical if the organization wishes its employees to take more initiative and stay committed to management objectives. Thus, the work place atmosphere must enable the employees to satisfy the higher order needs.

ii Extrinsic Motivation- On the other hand, extrinsic motivation refers to motivation that comes from outside an individual in exchange for external rewards and is not derived from the work itself (Deci and Ryan 2000). Extrinsic motivation takes the form of tangible monetary or non- monetary incentives such as pay rise, gift certificates, material possessions, vacation trips wall plagues, company banquets, movie tickets and prestige evaluations among others. For example, an employee may work doubly hard to finish a project before the scheduled deadline because of the tangible reward that accompanies for working effectively.

Extrinsic rewards can act as positive reinforce, they have been found to be an effective motivation tool for short-term gains (Adam, 2007). That is, meeting immediate goals, it may have long-term adverse effects / impacts on employees' behaviour. Furthermore, in contrast to extrinsic motivation, intrinsic motivation is said to exist when behaviour is performed for its own sake rather than to obtain material or social re-enforcers. The concept of intrinsic motivation was an important challenge to behaviourism, and has roots in White's (1959) competence or effectance motivation. Maslow (1943) and Alderfer (1969) addressed similar needs. A lot of research work indicates that employees who do not expect to receive extrinsic rewards outperform those who expert rewards (Kohn 1993). However, extrinsic rewards can still be useful if administered under the right conditions/ circumstances such as the absence or low levels of intrinsic motivation or when the role is unchallenging and mundane (routine).

2.3.4. Factors Enhancing Employees' Motivation

Employees want to earn reasonable salaries, as money represents the most important incentive, when speaking of its influential value (Sara et al, 2004). Financial rewards have the capacity to maintain and motivate individuals towards higher performance, especially workers from construction companies, as individual may use the money to satisfy their needs. Therefore, pay has a significant impact in establishing employees' diligence and commitment, being a key motivator for employees. Nevertheless, studies have shown that pay does not boost productivity on the long term and money does not improve performance significantly (Whitley, 2002). Moreover, focusing only on this aspect might deteriorate employees' attitude, as they might pursue only financial gains.

Fortunately, there are other non-financial factors that have a positive influence on motivation, such as rewards, social recognition and performance feedbacks. Numerous researches have also pointed out that rewards lead to job satisfaction, which in turn influence directive and positively the performance of the employees.

Moreover, rewards are one of the most efficient tools of management when trying to influence individual or group behaviour, as to improve organization's effectiveness. The vast majority of companies use pay, promotion, bonuses and other types of rewards to motivate employees and to increase their performance. In order to use salary as a motivator, managers have to develop salary structures, according to the importance of each job, individual performance and special allowances.

Employees can also be motivated through proper leadership, as leadership is all about getting thing done the right way. In order to achieve these goals, the leader should gain the employees' trust and make them follow him. Nevertheless, in order to make them trust him and complete their tasks properly for the organization, the employees should be motivated (Baldoni, 2005). The leaders and the employees help one another to attain high levels of morality and motivation.

Trust represents the perception of one individual about others and his willingness to act based on a speech or to comply with a decision. Therefore, trust is an important factor for an organization that wants to be successful, as it has the ability to enhance employees' motivation and foster interpersonal communication.

Irrespective of the degree of technical automation, attaining high levels of productivity is influenced by the level of motivation and effectiveness of the staff. Therefore, developing and implementing employee training programs is a necessary strategy to motivate workers. In addition, a good communication between the managers and the workforce can instigate motivation, as the degree of ambiguity decrease.

i. Financial Factors

Monetary factors of motivation involve granting rewards in terms of money such as commissions and bonuses (Yavuz, 2004). MSG Experts (2012) refers to

monetary incentives as those incentives which satisfy the subordinates by providing them with rewards in terms of money. Money is used as a primary outcome in comparison with the employees' input to determine if they are being treated equitably. However, it is debatable whether money is a chief source of satisfying the needs of people. On one hand, money is perceived as helpful in satisfying the social needs by enabling the possession of various material items. Hence, various wage plans and bonus schemes are introduced to motivate and stimulate the people to work. Therefore, money not only satisfies psychological needs but also the security and social needs. Money is important to employees because it is a medium of exchange (Odendaal and Roodt, 2003).

Under the old management paradigm, money was considered the best motivator; however, under the new leadership paradigm, pay is important but not a best motivator (Lussier and Achua, 2012:87). Lussier and Achua (2012:87) indicate that the current view of money as a motivator is that money matters more to some people than to others and that it may motivate some employees but not others. Money can motivate some people under some conditions, so the issue is not really whether or not money can motivate (Odendaal and Roodt, 2003). Odendaal and Roodt (2003) postulate that for money to motivate an individual's performance, certain conditions must be met: Firstly, money must be important to the individual. But money isn't important to everybody. High achievers are for instance intrinsically motivated; money would have little impact on these people. Secondly, money must be perceived by an individual as being a direct reward for performance. Unfortunately, performance and pay are poorly linked in most organizations. Pay increases are far more often determined by non-performance factors such as experience, supervisory perception, or company profitability. Thirdly, the marginal amount of money offered for the performance must be perceived by the individual as being significant. Fourthly, management must have the discretion to reward higher performers with more money, but unions and organizational compensation policies constrain managerial discretion. As Armstrong (2007) suggested, money is a motivator because it satisfies a lot of needs. It is a factor which is indispensable for life and which is needed to satisfy basic needs of survival and security. Higher needs such as self-esteem can also be satisfied by it. With money people are able buy things that show their status and create a visible sign of appreciation. In other words, money is a symbol of many intangible goals what makes it a powerful motivating factor. From Agarwal's

(2010) study based on a literature review on motivation and executive compensation, money is still the most crucial motivating factor for employee that makes him perform well in the company. He agrees that intrinsic rewards motivate executives but after a certain point of career money seems to have greater importance. Agarwal goes further in his conclusions as he indicates that long-term incentives are less effective than short-term, performance based incentives. This is the result of associated risk and uncertainty about the future which comes with long-term incentives.

ii. Non-Financial Factors

Non-monetary factors of motivation are those factors that do not involve direct cash payment (Yavuz, 2004). MSG Experts (2012) indicates that besides the monetary incentives, there are certain non-financial incentives which can satisfy the ego and self-actualization needs of employees. The incentives which cannot be measured in terms of money are put together in the category of "non-monetary incentives". Whenever managers wish to satisfy the psychological needs of the subordinates, they make use of non-monetary incentives. Some examples of non-monetary incentives are: encouraging employees by providing them with autonomy in their job and participation in decision-making, assigning challenging duties, improving working conditions, recognizing good work through small gifts, letters of appreciation.

MSG Experts (2012) adds that non-monetary incentives can be of the following types:

1. **Security of service -** Job security is an incentive which provides great motivation to employees. If their job is secured, they will put maximum efforts in to achieve the objectives of the enterprise. This also helps since they are free from mental tension and they can give their best to the enterprise.
2. **Praise or recognition-** Praise or recognition is another non-monetary incentive which satisfies the needs of the ego of the employees. Sometimes praise becomes more effective than any other incentive. The employees will respond more to praise and try to give the best of their abilities to a concern.
3. **Suggestion scheme-** The organization should look forward to taking suggestions and inviting suggestion schemes from the subordinates. This inculcates a spirit of participation in the employees. This can be done by publishing various articles written by employees to improve the work environment, which can be published in various magazines of the company.

This is also helpful in motivating the employees to feel important and they can also be encouraged to search for innovative ideas, which can be applied to improve work methods. This ultimately helps in growing a concern and adapting new methods of operations.

4. Job enrichment- Job enrichment is another non-monetary incentive in which the jobs of workers can be enriched. This can be done by increasing their responsibilities, giving them an important designation, increasing the content and nature of the work. In this way, efficient workers can get challenging jobs in which they can prove their worth. This is often also the greatest motivation for the efficient employees.

5. Promotion opportunities- Promotion is an effective tool to increase the spirit to work in a concern. I3f the employees are provided with opportunities for their advancement and growth, they feel satisfied and contented and they become more committed to the organization.

There is a large group of researchers who neglect the fact that money is a good motivator. Some of them are very critical about the use of money as a motivator. For example, McClelland (1968) writes that "money isn't nearly so potent a motivating force as theory and common sense suggest it should be. Some results that support McClelland words come from McKinsey Quarterly survey conducted in June 2009 (Dewhurst, Guthridge, and Mohr, 2009). Responses received from 1,047 executives, managers, and employees around the world showed that three non-cash motivators (praise from immediate managers, leadership attention, a chance to lead projects or task forces) are more effective motivators than the three highest-rated financial incentives (cash bonuses, increased base pay, and stock or stock options).

2.3.5. Motivational Techniques in Construction Industry

i. Achievement

Herzberg's study shows the principal motivator for top performance to be achievement. Many researchers have agreed with Herzberg's findings that this is the most powerful motivator. To develop workers and staff in construction projects into 'achievers', they should be given assignments that are suited to their best skills (Mansfield and Odeh, 1991). Achievement may be satisfied through specialization and authority in a specific area. Furthermore, the

construction worker must be placed in the position where work tasks call upon the most productive and efficient use of his (McQuilleen, 1986). According to the study of Moilwa and Langfor (1990), this factor has been shown to be amongst the most important, regardless of the conditions and/or the nature of work itself.

ii. Recognition

Recognition is another one of the most effective motivational tools management can use. This recognition can come publicly, from within the organization, from peer groups inside and outside the company, or in just a simple comment from a superior. Organizations can greatly increase the motivation of personnel working on a project by tying them personally to press releases, speaking engagements, newsletters, or any other visible means of project recognition which enhances their personal reputation (McQuilleen, 1986). Recognition and praise are a form of giving positive reinforcement or in other terms giving praise when a desired task is accomplished and withholding it when it is not accomplished (Cox et al., 2006). Recognition is an excellent nonmonetary incentive that is often underutilized as a tool to motivate employees to higher levels of performance (Fischer and Nunn, 1992).

Superior performances should be reinforced with immediate nonmonetary incentives such as recognition and praise in the form of commendation memos, certificates, and publicity of the performance (Skinner's reinforcement theory) (Khan, 1993). According to the survey conducted by Moilwa and Langfor (1990) recognition factor as a motivator is highly ranked and this factor is in agreement with the ranking of (Herzberg, 1968). By recognition, construction workers often feel that they are not heeded and creates an obligation for high standards of performance (Kazaz and Ulubeyli, 2007, Mansfield and Odeh, 1991). Fischer and Nunn (1992) demonstrated the effectiveness of the recognition of individuals and groups on their motivation and productivity. He report that the recognition effort resulted in an increase in productivity of 2%. The findings of Silas et al. (2000) found that, one of the most direct problematic impediments to Iranian site managers' motivation were perceived by them to be recognition.

iii. Incentives

According to MSG Experts (2012), an incentive is referred to as something which is given in addition to a wage; which means additional remuneration or a benefit to an employee in recognition of achievement or better work. Incentives provide a spur or zeal in the employees for better performance. It is a natural thing that nobody acts without a purpose. Therefore, a hope for a reward is a powerful incentive to motivate employees. Besides monetary incentives, there are some other stimuli which can drive a person to do better; these will include job satisfaction, job security, job promotion, and pride for accomplishment (MSG Experts, 2012). Studies have revealed that there are various incentives set in accordance with specific project objectives. In a study that investigated incentive mechanisms for project success, Bower et al. (2002) found that the provision of financial incentives must align the needs of the client and the contractor, correctly allocate risk, and allow an appropriate level of client involvement. Howard (1996:i) identified innovative contractor compensation strategies that have been used successfully to meet clients' objectives. The following are examples of contracts with incentive features found in a study by Howard (1996) whereby various innovative strategies for compensating engineering and construction contractors were investigated.

1. **Contractor overheads and profits-** The contract was restructured so that the contractor would be reimbursed for overheads based on performance in five incentive areas, including: budget, schedule, safety, quality, and customer satisfaction. The client and the contractor would use these points to calculate individual awards, dependent on successful project completion. The contractor would earn a profit only if the project was completed both on or ahead of schedule and under budget (Howard, 1996:16).

2. **Environmental compliance project -** Since the motivation for this project was regulatory compliance, and the project would not directly produce a revenue stream, the primary business objectives of the owner were to minimize costs and to complete the project prior to the regulatory deadline (Howard, 1996).

3. The two-tiered incentive contract- This contract consisted of supplementary maintenance and modifications of construction services of seven fossil fuel and twenty-nine hydroelectric power plants of a major electricity utility company (Howard, 1996:19). Tier 1 consisted of plant performance goals, while Tier 2 was general performance.

4. Corporate team performance incentives- The client, construction project manager, architect and the engineering team members were all included in the team incentive (Howard, 1996:41).

5. Shared under-run bonus based on performance- A budget was fixed, and the contract was based on reimbursement of direct project expenses plus a fixed fee. The construction manager's share was 15% of any final under-run costs to budget, conditional on project completion in a predetermined time, together with the satisfactory client's evaluation of construction management performance (Howard, 1996:48-49). A 7% sharing of under-run, relative to the construction budget, was added to the architect's fees (Howard, 1996:48).

6. Pay for performance to enhance teamwork- The project team strongly believed that previous contracting strategies could be improved upon to drive teamwork and to enhance performance in the areas of cost, schedule, safety and quality (Howard, 1996). An average project performance would entitle the contractor and the designer to earn a fee stated in the contract and, depending on the performance of the contractor, an additional agreed-upon amount could be earned or lost by both the contractor and the designer (Howard, 1996).

7. Client subjective performance appraisals- The client offered a contract using its standard agreement for engineering and procurement services, with a section added describing a unique compensation scheme based solely on the client's subjective appraisal of engineering performance (Howard, 1996). This was a cost-reimbursed contract. It stated that the contractor would earn a fee between 0% and a maximum percentage based solely on the client's satisfaction (Howard, 1996). The client communicated performance appraisal measures in meetings with the client's project manager, project engineers and plant customers (Howard, 1996).

8. Contractor and craft productivity incentives- The client sought to motivate the contractor to reduce the construction costs, and thereby arrived at an incentive based on craft productivity (Howard, 1996). A labour cost of $25/hour was used to develop an incentive plan. The client's logic in incentive development was that for every hour that could be reduced, there was a saving of $25, and to stimulate the maximum savings, the client was willing to share it on a $15 client, and $10 contractor basis (Howard, 1996:81). The contractor would be paid a $10 bonus for each under-run hour, and the individual worker would receive $0.50 per hour for every month the craft workers could exceed productivity rates that had been built into the targets (Howard, 1996).

9. Incentive for field supervision- The contract between the client and the contractor was a guaranteed maximum for construction costs plus a fixed fee that covered the contractor's profit (Howard, 1996:97). The contractor's objective was to demonstrate his abilities, and to become a contractor of choice against the competitor who had previously done business with the client. The contractor developed an incentive plan for foremen aimed at enhancing productivity, schedule performance, safety and the utilization of females and minorities (Howard, 1996:98).

iv. Responsibilities

Some operatives can be motivated to better job performance if they are given the responsibility for their performance and their group's performance. This motivator coincides directly with achievement. A higher level of responsibility also can charge an individual who feels he now has greater control over his own destiny (McQuilleen, 1986). Giving responsibility to employees keeps them interested in their jobs and leads to the satisfaction of other needs, such as freedom, recognition and advancement, all of which will result in improved motivation and performance.

Workers and their supervisors who are denied responsibility feel dissatisfied, bored and frustrated. Meeting responsibility needs may be done by providing workmen with a task and letting them decide on the method of working as long as conditions of expected quality and finishing time are met (Mansfield and Odeh, 1991). Therefore the individual feels secure when entrusted with a certain amount of responsibility (Moilwa and Langfor, 1990). Providing workers with

an opportunity to use their own initiative shows trust in the employees and motivates their work performance (Kazaz and Ulubeyli, 2007). sufficient autonomy should be granted to the employees in the accomplishment of their job. This would require actions such as reducing the number and frequency of controls and making employees responsible for checking their own work (Khan, 1993). Asad and Dainty (2005) ensured that, participation in the decision-making considered an important motivating factors of construction employees. Employees enjoy being assigned challenging job tasks. Challenging jobs should not be interpreted as employees being subjected to more work. It should refer to employees handling more demanding work with greater autonomy, while receiving support within the organization. Maloney (1986) found that some hygiene factors can motivate construction employees, in particular, site managers who value responsibility and autonomy as a powerful motivator. This suggests that quality of work life includes the autonomy people are granted in the performance of their work, the participation they are allowed in making decisions that affect them, and the social interactions allowed by the job.

Giving people the choice to make decisions and giving them tools and supports to their job will increase their inner motivational force. A manager should define clear and achievable goals for his workers and should give them authority and resources to achieve those goals (Halepota, 2005 and Mustapha and Naoum, 1998). Workers are highly motivated if they are allowed to convey their opinions to their supervisors and managers. Therefore, communication channels for different organizational levels and cross levels should be established for the exchange of information and workers' involvement in decision making in an attempt to motivate construction workers (Lam and Tang 2003).

v. Work Satisfaction

Construction is not an attractive industry for many workers because the working conditions are generally difficult. However, the industry does offer a wide variety of jobs for those who are capable and willing to undertake them. Higher skills lead to a wider choice of jobs and greater satisfaction in a chosen role, but a lack of skills can lead to dissatisfaction with the job, and hence to poor productivity. The skill levels of workers thus have an effect on productivity through both increased production and enhanced job satisfaction (Kazaz and Ulubeyli, 2007).

Satisfaction is a function of the job outcomes desired and expected and those received. Individuals who receive the outcome they desire or expect from their work will tend to be more satisfied with their work (Maloney and McFillen, 1985). Satisfaction in the work itself and job growth are really interrelated to many of the other satisfiers recognized by Herzberg (1968), Moilwa and Langfor (1990) and others. Managers can motivate engineers to be more creative, imaginative, and ingenious in their statement of ideas and work methods if they are allowed some autonomy at work. Individuals who have fulfilled many of their other needs such as job security, social acceptance, and peer or public recognition will fell satisfied (McQuilleen, 1986).

Proper recruitment and selection procedures can play an important role in the motivational process, so that people with the necessary and appropriate skills and aptitudes can be placed on those jobs where they can best perform and derive maximum satisfaction (Asad and Dainty, 2005). Overall satisfaction was measured on two multi- item scales. The first represented general job satisfaction and the second measured a worker's intrinsic satisfaction (Maloney and McFillen, 1987). Self-satisfaction and the feeling of accomplishment on doing a job successfully from the work done are considered as a prime motivating factor. It can be suggested that in order to maximize self-satisfaction from the work done, it is important that companies should adopt proper recruitment and selection procedures. It has been suggested by previous studies that, human-sourced work accidents, absenteeism and turnover are more common among workers who are unhappy with their work situation than among those who are satisfied (Kazaz and Ulubeyli, 2007). Satisfied workers exhibit lower absenteeism and turnover and file fewer grievances. According to the study of Maloney and McFillen (1985), the workers were asked about the importance they attach to various job related factors and their satisfaction with each factor

vi. Advancement

Career advancement is one way that operatives expect to be rewarded for their effort and achievement. Part of the motivation to grow with new knowledge and responsibilities is the reward of advancement (McQuilleen, 1986). Short-term employment in the construction industry appears to be a common policy; this lessens the opportunities for promotion and advancement in one organization.

Also, many employees in construction are restricted with regard to the advancement ladder owing to the highly specialized nature of their jobs, and they tend to do the same work in all projects. Advancement can be achieved via rewarding staff with special assignments or new responsibilities, transferring them to new jobs, or in any other way that enriches experience and knowledge, such as via attendance at educational courses, or trips to another part of the country or world (Mansfield and Odeh, 1991). The salary factor strongly influences the advancement factor. The implication in this case is that, when advancement is achieved, salary progression is expected to come with it (Moilwa and Langfor, 1990).

