

**CAPACITY UTILIZATION OF CONSTRUCTION
CRAFTSMEN IN PUBLIC SECTOR IN NORTH CENTRAL
ZONE OF NIGERIA**

**PHILIP OLAYEMI LAWAL
(BSc, MSc,
PGES/UJ/11936/00**

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DECLARATION

I, hereby declare that this work is the product of my own research efforts, undertaken under the supervision of Professor J. O. Kolawole and has not been presented elsewhere for the award of a degree or certificate. All sources have been duly distinguished and appropriately acknowledged.

Student's signature & Date.
PHILIP OLAYEMI LAWAL, PGES/UJ/11936/00

CERTIFICATION

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DEDICATION

This work is dedicated to the absolute Philosopher who was, is and ever shall be, the ONLY WISE GOD. It is also dedicated to all construction craftsmen in Nigeria.

TABLE OF CONTENTS

DECLARATION	ii
CERTIFICATION	iii
ACKNOWLEDGEMENT	iv
DEDICATION	vi
ABSTRACT	xiv

CHAPTER ONE

	page
INTRODUCTION	
1.1 BACKGROUND OF THE STUDY	1
1.2 STATEMENT OF THE STUDY PROBLEM	3
1.3 AIM AND OBJECTIVES OF THE RESEARCH	4
1.3.1 Aim of the Study	4
1.3.2 The Objectives of the Study	4
1.4 RESEARCH HYPOTHESES	5
1.5 JUSTIFICATION FOR THE STUDY	6
1.6 SCOPE AND LIMITATION	7
1.7 ASSUMPTIONS OF THE STUDY	8
1.8 THEORETICAL FRAMEWORK	8
1.8.1 Output-Oriented Technical Efficiency	11
1.8.2 Input-Oriented Technical Efficiency	13
1.8.3 Production Functions	14

CHAPTER TWO

LITERATURE REVIEW

2.1	CONCEPTS OF PRODUCTIVITY AND CAPACITY UTILISATION	18
2.1.1	Definition of Key Terms	18
2.2	PRODUCTIVITY APPRAISAL	24
2.3	MEASUREMENT OF CAPACITY UTILISATION	25
2.3.1	Prima-based Capacity and Capacity Utilization	26
2.4	THE EMERGENCE OF WAGE EMPLOYMENT IN NIGERIA	26
2.5	THE IMPORTANCE AND FUNCTIONS OF WAGES	27
2.6	ECONOMIC POLICY OF NIGERIAN GOVERNMENT	29
2.7	WAGE DETERMINATION POLICY IN NIGERIA	30
2.7.1	Wage Fixing	30
2.7.2	General Levels of Wages in Private/Public Sectors	32
2.7.3	Wage Structures	32
2.8	WAGE POLICY INSTRUMENTS	34
2.9	CHARACTERISTICS OF THE CONSTRUCTION INDUSTRY LABOUR MARKET	36
2.9.1	Peculiar Characteristics of the Construction Industry	38
2.9.2	The Economy of Labour	42
2.9.3	Labour Demand Characteristics	42
2.9.4	Labour Supply Characteristics	42
2.9.5	Labour Market Benchmarking	43
2.10	MOBILITY OF CONSTRUCTION WORKERS	44
2.11	CONTRIBUTIONS OF CONSTRUCTION SECTOR TO CAPITAL FORMATION and GROSS DEVELOPMENT PRODUCTS	45
2.12	PECULIARITY OF CONSTRUCTION LABOUR MOTIVATORS	49

2.13	LABOUR PRODUCTIVITY IN THE NIGERIAN CONSTRUCTION INDUSTRY	50
2.14	PRIVATIZATION OPTIONS FOR THE PUBLIC ENTERPRISES	52
CHAPTER THREE		
METHODOLOGY		
3.1	SOURCES OF DATA	56
3.2	TYPES OF DATA	57
3.2.1	Demographic Variables	58
3.2.2	Working Experience Characteristics	58
3.2.3	Socio-economic Variables	59
3.2.4	Occupational Variables	60
3.2.5	Variables Indicating Levels of Motivation	61
3.3	PROCEDURES OF DATA COLLECTION	62
3.3.1	Instruments of the Survey	62
3.3.2	The Field Work Procedure	64
3.4	RESEARCH POPULATION/ SAMPLE FRAME	65
3.4.1	The Target Population of the Study Area	66
3.4.2	Sample Size	67
3.5	PROBLEMS OF DATA COLLECTION	68
3.6	RELIABILITY OF DATA	68
3.7	PILOT STUDY	69
3.7.1	Pre-testing of the Questionnaire	71
3.8	SURVEY POPULATION	73
3.9	METHODS OF DATA ANALYSIS	75
3.9.1	Statistical Tests	75