Receiving promotion in the organization gives psychological satisfaction. This is because one gets better status, more challenging job, authority etc., which are more worth than getting more pay by way of promotion (Lam and Tang, 2003). Zakeri et al. 1997 found in his survey conducted on Iranian construction operatives that prospect of promotion has been recognized as a motivator. Asad and Dainty (2005) found that, Job promotion was considered to be a more important motivator by the professional staff, compared to the unskilled and skilled operatives. This finding illustrates that professional employees have greater desires for career progress and are more willing to accept positions of higher responsibility. These findings are consistent with Schrader (1972), who suggested that workers, who could have been promoted, opt to remain with their craft as they do not want to take on additional responsibilities of a foreman.

vii. Participation

Participation helps workers to simplify the informational link and confront the superior face-to-face, thereby assessing the management's attitude and expected behavioral response to the issue (McQuilleen, 1986). Participation satisfies many needs, such as recognition, affiliation and acceptance. Participation provides the engineer with a feeling of importance, in that he has valuable information to offer that will improve the efficiency of the organization. Participation reduces defensive feelings of employees and establishes a better rapport with management (Mansfield and Odeh, 1991). lack of worker participation in planning seemed to have a demotivating effect. Workers often felt they were not heeded or simply perceived as being “just a number” (Kaming et al., 1998). According to Cox et al. (2006), two sets of attributes

affecting workforce needs were determined. The first set was praise and feeling like being a member of the group. In addition, feeling like being a member of the group was also found to be a common attribute with job security. This suggests that workers need praise before they get the feeling of being accepted by the group or crew. This acceptance into the group then leads to a feeling of job security.

viii. Competition

Competition increases innovation, and mental output can improve considerably as a result. Implementing competition in construction projects opens up the way for individuals with distinguished qualities to put their potential to work, which can then lead on to opportunities for later promotion. There are many positive aspects included in competition programmers, such as bringing the right kind of challenge to site employees, to reduce boredom and make repetitive work more acceptable (Mansfield and Odeh, 1991). Competition are more likely to act as universal vehicles for motivation (Mansfield and Odeh, 1991 and Khan, 1993). Many individuals produce better performance in a competitive work environment. This competitive drive can be utilized in the work environment by strengthening any competitive elements that exist between individual workers or between crews. This can then be channeled into productive competitions, possibly involving a bonus scheme (Kazaz and Ulubeyli, 2007).

ix. Safety

Safety is important for stability of one's life at home, at work, in society at large, for sanity, and for any other productive generation and application of the thought process. The lack of this basic need creates instability, incoherence, and fragmented thought and personality (Shoura and Singh, 1999). Safety has always a priority at any construction job site because the dangerous nature of most construction works renders them liable to many accidents. Occupational injuries can harm the reputation of a company, decrease productivity, and result in huge costs (Kazaz and Ulubeyli, 2007). The problem with unsafe working conditions is not always due to a lack of safety equipment, but is often caused by worker non-conformance to safety rules (Kaming et al., 1998). Health and Safety was considered a primary influence on motivation by both skilled and

unskilled operatives. Thus, construction companies should take measures to create more awareness about the health and safety issues on the construction sites, provide proper safety training to their employees and make efforts to make the sites safer for the skilled and general labor (Asad and Dainty, 2005). The findings of Kazaz and Ulubeyli (2007) showed that, There is an association between enhanced safety and timely payment of remuneration, and this suggests that delayed payments increase the risk of workers becoming dissatisfied at work, and thus more careless. In addition, dissatisfied workers are more likely to waste materials, and perhaps even sabotage equipment intentionally, thus increasing accident rates.

x. Job Security

Job security was considered an important job-related motivating factor by all the categories of employees. The finding of Asad and Dainty (2005) indicates higher importance attached to job security by the employees, when compared with the past (Schrader, 1972 and Hazeltine, 1976). The higher need for job security is consistent with the employees' higher desire for monetary rewards. Job security considerably increases labour motivation. Such job security is enhanced if employers and employees have a sense of mutual interdependence. However, job security is diminished if: (i) there is discontinuity of work (and a sense of 'job unity' only during particular projects); (ii) sub- contracting is widespread; (iii) the effectiveness of trade unions is inadequate; and (iv) conditions of high unemployment exist (Kazaz and Ulubeyli, 2007). Worker's motivation to utilize the most productive methods and technology will be increased if that worker perceives himself as having employment security (Moilwa and Langfor, 1990 and Zakeri et al., 1997). The survey of Cox et al. (2006) surmised that essentially a worker must first receive praise before they feel as if they are a member of the team and once they feel like a member of the team, they then begin to acquire feelings of job security. The results of this study further reinforce the findings of several previous behavioural studies. The survey of Moilwa and Langfor (1990) and Khan (1993) show that people should be given reasonable assurance of their job security in order to gain their commitment and loyalty to the organization and the employees who are quite content with the security provided by their jobs or by their positions tend to disregard the conditions within which they work.

xi. Interpersonal Relations

Teams play an important role in the success of any project and the consideration of teamwork was seen as a significant motivating factor by all categories of employee (Asad and Dainty, 2005). Establishing a good relationship amongst workmates can be of great advantage if utilized well, e.g. workers understand each other regarding habit, belief and language. "Team spirit" is more conducive to motivated employees than a fragmented "go-it-alone" atmosphere (Kaming et al., 1997).

Construction workers are attached to a crew or a project for a definite period of time, and they have an obligation to work productively together in a shared environment. This is more likely to occur if they are comfortable in their relationships with workmates and management (Kazaz and Ulubeyli, 2007). To bring the best out of staff, social relationships at work and sound attitudes have to be developed at an early stage of a contract, and project managers need to make every effort to communicate objectives all the way down the line. Construction managers can potentially achieve better results by promoting social relationships at work. The development of a good social environment and harmonious relationships encourages cooperation and satisfies acceptance and friendship needs (Mansfield and Odeh, 1991). According to Moilwa and Langfor (1990), Zakeri et al. (1997), Interpersonal relations of motivation is not highly regarded by the respondents. It recorded the lowest overall ranking on the motivation variables. The response to this variable coincides with that of Herzberg (1986).

xii. Money

Incentives help to motivate people (Hensey, 1987). The use of monetary incentives for superior performance is the most common way to reward and motivate people but the issue of money is not an easy one to resolve. Just like the other satisfiers, not everyone values money to the same degree. The use of incentive schemes has been in operation for a long time in the construction industry, and, in many cases, it leads to adequate satisfaction for managers and employees alike (Khan, 1993). Money can mean different things to different people; to some, it can be considered as a means of satisfying workers' differing levels of need; to others, monetary reward may represent security, increase in

status, or independence. Despite the dispute that surrounds money, one can say that the vast majority of people will not reject money, and most will try to have more of it (Mansfield and Odeh, 1991). Some workers are self-motivated, while others are motivated by outside forces. Workers who are self-motivated set their own goals to reach but it is important for those goals to have incentives attached to them if continued motivated behaviour is desired. It does not matter whether employees are self- motivated, extrinsically motivated, or both; in order for incentives to be most effective they must address the needs of the individual employee (Cox et al., 2006). Money earned is the foremost motivating and de-motivating factor in the eyes of the construction workers (Parkin et al., 2009). Olomolaiye and Ogunlana (1988) asserted that, earnings related factors were predominant for motivating construction operatives in a developing country. The findings of Zakeri et al. (1997) support these previous surveys, indicating money related issues for Iranian construction operatives. If the economy is prosperous, and employees reach a comfortable level of lifestyle, where there is a balance between spending on desires and the actual income received, then money becomes less influential (Mansfield and Odeh, 1991). Asad and Dainty (2005) summarized that money remained an important motivator. If this finding was compared with the studies on construction operative motivation carried out by Schrader (1972) in UK, and Hazeltine (1976) in the US, it indicates that monetary rewards (such as pay and fringe benefits) were not considered the most important motivators. Therefore, on the basis of these findings, it would seem even more important for construction companies to manage and use financial incentives to achieve improved performance.

Frederick Herzberg and Abraham Maslow have often been misquoted as saying that pay is unimportant. Maslow would probably say that pay is directly tied to many of the five basic needs people have. Herzberg notes that pay is a dissatisfier (instead of a motivator), because it is seldom truly based on performance. Remuneration is seen as the most important reason of why an individual has to work in a job. Because it both meets the physiological needs that are the most basic requirement of people, and gives esteem in a society. When considering money as a motivator, it will include the following:

1. Fairness of pay- People should be treated fairly and equally in terms of their initial salary as well as subsequent rewards such as raises, bonuses, and promotions. It should also be ensured that they do not get a feeling of being under rewarded. This could be achieved by clearly defining and communicating

the reward system, making honest appraisals, and rewarding for performance- and performance only (Khan, 1993). Zakeri et al. (1997) indicate that, Iranian operatives ranked fairness of pay as their greatest motivator. Low pay levels are a major source of discontent to many Iranian construction operatives (Zakeri et al., 1997). Silas et al. (2000) found that, the most direct problematic impediments to Iranian site managers' motivation were perceived by them to be fair pay.

2. Incentives and financial rewards- Incentives are usually defined as tangible rewards that are given to those who perform at a given level (Thwala and Monese, 2008). According to Thwala and Monese (2008), many companies feel that pocket money is no longer a good motivator. Others contend that small rewards do not motivate. Olomolaiye and Price (1984) suggested that financial incentives can improve site productivity threefold. Although it is important that it be applied properly for prevention of any probable negative consequence. Hensey (1987) categories incentives into two categories, membership and performance. Both kinds of incentives are important; however, they do different things. Membership incentives help to keep people. Examples are pension plans, health or life insurance, stock purchase opportunities, profit sharing (not based on performance), competitive salaries, image of the firm, location, colleagues, cars, computers, memberships, dinners, and retreats. Performance incentives help to motivate people. Employees work harder for these. Performance-based incentives including cash or stock, dividends on shares, stock equity growth, merit salary increases, advancement, and increased responsibilities are all prime examples. Recognition in the form of cash awards, other awards, and a special note in a newsletter also fall into this category. Hensey (1987) also asserted that short- term bonuses, incentives, etc., enable a manager to rapidly reward stronger performance and reverse the process if performance drops or money is scarce. Olomolaiye and Ogunlana (1988) asserted that earnings related factors were predominant for motivating construction operatives in a developing country. The findings of Zakeri et al. (1997) support these previous surveys, indicating financial incentives has the second highest importance rank to Iranian construction operatives but was poorly gratified on the gratification scale.

3. On-time payment- Timely payment is one of the primary principles of any working agreement. It obliges the employer to pay employees' wages and allowances for performing a task. The amount of pay and on-time payment is

the most vital factors required to meet the first hierarchy need of Maslow. A worker, for example, will probably quit the job if a higher wage is offered by another firm. Despite Herzberg's argument that money is not a 'satisfier' and is thus not a 'motivator', but according to Ogunlana and Chang (1998) and Kazaz and Ulubeyli (2007) seems to indicate the contrary, they found that money is the most powerful motivator of construction workers, and that low levels of remuneration are a major source of discontent among these workers. Hence, with inadequate wages one cannot expect operatives to perform a challenging task competently.

If money is to be used as a motivator, it is important to remember that the actual timing as to when employees are rewarded can be very important with respect to its effect on motivation. Regular instalments of payment have been found to have very little influence on motivation. Any reward that is given immediately desired outcome has been shown to be the most effective (Mansfield and Odeh, 1991). Adequate working facilities can reduce to some extent the demotivating effects of low levels of pay, delay in payment simply cannot (Kazaz et al. 2008). Zakeri et al. (1997) found that delay in payments has a serious detrimental effect on contractors' productivity.

2.3.6. Challenges of Management with Respect to Workers Motivation

Motivation has been proven to be a very powerful tool for increasing organizational success (Tizazu, 2015; Kirstein, 2010; Parkin, et al., 2009; Pike, 2001). Unfortunately, managers fail to utilize motivation in order to retain their employees (Bassel et al., 2007). Management of construction projects are faced with a lot of challenges which makes it difficult to adopt appropriate motivational strategies. Some of the problems limiting management performance in managing projects through motivation are caused by the construction industry related factors while some are caused by employee related factors. Other challenges facing construction management team can be attributed to the financial strength and the competitive nature of construction organizations.

The study by Osuji (2014), on the motivational factors of Employee-consultants in the Nigerian construction industry revealed that worker's wages, company's expenditures and low availability of income affected management performance

in motivating their employees. He therefore suggests that it would be necessary for the management of construction firms to apply a high level of managerial skills to permit them deal with their employee motivation.

Nordmeyer (2017), believed that personal problems of employees can limit management effort in adopting proper motivational techniques and listed: low self-confidence, low expectations for success, lack of interest, achievement anxiety and fear of failure as factors with employees which might make it difficult for any motivational technique to work affectively.

The unique nature of construction industry is also seen as a major challenge affecting the success of any motivation technique. Hazeltine (1976), recommended that construction management should fully understand the unique characteristics of construction industry before developing motivation policies. Mansfield and Odeh (1991), asserted that the construction industry is characterized by short term employment which is often based on the life of the project or part of it and the employees are not allowed sufficient time to integrate with their organization in order to develop a proper understanding of the job. Subsequently, Halepota (2005), believed that environmental factors is one of the factors that affect motivation which cannot be controlled by management.

2.3.7. The Impact of Low Motivation Level on Project Success

If an organisation has a number of significantly low motivated employees', then many challenges will arise for them to deal with and their success will consequently suffer (Küzler and Payne, 2007). Previous research suggests that the reason for this is because organisations fail to do enough to ensure their employees' are motivated (Weightman, 2008).

One of the main implications of low employee motivation that has occurred in past research, is that employees begin to have less respect for management and put in less effort, therefore project goals are not achieved (Kuvaas et al, 2012). This lack of commitment has been proven to be very damaging for performance and productivity has been shown to significantly lower (Johnson et al, 2010). This has been supported in other research where it has been shown that low productivity is a huge risk for an organisation, leading to them failing to retain a

competitive advantage, and therefore damaging their success in the industry (Armstrong, 2012; Lavanya and Kalliath, 2015).

Moreover, it has been suggested that if one individual is suffering from low motivation levels then this may disrupt others within the working environment, resulting in more employees' failing to perform at peak level and lacking enthusiasm (Oana-Lavinia, 2008; Ten Brummelhuis et al, 2011). It would also seem that low employee motivation can lead to further negative impacts such as sabotaging of client relationships (Nelson and Quick, 2012) This is particularly concerning in industries that are dependent on clients, for example the construction industry (Ashworth, 2012). However these are assumptions and have not been confirmed in actual studies.

Dysvik and Kuvaas (2010) carried out a cross sectional survey, with findings that created the assumption that it's not just productivity that is affected, as there has been confirmation of a strong relationship between the level of motivation and employee turnover. This notion has been developed in further research, stating that absenteeism as well as employee turnover are negatively impacted by low employee motivation, causing further challenges for organisations (Gaur and Bhardwaj, 2014). The challenges that occur from high employee turnover are mostly direct and indirect costs, but also loss of goodwill, consequently impacting the success of the organisation (Ramlall, 2004). Cho and Perry (2012) add to this by making the assumption that trust is also lost in management when there is low motivation and this can be challenging enough on its own to try and gain back.

2.3.8. Motivational Models

Motivational models provide an arrangement and structure for developing, communicating, and managing worker motivation. The following paragraphs discuss some of the motivational models available in the literature.

i. Vroom Motivational Model

To relate performance and motivation in mathematical form, Vroom (1964)

expresses performance (P) as a function of the product of motivational force (M) and workers' ability (A). Figure (2.1) Thus:

$$P = MA \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots 2.27$$

Where

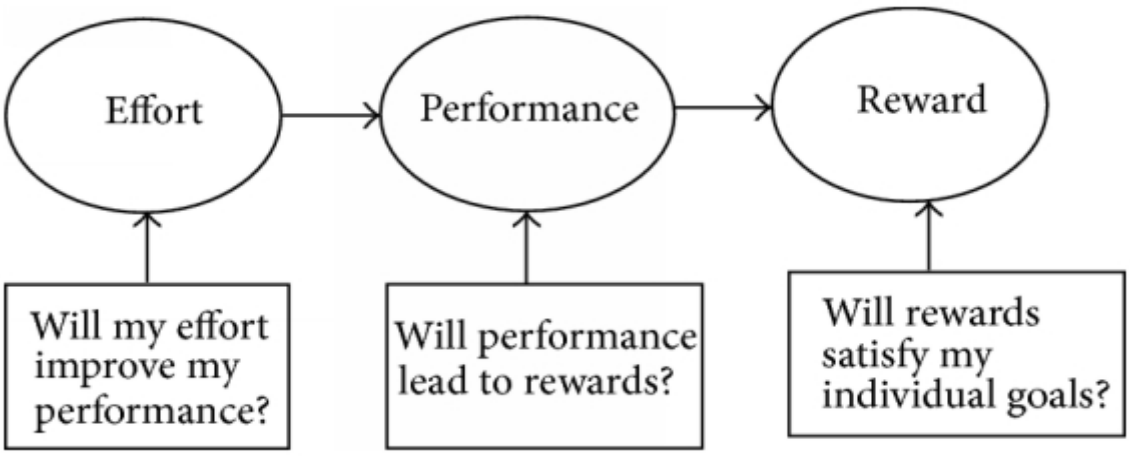
M is expressed as F(EIV)

E - Worker's expectancy with probability value from 0 to 1 to achieve the expected outcome

I = instrumentality of being rewarded or punished, probability value from- 1 to +1 for the expected outcome

V = valence or perceived value of the expected outcome to the individual.

Vroom model does not give an insight into the type of reward employees want that will satisfy their personal goals and make them perform better in the future. This makes it so difficult to apply the model.



2.1 ***Vroom expectancy model of motivation***
Source: *Vroom (1964)*

ii. Maslow Motivational Model

Maslow (1970) argued that human beings strive to satisfy the following needs basically classified in ascending order: physiological needs, safety needs, social or belonging needs, self-esteem needs, and the need for self- actualization. These needs are arranged hierarchically in his model (Figure 2.2). For example,

if a worker has satisfied own physiological needs, he/she will next pursue safety needs. As soon as these are placated, social needs will be pursued, and so on.

The model of Maslow relied on needs as the only motivator. Also, this model addresses people generally; the group of people mostly affected were not mentioned. This model does not give any clue on how organizations, especially construction industries can help individuals solve these needs to get them motivated for improved performance.

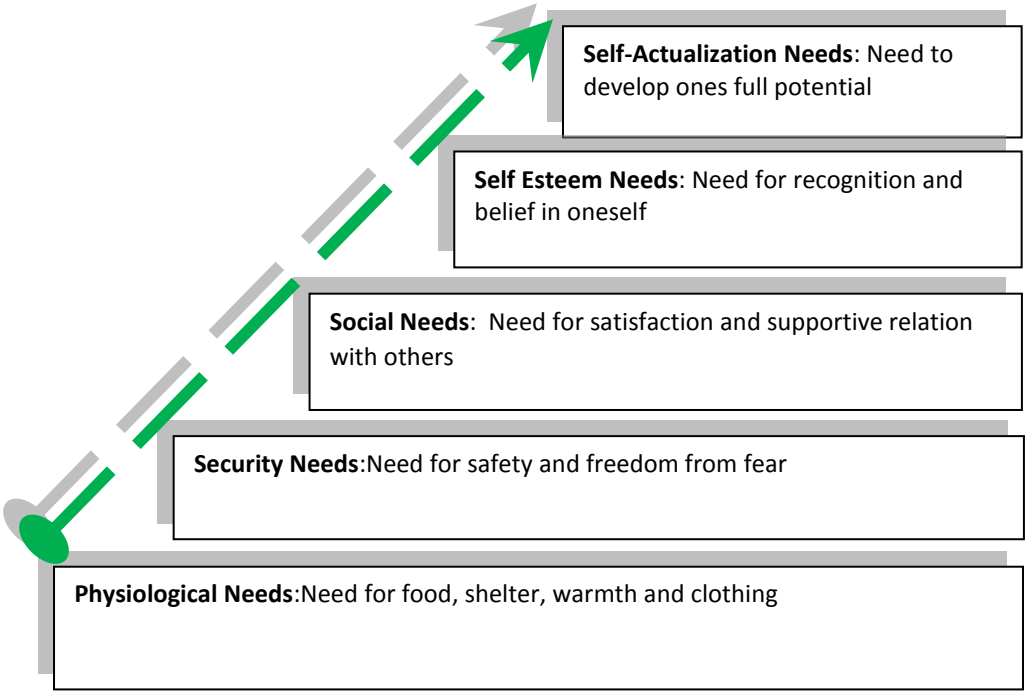


Figure 2.2 ***Maslow Hierarchy of needs model of motivation***
Source: *Fincham and Rhodes (2005)*

iii. Chun Motivational Model

Chun (1968), developed a model of motivation and hypothesized motivation as a multiplication function of Needs (N), Incentives (I), and Expectancies (E) which is mathematically expressed as:

$$M = F(N\ I\ E) \qquad \ldots\ldots\ldots\ldots\ldots\ldots\ 2.28$$

Where'

N - Needs

I - Incentives

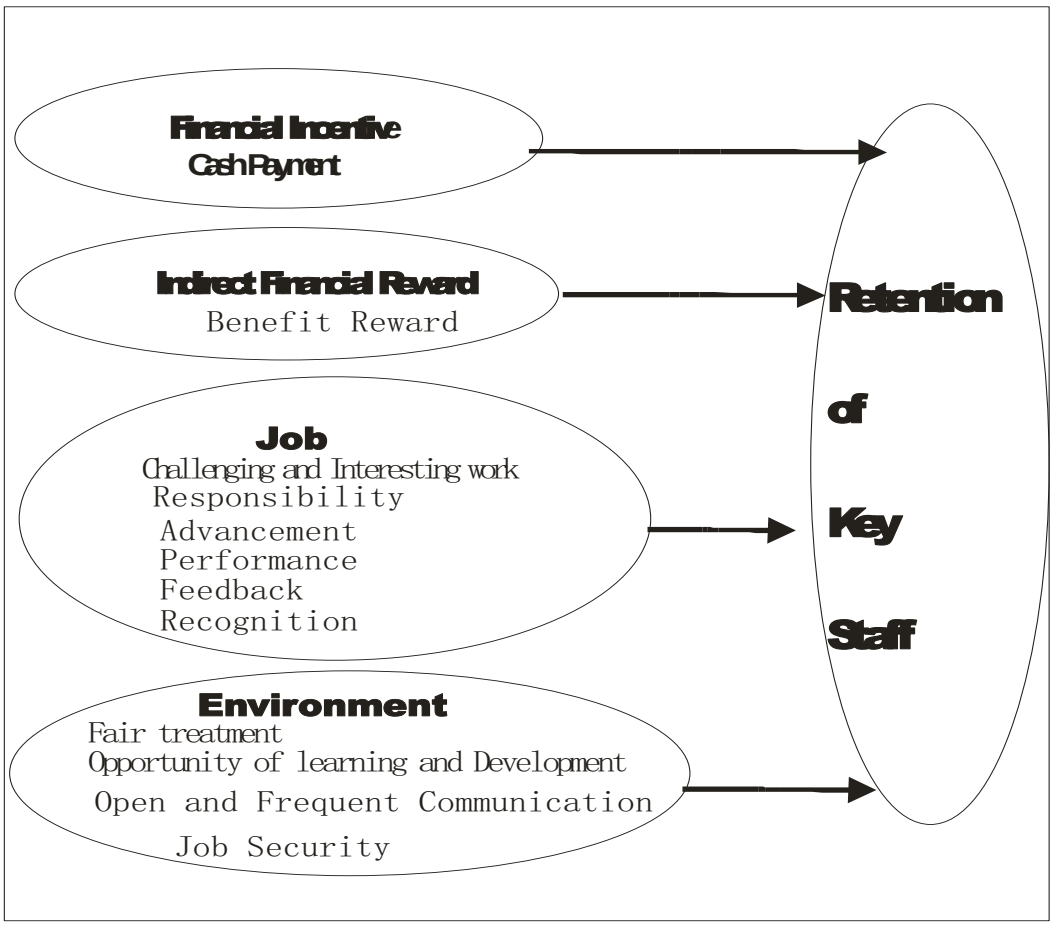
E = Expectancies

Chun's model is similar to Vroom and Maslow models. The model does not answer such questions as; what are the needs of individuals? What type of incentives will be most suitable for different individuals under different settings? This model just like the others is also very old and may not fully address the issues affecting workers motivation in recent times.

iv. Zhang and Wallace Motivational Model

Zhang and Wallace (2008), built a model of motivational factors affecting the retention of key staff in the Chinese construction industry (Figure 2.3), their model concluded that retention is a function of four major motivational factors which are:

i. Direct financial reward
ii. Indirect financial reward
iii. Job Environment



F*igure 2.3: Model of motivational factors affecting *Retention

Source: Zhang and Wallace (2008)

Zhang and Wallace model was addressing the problem of retention and of key staff in the Chinese construction industry. The model did not address Productivity but retention. Of what use is the retention of key staff that is not productive?

It is so glaring after the review of the above motivational models that nothing has been done so far to manage the productivity of building tradesmen especially in the key trades (Masonry, Carpentry and Steel Fittings) through motivation. Therefore for the first time, this work will build up a model for enhancing labour productivity in the building sub-sector through the development of a motivational model taking into consideration the peculiar nature of the needs and psychology of workers in the study area. And as well determine the impact of these considerations on their productivity. The model will also consider other factors as equity and reinforcement as very strong motivators outside the needs or expectations of individuals.

2.3.9. Importance of Motivation

Motivation is an important in the work place because motivation implies arousal and maintenance of interest in the doing an activity. Motivation is of enormous importance with regards to enhancing performance in any organization. Every manager strives to motivate his or her employees to greater and higher performance towards achieving organizational mission. According to Moorhead and Griffin (1998,) performance is dependent on three factors, namely, Ability, Environment and Motivation. This could be expressed mathematically as:

$$P = M + A + E \qquad \ldots\ldots\ldots\ldots\ldots\ldots 2.30$$

Where

M - Motivation

A - Ability

E - Environment

Ability which is the employees' skill and capacity to perform a given work, can be acquired in the case of its deficiency, through a training program or a transfer

to a simpler job. Environment, which refers to the requisite physical material resources and equipment to do the job, can also be provided.

However, motivation that entails a worker wanting to do the job cannot be easily provided or generalised. It requires extra effort on the part of the manager to determine what will motivate the employee to work hard enough to meet set performance levels. Thus, motivation is important in an organisation in as much as it determines employees' performance in conjunction with ability and environment (Moorhead and Griffin, 1998).

i. Increased Productivity

Motivated employees can lead to increased productivity and allow an organization to achieve higher levels of output (Heryati, 2019). A single demotivated core employee in an organization can lead to low productivity in the organization (Ghandi, 2010). Proper and timely motivations of employees help increase productivity and efficiency of employees. When employees are motivated, they bring energy and speed to the functioning of an organization (Tutorials point, 2019). EDUCBA (2019), believes that employee motivation is the key to happy and satisfied employees and that a happy workplace has higher productivity and higher productivity generates higher revenue in return.

ii. Increased Employee Commitment

When employees are motivated to work, they will generally put their best efforts to work in the tasks that are assigned to them (Heryati, 2019). Tizazu (2015) opined that if employees are committed to an organization, they are less likely to leave or be absent and may also display other behaviours which are valuable to the organization. Unhappy employees do only what is necessary and ten go home and forget about their jobs until the next day. Creating an atmosphere where employees feel motivated allows them to arrive at work ready to do their best (Nystrom, 2017). Motivated and satisfied employees will have committed approach towards organizational objectives (Varma, 2017).

iii. Improved Employee Efficiency

According to Hema (2016), motivation improves efficiency while the efficiency is reflected through increase in productivity and decrease in cost. This author further argued that the ability to do work and willingness to do work both affect the efficiency of a person. The ability to do work is obtained with the help of education and training and willingness to do work is obtained with the help of motivation (Hema, 2o16). Employees' motivation is more than just a concept; it is what drives good employees to do great things and an understanding of the importance of motivation within the work is one of the most important part of running a successful business (GradJobs, 2018). Employees who feel motivated tends to take the initiative, develop creative solutions to problems and even inspire co-workers to give their best performances as well, while demotivated employees don't do any of that (Habas, 2018).

iv. Reduced Rework

Increased efforts at work reduce work errors and in a way reduce rework at work. It enhances employee productivity and high performance is somehow delivered (EDUCBA, 2019).

v. Reduction in Employee turnover

Unmotivated employees are likely to expend little efforts in their jobs, avoid the work place as much as possible, exit the organization and produce low quality work (Brent, 2010). Motivated people work for a longer time in the organization and there is decline in the rate of turnover (Hema, 2016). This author further stressed that the reputation of an organization is affected by employees turnover, and that this creates a problem for the manager. A lot of time and money go waste in repeatedly recruiting employees and giving them training and education (Dess and Shaw, 2001; Hema, 2016). Only motivation can save organization from such wastage (Hema, 2016).

2.3.10. Productivity in Construction

Productivity being a major concern to production and operation managers, higher productivity can be achieved through better utilization of available resources. Encyclopedia (2010) asserted that productivity is often used as a measure of, index of growth, measure of efficiency and wages and price analysis. An overall rise in a nation's labour productivity signifies the availability of a larger quantity of goods and services per worker than before and accordingly, a potential for a higher real income per worker. Countries with high labour productivity are usually those with high real wages, while those generally with low in productivity are those with low real wages Alinaitive, Mwakali and Hansson, 2007).

Olomolaiye and Ogunlana (1989) cited by Polycarp, Saidu, Abdullahi, Wasiu, Abdulumin and Bolaji (2014) noted that the production outputs in key building trades in Nigeria were lower than they ought to be. The inefficient method, lack of appropriate tools and poor supervision and training were advanced as reasons for the low productivity of Nigerian workers. But, this study is so old that the factors listed as those affecting labour productivity may not be the case in recent times.

Thomas (1991) stated that the factors undermining on the productivity of construction workers are as follows: Type, scope, layout and complexity; Time frame (percentage complete); Construction methods; Weather ;Skill of the work force; Work practice; Length of work day ;Availability of materials; Incentives ;Degree of supervision ; Enabling environment; Government regulations and organization size and maturity. The study of Thomas was not specific as to which category of construction workers were affected by those factors of productivity highlighted in his study, although he considered incentive in his work, but the work did not state the type of incentive the tradesmen prefer best in their work performance.

A study carried out by Alinaitive, Mwakali and Hansson (2007) ranked incompetent supervision and lack of skills of the workers as the two most significant causes of low productivity of construction workers in developing countries. Unfortunately, a lot of countries in Africa are still developing and

different countries are affected by different factors. Similarly, Odusami and Unoma (2011) noted that the problems of low productivity can be directly linked to poor and inadequate training of construction skilled workers. The work of Odusami and Unoma did not consider motivation as a factor that can possibly affect the productivity of construction tradesmen.

Hampson (cited by Ibrahim *et al.*, 2010) stated that the construction industry when compared with the manufacturing industry has demonstrated lower productivity in spite of its significance because construction performance affects all sectors of the economy. This is why it is estimated that a 10 percent increase in construction productivity will give rise to 2.5 percent improvement in Gross Domestic Product. (Stoeckel and Quirke cited by Ibrahim *et al.*, 2010). Kazaza and Ulubeyli (2007) asserted that productivity is one of the most important factors affecting the overall performance of any organization whether large or small organization. At the micro-level, improved productivity decreases unit costs and serves as an indicator of project performance. At the macro-level, improved productivity is a vital tool in countering inflationary effects and determining wage policies. Improved productivity according to Kazaza and Ulubeyli (2007) is always counted among the basic means of solving economic problems.

Inefficient management of construction resources according to Shehata and El-Gohary (2011) can result in low productivity. Hence, they cautioned that it is important for contractors and construction managers to be familiar with the methods leading to evaluate the productivity of the equipment and the laborers in different crafts. To achieve the income expected from any construction project in general, it is important to have a good controlling hand on the productivity factors that contribute in the integrated production composition such as labor, equipment, cash flow. Olomolaiye*et al.* (cited by Enshassi, Mohamed, Mustafa and Mayer, 2007) established that the factors affecting productivity are not the same and constant which may vary from one country to another, from one project to another and even within the same project depending on the prevailing situation. Enshassi *et al.* (2007) asserted that in order for construction productivity to be improved, there is the need to study the factors affecting it. They further stated that in spite the researches that have been conducted, no uniform set of factors with profound influence on

construction productivity have been found or even agreement on the mode of classification of the factors. In a related development, Chan (2002) concluded that even with the plethora of researches in labor productivity, there is still little to show for it in the construction industry.

Umeadi (2011), studied the factors affecting the productivity of masons in Awka. Though this study was carried out in the southeastern Nigeria, it only covered one state out of the five states in the south east, besides the only tradesmen considered were masons, as a result the scope makes it too small to make generalization on the productivity factors affecting building tradesmen in the southeastern Nigeria.

Ngwu (2014), established constants for labour productivity in his survey still in the south eastern Nigeria and recommended that these constants be used for pricing. But, his study did not investigate the methods for improving labour productivity or established a model for enhancing labour productivity in order to ensure that these tradesmen produce within the standard outputs recommended in his work.

2.3.11. Factors Affecting the Productivity of Craftsmen

Productivity factors in this section are grouped under five main headings. These group headings are**:** project characteristics, labour characteristics, management system, resource management, internal and external environment. The purpose is to develop a conceptual framework that shows the interrelationship among these group factors.

i. **Project Characteristics**

Type and size - Site productivity is determined by a number of factors, one of which is the type and size of the project including layout and complexity. Naturally, a large construction site requiring a large number of workers and will be relatively harder to manage than a smaller size. The difficulties in managing manpower on a large scale may result in productivity loss. A large proportion of high costs in construction works are as a result of excessive labour costs. These costs can be reduced if productivity on site is increased by improving labour efficiency. Thomas (1991) notes that work on a complex project such as the construction of a nuclear project becomes more difficult as the project advances.

The construction method such as use of off-site pre-fabrication units will reduce the number of labour hours required. Other factors such as the level of skill amongst the workers and work practices and length of workday can affect productivity on construction site. A further research by Proverbs et al. (1999) into construction resource and productivity level for high rise concrete construction was conducted among contractors across France, Germany and UK. For concrete placing productivity rates, none of the resource factors (material, plant or labour) when considered independently was found to be of significance. It was then concluded that international variations in concrete placing productivity rates were not connected directly to these individual factors. However, framework productivity rates were impacted by the type of framework utilized on column and beam work. The most unproductive rates were related to traditional timber solutions, while proprietary (for column work) and prefabricated (for beam work) solutions were associated with the most efficient (and hence most economic) productivity rates. Moreover, when working more than 5 days each week, the productivity of framework operations was found to decline.

Overcrowding– There is evidence to suggest that overcrowding leads to productivity loss. It has been suggested by Smith (1987) that a labour density greater than one man per 30 m2 will lead to a decrease in productivity. According to Rad (1980) cited in Kaming et al. (1998), an average weekly loss of 5 hour per man resulting from congestion on nuclear power station sites. As working space deceases from 30 m2 (standard working space) to 10 m2 per operative, it incurs about a 40% productivity loss (Smith, 1987). Thomas et al. (1985) conducted a comparative study in Europe to find out whether countries differ in their employment of sub-contractors. The result of their model based survey of contractors (planning engineers) in France, Germany and UK, indicated that the working schedule of UK and German contractors may be excessive, and can have an impact on construction productivity level. The survey also identified that the UK's labour force employed on site are 26% employed directly and 74% sub-contractors, but in France 93% of labour force on site are directly employed and only 7% are sub-contractors.

ii. Factors Related to Labour

Lack of measurement and benchmarking - Labour related factors affect the physical progress of any construction project. In order to improve labour

productivity, site production should be measured on a regular basis, and then compared to an acceptable standard benchmarks. The management of each contracting company should maintain its own record which describing the baseline productivity in different previous projects with similar conditions. Enshassi et al. (2007) argues that such records can be used to help estimate labour productivity in future projects. For example, changes made to original scope of work are costly and have an effect on labour productivity and should be recorded. Although some changes are inevitable, the impact on site productivity is nonetheless significant. The impact of changes to original scope of work has been investigated by Thomas and Napolitan (1995). They studied the impact of changes in quantitative terms and discussed why change impacts on the labour forces efficiency. They also explored the relationship between changes and various types of disruption.

Labour efficiency - Efficiency is the relative loss of productivity compared with a benchmark setup in the original plan of work. The effect of changes on labour productivity was investigated by Leonard (1987). His study was based on a detailed review of 90 claim cases and the percentage loss of productivity was shown as a function of the total work hours spent on changes. The increase in the percentage of work hours spent on changes led to a 10-20% loss of productivity. Another study by Zink (1990) that dealt with labour efficiency and changes, suggested a measured mile method to quantify work hour overrun. Changes are considered as an indirect factor by many researches within the construction industry. However, it is also realized that changes themselves do not decrease productivity or efficiency, it is the manpower involved in the process. If a change occurs in the final stage of a construction project the crew must stop working until the changes are carried out first. Also the work method may require changes as well as more co-ordination being required. Once changes occur routine works will change, processes will slow and the total work hour will be several times greater. On average, there is a 30% loss of efficiency when changes are being performed, although it is possible to perform many changes without a loss of efficiency.

Skills and ability - Olomolaiye et al. (1998) explains that the personal attribution of workers contribute to the factors that directly affect productivity. He specifies these attributes as:

i. Worker's skills, experience, training and qualifications.
ii. Innate physical and mental ability.
iii. Intensity of the application of both skills and innate ability to the production process.

iii. Management System

Decision support systems - Christian and Hachey (1995) found that delays and disruption within the construction site are created by idle and waiting times. An analysis and breakdown of delay would enable the management team to focus on this important and un-productive factor. The delays associated with waiting for supervisory instruction only occur when there are severe time constraints and problems with shortages of on-site managerial staff. In this context, the Construction Decision Support System for delay analysis [Delay Analysis System (DAS)] was developed by Yates (1993) to assist managers in decision-making process. The DAS brings together traditional project control techniques with interactive methods to produce a programme that can both monitor progress towards achieving project milestones and simultaneously it highlights the causes for deviations from established baselines. It also provides recommendations on how the management team can eliminate or minimize delay during construction periods.

Management influence - Thomas (1992) investigated the level of labour productivity for masonry activities from seven countries by selecting case study projects. Statistical analyses showed little difference in productivity amongst the seven countries, despite major differences in labour practice. The aim of this investigation was to show that productivity in Australia, Canada, England, Finland, Scotland, Sweden and the United States is similar but the principle difference was management influence. The site with the highest level of disruption had the worse productivity level on site. Other objectives of the investigation were to test the validation of factor model, the management influence on labour productivity and the level of control contractor has over labour productivity. Other investigations have shown that the labour disruption accounts for more than 50% of the variability in daily crew productivity (Sanders et al. 1989).

Variation orders - The variables affecting efficiency is believed to be the time of the change. Rework, disruption and presence of change work can lower labour performance (Thomas et al., 1995). Hanna et al. (1999) have identified the impact of changes on construction site and described that disputes are common between the client and contractors when these changes occur. Their study used data from 43 projects and a linear regression model was developed that predicted the impact of changes on labour efficiency. The model allows labour efficiency loss to be calculated in a particular project enabling both the client and the contractor to understand the impact such changes will have on labour productivity. However, this study is limited to mechanical trade with some specific plumbing, fire protection, and process piping. From a study carried out by Thomas and Napolitan (1995) over a period of 4 years, based on 3 projects, an equation was derived to calculate the efficiency loses from the impact of change order. Efficiency was defined as actual productivity ratio to baseline productivity. Baseline productivity was also measured for this survey. Efficiency was determined by dividing the performance ratio equation value on a normal day by the performance ratio equation when change order had occurred. The survey result showed an average loss efficiency of 30%. Change order impact on a project lowers labour efficiency and productivity. The result of a survey by Hanna et al. (1999) indicated that labour efficiency on a job that is not impacted by change has a higher level of efficiency. Disruption which was also found to cause changes in the original plan of work increased the project cost through re-work and decreased labour efficiency for the main contractors and subcontractors.

iv. Factors Related to Resource Management

Material - Ferguson et al. (1995) suggest that 50% of the waste deposited in disposal sites in the UK is construction waste. In order to reduce waste and increase productivity Just-In-Time (JIT) has been introduced on construction sites. Pheng and Tan (1998) investigated whether the introduction of JIT can reduce the level of wastage on site. Their investigation showed that wastage of materials could be kept to a minimum and consequently productivity improved. From the result of the survey, both project and site managers did not regard wastage on site as an important factor in improving construction productivity. Faniran and Caban (1998) suggested that wastage on site could be reduced if design changes were kept to a minimum during the construction work. The

respondents also identified leftover material scraps, waste from packaging and unreclaim able non-consumables, design/detailing errors, and poor weather as being important sources of construction waste.

Material management is a worldwide problem and ongoing researches have been conducted to highlight its effect on site productivity. Abdul Kadir et al. (2005) in their research into factors affecting construction labour productivity for Malaysian residential projects, found that material shortage at site as well as non-payment to suppliers causing the shortage of material delivery to site as highly important. Other factors that can cause time and cost overrun and subsequently affect productivity are change order by consultants; late issuance of construction drawing by consultants; and incapability of contractors' site management to organize site activities.

Waiting time - Christian and Hachey (1995) found that delays and disruption are created by idle and waiting time. Hester et al (1987) in his study into interruption time, found that the level of productivity for pipe work installation can be reduced by 70% when installation work was interrupted by more than one interruption per section of pipe work. Interruption lasting longer than a half hour was found to cause productivity loss of about 35% during a working day. Thomas et al. (1992) also found that disruption has a major effect on labour productivity. The average daily productivity for non-disrupted days was 0.44 work hours / m2. Disrupted days had an average productivity of 2.16 work hours / m2, an average increase of 388%. The respondents identified that ‘delays and disruption caused by design team mistakes’, can have a negative impact on productivity levels. Project managers identified ‘delay and disruption caused by late arrival of materials’, as a determinant that can reduce the level of productivity ranking this factor as the fourth most important determinant of productivity. Site managers ranked this factor as the seventh most important determinants of productivity.

Leadership - The construction process is a collective effort involving a team of specialists from different organizations. The leader of the team may affect the productivity of the design and construction. The person who leads the team varies dependent upon the contractual arrangement adopted for the project. A number of studies have been conducted to investigate the relationship between

leadership styles and productivity rate. For example, Cheung et al. (2001) carried out an empirical survey that aimed to establish the relationship between leadership behaviours of design team leaders and the satisfaction of the design team members. The results indicate that charismatic and participative leadership behaviour primarily determines the satisfaction of the team members.

Motivating factors - Motivation is a prime determinant of worker performance. As far as known, researchers have failed to develop a commonly agreed theory that addresses worker motivation that is valid and relevant to the construction industry. A key motivator for one worker compared with another worker in a certain situation may differ. Individuals tend to seek a job, which will satisfy personal needs. Key motivators may be one or a combination of the following: high achievement, recognition, the nature of the work itself, responsibility and personal advancement and growth. In the view of some researchers, it appears that there are differences in opinion whether workers motivation contributes positively or at all to the level of productivity on construction sites. A number of behavioural and psychological researchers have argued that the expenditure of effort by a worker is the physical manifestation of motivation. The greater worker motivation is, the greater the worker motivation becomes. For example, Kazaz et al. (2007) showed that monetary factors in Turkey remain pre-eminent in influencing productivity, but that the socio-psychological factors such as giving responsibility and taking account of cultural differences appear to be increasingly importance in a developing economy. On the other hand, ranking on questions related to motivation showed that there is little support for the suggested motivating factors on construction site.

For instance, Olomolaiye (1990) used a model to define how a bricklayer spent a working day on site. With the help of a computer aided activity-sampling package, his investigation showed that motivational issues did not influence the rate of work. Others researchers argued that other independent factors such as lack of tools, shortage of materials, delays in decision-making by management, change order, late forwarding of information etc, can all have an indirect impact on worker satisfaction and therefore affect productivity on site. Ranking of questions related to the hygiene factors on productivity showed that, in the view of the project or site managers, there was no strong correlation between: company policy, relationship with equals, relationship with sub-ordinates,

status, and personal factors on the level of productivity on construction site. The only factors that seem to be of importance to the respondents are salary and supervision. Other factors such as high salary and job security are other factors for high productivity among firms. Training is also considered to be an influential factor in high productivity on construction sites. In recent years the growth in labour only sub-contracting on sub employment bases in UK construction sector and the level and quality of training within the industry is a source of concern. Productivity within the UK construction industry compared with West Germany and France is partly the result of low levels of training labour force receive in UK (Prais and Steedman 1986). In this context, UK government policy has emphasized the role of skills development and training as a means of improving productivity performance across all sectors of the economy. According to Abdel-Wahab et al. (2008), there is inconsistency in the industry's productivity performance, despite the overall increase in qualification attainment levels and participation rates in training over the same period. However, the year-by-year change in the participation rate of training was not consistently associated with an improvement in productivity performance. Therefore, there is an urgent need to consider skills development and training within the context of construction businesses in relation to other factors in order to unpack how skills can bring about improvement in productivity performance.