CHAPTER FOUR

DATA ANALYSIS AND PRESENTATION OF RESULTS

4.1	CHARACTERISTICS OF THE CRAFTSMEN	79
4.1.1	Demographic and Educational	79
4.1.2	Level of Utilization Characteristics	81
4.2	METHODS OF ANALYSIS	81
4.2.1	Values of Work Done Per Annum	82
4.2.2	Annual Costs of Labour Input Per Department	84
4.2.3	Performance Averages	85
4.2.4	Relative Returns of Employer's Investment	95
4.2.5	Regression Analysis	100
4.2.6	Productivity Ratings by the Supervisor	106
4.2.7	Productivity Ratings Observed	108
4.2.8	Correlation Analysis	110
4.2.9	Analysis of Variance	110

CHAPTER FIVE

DISCUSSION OF FINDINGS

5.1	DEMOGRAPHIC AND EDUCATIONAL CHARACTERISTICS	113
5.2	SOCIO-ECONOMIC CHARACTERISTICS	114
5.3	WORKERS' PRODUCTIVITY LEVEL	115

CHAPTER SIX

SUMMARY, CONCLUSION AND RECOMMENDATIONS

6.1	SUMMARY	118
6.2	CONCLUSION	120
6.3	RECOMMENDATIONS FOR FURTHER RESEARCH	122

6.4 CONTRIBUTIONS TO KNOWLEDGE	123
REFERENCES	124
APPENDIX A QUESTIONNAIRE	132
APPENDIX B FIELD DATA AND ANALYSES	141
APPENDIX C PUBLICATION FROM THE WORK	158

LIST OF TABLES

	Page
1. Capacity Utilization of the Nigerian Manufacturing Sector	23
2. Compositions of Nigerian Fixed Capital Formation	46
3. Some Indicators of Nigerian Economy	47
4. A Pilot Survey of Private Sector Construction Operatives Wages	70
5. Comparison of Wages of Craftsmen	72
6a. Distribution of Federal Ministries Craftsmen groups by Salary Levels	74
6b. Distribution of State Ministries Craftsmen groups by Salary Levels	74
7. Distribution of Sampled Craftsmen by Trade Grouping	80
8. Values of Work done annually by Each Department	83
9. Departmental Annual Labour Input Costs	86
10. Averages of departmental Annual Labour Input/Output Values	88
11. Relative Return of the Employer's Investment on Labour	96
12. Average Relative Returns of Each Federal Departments in ten years	99
13. Regression of Federal Departments per Annum	101
14. Productivity of the Craftsmen – As rated by the Supervisors	107
15. Productivity as Observed	109
16. Correlation Analysis of Productivity Ratings	111
17. ANOVA of Means	112

LIST OF FIGURES

	Page
1. All Departments Average Annual Labour Input/output Values	91
2. Federal Departments Average Annual Labour Input/output Values	93
3. State Departments Average Annual Labour Input/output Values	94

ABSTRACT

The research examined the utilization levels of the capacities of the construction craftsmen in the public sector of the Nigerian economy sequel to speculations that construction craftsmen in the public sector have low level work output. The issue of work output borders on labour capacity utilization. Craftsmen in the public sector were identified in the study and the extent to which their services were utilized by the employing departments was verified over a ten-year period. The research was focused at generating information that can be used to improve on usage of labour resource in the construction industry. The objectives include generating distribution of craftsmen by skill, determining the relationship between annual labour output and input of each department and making appropriate recommendations. Literatures on construction labour economy were reviewed. The methodology entails a pilot study comparing the wages operating in the public with the private sector, data collected were sourced by questionnaire and historical records. Samples were collected from State and Federal Ministries of Works in Kwara, Niger and Plateau States. Data on number of craftsmen per salary grade level per department were collected from registry department of each ministry for a ten-year period. Different sets of structured questionnaire were served on the craftsmen and their supervisors. The statistical techniques used to analyse the data include percentages, averages, linear regression, correlation analyses and analyses of variance (ANOVA). All the four departments of the Ministry were covered by the research. Results revealed that craftsmen were unequally represented by gender with 92.5% male; 81.5% were between 30 and 50 years old; their salary clustered in levels 05 to 07; they remain with single employer though they prefer change of employment for better utilization of their skills; they were idle most days of the year for lack of job orders; one reason for insufficient work was that most State Governors/Ministers of Works gave out work on contracts by unorthodox means; The study shows that there was no significant relationship between the work output of the craftsmen in the public service of the zone and the corresponding wages earned. In 87% cases, the employer had negative return of his investments on the craftsmen. Productivity was higher generally in the federal ministry than in the state. The perception of the departmental heads on the level of achievement of the annual production plans of the departments was in line with the calculated productivity ratings. Productivity ratings for the craftsmen category were created as an attempt to assist the government in the human resource planning requirement of this group. It was envisaged that the study will assist the Nigerian government in the human resources planning for the construction industry to cater for the needs of the various government establishments in direct labour project executions.