Resource planning – Many researchers have cited ineffective resource management as the primary cause of poor productivity rather than an unmotivated and unskilled workforce. For example, Allmon et al. (2000) revealed four primary ways of increasing productivity through management, namely planning, resource supply and control, supply of information and feedback, and selection of the right people to control certain factors. The result of a model based survey by Proverbs et al. (1996) of contractors planning engineer in France and UK suggested that planned construction time for an identical high rise in-situ concrete framed structure in France is 9 weeks faster than UK. It takes French contractors 13 weeks where the average of 22 weeks is recorded for UK firms. French firms work less hours per week but are more productive when compared with UK firms. Since planned construction periods reflect past experience, French contractors appear to achieve superior levels of productivity on site, because they utilize directly employed workers and have

less supervisors on site. The causes of high productivity amongst French contractors are:

i. Scheduled overtime is avoided.
ii. Labour force is directly employed.
iii. They are main skilled work force.
iv. The maximum of 40 hour per week is the norm rather than the exception.

Naoum (1996) conducted a survey into productivity factors in construction to find out, first, whether there are significant differences in opinions between head office personnel and site managers on factors that influence construction productivity and, second, to determine groups of factors that mostly influence site productivity. A critical discussion was structured under three general headings: (1) management factors; (2) employee motivation; and (3) experience and training. Twenty-nine factors were extracted from the above headings and were assessed by 19 head office personnel and 17 site managers. The survey indicated that both samples regard 'ineffective project planning' and 'constraints on a worker's performance' as the most
crucial factors influencing productivity. Other highly ranked factors by both samples are 'difficulties with material procurement', 'lack of integration of project information', 'disruption of site programme', 'lack of experience and training' and 'exclusion of site management from contract meetings'. Ultimately, when the factor analysis technique was applied on the 29 factors, the result shows that Resource Management Effectiveness appeared to be the most dominant group of factors influencing construction productivity. This was later confirmed by Doloi (2008) in a research into the application of Analytical Hierarchy Process (AHP) in improving construction productivity from a management perspective. Anecdotal evidence suggests that workers' attitude towards high productivity may not be limited to purely financial rewards, but inherently linked to many other latent factors. This research shows that the biggest influences on productivity are planning and programming.

iv. Impact of External Environment

Technology - Technology has had a great effect on productivity output within theconstruction industry. Technological advancement has resulted in considerable changes to most tasks on construction sites. Machinery has become more powerful and complex. This new technological advancement

requires new manpower skills to ensure proper and full use is made. It is becoming increasingly problematic to separate the contribution made by management, labour and machinery, to productivity. Innovation within the construction industry faces many barriers such as diversity of standards, fragmentation, business cycles, risk aversion and other factors, which all produce a complex and unfavourable climate, in which to work. A high labour cost within the construction industry is a strong reason for this industry to move towards new technology. One of the reasons that many construction firms are reluctant to move towards new technology is the risk it carries if the new technology proves to be ineffective. The cost of changes may prove to be too high for the firms and may put their future in jeopardy. Heap (1987) argued that productivity could be improved if manpower is replaced by modern high capacity plant and equipment. In most developing countries with limited capital, mechanization may increase the unemployment. Other problems associated with introducing modern machines and equipments include costly and complicated maintenance, with machine downtime contributes towards a fall in productivity. Baldwin (1990) believed information technology would revolutionize management information systems and help management obtain accurate information that leads to faster and more accurate decisions on site. So far many productivity studies tend to concentrate on improving the technology related to the construction site. Rapid mechanization within the industry has resulted in increasing productivity by the introduction of structural steel, system form work, pre-casting techniques, pre-fabrication and component manufacture, but the construction industry requires more innovation to remain competitive among other sectors.

Weather - The factor model by Thomas (1987) evaluated the effect of temperature and relative humidity on productivity. Multiple regression techniques were used to explain approximately 40% of the variability in the daily productivity data. Other statistical parameters are also described. The results of the weather model are compared to similar relationships reported by other researchers. The relationship developed by the writers is consistent with those reported in the literature. The factor model and the methods used to develop the weather model appear to be valid because the discounted productivity curve has less variability than the original productivity data. Lastly,

an example is presented that illustrates the way in which impact of weather on productivity can be evaluated.

2.3.12. Historical Perspective of labour laws in Nigeria

Wage earning employment was not known to the indigenous Nigerian communities until the advent of the colonialist. What existed then was communal labour and trade by barter (Joseph, 2014). Thus, under the communal labour system, members were paid back in services rather than in money (Berry, 1993). The advent of the colonialist led to the development of wage earning and employment (Hopkins, 1996). With the development of wage earning employment and a monetized economy, Labour Laws began to evolve to regulate Master-Servant- Relationship. Most of these legislators came up with 'alien' ideas which are different from the colonial masters-Britons (Albert, 2014). However, after the attainment of political independence in 1960, most Nigerian Laws including Labour Laws are essentially reproduction of the English Laws (Mwalimu, 2005).

Although the 1938 trade union ordinance gained much recognition and thus, regarded as the landmark of labour laws in Nigeria, the antecedent to the advent of labour laws can be traced to 1880s. E. E Uvieghana (2001) pointed out that the legislation then was called "workers chapter" extracted from the "master and servant ordinance for the gold coast". It has its long little as "an ordinance for the regulation of the relations between employers and employees". This master and servant ordinance was amended in 1885 and in 1900 after the creation of the Southern and Northern protectorates. Similar ordinance was made for each of the protectorate. After the amalgamation of the Southern and Northern protectorates in 1914, the ordinance was made for the whole country in 1917. The master and servant ordinance of 1917 was re-amended in 1929 and were called "Labour Code Ordinance of 1929" (E. E. Uvieghana, 2001). Although this ordinance (1929) has been argued against by several scholars, it is not indigenous because it was the colonial master who promulgated it for their selfish interest of exploitation.

Prior to 1938, there were few workers in wages employment in Nigeria because the natives then preferred agricultural work as it offered more incentives and ensure for freedom unlike factory works. Consequently there were few workers associations who also were not militant but formed for the professional and

social well-being of workers alone. Some of these unions then were NCSU formed in 1912 and NUT as well as RWU both formed in 1931. Government on the other hand was not contributing directly to the affairs of industrial relations. After when the world war ended in 1914, the cost of living arose dramatically, the workers could not bear the burden of inflation caused by the war. They started agitating against poor condition of work, example of such agitation was that which was led by veteran leader, Pa Michael Imodu who led 300 workers to government house in a protest against poor condition of work and came out successively. These agitations constituted much embarrassment to the employers and the then colonialist and thus, they promulgated the 1938 trade Union Ordinance which is now widely accepted as the landmark of labour laws in Nigeria. Their intension was to use this law as a way of regulating the affairs of these hitherto illegal unions. The law legalized trade unionism and provided that 5 members can form unions. It also provided that government could regulate the internal and external administration and affairs of these unions. This was the noted beginning of labour laws in Nigeria.

The role of government in the development of Nigerian labour laws is very significant as they have made several changes in these laws before and after Nigerian independence. After the 1938 ordinance, two ordinances were promulgated in 1941; the workmen compensation ordinance of 1941 was meant to make it imperative for employers to compensate any of his employees who sustain injuries in the course of his work. The law also stated the categories of those injured workers which may or may not be catered for. The second law in 1941 was the trade dispute ordinance of 1941 enacted for conflict resolution when the joint machinery for conflict resolution failed.

In 1945, labour code ordinance of 1929 was amended and was referred to as 1945 Labour Code Ordinance. In 1958 another two laws were introduced by government. One is the Factory ordinance chapter 66 enacted to ensure register his factory and provide security, safety and welfare for occupants (workers) in his factory premises. The second law in 1958 is Wages Board Ordinance of 1958 through which government intervene in the review of workers' wages structure. In July 29th 1966, General Yakubu Gowon (a military leader) through military coup took over the government of Aguiyi Ironsi (Sunday Olagunju, 2007). This military government promulgated several decrees. The first one is Trade disputes (emergency provision) decree, 1968 enacted for settlement of

disputes in industrial set up. This decree was ineffective as there were still several industrial crises in Nigeria. Thus, the federal military government in the following year introduced another Trade dispute (emergence provision, amendment) decree, 1969. This was the decree that banned strike and look out, it provided that no employer should increase the salary of any worker without the approval of the military government. Between 1970 and 1975, two great events took place in Nigeria, first was the civil war that ended in 1970 and the overthrow of Gowon's administration in 1975. The aftermath of the civil war had effect on workers' salaries and affected their standard of living. The government then introduces Wages Board and Industrial council decree in 1973 to review the salary structure of workers. It was this decree that established the Wages Advisory Council. In the same 1973 another crucial law was promulgated called Trade Union Act 1973 which increased the number of members to form union from 5 to 50. It repeals the 1938 ordinance. It also banned workers under essential services from unionizing.

In 1974 the Labour Act no 21 was enacted to repeal and fill the loopholes of the 1929 Labour code ordinance. It serves to protect workers against employment exploitation by introducing such provision as terms and condition of work, contract of employment, holiday pay and leave allowances, medical facilities etc. In 1976, Trade dispute (enquiry and arbitration) decree was promulgated which brought about the formal statutory procedure for conflict resolution by establishing Industrial Arbitration Panel (IAP) and National Industrial Court (NIC). In 1978, Trade union (amendment) decree, 1978 was introduced to enrich the pocket of trade union as it introduces check-off due system and also granted workers in essential services to unionize.

In 1981, Wages Board Act was promulgated. In 1986, Trade Union (miscellaneous provision) was introduced and amended in 1989. In 1987, both the Factory Act and the Workmen's Compensation Act were also amended. In 1991, the National Minimum Wage Act was introduced. It prescribed a statutory minimum rate of pay to workers. In 1996, the military government introduced four decrees which are decree no. 4, 24, 26, and 29. In 2005, the National Assembly under the leadership of Adolphus Wabara and assented to by the President Chief Olusegun Obasanjo in 30th march 2005 introduced another law; the Trade union (amendment) Act cap 437 Law of Federation of Nigeria 2005.

Finally, the Employee's Compensation Act, 2010 was signed into law on the 17th day of December, 2010, basically to address the patent flaws in the Workmen's Compensation Act, 1987. The Act repealed the Workmen's Compensation Act and made comprehensive provisions for compensation that will accrue to an employee or the employee's estate in the event of death, injury, illness or any disability arising out of or in the course of the employee's employment. The Act represents a major step in the right direction in respect of labour rights and protection in Nigeria.

2.3.13. Skill Development and Certification for Tradesmen in Nigeria

The federal ministry of labour and productivity is the sole government agency vested with the responsibility of issuing certificate of competence (Trade test certificate) to qualified tradesmen. Trade testing is the process of properly assessing and classifying tradesmen in different skills or trades and awarding certificate of competence of grades iii, ii and i to persons so tested as evidence of the person's proven ability. Grade iii certificate represents assistant tradesperson level, Grade ii certificate represents qualified tradesperson level while Grade i.certificate represents supervisory tradesperson level.

The ministry conducts trade tests at trade test workshops for grading the skills of employed and unemployed (but employable) tradesmen and students of vocational training schools and technical colleges. The tests are conducted in more than 48 trades under the supervision of experienced professional staff and specialists testers. The trade test certificate issued by the ministry presents a unique opportunity for generating jobs and ensuring placement. The trade test certificate also provides standard grading for artisans and craftsmen which facilitates access to better paid jobs or work as self-employed persons. It provides Nigerians with a standard validation of tradesmen qualifications. Workers passing any of the grades are given certificates of competency and employers are assured that any applicant for employment possessing these certificates has reached the standard of skill indicated on the certificates.

The Ministry of Labour already has five functional skill upgrading training centres located at Kaduna, Ibadan, Bauchi, Lagos and Calabar. The yawning skill gap between turn-out of some skill acquisition centres and industry requirement s is what the skill upgrading training centres seek to bridge. The

skill upgrading centres upgrades the skills of poorly trained artisans and craftsmen and equips them with high technical skills that meet the needs of employers. The centres offer both theoretical and practical training in all trades. At the end of their training, qualified tradesmen are issued trade test certificates after passing the requisite trade test. Admission to the centres is open to tradesmen who have undergone 3 years training or have graduated from technical colleges and worked for at least one year. The course contents, syllabus and curriculum have always been revised and redesigned to meet the needs of present day technology. Each centre has the capacity to train 800 trainees per year. The centres presently run the following programs:

i. A Two years (24 months) training for graduates of secondary schools and other higher institution.
ii. A twenty four weeks (6 months) intensive course for technologists, craftsmen and technicians already working in public and private sectors,
iii. A twelve weeks (3 months) intensive course for workers, both in public and private sectors, as well as post retirement business training. It is the ultimate plan of the government to have at least a centre in every state capital and the federal capital territory.

The under listed trades are approved and contained in the trade testing syllabus:

i. Auto-mechanic's work
ii. Audio-visual equipment mechanic
iii. Auto-electrical work
iv. Automotive mechatronics
v. Blacksmith
vi. Bricklaying and masonry
vii. Cabinet making
viii. Carpentry and joinery
ix. Carpentry (boat making)
x. Ceramics, bricks and pottery making
xi. Coach building
xii. Computer craftwork
xiii. Driver mechanic work
xiv. Driver mechanic work (EMM)
xv. Electrical fittings

xvi. Electrician work
xvii. Filming/ event videographer/ metal fabrication
xviii. Metal machining
xix. Motor body building
xx. Spray painting
xxi. Stream fitting
xxii. Tailoring and dress making
xxiii. Television mechanic work
xxiv. Turning
xxv. Vulcanizing and tyre work
xxvi. Weaving (textiles)
xxvii. Weaving (Blind)
xxviii. Welding (Gas).

2.3.14. Gaps in Literature

The review of literature on productivity and motivation in the construction industry shows that there are major short comings in this research area:

i. past studies largely relied on expectancy theory without integrating other motivation theories(see section 2.3.8),

ii. There is also no recent study done on productivity improvement based strictly on motivational variables with regards to prevailing local working conditions in the building construction Industry in Nigeria (see section 2.3.10).

iii. Most researches have been done in the area of business management and psychology of workers generally without reflecting the psyche and aspirations of construction tradesmen, especially in the study area.

iv. Furthermore, no studies have really established between poor employee motivation and their work attitude and hence productivity.

v. None of the past studies considered management challenges with respect to how workers react to motivational variables in the building construction industry.

vi. Literature review also shows that no study had established that punishment was a form of motivation of tradesmen on site.

vii. No study on motivation had been specifically carried out with the major tradesmen as respondents.

viii. Most importantly, there are no evidences where models for predicting productivity was based on motivational variables, nor was used for the determination of equitable wage rates for different grades of craftsmen based on equity theory. It is evident that such model has neither been able to be used to calculate the exact amount payable as bonus based on employee's performance standard as supported by Incentive Theory and Reinforcement Theories.

This research therefore intends to fill the observed gaps enumerated above; it is therefore intended to focus solely on major tradesmen in the building construction industry. The research also intends to integrate other theories like the Equity theory, Reinforcement theory and Incentive theory, supporting equity of rewards and financial incentive as strong motivators. The research also intends to explore management challenges with respect to workers' motivation in developing an appropriate model which will obviate the observed challenges.

CHAPTER THREE
RESEARCH METHODOLOGY

3.1 Research Design

Research design is an outline or a scheme that serves as a useful guide to the researcher in his effort to generate data for his study. According to Kothari (2004), research design is the conceptual structure within which research is conducted; it constitutes the blueprint for the collection, measurement and analysis of data. Three main categories of research design include: Survey design, Experimental design, and Ex Post Facto design.

Survey research design focuses on population or the universe, and data are collected from the population and subjected to intensive study and analysis (Asika, 2009). Survey research is appropriate in circumstances where the opinion or perception of respondents is required for the study.

It is for this reason that this research adopted the Survey research method in which structured questions have been formulated to elicit responses from a selected population. The research employed questionnaire eliciting graded explanations to the phenomena under study. Questions developed were administered to a stratified sample of study population.

3.1.2 Research Philosophy

A research philosophy is a belief about the way in which data about a phenomenon should be gathered, analysed and used. Two major research philosophies have been identified in the western tradition of science, namely positivist (sometimes called scientific) and naturalistic (also known as anti-positivists or interpretivists).

Researches that make use of quantitative tools, techniques that emphasize measurement and counting are called positivism; while those that use qualitative tools of observation, questioning and description are called naturalism.

Positivists assume that reality is fixed, directly measurable, and knowable and that there is just one truth, one external reality. In contrast, naturalistic researchers assume that reality constantly changes and can be

known only indirectly through the interpretations of people; they accept the possibility that there are multiple versions of reality. People who are uncomfortable with such uncertainty are more likely to choose the quantitative paradigm with its assumptions of a single, measurable (countable) and knowable truth; people who can tolerate uncertainty are more likely to favour a qualitative paradigm with its acceptance of multiple perspective of truth and constantly changing reality.

The Research Philosophy adopted in this study is the Positivism since it adopted a structured questionnaire for data collection which enabled the data collected to be measured using different statistical tools.

3.2 Types and Sources of Data

Data for this work was gathered from two major sources, primary and secondary sources.

i. P**rimary data -** These data were generated from the questionnaire, oral interviews, direct observations and discussions. The primary data covers data on the:

1. factors that motivate operatives;
2. motivational strategies in use by the organizations under study;
3. challenges of management with respect to employees motivation;
4. factors that demotivates employees in their work performance;
5. effects of poor motivation on employees attitude to work;
6. effects of poor performance on project success;
7. wage rates of the workers in the organizations;
8. government monitoring of compliance with wage laws;
9. compliance with the Nigerian minimum wage policies;
10. compliance with workmen' Compensation Act, 2010;
11. annual Employee turnover due to inadequate motivation;
12. factors that improve employees' productivity and
13. on punishment factors affecting employees' motivation.

ii. **Secondary data-** Secondary data were actually gathered from textbooks, internet, magazines and academic journals, previous research work on motivational subjects within and outside construction discipline. They include data on existing standard time and standard output from the

Federal Ministry of Labour and Productivity and relevant government agencies.

3.3 Formulation of Study Questionnaire

This section discusses the general characteristics, the design and the administration of the research questionnaire as presented in sub-section 3.3.1.

3.3.1 Characteristics, Design and Administration

The general form of a questionnaire may either be structured or unstructured. In the structured type of questionnaire, the researcher draws up a set of questions and at the same time provides probable response options to the questions. In the case of an unstructured questionnaire, possible answer options are not provided. Instead, a space is provided for respondents to write their answers, or express their opinions concerning the questions. This research has adopted a structured Questionnaire.

The Questionnaire for the research was divided into nine sections A, B, C, D, E, F, G, H, I. Section A is the demographic information section and covers questions on the level of academic qualification of respondents, years of experience, place of work, professional qualification, position in the company and average annual income. Section B comprises of questions on the factors that motivate employees (Financial and non-financial factors). Section C comprises questions on the factors of motivation preferred best by employees. Section D, which was meant for Management, contains questions on factors that challenge management efforts towards employee motivation. Section E contains questions on factors that demotivate employees in their work performance. Section F contains questions on the punishment factors that affecting the motivation of tradesmen. Section G, which was meant for Management staff contains questions on the effects of poor employee performance on Project delivery success. Section H contains questions on the effects of poor motivation on employee's work attitude, while section I contains information on the factors that affect the productivity of tradesmen.

A five-scale Likert rating was used to measure each respondents arguments on the questions provided. The questions was also structured to ensure consistency and also to avoid ambiguity. In addition to this, the respondents were also directed on how to complete the questionnaire appropriately. A cover letter accompanying the questionnaire was also attached to give a brief description of the research aim and objectives, assuring respondents of confidentiality of their responses and expressing appreciation for their anticipated responses.

Concerning the administration of the questionnaire, some of the questionnaires were administered and collected in person while some were administered and collected with the help of research assistants. The number of questionnaire distributed was two hundred and eighty (280). But, out of this number only two hundred and seventeen were correct and appropriately completed.

3.4 Population of the Study

Population of the study refers to the totality of the subjects under investigation. It is the target of the study. A preliminary survey was carried out determine the target population within the study area. The study used a total population of five hundred and thirty five (535), comprising fifty five (55) management staff and four hundred an eighty (480) skilled labour (major building tradesmen) from the seven construction companies in the study area: Reynold Construction company (RCC), Fancy Construction Company (FCC), New Ideas Construction Company (NICC), Consolidated Construction Company (CCC), Hammakop Consortium Limited (HCL), Chinese Government Company (CCC) and J and J Construction Company (JJCC). The study population as represented in Table 3.1.

Table 3.1: Composition of the Study Population (Skilled Labour)

S/N	Skilled WORKERS	NAME OF CONSTRUCTION COMPANY								
		HCL	FCC	NICC	CCC	RCC	CGC	JandJ	Total	%
1	Site Supervisors	1	3	2	4	5	3	2	20	4
2	Foremen Masons	2	5	4	6	8	5	4	34	7
3	Foremen Carpentry	4	6	3	8	5	6	8	40	8
4	Foremen Steel Fittings	4	5	5	7	5	7	5	38	8
5	Masons	15	10	18	20	28	15	25	131	28
6	Carpenters	16	25	12	10	20	15	8	106	22
7	Steel Fitters	16	20	15	14	19	12	15	111	23
8	Sub- Total	58	74	59	69	90	63	67	480	100

Source: Field Survey 2018

Legend: HCL - Hammakop Consortium Limited; FCC - Fancy Construction Company; NICC - New Ideas Construction Company; CCC ; Consolidated Construction Company; RCC - Reynold Construction Company; RCG - Chinese Government Company; J and J - J and J Construction Company.

Table 3.2: Composition of the Study Population (Mgt. Staff)

S/N	MGT STAFF	NAME OF CONSTRUCTION COMPANY								
		HCL	FCC	NICC	CCC	RCC	CGC	Jan dJ	TOTAL	%
1	Managing Director	1	1	1	1	1	1	1	7	12.7
2	Technical Director	1	1	1	1	1	1	1	7	12.7
3	Head Of Operation	1	1	1	1	1	1	1	7	12.7
4	Project Manager	1	1	1	1	2	2	1	9	16.3
5	Project Engineers	1	1	1	1	2	2	1	9	16.3
6	Site Engineers	1	1	2	3	3	4	2	16	29.1
7	Sub-total	6	6	7	8	10	11	7	55	100

Source: Field Survey 2018

Legend: HCL = Hammakop Consortium Limited, FCC = Fancy Construction Company, NICC = New Ideas Construction Company, CCC = Cnsolidated Construction Company, RCC = Reynold Construction Company, RCG = Chinese Government Company, J and J = J and J Construction Company.

3.5 Sampling Frame

A sampling frame can be regarded as a list of items or people forming the population from which a sample can be taken (Sutrisna, 2009). It can also be referred to as a complete list of all members of the population to be studied. The sampling frame must thus, be representative of the population. Based on this, the sampling frame for the research is made up of the Nominal Roll which contains complete information about all the employees in the various construction companies selected and the their payroll register indicating the total amount of salary earned by each employee and the attendance register that indicates the number of staff who report to work for each day.

3.6 Sampling Technique

The sampling technique used in the study for the selection of respondents is Purposive or Judgemental sampling and Stratified sampling. Purposive sampling technique is a type of non-probability sampling where the researcher chooses the sample based on whom they think would be appropriate for the study. This is primarily used when there is a limited number of people that have expertise in the area being researched.

The goal of purposive sampling is not to randomly select units from a population, but to create a sample with the intention of making generalizations (statistical inferences) from that sample to the population of interest. The main goal of purposive sampling is to focus on particular characteristic of the population that are of interest, which will enable the researcher address his research objectives. The study focused on management staff and skilled labour from selected trades (Masonry, Carpentry and Steel Fittings). Stratified sampling is a sampling technique which is used to divide the population into strata from which the researcher sample randomly. This technique is used when the researcher wants to highlight specific sub groups within the population. This sampling technique was used by the researcher to divide the study population into management and labour.

3.7 Determination of Sample Size

The sample size was determined using the Taro Yamane's formula which is given as:

$$n = \frac{N}{1+N2(e)^2} \qquad \text{……..…… (3.1)}$$

Where,
N is the study population;
n - Sample size
e - Decision level of error (e=0.05)

$$n_1 = \frac{N1}{1+N1(e)^2} \qquad \text{...……..... (3.2)}$$

Substituting the value of N_1= 480 in Eq. 3.2, we have;
n_1 = 218

$n_2 = \frac{N2}{1+N2(e)^2}$ ……. (3.3)

Substituting the value of N_2= 55 in Eq. 3.3, we have;

n_2 = 48

Therefore, $n = n_1 + n_2$ ……. (3.4)

Substituting the value of n_1= 218 and n_2 = 48 in Eq. 3.4, we have
n = 266
Thus, accepted sample size for the study is 266.

3.8 Data Analysis Methods (Instruments of Data Analysis)

The statistical tools that were used in the work include: Relative frequency distribution, mean score, percentages, relative importance index. The researcher also made use of inferential statistics such as one-factor analysis of variance, Z-test and one-sample t-test to validate the research hypothesis. In addition, the study made use of regression techniques to model the relationship between performance and motivation of workmen in construction companies, while correlation analysis techniques were employed in ascertaining the level of agreement in opinions of the different categories of craftsmen selected for the study. All tests were judged at 5% level of significance.

3.8.1 Relative Frequency Distribution

This was used to answer questions raised in general information of section A of the questionnaire. This is the frequency of the respondents on each factor divided by the total frequency of all the respondents. It is generally expressed as percentage or average. It can be represented mathematically as:

$\% = \frac{x}{n} \times 100$ …….. (3.5)

Where
x = number of respondents agreeing with a particular variable.
n = total number of items or respondents sampled.

3.8.2 Mean Score Index

In order to rank the severity of factors covered by the questionnaire, mean score index was used. Mean score index is mathematically represented as

$$MSI = \frac{\sum FX_i}{N} \quad \text{…..…….. (3.6)}$$

Where;

F = Frequency of respondents to each.

Xi = The score given to each factor by the respondents

N = The total number of respondents concerning each factor

3.8.3. Relative Importance Index (RII)

This tool was used to determine the relative importance to the respondents on the factors that motivate them to work harder, as well as the factors inhibiting management to effectively utilize motivation to increase project success. RII can be computed using the formula below:

$$RII = \frac{\sum_{i=1}^{5} W_i X_i}{5 \sum X_i} \quad \text{……..... (.7)}$$

Where

W_i = the weighting given to each variable by the respondents, ranging from 1- 5

X_i = the percentage of respondents scoring

i = the order number of respondents

3.8.4 Analysis of Variance (ANOVA)

ANOVA is used to determine whether a significant difference exists between means of three or more groups. This tool was used in this research to draw conclusion on the group means of the respondents (Masons, Carpenters, Steel Fitters), to ascertain if an observed difference between groups means will depend on the variance of observation within groups. The concept underlying ANOVA is that the total variation of scores is computed through the summation of between group variance and within group variance. This can be represented mathematically as;

SST = SSB + SSW …….. (3.8)

Where;
SST = Total Sum of Squares
SSB = Sum of Squares between group
SSW = Sum of Squares within group

$SS_T = \sum_{i=1}^{k} \sum_{j=1}^{ni} \left(X_{ij} - \bar{X}\right)$ ..... (3.9)

Where;
k = number of groups/population
ni = the sample size taken from group i
X_{ij} = the jth response sampled from the with group/population
$\bar{X}$ = the mean of all responses irrespective of the group

SSB = $\sum_{i=1}^{k} ni\,(X - \bar{X})$ ..... (3.10)

Where;
$\bar{x}_i$ = sample mean of responses from ith group
$\bar{x}$ = the mean of all responses

SSW = $\sum_{i=1}^{k} n_i - 1$ ..... (3.11)

Where;
ni = sample size taken from group i
si = the sample standard deviation from the ith group

The F statistic is calculated by dividing the mean of square between group by the mean of square within group and it is represented mathematically as:

F statistic = $\frac{MSB}{MSW}$ ..... (3.12)

Where;
MSB = mean of squares between group
MSW = mean of squares within group

MSB = $\frac{SSB}{K-1}$ ..... (3.13)

Where;
SSB = sum of squares between group
k = number of groups/population

MSB = $\frac{SSW}{n-k}$ ..... (3.14)

Where;
n = total sample size
k = number of groups/population

3.8.5 Regression Model

Regression Model deals with the analysis of the relationship between a dependent variable (often called an 'outcome' variable) and one or more independent variables (often called the 'predictors', 'covariates' or 'features'). It is the relationship between X and Y or the regression of X scores on Y scores. The regression model was used to test hypothesis two and for building the model. The Regression equation is given as:

$Y = \alpha + \beta X + e$ …….. (3.15)

Where;

$$\alpha = \bar{Y} - \beta\bar{X}$$

$$= \frac{\sum Y - \beta \sum X}{n}$$

$$\beta = \frac{n\sum XY - \sum X \sum Y}{n\sum X^2 - (\sum X)^2} \quad \text{…… (3.16)}$$

Where;

Y = dependent variable (Productivity)

X = independent variable (Financial Motivation)

α = intercept on Y – axis

β = slope or gradient of the regression line

n = number of groups

e = error term

3.8.6 Correlation Coefficient

Correlation coefficient usually denoted by r, measures the degree of linear relationship between two variables. If the two variables X and Y are assumed to have a linear relationship, the value of r measures the extent to which sample observations on X are correlated with sample observations on Y. Mathematically, the correlation coefficient (r) is represented as:

$$r = \frac{\sum[(X - \bar{X})(Y - \bar{Y})]}{\sqrt{(X - \bar{X})^2}\sqrt{(Y - \bar{Y})^2}} \quad \text{…….. 3.18}$$

Where;

$\bar{X}$ = mean of sample X

$\bar{Y}$ = mean of sample Y

3.9 Validity and Reliability of Measuring Instrument

Validity of an instrument refers to the extent an instrument of measurement actually measures what it is intended to measure (Ogunoh, 2008). An instrument is valid to the extent, that it is tailored to achieve the research objectives. The researcher ensured the validity of the questionnaire by undertaking a pilot survey within the research area using convenience sampling technique. The researcher achieved this by administering the questionnaire to some selected staff in the study area. The questionnaire was submitted to the research supervisor for vetting, correction and suggestions to ensure that the questionnaire was capable of soliciting responses that proffer answer to the research questions.

In order to achieve reliability of data from questionnaire distribution, the researcher exercised care and caution, to ensure that questionnaires was administered to the right respondents, only necessary questions was asked, which was neither offensive nor misleading and options of answers was provided to questions, except where opinion of respondents are needed to confirm the answers. Information contained in the questionnaire was also clear and unambiguous and the researcher collected the completed questionnaire.

The questionnaire was also subjected to internal consistency test using Cronbach's alpha in order to test the factors affecting employee motivation. Sushil and Verma (2010) asserted that if a test has a strong internal consistency, it should only show moderate correlation among values (0.70 to 0.90). Too low values means unreliability and too high values revealing some items are redundant and should be removed from the test. For this study, α value of 0.7 was used as cut off value.

CHAPTER FOUR

DATA PRESENTATION, ANALYSIS AND INTERPRETATION

4.1 Introduction

This chapter presents, analyses, and interprets the various data obtained from the field survey. The discussions are based on the different statistical analyses carried out on the collated data generated. Relevant instruments were employed and inferences drawn at a benchmark of 5% level of significance.

4.2 DATA PRESENTATION

This section discusses the data on general information from the questionnaire. It is based on table 4.1 to 4.11.

Table 4.1: Summary of responses from field survey (by type of Employee)

Type of Employee	Frequency	Percentage value
Management	7	3.23%
Tradesmen	210	96.77%
Total	**217**	**100.00%**

Source: Field survey, 2018

The result in table 4.1 shows that a total of two hundred and seventeen (217) questionnaires were retrieved after distribution. Particularly, the result shows that out of the 217 retrieved, seven (7) representing 3.23% was from management staff, while the remaining two hundred and ten (210) representing 96.77% was from tradesmen.

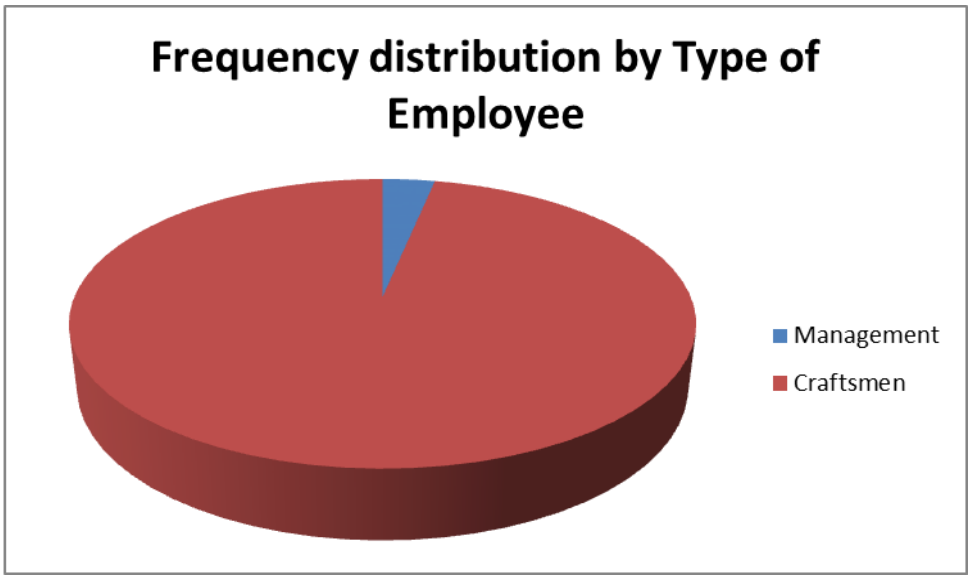


Figure 4.1 Response rate by type of Employee
Source: Researcher's field survey, 2018

Table 4.2: Response Rate by type of building trade

Category	Number of questionnaire distributed	Number of questionnaire retrieved	Percentage
Carpentry	80	70	87.5%
Masonry	120	100	83.3%
Steel Fittings	66	40	60.6%
Total	**266**	**210**	**78.9%**

Source: Field survey, 2018

From the result in 4.2, the overall response rate is 78.9%. Particularly, the result shows that the response rate of the carpenters is 87.5%; for mason men, it is 83.3% while for Steel Fitters, the response rate was 60.6%. These indicate high response rate from the various tradesmen and therefore confirm that further analysis can be carried out.

More so, the result shows that 33.33% of the respondents are carpenters, 47.62% are mason men while 19.02% are Steel Fitters.

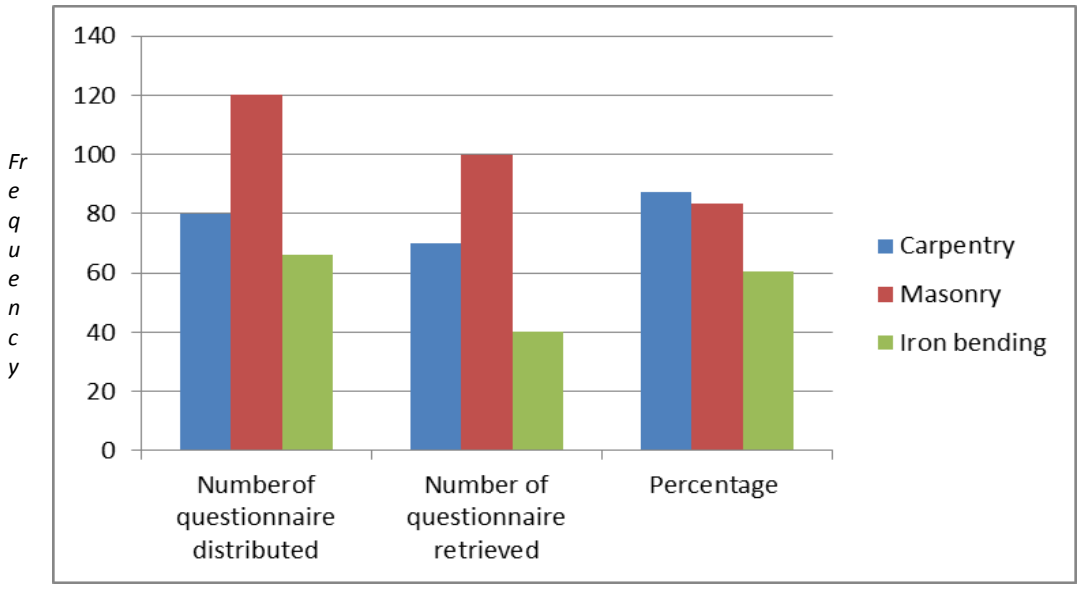


Figure 4.2 ***Response rate on the type of building trade***
Source: Researcher's field survey, 2018

Table 4.3: Distribution of the respondents by Place of work

Place of work	Tradesmen	Management	Frequency	Percentage
HCL	22	1	23	10.59
FCC	30	1	31	14.29
CCC	27	1	28	12.90
RCC	40	1	41	18.89
CGC	33	1	34	15.67
NICC	28	1	29	13.36
JandJ	30	1	31	14.29
TOTAL	**210**	**7**	**217**	**100**

Source: Field survey, 2018

Table 4.3 is distribution of the respondents by places of work. The result shows that a total of 23 (10.59%) workmen comprising of 1 management staff and 22 tradesmen responded from Hammakop consortium limited (HCL) construction company, 31 (14.29%) which consists of 30 tradesmen and 1 management staff are from fancy construction company (FCC), 28 (12.90%) which consists of 27 tradesmen and 1 management staff are from consolidated construction company (CCC), 41 (18.89%) which consists of 40 tradesmen and 1 management staff are from Reynold Construction Company (RCC), 34(15. 67%) which consists of 33 craftsmen and 1 management staff are from Chinese Government Company (CGC), 29(13.36%) which consists of 28 tradesmen and 1 management staff are

from new ideas Construction Company (NICC) while 31(14.29%) which consists of 30 tradesmen and 1 management staff are from JandJ Construction Company (JandJ).

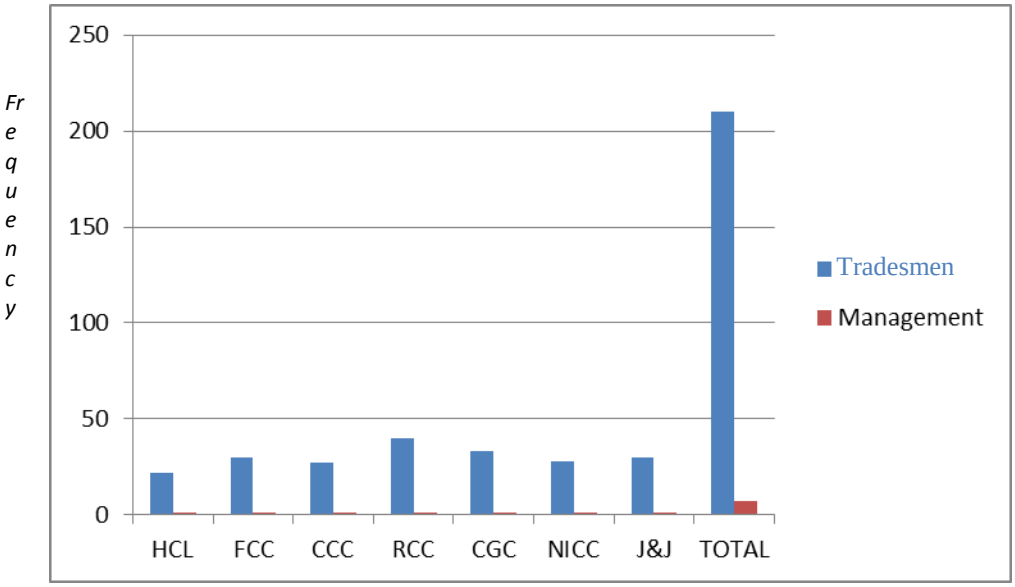


Figure 4.3 Distribution of the respondents by Place of work
Source: Researcher's field survey, 2018.

Table 4.4: Percentage Response on Years of experience

Years of experience	Frequency	Percentage response
Less than 10 years	30	13.82%
10 to 20 years	120	55.29%
21 to 30 years	50	23.04%
31 to 40 years	10	4.61%
Above 40 years	7	3.23%
Total	**217**	**100.00%**

Table 4.4 shows the frequency distribution of years of experience of the respondents. The result shows that out of the 217 respondents, a total of 30 representing 13.82% have less than 10 years experiences, 120(55.29%) have 10 to 20 years of experience, 50(23.04%) have 21 to 30 years of experience, 10(4.61%) have 31 to 40 years of experience, while 7(3.23%) of the respondents have experiences above 40 years.

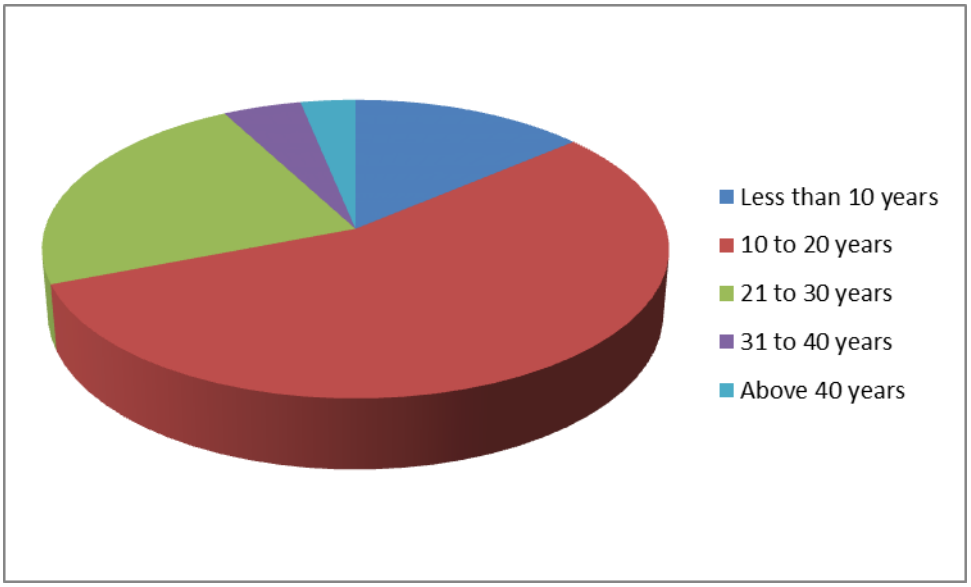


Figure 4.4 Response rate on years of experience

Table 4.5: Percentage Response on Level of Academic qualification

Level of academic qualification	Frequency	Percentage response
M.Sc.	1	0.47%
B.Sc.	3	1.38%
HND	3	1.38%
SSC	18	8.29%
FSLC	192	88.48%
Total	**217**	**100.00%**

Table 4.5 presents the percentage response on the level of academic qualification of the respondents. The result shows that none of the respondents has a Ph.D. degree and none have OND. It also shows that 1(0.47%) of the respondents have M.Sc., 3(1.38%) have B.Sc., 3(1.38%) have HND, 18(8.29%) have SSC and while 192(88.48%) have first school leaving indicating that majority of the respondents only attended primary education.

Table 4.6: Percentage Response on Position in the company

Position in the company	Frequency	Percentage response
Management	7	3.23%
Tradesmen	197	90.78%
Foremen	13	5.99%
Total	**217**	**100.00%**

Table 4.6 shows the percentage response on the position of the respondent in their various places of the works and reveals that 3.23% are management staff, 90.78% tradesmen and 5.99% are trades foremen.

Table 4.7: Percentage Response on Profession of Mgt. Staff

Profession of Mgt. staff	Frequency	Percentage response
Building	2	28.57
Engineering	4	57.14
Quantity Surveying	1	14.28
Architecture	-	0
Others	-	0
Total	7	100

Table 4.7 shows the percentage response on the profession of mgt. staff and reveals that 28.57% are Builders, 57.14% are Engineers and 14.28% are Quantity surveyors.

Table 4.8: Distribution of average annual income of the respondents

Annual income (₦)	Frequency	Percentage response
Less than ₦800,000	190	87.56%
₦800,000 to ₦1M	20	9.22%
Above ₦1M	7	3.23%
Total	**217**	**100.00%**

Table 4.8 shows the percentage response of the respondents on the average annual income, and shows that 87.56% have average annual income of less than ₦800,000, 9.22% have income between ₦800,000 and ₦1m annually, while just 3.23% have average annual income above ₦1m. This indicates that a greater percentage of the respondents are low income earners.

Table 4.9: Percentage Response on Nature of appointment

Nature of appointment	Frequency	Percentage response
Permanent	17	7.83%
Temporary	74	34.18%
Contract	126	58.86%
Total	**217**	**100.00%**

Table 4.9 shows the percentage response of the respondents on the nature of appointment and reveals that 7.83% are on permanent appointment, 34.18% are on temporary appointment while 58.86% are on contract appointment. This shows that a greater percentage of the respondents are on contract appointment with their respective companies.

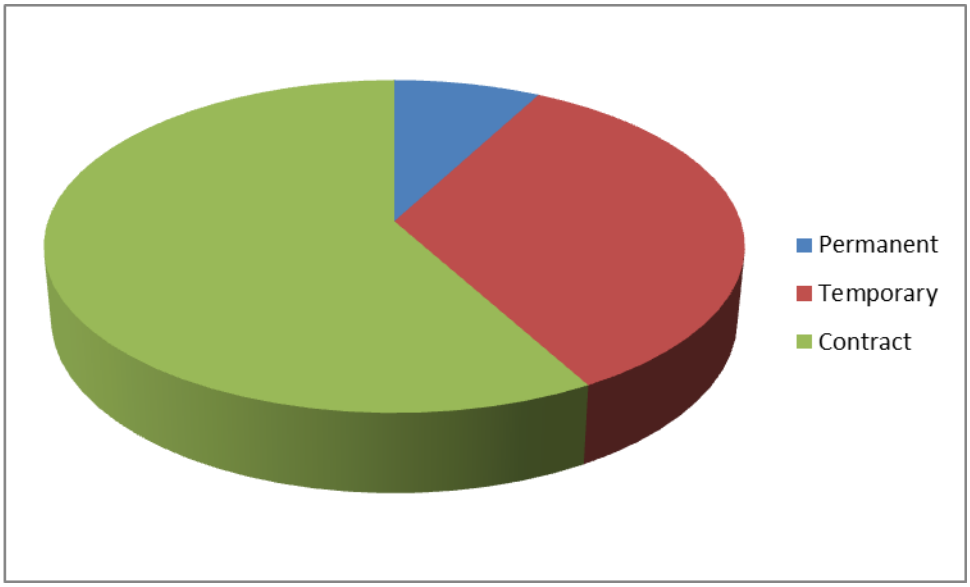


Figure 4.5 Response rate on the nature of appointment
Source Researcher's field survey, 2018

Table 4.10: Percentage responses on nature of Apprenticeship

Nature of Apprenticeship	Frequency	Percentage response
Tech. College	10	4.76%
NDE	0	0%
Private	126	60.00%
On the job training	74	35.24%
Total	**210**	**100.00%**

Table 4.10 shows the percentage response of the respondents on the nature of apprenticeship and indicates that 4.76% attended technical college, none passed through NDE, and 60.00% were trained privately while 35.24 % were trained on the job.

Table 4.11: Percentage response on grade of test

Grade of Test	Frequency	Percentage response
Grade one	5	2.38%
Grade two	7	3.33%
Grade three	4	1.90%
None	194	92.34
Total	**210**	**100.00%**

Table 4.11 revealed that 2.38% of the respondents hold grade one certificate, 3.33% hold grade two certificate, 1.90% hold grade three certificate and 92.34 % hold none of the grades certificates.

4.3 ANALYSIS AND INTERPRETATION OF DATA

This section analyses and interprets the data on research questions collected from questionnaire. The data analyses in this section are presented in table 4.12-4.25.

Table 4.12: Result of mean responses on the financial factors influencing tradesmen motivation in construction companies

Question items	Carpenter		Mason men		Iron bender		$\bar{\bar{X}}$	RII (%)	Des. Rank
	Mean	Std	Mean	Std	Mean	Std			
Cash award	4.79	0.104	4.40	0.188	4.97	0.016	4.72	41.18	11
End of the year bonus	4.44	0.207	4.83	0.234	4.80	0.118	4.69	35.29	12
Leave allowance	3.76	0.501	4.50	0.509	4.64	0.516	4.30	23.53	14
Transport allowance	4.96	0.239	4.94	0.503	4.95	0.653	4.95	70.59	5
Housing Allowance	4.83	0.483	4.98	0.637	4.96	0.753	4.92	58.82	8
Hazard allowance	4.51	0.600	4.54	0.693	3.50	0.548	4.18	11.76	16
Overtime with pay	4.77	0.157	4.93	0.459	4.97	1.169	4.89	47.06	10
Vehicle loan	3.55	0.514	4.12	0.783	3.67	1.227	3.78	5.88	17
Accident insurance	4.99	0.554	5.00	0.118	4.86	1.102	4.95	70.59	5
Gratuity/ Retirement award	4.12	0.611	4.53	0.115	4.04	1.221	4.23	17.65	15
Hospital allowance	4.98	0.344	4.92	0.215	4.98	0.133	4.96	82.35	4
Tools allowance	4.22	0.615	4.13	1.111	4.94	1.052	4.43	29.41	13
High Wage rate	4.98	0.903	5.00	1.107	4.99	1.154	4.99	94.12	2
Equitable wage	4.94	1.022	5.00	0.553	5.00	0.723	4.98	88.24	3
Prompt wage payment	5.00	0.510	5.00	0.518	5.00	0.311	5.00	100	1
Progressive wage	4.96	0.321	4.89	0.232	4.85	1.006	4.90	52.94	9
Lunch allowance	4.85	0.576	5.00	0.497	5.00	1.169	4.95	70.59	5
Cluster Mean & Std.	**4.63**	**0.486**	**4.75**	**0.498**	**4.71**	**0.757**	**4.70**		

Source: Field survey, 2018

For the financial factors of motivation in table 4.12, prompt wage payment ranked 1st with fractional rank (relative importance index (RII)) value of 100%. This was followed by high wage rate, equitable wage, hospital allowance,

transport allowance, accident insurance and lunch allowance. Other relevant factors as shown in the result were housing allowance and progressive wage payment having a percentage fractional ranking values of 58.82% and 52.94% respectively. The least among the factors was vehicle loan with a fractional index 5.88%. These factors are graphically represented in figure 4.6. Since these result was based on descriptive evaluation, the researcher could not solidly make a conclusion regarding the affected hypothesis, thus further inferential tests were carried.

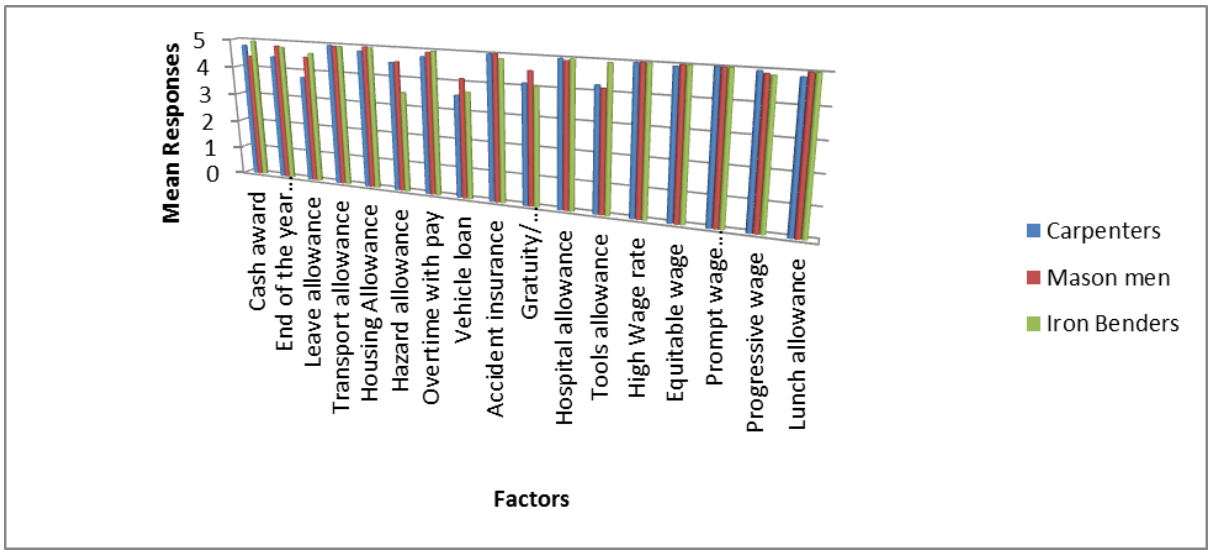


Figure 4.6 Response rate on the financial factors affecting employee motivation

The bivariate correlation test of association was performed on the average responses of the categories of workers in the study area. This was to find out if they respectively agree with each other for further analysis. The Pearson correlation test result as shown in the table 4.13.

Table 4.13: Association of the mean responses of the tradesmen on effect of financial factors of motivation

	Carpenters	Masons	Steel Fitters
Carpenters			
Correlation coefficient	1	0.816**	0.653**
p-value		0.000	0.005
Masons			
Correlation coefficient		1	0.575**
p-value			0.016
Steel Fitters			
Correlation coefficient			1

****indicates that correlation is significant at the 0.05 level (2-tailed).**

The correlation test result shows that there is high level of agreement (association) in mean responses of the tradesmen in the selected companies. The positive values of correlation coefficient (r = 0.816; 0.653; 0.575) implies that the tradesmen all agree that financial motivation positively affects site operatives for effective project delivery in the companies.

The researcher therefore performed one sample Z-test to ascertain whether financial motivation significantly affects workmen's performance in construction companies. The result is as presented 4.13b:

Table 4.13b:Effect of Financial motivation on performance

Variable	Test of $\mu = 3.00$ vs $\mu \neq 3.00$; assumed sigma = 1.581					
	N	Mean	Std.	SE Mean	Z-stat.	Sig.(2-tailed)
Mean Response	17	4.695	0.371	0.383	4.42	0.000

Source: Researcher's computation using MINITAB 17.

Decision Rule: Reject H_o if p-value < 0.05 otherwise do not reject.

Conclusion: The Z-test result above with a statistic value of 4.42 and associated probability value of 0.000 < 0.05 indicates that financial motivation positively

and significantly affect workmen performance for effective project delivery in construction companies.

Table 4.14: Tradesmen's responses on the effect of non-financial motivation on project delivery

Question items	Carpenter		Mason men		Steei Fitters		$\bar{\bar{X}}$	RII
	Mean	Std	Mean	Std	Mean	Std		
Promotion opportunity	2.12	1.115	2.43	1.006	2.26	1.316	2.27	0.45
Job security	1.74	0.372	1.33	1.207	2.87	1.333	1.98	0.38
Praise	2.86	0.361	1.99	0.433	1.42	0.432	2.09	0.42
Recognition	1.68	1.123	2.96	0.833	1.30	1.225	1.98	0.39
Training	4.75	0.913	3.41	1.221	3.06	1.018	3.74	0.75
Involvement in decision making	1.79	1.302	2.39	0.799	1.97	0.233	2.05	0.41
Supervision	3.09	1.315	2.53	1.283	3.32	1.272	2.98	0.59
Safety on site	2.33	1.072	3.40	0.733	2.97	1.013	2.90	0.58
Adequate working environment	3.30	0.774	2.55	0.935	3.57	0.969	3.14	0.63
Tools/Equipment provision	2.22	0.983	3.82	1.030	2.78	1.156	2.94	0.59
Respect from supervisors	5.00	0.972	4.93	1.216	4.47	1.034	4.80	0.96
Good relationship with co-workers	2.55	1.115	2.13	0.755	3.78	1.023	2.82	0.56
Amount of freedom at work	3.44	1.005	3.12	0.984	1.42	0.355	2.66	0.53
Opportunity to learn new things	2.90	0.876	2.72	1.022	2.30	0.784	2.64	0.52
Holidays and free time	3.67	1.055	4.44	1.189	4.82	1.012	4.31	0.86
Break at work	4.63	1.503	5.00	1.112	4.77	0.988	4.80	0.96
Cluster Mean and Std.	**3.00**	**0.991**	**3.07**	**0.985**	**2.94**	**0.948**	**3.01**	

Source: Researcher's computation, 2018

The descriptive result in table 4.14 shows that the most important non-financial motivation factors to the Tradesmen is respect from supervisors and break at work (with RII of 0.96 respectively). This implies that the employee value their respect so much in their workplace for effective performance and productivity and as well needs break at work. The next is Holidays and free time with RII of 0.89 respectively; followed by training and adequate working environment (with RII of 0.75 and 0.63 respectively). The least in their consideration was job security with a relative importance index of 0.38.

Generally, the cluster mean value of 3.01 indicates that the non-financial motivation factors slightly triggers workmen's performance and effective project delivery.

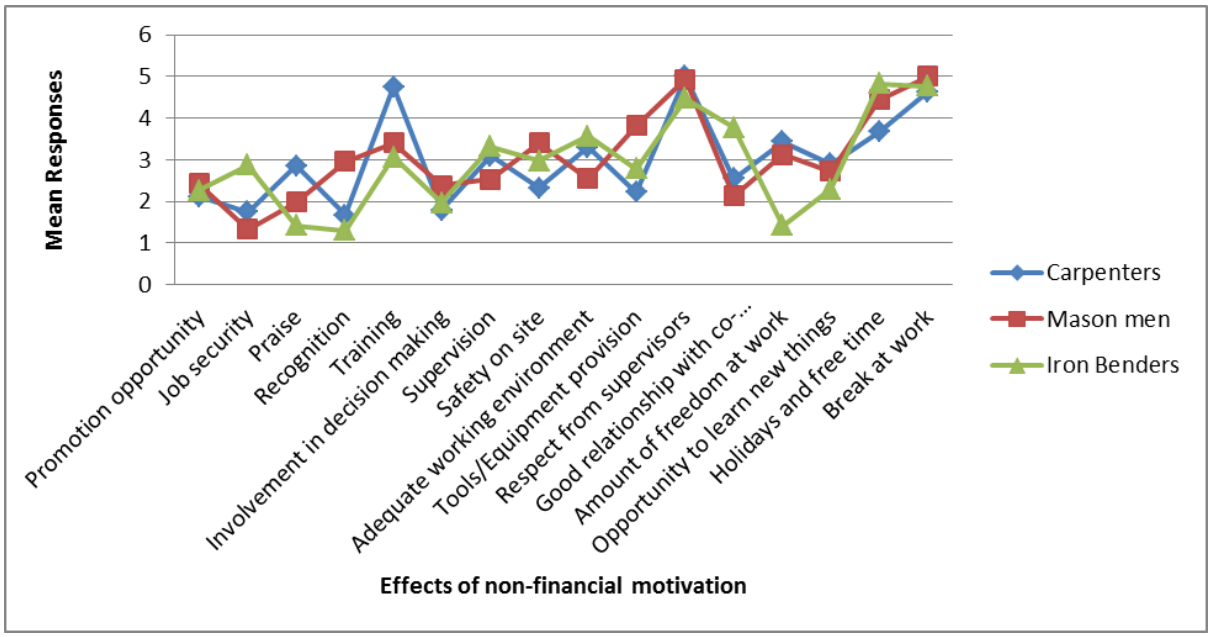


Figure 4.7 Line graph on the non-financial factors affecting tradesmen motivation

The researcher also performed analysis of variance (ANOVA) test to compare the mean responses and also to ascertain the level of agreement of the tradesmen.

Test statistic: $F = \frac{Mean\ square\ treatment}{Mean\ square\ error}$

Table 4.15: ANOVA table

Source of variation	Sum of Squares	df	Mean Square	F	Sig.	Levene's stat. (prob)
Between Groups	0.134	2	0.067	0.056	0.945	0. 059(0.943>0.05)
Within Groups	53.455	45	1.188			
Total	53.589	47				

Source: Researcher's computation using SPSS 22

Decision rule: Reject H_o if p-value $\leq$ 0.05, otherwise do not reject.

The ANOVA test result with the F-statistic value of 0.056 and associated probability value 0.945 > 0.05, indicates that there is no significant difference in the mean responses of the tradesmen in the selected construction companies. Meanwhile, the Levene's test of homogeneity of variances (with p-value 0.943

> 0.05) indicates that the variances are homogeneous, in other words, equal which confirms appropriateness of the use of ANOVA tools.

Then, the one-sample Z-test was performed to ascertain whether non-financial motivation significantly affect workmen's performance in the selected construction companies. The result is as presented in table 4.15b.

Table 4.15b:Effect of Non-Financial motivation on performance

Variable	Test of μ = 3.00 vs $\mu \neq$ 3.00; assumed sigma = 1.581					
	N	Mean	Std.	SE Mean	Z-stat.	Sig.(2-tailed)
Mean Response	16	3.006	0.945	0.395	0.02	0.990

Source: Researcher's computation using MINITAB 17.

Decision Rule: Reject H_o if p-value < 0.05 otherwise do not reject.

Conclusion: The Z-statistic value of 0.02 and associated probability value of 0.990 > 0.05 indicates that non-financial motivation has no significant positive effect on the workmen performance for effective project delivery in construction companies. The researcher therefore upholds the null hypothesis.

Table 4.16: Factors of motivation preferred best by crafts employees

Factors	Responses					Total	Mean	RII	Rank
	SP	P	UND	NP	SNP				
Financial	208	2	0	0	0	210	4.99	0.99	1st
Non-financial	2	2	0	201	5	210	2.02	0.40	2nd

Source: Researcher's computation

The result in table 4.16 indicates that the trades employee prefer financial motivation (with RII of 0.99) to non-financial motivation (with RII of 0.40) for their performance and effective project delivery in construction companies. As the financial motivation takes the lead, it was deduced that motivation has a significant positive effect on workmen performance and effective project delivery in construction companies.

Table 4.17: Management challenges with respect to tradesmen motivation

Challenges	Responses (n = 7 management staff)					Statistics		Rank
	MC (%)	C (%)	UND (%)	NC (%)	NVC (%)	$\bar{X}$	RII	
Hiring the wrong people from the start	5(71.4%)	2(28.6%)	0(0.0%)	0(0.0%)	0(0.0%)	4.71	0.94	2nd
Poor financial strength	6(85.7%)	1(14.3%)	0(0.0%)	0(0.0%)	0(0.0%)	4.85	0.97	1st
Company's expenditure	4(57.1%)	2(28.6%)	0(0.0%)	1(14.3%)	0(0.0%)	4.00	0.80	5th
Prolonged decision making	5(71.4%)	1(14.3%)	0(0.0%)	1(14.3%)	0(0.0%)	4.14	0.83	4th
Short nature of projects	0(0.0%)	0(0.0%)	2(28.6%)	3(42.9%)	2(28.6%)	2.00	0.40	12th
Over minimization of resources	3(42.9%)	2(28.6%)	0(0.0%)	1(14.3%)	1(14.3%)	3.14	0.63	8th
Market changes	4(57.1%)	1(14.3%)	1(14.3%)	0(0.0%)	1(14.3%)	4.00	0.80	5th
Low self-confidence of employees	0(0.0%)	0(0.0%)	0(0.0%)	4(57.1%)	3(42.9%)	1.57	0.31	14th
Employee's lack of interest	1(14.3%)	0(0.0%)	2(28.6%)	3(42.9%)	1(14.3%)	2.57	0.51	9th
Low expectation for success	0(0.0%)	0(0.0%)	3(42.9%)	2(28.6%)	2(28.6%)	2.43	0.49	10th
Achievement anxiety	0(0.0%)	0(0.0%)	0(0.0%)	6(85.7%)	1(14.3%)	1.86	0.37	9th
Fear of failure	1(14.3%)	1(14.3%)	1(14.3%)	1(14.3%)	3(42.9%)	2.43	0.49	10th
Attitude problem	3(42.9%)	1(14.3%)	0(0.0%)	1(14.3%)	2(28.6%)	3.29	0.66	7th
Diverse workforce	4(57.1%)	2(28.6%)	0(0.0%)	1(14.3%)	0(0.0%)	4.29	0.86	3rd
Cluster mean						**3.23**		

Source: Field survey, 2018

The result in table 4.17 which shows the challenging factors that limit management effort towards the motivation of their tradesmen indicates (from the ranking statistics) that poor financial strength is the most challenging factor with RII of 0.97. This was followed by hiring the wrong people from the start with RII of 0.94; diverse work force with RII of 0.86; prolonged decision making with RII of 0.83; company's expenditure with RII of 0.80, and so on. The least was low self-confidence with RII of 0.31. The cluster mean value of 3.23 > 3.00 indicates that the outlined factors jointly affect management efforts on tradesmen motivation in construction companies.

To ascertain the degree of effect of these factors, the researcher performed a one-sample t-test. The result is as presented in table 4.18.

Table 4.18: One-sample t-test result

Test Value = 3.0

					95% Confidence Interval of the Difference	
	T	df	Sig. (2-tailed)	Mean Difference	Lower	Upper
Mean Response	0.795	13	.441	.23429	-.4027	.8713

The result (with t-statistic value of 0.795 and p-value of 0.441 > 0.05) indicates that these factors have positive but insignificant effect on managements' efforts to tradesmen motivation in construction companies in the area.

Table 4.19: Factors that demotivates tradesmen in their work performance

Question items	**Carpenter**		**Mason men**		**Iron bender**		$\bar{\bar{X}}$	**RII**
	Mean	**Std**	**Mean**	**Std**	**Mean**	**Std**		
Inequitable wage	4.77	0.978	4.61	0.859	4.90	1.032	4.76	0.95
Late payment of wages	4.90	1.103	4.89	1.117	4.99	1.156	4.92	0.98
Absence of breaks and free time	2.10	0.897	1.87	1.015	2.72	0.070	2.23	0.45
Allowance denial	4.53	1.152	4.50	0.779	4.44	0.968	4.49	0.89
Poor job security	2.33	0.555	3.01	1.104	1.32	0.433	2.22	0.44
Lack of respect from supervisors	3.41	0.738	3.10	0.669	4.50	0.903	3.67	0.73
Lack of recognition	2.43	1.012	1.98	0.983	1.68	0.708	2.03	0.41
Poor working environment	2.14	1.139	2.50	1.184	1.30	0.989	1.98	0.39
Lack of training	2.41	0.566	2.13	1.001	2.99	1.031	2.51	0.50
Unfair weather	3.52	1.113	3.92	1.323	4.53	0.889	3.99	0.79
Cluster Mean and Std.	**3.25**	**0.925**	**3.25**	**1.003**	**3.34**	**0.818**	**3.28**	

From the result in table 4.19, the tradesmen agreed that the factors that demotivate them from performing well in their workplaces include inequitable wage, late payment of wages, allowance denial, lack of respect from supervisors, and unfair weather with average response values > 3.00 (average likert). The result also shows that the most demotivating factor among the out listed is late payment of wage with a relative importance index (RII) value of 0.98, and followed by inequitable wage with RII value of 0.95 and allowance denial with RII value of 0.89. While the least among them was lack of respect from supervisors with RII value of 0.73.

In addition, the result further shows that poor working environment, lack of training, lack of recognition, poor job security, and absence of breaks and free time are not demotivating factors in construction companies.

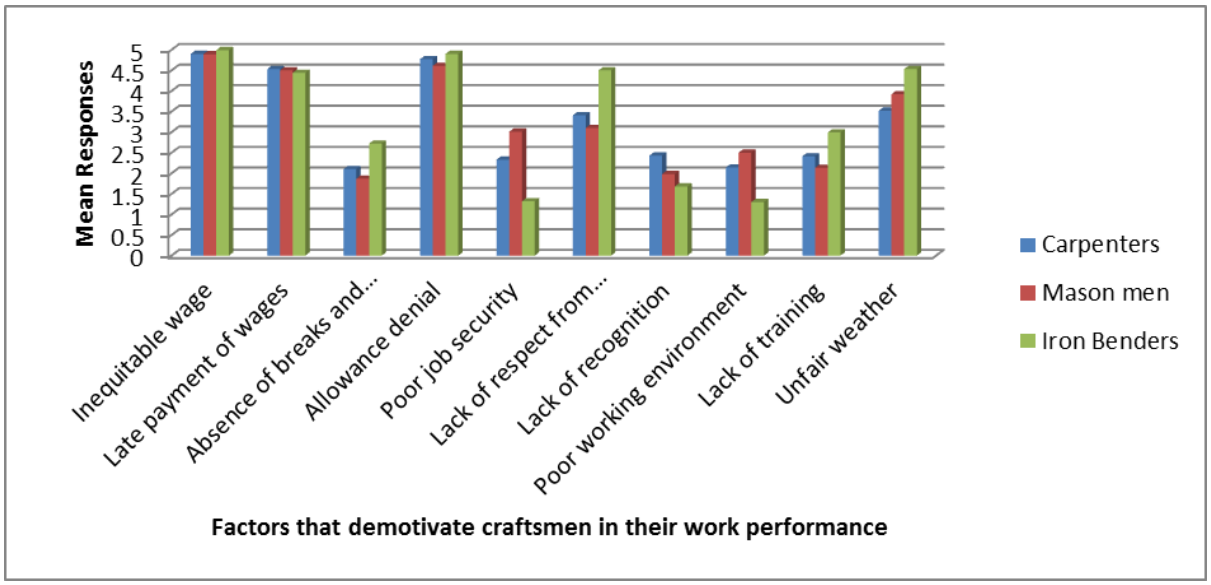


Figure 4.8 A graph of response rate on the factors that demotivates tradesmen

The extent of effect of these factors were measured using the one-sample student's t-test, the result obtained was presented in the table 4.20:

Table 4.20: One-sample t-test result

Variable	Test of $\mu = 3.00$ vs $\mu \neq 3.00$					
	N	Mean	Std.	SE Mean	t-stat.	p-value
Mean Response	5	4.366	0.525	0.235	5.82	0.0044

Source: Researcher's computation using MINITAB 17.

The result in table 4.20 shows that the agreed factors significantly demotivates tradesmen from performing well in their workplaces, ($t = 5.82$; $p = 0.0044 < 0.05$).

Table 4.21: Factors that affect tradesmen productivity

Question items	Carpenters		Masons		Steel Fitters		$\bar{\bar{X}}$	RII
	Mean	Std	Mean	Std	Mean	Std		
Lack of Supervision	3.90	1.201	3.79	0.723	3.74	0.844	3.81	0.76
Poor Company's policy	2.20	0.922	2.19	0.803	2.81	1.070	2.40	0.48
Lack of Punishment	1.82	0.519	1.65	1.311	1.33	1.500	1.60	0.32
Low level of skill	4.98	1.120	4.51	1.327	4.64	1.325	4.71	0.94
Lack of Motivation	5.00	0.589	5.00	1.090	4.97	1.461	4.99	0.99
Non-availability of materials	3.01	0.164	3.05	1.101	3.00	1.406	3.02	0.60
Lack of Tools and equipment provision	3.00	1.411	3.00	.932	3.01	0.977	3.01	0.60
Bad site access	2.94	1.090	2.97	1.184	2.85	1.319	2.92	0.58
Lack of Experience	3.81	1.038	3.78	1.121	3.93	1.314	3.84	0.77
Absence of Information and feedback	2.39	1.011	2.55	.809	2.50	0.905	2.48	0.49
Unfair wage	5.00	0.549	4.98	1.040	4.99	1.212	4.99	0.99
Inclement weather	3.02	1.200	3.22	1.032	3.15	0.823	3.13	0.63
Cluster Mean and Std.	**3.42**	**0.901**	**3.39**	**1.039**	**3.41**	**1.180**	**3.41**	

Source: Researcher's computation, 2018

From the result in table 4.21, it was ascertained that lack of motivation and unfair wage (with strata mean value of 4.99 respectively and explanatory power of 99% respectively) are the most important factors that affect productivity of tradesmen in the construction companies. This was followed by low level of skill which ranked 3rd with RII value of 0.94(or 94%); lack of experience with RII value of 0.77 and lack of supervision with explanatory power of 76%. Lack of punishment was found to be the least factor with mean response value of 1.60 and relative importance index of about 0.32(32%).

Moreover, it was also ascertained that there is no significant variation in mean responses of the three groups (carpenter, mason men, and iron bender), with prob(F-statistic = 0.997). Although from a descriptive evaluation, the cluster mean response of carpenters was higher compared to that of the mason men and Steel Fitters. The grand cluster mean value of 3.41 > 3.00 indicates that the out listed are the factors that affect tradesmen productivity in the construction companies.

Table 4.22: Respondents' opinion on the effect of punishment on tradesmen motivation

Question items	Carpenter		Mason men		Iron bender		$\bar{\bar{X}}$	Std.
	Mean	Std	Mean	Std	Mean	Std		
Oral warning	1.01	0.929	1.51	0.773	1.26	0.668	1.26	0.790
Written warning	1.43	1.084	1.12	0.473	1.23	0.813	1.26	0.790
Cash penalty	1.04	0.501	1.25	0.482	1.01	0.544	1.10	0.509
Issuance of Query	1.49	0.269	1.13	0.533	0.95	1.292	1.19	0.698
Reduction of pay	1.27	0.889	1.38	1.223	1.34	0.753	1.33	0.955
Demotion	1.21	1.159	1.14	0.684	1.52	0.548	1.29	0.797
Work overload without pay	1.22	0.514	1.23	0.459	1.27	0.746	1.24	0.573
Overtime without pay	1.17	0.175	1.43	0.511	1.12	1.027	1.24	0.571
Suspension without pay	1.59	0.711	1.16	1.229	1.48	1.102	1.41	1.014
Dismissal	1.12	0.622	1.53	1.011	1.13	0.737	1.26	0.790
Cluster Mean	**1.26**	**0.685**	**1.29**	**0.738**	**1.23**	**0.823**	**1.26**	**0.749**

Source: Researcher's computation, 2018

The descriptive result in table 4.22 (with cluster mean = 1.26 < 3.00) shows that all factors of punishment negatively affects tradesmen's motivation in construction companies. From the result, it was ascertained that the major punishment factor affecting tradesmen motivation is suspension (mean = 1.41) while the least is cash penalty (mean = 1.10). The opinion of the respondents (carpenters, mason men, and Steel Fitters) was confirmed not to vary significantly among the tradesmen.

Table 4.23 shows the managements' opinions on how poor performance on the part of tradesmen can affect the entire project success indicates that the major contest in this regard includes: delay in project completion, low productivity, increased project cost, and poor quality of work with a relative importance index (RII) value of 0.97 respectively. These were followed by disputes and litigation with RII value of 0.91; Project abandonment with RII value of 0.88; dissatisfaction on the side of client with RII value of 0.83; and lastly diminishing client relationship with RII value of 0.80.

Also, the result shows (with a cluster mean value of 4.54 > 3.00) that the management staff of the selected construction companies strongly agreed that the out listed factors are really what result from poor performance on the part of tradesmen in the construction companies.

Table 4.23: Management staff responses on effect of tradesmen poor performance on project delivery

Factors	Responses (n = 7 management staff)					Statistics		Rank
	SA (%)	A (%)	UND (%)	DA (%)	SDA (%)	$\bar{X}$	RII	
Diminishing client relationship	4(57.1%)	1(14.3%)	0(0.0%)	2(28.6%)	0(0.0%)	4.00	0.80	9th
Delay in project completion	6(85.7%)	1(14.3%)	0(0.0%)	0(0.0%)	0(0.0%)	4.86	0.97	1st
Low productivity	6(85.7%)	1(14.3%)	0(0.0%)	0(0.0%)	0(0.0%)	4.86	0.97	1st
Dissatisfied client	4(57.1%)	2(28.6%)	0(0.0%)	0(0.0%)	1(14.3%)	4.14	0.83	8th
Poor quality of work	6(85.7%)	1(14.3%)	0(0.0%)	0(0.0%)	0(0.0%)	4.86	0.97	1st
Increased material wastage	4(57.1%)	2(28.6%)	1(14.3%)	0(0.0%)	0(0.0%)	4.43	0.89	6th
Increased project cost	6(85.7%)	1(14.3%)	0(0.0%)	0(0.0%)	0(0.0%)	4.86	0.97	1st
Disputes and litigations	5(71.4%)	1(14.3%)	1(14.3%)	0(0.0%)	0(0.0%)	4.57	0.91	5th
Project abandonment	4(57.1%)	1(14.3%)	2(28.6%)	0(0.0%)	0(0.0%)	4.29	0.88	7th
Cluster mean						**4.54**		

Source: Field survey, 2018

Table 4.24: Effects of poor motivation on tradesmen work attitude

Question items	Carpenter		Mason men		Steel Fitters		$\bar{\bar{X}}$	RII
	Mean	Std	Mean	Std	Mean	Std		
Lack of commitment	4.23	1.190	4.51	0.690	4.58	0.97	4.44	0.89
Unhappy craftsmen	4.48	1.302	4.12	0.801	4.30	0.84	4.30	0.86
Lack of interest	4.53	1.362	4.77	0.817	3.99	0.90	4.43	0.89
Increased absenteeism	4.39	1.033	4.78	0.839	4.81	0.90	4.66	0.93
Increased turnover	4.99	1.309	4.85	0.888	4.83	0.65	4.89	0.98
Delay in completing a task	4.78	1.107	4.89	1.013	5.00	0.68	4.89	0.98
Low productivity	4.98	0.914	4.86	0.672	4.92	0.96	4.92	0.98
Poor quality of work	4.91	1.115	5.00	0.924	4.76	1.41	4.89	0.98
Increased material wastage	4.70	0.998	4.69	1.101	4.77	0.72	4.72	0.94
Lateness to work	4.55	0.178	4.89	1.120	4.51	0.53	4.65	0.93
Cluster Mean and Std.	**4.65**	**1.051**	**4.74**	**0.887**	**4.65**	**0.856**	**4.68**	

Source: Researcher's computation, 2018

Table 4.24 shows the result on the effects of poor motivation on tradesmen attitude to work. The result indicates that the most serious effect of poor motivation on employee's works attitude is low productivity; followed by

increased turnover, delay in completing a task, and poor quality of work with a relative importance index of 0.98 respectively. These were followed by increased material wastage with a relative importance index of 0.94 and increased absenteeism and lateness to work with RII value of 0.93 respectively. The next were lack of commitment and lack of interest with RII values of 0.89 respectively, while the least was unhappiness with RII value of 0.86. Jointly, the result indicates that all the items were ranked high by the employees which shows that poor motivation have devastating effect on the workers' attitude to work.

Comparing these opinions rank to ascertain the degree of discrepancy, the researcher employed analysis of variance techniques. The result is as presented below:

Test statistic: $F = \frac{Mean\ square\ treatment}{Mean\ square\ error} = \mathbf{0.322}$

Table 4.25: ANOVA table

Source of variation	Sum of Squares	df	Mean Square	F	Sig.	Levene's stat. (prob)
Between Groups	0.049	2	0.024	0.322	0.727	0. 417(0.663>0.05)
Within Groups	2.052	27	0.076			
Total	2.101	29				

Source: Researcher's computation using SPSS 22

The ANOVA test result with F-statistic value of 0.322 and associated probability value of 0.727 > 0.05 indicates that there is no significance difference in the opinion ranks of the tradesmen hence the decision on aggregated form is appropriate. The levene's test result with a statistic value of 0.417 and associated probability value of 0.663 > 0.05 strongly supports the application of ANOVA techniques in the analysis.

4.3 Tests of Hypotheses

4.3.1 Test of Hypothesis One

The research hypothesis one sought to determine the effect of poor motivation on workmen's performance in the selected construction companies. The null and alternate hypotheses are respectively re-stated as follows:

H_o, 1: Poor motivation does not significantly affect workmen's performance.

H_a, 1: Poor motivation significantly affects workmen's performance.

Level of Significance (α) = 0.05

The one-sample t-test result (with t-stat. = 23.555; p-value = 0.000 < 0.05) as shown in table 4.26 indicates that poor motivation significantly affect tradesmen performance in construction companies.

Table 4.26: One-Sample t-test result

	Test Value = 3.0					
					95% Confidence Interval of the Difference	
	T	Df	Sig. (2-tailed)	Mean Difference	Lower	Upper
Mean Response	23.555	9	.000	1.67900	1.5178	1.8402

***Source**: Researcher's SPSS output*

The researcher therefore rejects the null hypothesis and accepts the alternative that poor motivation significantly affects workmen performance in construction companies.

4.3.2 Test of Hypothesis Two

Hypothesis two sought to establish the relationship between motivation and effective project delivery in construction companies. The hypothesis in both null and alternate are stated thus:

H_o, 2: There is no significant relationship between motivation and effective project delivery.

H_A, 2: There is a significant relationship between motivation and effective project delivery.

Level of significance (α) = 0.05

The Pearson product moment correlation test result indicates that factors of financial motivation are positively and significantly associated with effective project delivery while non-financial factors have positive but slightly insignificant relationship with effective project delivery in construction companies in south east Nigeria. The researcher therefore rejects the null hypothesis and accepts that motivation has a significant relationship with effective project delivery in south east Nigeria.

Table 4.27: Correlation results of relationship between motivation and effective project delivery

		Effective project delivery	Financial factors of motivation	Non-financial factors of motivation
Effective project delivery	Pearson Correlation	1		
	Sig. (2-tailed)			
	N	12		
Financial factors of motivation	Pearson Correlation	.650*	1	
	Sig. (2-tailed)	.022		
	N	12	17	
Non-financial factors of motivation	Pearson Correlation	.568	.371	1
	Sig. (2-tailed)	.054	.157	
	N	12	16	16

*. Correlation is significant at the 0.05 level (2-tailed).

***Source**: Researcher's SPSS 25.0 output, 2018*

4.3.3 Test of Hypothesis three

H_o, 3: Punishment does not significantly affect worker's motivation.

H_A, 3: Punishment significantly affects worker's motivation

Level of significance (α) = 0.05

Table 4.28: t-test result of effect of punishment on worker's motivation

One-Sample Test: Test Value = 3.0						
					95% Confidence Interval of the Difference	
	T	Df	Sig. (2-tailed)	Mean Difference	Lower	Upper
mean responses	-67.716	9	.000	-1.74200	-1.8002	-1.6838

***Source**: Researcher's computation using SPSS 25.0*

The t-test statistic value of -69.716 and associated probability value of 0.000<0.05 indicates that punishment negatively and significantly affect

tradesmen motivation in construction companies in south east Nigeria. The researcher therefore rejects the null hypothesis and upholds the alternative.

4.4 A Multiple Regression Model of Motivation for Labour Productivity

4.3.1 Basic Assumption

An "Appropriate model on the productivity of tradesmen" in the study area was developed based on the following assumptions:

i. The labour productivity rates used were measured on the basis of Theoretical Framework earlier espoused in Chapter Two.

ii. The established standard time and standard output from past studies used reflects on the prevailing site conditions in the study area.

iii. Wage rates used for determination of equitable wage expresses the qualitative and quantitative characteristics of labour.

iv. Coefficient of timely payment of wage for the model is based on the assumption that tradesmen are paid on or after their due date of payment.

v. Coefficient of equitable wage is also calculated on assumption that payment of wage to tradesmen can either be perceived by them as equitable or inequitable due to under payment.

Thus, it developed a model using the mathematical relationship:

$$Y = f(X_1, X_2, X_3, \varepsilon) \qquad \ldots\ldots 4.1$$

where,

Y is the level of labour productivity of building tradesmen determined from the impact of the motivational variables which have the most relative positive impact on labour productivity expressed as: $f[C + (\alpha\beta\gamma\sum_{i=1}^{n} X_i)]$. The level at which Y yields maximum result is said to be optimum or appropriate.

The result of motivation of workmen is an improvement on the level of their productivity. Thus, the measure of the positive impact of motivational variables could be expressed as:

$$Y_{opt(max)} = C + \alpha X_1 + \beta X_2 + \gamma X_3 + \varepsilon \quad \ldots\ldots. 4.2$$

C is a constant, while X_1, X_2, and X_3 are motivational variables which impact most positively on the productivity of tradesmen. From the results of the study, some motivational variables were found to have profound impact on the productivity of tradesmen in study area in order of preponderance. They include (i) Timely payment of earned wages, (ii) Equitable wage, and (iii) extra allowance (Bonus), such that the model is represented thus:

$$LP = C + \alpha TP + \beta EW + \gamma EA + \varepsilon \quad \ldots\ldots. 4.3$$

where,

LP stands for Labour Productivity;

TP stands for timely payment of earned wages;

EW stands for equitable wage;

EA stands for extra allowance (or bonus)

$\alpha, \beta, and\ \gamma$ are coefficients of timely payment of earned wages, equitable wage, and extra allowance (bonus), respectively; ε is the error associated with the model.

Timely payment of earned wages is expressed through a coefficient of timely payment- αi ($0 \leq \alpha \leq 1$). When wages are paid as at when due, α = 1; otherwise α<1, the exact value depending on the length of time delay of payment was made. The exact value of the coefficient α is calculated as follows:

$$\alpha = \frac{Date\ payment\ was\ due}{Actual\ date\ of\ payment} \quad \ldots\ldots\ldots\ldots 4.4$$

For example, if the date payment of wages was on the June 30, but for any reason it was delayed till July 5, the value of α will be:

$$\alpha = \frac{30}{35} = 0.86$$

Therefore, the corresponding productivity as a result of late payment will therefore assume the level:

$$LP_{lp} = C + \alpha TP \qquad \ldots\ldots 4.5$$

Equitable wage on the other hand will be expressed through a coefficient of equitable wage which is expressed as:

$$\beta i \ (0 \leq \ \beta \leq 1 \ ) \qquad \ldots\ldots\ldots 4.6$$

When wages are equitable, $\beta = 1$; otherwise $\beta < 1$. The exact value of β is calculated as follows:

$$\beta = \frac{Actual wage\ paid}{Equitable\ wage} \qquad \ldots\ldots 4.7$$

Equitable wage rate is calculated through wage coefficients using the formula below:

$$Wi = \frac{Ri}{Sop} \qquad \ldots\ldots 4.8$$

In order to apply Eq. (4.7), use is made of the established wage tariff for various categories of tradesmen as shown in table 2.5 and 2.6. For example, if two masons in grade levels I and II executed a job worth of N2000. Using the wage tariff in table 2.6, their equitable shares are calculated as follows:

$$\frac{0.406}{0.825} \text{ X } 2000 = N984.24$$

$$\frac{0.419}{0.825} \text{ X } 2000 = N1015.76$$

If the contractor decides to pay N1000 each, this results in inequitable wage for both of them (over compensation for the mason in grade one category and under compensation for the mason in grade two categories).

To calculate the coefficient of equitable wage using the model:

$$\beta = \frac{Actual\,wage\,paid}{Equitable\,wage}$$

$$\beta = \frac{N1000}{1015.76} = 0.98$$

Corresponding productivity as a result of inequitable wage will be:

$$LP_{ie} = C + \beta EW \qquad \ldots\ldots 4.9$$

The joint impact of these two key motivational variables, namely timely payment of wages and the payment of equitable wage rate which, according to the result of this research have the most profound impact on the level of productivity Y is determined using the developed Motivational Model as expressed in Eq.(2.26). Thus, for the given example, the resulting productivity level of the case study category of mason will be:

$LP_{ap} = \alpha$ x $\beta \sum_{i=1}^{n} xi$ = 0.86x 0.98Y = 0.84x 1.5m^2 (1.5 is the established standard output of mason / hour) = 1.26m^2 / hour of block work, which is equivalent to 9x1.26m^2 = 11.34 clay blocks/hour.

Accept 11No. of Blocks, or 11x8=88 No. of clay blocks per day.

The model has shown that this productivity is inappropriate because it is below the established standard which ought to have been 108No. of clay blocks per man day, due to delay in payment and inequitable wage. This will help management to do the needful in order to achieve optimum productivity for effective delivery of the project.

Bonus is also expressed through a coefficient of Bonus which is expressed as:

$$y\ (0 \leq \ y \leq 1\ )$$

When Bonus is correctly paid y = 1; otherwise y < 1. The exact value of y is calculated as follows:

$$y = \frac{Actual\ Bonus\ Amount\ Paid}{Correct\ Bonus\ Amount} \quad \text{..... 4.9}$$

Payment of Bonus is computed by finding the difference between the actual output due to prevailing condition at work place and that based on the established standard output, and dividing the difference between the standard output and multiplying by the actual wage paid. This can be represented mathematically by the formula below:

$$B = \frac{Aop - Sop}{Sop} * wage \quad \text{..... 4.10}$$

Where

$A_{op,}$ = Actual Output and S_{op} = Standard Output, B = Bonus

For example, if the actual output of a mason who earns N2000 is $13m^2$, then the bonus payable to him is:

$$B = \frac{13-12}{12} * 2000 = N166.66$$

Accept B = N166.66 to be paid as additional earning to the mason over and above what he would have earned as for the day.

If the contractor pays N100 as bonus instead of N166.66, then y is calculated as,

$$y = \frac{150}{166.66} = 0.9$$

Corresponding productivity as a result of incorrect bonus will be:

$$LP_{ib} = C + yEA \quad \text{..... 4.11}$$

The joint impact of these three key motivational variables, namely timely payment of wages and the payment of equitable wage rate and bonus which, according to the result of this research have the most profound impact on the level of productivity LP is determined using the developed Motivational Model as expressed in Eq.(4.12) using the labour constant in table 4.29 (16.89 unit/m^2)

$$LP = 16.89 + 0.86TP + 0.98EW + 0.9EA \quad \ldots\ldots 4.12$$

Table 4.29: Labour Productivity rate of Steel fitting building process per man hour

S/N	Building Process	Unit	St (h/unit)	Sop(unit/m-h)	Date payment is Due	Date Payment is made
1	Cut and bend 10mm diameter high yield bars as stirrup	No	0.059	16.89	June 30th	July 10th

Source: Adapted from Ngwu, 2014.

The benefit from the application of this model is that it serves as a handy barometer in gauging accurately the immediate effect which delay in the payment of wages and inequitable wage rates may have on the productivity of workers in a building project. The model can also be used to predict the positive effects of timely payment of wages, equitable wage and correct bonus amounts on labour productivity. It is expected that this model will go a long way in responsive labour management, thereby creating healthy relationship between the management and workers in general, with the concomitant effect of enhancing the productivity of labour for the desired effective project delivery.

4.3.2 Application of the Developed Motivational Model

In order to apply this model, the following procedures should be followed:

i. Establish own S_t and S_{op} (Labour Constants) for the organisation as explained in the Theoretical Framework. However, use the existing standard where it exists as in Tables 2.8-2.10 for the categories of tradesmen involved;

ii. Compute the values of the coefficients of timely payment of wages and equitable wage rates α and β respectively;

iii. Compute joint effect of timely or late payment of workmen and equitable or non-equitable wage rates on the productivity;

i. Determine the nominal (standard) and the actual level of productivity Y_s and Y_a respectively;

v. Compute the value of payable bonus, if applicable.

vi. Compute joint effect of timely or late payment of workmen and equitable or non-equitable wage rates, correct or incorrect bonus on the productivity;

****CAUTION****

This Model is at this stage Hypothetical and should be applied with caution.

CHAPTER FIVE

SUMMARY OF FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

5.1 Summary of Findings

The results from this research has been presented and analysed in Chapter four. The following are key findings:

i. Financial motivation affects tradesmen's performance more than non-financial motivation.

ii. Prompt payment of wages was one of the most significant financial motivations that affect tradesmen's performance. Other financial motivations that affect tradesmen's performances significantly include; equitable wage, progressive wage, high wage rate and other allowances.

iii. Management are faced with a lot of challenges which limit their efforts towards employee motivation. The highest challenge facing them is poor financial strength. Other challenges facing them are: hiring the wrong people from the start, diverse workforce, prolonged decision making, company's expenditure and market changes.

iv. Poor motivation of tradesmen significantly affect project delivery by affecting tradesmen performance and can result to low productivity, high labour turnover, delay in task completion and poor quality of work on their parts.

v. There is no significant difference in the mean response of the three groups of respondents on the factors that affect their productivity with unfair wage, lack of motivation and poor level of skill being the most serious factors.

vi. Punishment negatively and significantly affects tradesmen's motivation.

vii. Poor motivation significantly affects tradesmen attitude to work.

5.2 Conclusions

Financial variables based motivation of tradesmen is very effective in construction project delivery. Building tradesmen are human beings and not machines; they have feelings and react to presence or absence of motivational variables especially the financial variables.

Poor Financial strength is one of the most serious challenges faced by management regarding the financial motivation of their employees, for effective project delivery.

Poor motivation of tradesmen by management results in a negative work attitude of employees thereby affecting performance and poor performance by tradesmen affects the overall project delivery success as perceived by management.

Some factors can seriously demotivate tradesmen from performing well on their jobs and include: Inequitable wage; allowance denial; late payment of wage; lack of respect from supervisors and unfair weather.

Punishment has a negative effect on work motivation of tradesmen for improved productivity.

Finally, the research also concluded that, there is a significant relationship between motivation and effective project delivery.

Consequently, the research successfully achieved the following objectives from the results of the analyses done:

i. Identified and ranked the factors that motivate building tradesmen for effective project delivery for financial and non-financial factors as shown in Tables 4.11 and 4.13 respectively.

ii. Identified and ranked the factors inhibiting management efforts towards tradesmen motivation as shown in Table 4.16.

iii. Identified the implications of poor motivation of tradesmen on their attitude to work as shown in table 4.21, which in turn affects their performance which can result to negative effects on project delivery as ranked by management in table 4.20.

iv. The study developed a motivational model based on prompt payment of wage and equitable wage, which can be used by management for improving productivity of tradesmen.

The tradesmen motivational model developed in this study [$LP=C + \alpha TP + \beta EW + \gamma EA + \varepsilon$] can be effectively used in responsive labour management in South East, Nigeria.

The model can be used to predict productivity under timely payment, equitable wage and also calculate the amount payable as bonus.

5.4 Recommendations

i. The study recommends that tradesmen acquire trades certificate for easy placement under relevant grades so that wages can correctly be calculated for a job.

ii. Employers of labour should comply with the existing labour laws in Nigeria like the minimum wage policies and the workmen compensation act.

iii. Construction companies should do their best in making the appointments of their tradesmen a permanent one, as this might make them remain committed to the organization.

v. Construction companies should use financial motivation for their tradesmen.

vi. Management of construction companies should ensure that timely payments are made to their employees and that the payments are equitable. They should also give bonus to the employees whose outputs are higher than that of established standards. They should refer to the wage tariff used in this study for calculation of equitable wage for different grades of tradesmen in their companies.

vi. Managers and supervisors should show respects to their sub-ordinates, even though they pay them well. They should also grant them break at work.

vii. Management should avoid the use of punishment as a motivator in the work place and identify other disciplinary measures.

vii. Management should device a way of managing companies fund to enable them make adequate provisions for employee motivation. They should also

review their recruitment strategy to ensure that the right employees are hired from the beginning.

viii. Since unfair weather is another factor that demotivates employees significantly, management should try as much as possible to execute projects at the time of the year when the weather condition is favourable.

ix. During the time of economic instability in the company, management should communicate with their employees why their income cannot be improved, but, once there is an economic boom, they should quickly reflect it in their wages.

x. The model developed by the research is strongly recommended for effective project delivery.

xi. Government should sometimes offer grants to these companies especially the indigenous ones to help them boost their financial strength.

xii. Government should ensure strict compliance with labour laws in Nigeria by employers of construction labour.

5.5 Contributions to Knowledge

i. The study has successfully built up a model of motivation based on multiple linear regressions for improved productivity of key building tradesmen with emphasis on Equity, Reinforcement and incentive theories.

ii. The Model can be used to predict the level of productivity under timely payment of wages, equitable wage and correct bonus.

iii. The study was able to determine the method of calculating bonus based on tradesmen's output.

iv. The study was able to determine the method of calculating equitable wage rates for different categories of tradesmen both in public and private appointment.

5.6 Areas for Further Study

i. Further studies on the motivation of building construction workers should be extended to other geo-political zones in Nigeria.

ii. A model of motivation for management should be studied in future, as this research only considered tradesmen while building the model.

iii. Further research should identify more factors challenging management efforts towards employee motivation to see whether a strong correlation could be obtained between their efforts and the motivation of their employees.

iv. Further studies should investigate the effects of inequity due to over compensation on tradesmen productivity.

v. Further research should study other trades operatives like tillers, painters, plumbers and electricians.

vi. Further studies should build other models for improving productivity based on Supervision and training.

vii. It strongly recommended that further research be carried out in the entire zone in order to establish Technological Rates/Standards (standard time (S_t) and standard output (S_{op}) for various categories of tradesmen in the zone, which are *sine quo non* for the application of the developed Motivational Model.

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APPENDIX: SPSS RESULT

```
REGRESSION
  /MISSING LISTWISE
  /STATISTICS COEFF OUTS R ANOVA
  /CRITERIA=PIN(.05) POUT(.10)
  /NOORIGIN
  /DEPENDENT Performance
  /METHOD=ENTER Motivation
  /RESIDUALS DURBIN.
```

Regression

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	Financial Motivation[b]	.	Enter

a. Dependent Variable: Performance
b. All requested variables entered.

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.282[a]	.079	-.023	.97289	2.469

a. Predictors: (Constant), Financial Motivation
b. Dependent Variable: Performance

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.733	1	.733	.775	.402[b]
	Residual	8.519	9	.947		
	Total	9.252	10			

a. Dependent Variable: Performance
b. Predictors: (Constant), Financial Motivation

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.234	3.804		.061	.952
	Financial Motivation	.709	.805	.282	.880	.402

a. Dependent Variable: Performance

DEPARTMENT OF BUILDING
FACULTY OF ENVIRONMENTAL SCIENCES
NNAMDI AZIKIWE UNIVERSITY, AWKA
ANAMBRA STATE

QUESTIONNAIRE ON DEVELOPING APPROPRIATE MOTIVATIONAL MODEL FOR THE IMPROVED PRODUCTIVITY OF MAJOR BUILDING TRADESMEN IN SOUTH EAST STATES OF NIGERIA

The above named topic is a student's dissertation topic which is a part of the requirements for completion of Doctor of Philosophy (PhD) program in Construction Management. I shall be grateful if you could assist by supplying the necessary information required in the questionnaire. The information provided will be used mainly for academic purpose.

Thank you for the anticipated cooperation.

Mrs. Ogbuiyi Obianuju Jacinta
Department of Building
Nnamdi Azikiwe University, Awka

SECTION A

DEMOGRAPHIC INFORMATION

Please, tick as appropriate any of the following:

PLACE OF WORK HCL ☐ FCC ☐ CCC ☐ RCC ☐ CGC ☐ NICC ☐ JCC ☐

YEARS OF EXPERIENCE Lessthan10 ☐ 10-20 ☐ 21 -30 ☐ 31-40 ☐ above 40 ☐

LEVEL OF ACADEMIC QUALIFICATION PhD ☐ Msc ☐ Bsc ☐ HND ☐ OND ☐ SSC ☐ FSLC ☐

POSITION IN THE COMPANY MGT ☐ Craftsman ☐ FOREMAN ☐

PROFESSION OF MGT STAFF BLD ☐ ENG. ☐ Q.SURV. ☐ ARC. ☐ OTHERS ☐

TYPE OF BUILDING TRADE CAPENTRY ☐ MASONRY ☐ STEEL FITTINGS ☐

AVERAGE ANNUAL INCOME Less than 500000 ☐ 500000 – 1M ☐ 1.1M – 2M ☐ Above 2M ☐

NATURE OF APPOINTMENT PERMANENT ☐ TEMPORARY ☐ CONTRACT ☐

NATURE OF APPRENTICESHIP TEC H COLLEGE ☐ NDE ☐ PRIVATE ☐ ON THE JOB TRAINING

GRADE OF TEST GRADE 1 ☐ GRADE 2 ☐ GRADE 3 ☐ NONE ☐

*** Legend**: HCL- Hammakkop Consortium Limited, FCC- Fancee Construction Construction Company, CCC: Consolidated Construction Company, RCC- Reynold Construction Company, CGC- Chinese Government Company, NICC- New Ideas Construction Company, J and J Construction Company. NDE- National Directorate of Employment. BLD-Building. ENG- Engineering. Q. SURV- Quantity Surveying. ARC.- Architecture.

SECTION B

INSTRUCTION

Please kindly rate each of these factors of motivation below in order of importance as a motivator in your work performance. You are to use the following rating scale:

Very important VI (5)
Important I (4)

Undecided UND (3)
Not Important NI (2)
Not very important NVI (1)

FACTORS AFFECTING CRAFTS EMPLOYEES MOTIVATION						
S/N	**FINANCIAL FACTORS**	**VI**	**I**	**UND**	**NI**	**NVI**
1	Cash award					
2	End of the year bonus					
3	Leave allowance					
4	Transport allowance					
5	Housing Allowance					
6	Hazard allowance					
7	Overtime with pay					
8	Vehicle loan					
9	Accident insurance					
10	Gratuity/ Retirement award					
11	Hospital allowance					
12	Tools allowance					
13	High Wage rate					
14	Equitable wage					
15	Prompt wage payment					
16	Progressive wage					
17	Lunch allowance					

FACTORS AFFECTING CRAFTS EMPLOYEES MOTIVATION						
		LIKERT RATING				
S/N	**NON-FINANCIAL FACTORS**	**VI**	**I**	**UND**	**NI**	**NVI**
1	Promotion opportunity					
2	Job security					
3	Praise					
4	Recognition					
5	Training					
6	Involvement in decision making					
7	Supervision					
8	Safety on site					
9	Adequate working environment					
10	Tools/Equipment provision					
11	Respect from supervisors					

12	Good relationship with co-workers					
13	Amount of Freedom at work					
14	Opportunity to learn new things					
15	Holidays and Free time					
16	Break at work					

SECTION C

Please rank the financial and Non-financial factors of motivation below in your order of preferences. You are to use the following rating scale:

Strongly preferred SP (5)
Preferred P (4)
Undecided UND (3)
Not preferred NP (2)
Strongly not preferred SNP (1)

FACTORS OF MOTIVATION PREFERED BEST BY CRAFTS EMPLOYEES						
		LIKERT RATING				
S/N	**FACTORS**	**SP**	**P**	**UND**	**NP**	**SNP**
1	FINANCIAL					
2	NON-FINANCIAL					

SECTION D (FOR MANAGEMENT STAFF ONLY)

Please rank the following factors challenging management effort towards employee motivation in order of degree of its challenge. Use the following rating scale:

Most challenging MC (5)
Challenging C (4)
Undecided UND (3)
Not challenging NC (2)
Not very challenging NVC (1)

FACTORS CHALLENGING MANAGEMENT EFFORT WITH RESPECT TO MOTIVATION						
		LIKERT RATING				
S/N	CHALLENGES OF MGT	MC	C	UND	NC	NVC
1	Hiring the wrong people from the start					
2	Poor financial strength					
3	Company's expenditure					
4	Prolonged decision making					
5	short nature of projects					
6	over minimization of resource					
7	Market changes					
8	Low self-confidence of employees					
9	Lack of interest					
10	low expectation for success					
11	Achievement anxiety of employees					
12	Fear of failure					
13	Attitude Problem of the employee					
14	Diverse work force					

SECTION E

Please rank the following demotivation factors in order of their effect on your work performance. Kindly use the following rating scale:

Strongly demotivating SD (5)
Demotivating D (4)
Undecided UND (3)
Not demotivating ND (2)
Strongly not demotivating (1)

FACTORS DEMOTIVATING CRAFTS EMPLOYEES PERFORMANCE						
		LIKERT RATING				
S/N	DEMOTIVATING FACTORS	SD	D	UND	ND	SND
1	Inequitable wage	5	4	3	2	1
2	Late payment of wages					
3	Absence of breaks and free time					
4	Allowance denial					
5	Poor job security					
6	Lack of respect from supervisors					
7	Lack of recognition					
8	Poor working environment					
9	Lack of training					
10	Unfair weather					

SECTION F

Do you agree that punishment is a motivator in your work performance? Kindly use the following rating scale:

Strongly Agree SA (5)
Agree A (4)
Undecided UND (3)
Disagree DA (2)
Strongly Disagree SA (1)

PUNISHMENT FACTORS AFFECTING EMPLOYEE MOTIVATION						
S/N	**PUNISHMENT FACTORS AFFECTING EMPLOYEE MOTIVATION**	**LIKERT RATING**				
		SA	**A**	**UND**	**DA**	**SA**
1	Oral warning					
2	Written warning					
3	Cash penalty					
4	Issuance of Query					
5	Reduction of pay					
6	Demotion					
7	Work overload without pay					
8	Overtime without pay					
9	Suspension					
10	Dismissal					

SECTION G (FOR MANAGEMENT STAFF ONLY)

Do you agree that poor employee performance can have the following effects listed on the table below on project delivery success? Kindly use the following rating scale:

Strongly Agree SA (5)
Agree A (4)
Undecided UND (3)
Disagree DA (2)
Strongly disagree SA (1)

EEFECTS OF POOR EMPLOYEES PERFORMANCE ON PROJECT DELIVERY SUCCESS						
S/N	**EFFECTS**	**LIKERT RATING**				
		SA	**A**	**UND**	**DA**	**SD**
1	Diminishing client relationship					
2	Delay in project completion					
3	Low productivity					
4	Dissatisfied client					
5	Poor quality of work					
6	Increased material wastage					
7	Increased project cost					
8	Disputes and litigation					
9	Project abandonment					

SECTION H: Effects of poor motivation on employee's work attitude

Can poor motivation affect your work attitude in the ways listed on the table below? Rank your extent of agreement using the following rating scale:

Strongly Agree SA (5)
Agree A (4)
Undecided UND (3)
Disagree DA (2)
Strongly disagree SA (1)

SN	EFFECTS	5	4	3	2	1
		SA	A	UND	DA	SDA
1	Lack of commitment					
2	Unhappy craftsmen					
3	Lack of interest					
4	Increased absenteeism					
5	Increased turnover					
6	Delay in completing a task					
7	Low productivity					
8	Poor quality of work					
9	Increased material wastage					
10	Lateness to work					

SECTION I

Please kindly rank the following factors affecting productivity. Kindly use the following rating scale:

Strongly Agree SA (5)
Agree A (4)
Undecided UND (3)
Disagree DA (2)
Strongly Disagree SDA (1)

SN	FACTORS AFFECTING PRODUCTIVITY	5	4	3	2	1
		SA	A	UND	DA	SDA
1	Lack of Supervision					
2	Poor Company's policy					
3	Lack of Punishment					
4	Low level of skill					
5	Lack of Motivation					
6	Non-availability of materials					
7	Lack of Tools and equipment provision					
8	Bad site access					
9	Lack of Experience					
10	Absence Information and feedback					
11	Unfair wage					
12	Inclement weather					