CHAPTER ONE

INTRODUCTION

1.1 BACKGROUND OF THE STUDY

The issues of labour are vital and sensitive to the economic growth of any nation. No nation can do without labour resource. Even in developed economies no matter the level of automation of their industries, labour force still remains the single most important factor of production (Woodgate, 1991; Mansfield & Odeh, 1991 and Kolawole & Boison, 1999). Though most, if not all, of the various industries of a developing economy are labour dependent, construction industry is especially labour dependent and labour intensive.

The Nigerian economy being a developing one is generally more labour dependent than machine dependent (World Bank, 1984). The Construction Industry's contribution to the national output of Nigeria, in terms of fixed capital formation and the Gross National Product (GNP), is as high as 10 to 20 per cent (United Nations, 1976). Various researchers reported diverse percentages of the GNP for the industry in Nigeria. For instance, Jagboro (1989), reported 14 per cent, while Mogbo (2000), reported 11 per cent. These are in line with the global contribution of the industry to the Gross National Product, which is taken to be worth ₦350 trillion and accounting for 10 – 15 per cent of gross national products (Mogbo, 2002). It is therefore certain that the industry is basically a large contributor to the economic growth of Nigeria.

Aggregating all construction site labour forces in Nigeria together would indicate that a large proportion of the total working population of the country is involved. Indeed the National Population Commission

(NPC), the Federal Office of Statistics (FOS), the Nigerian second and third national development plans put the population proportion of this group of the workforce in Nigeria as third after those of Agricultural workers and Sales workers respectively (NPC, 1998 and FOS, 1999). Andawei (2002) is of the opinion that the Building and Construction Industry in Nigeria is the largest employer of labour. Olaloku (1987) quantitatively put the employment figure for the Building and Construction industry as close to a third of the total workforce. The industry participants who, though are from diverse disciplines, are mainly tradesmen and unskilled labourers.

The productive sector of the Nigerian economy is suspiciously bedevilled with under employment of its labour resources resulting in low productivity as noted by various observers (Okwa, 1981 and Akerele, 1991). The poor performance cuts across both the public and the private sectors (FOS, 1997a). However, utilization of the public sector labour force is far below expectations (ASCSN, 2001). Moreover the public sector salary and wages structure forms the basis for the private sector wage structure. Sobowale (2000) observed that capacity utilization of the manufacturing industry in Nigeria had been on the 30 per cent average since the introduction of Structural Adjustment Programmes (SAP) in 1986. Olawole (2000) opined that the involvement of the public sector in entrepreneurship is usually ideological.

It is understood that the three levels of government – Federal, State and Local governments – established Public Works Departments (PWD), currently known as Ministry of Works, recruited and trained employees with the main aim that such employees' skills would be optimally utilised to justify the investment on them. It is none-the-less appreciated that

optimum utilisation of labour resource is not the sole reason for employment in the public sector. That is, the promotion of employment in the public sector should be seen as a means of improving social conditions and social integration, and not solely or simply as a means of meeting the economic or political objectives of the employer (ILO, 2001).

1.2 STATEMENT OF THE PROBLEM

It is generally held that in Nigeria, the construction workers in the public service, like most workers of the public service, have almost zero productivity (Akerele, 1991 and ASCSN, 2001). This opinion portrays under-utilization (or ineffective utilization) of the public service labour force. However the up to date knowledge of the level of capacity utilisations of the craftsmen in the Nigerian building and construction industry is limited. At the moment, there is inadequate information of the population of the craftsmen in the public sector. The proportional representation by sex, ages and the working experiences of these craftsmen are not known. If the production capacity of the workers is underutilised, some issues are raised which require further probing into. It would be appropriate to examine if the production plan had sufficient work or not for the craftsmen; any year that the plan was not achieved what the likely factor was responsible for that. Other available means of executing the production plans without involving the craftsmen require examination and the implication of this approach to the plan execution.

It can be said that very little is known of the level of utilisation of the construction craftsmen in the public sector of the Nigerian economy. Yet proper labour capacity utilization is directly related to the economic

growth of Nigeria. Further still, Kolawole and Frank (1999) observed that effective utilisation of manpower leads to employment expansion.

The data gathered constitute useful inputs in the determination of:

- (i) priority scales of factors for consideration in recruitment drive for public sector construction craftsmen,
- (ii) optimal ways of utilising the skills of the craftsmen.

The problem of the study is summarised as follows:

1. What the level of utilization of the capacities of the public sector construction craftsmen is
2. What the pattern or characterisation of the utilization of the craftsmen capacities are.
3. Probing of whether the craftsmen are satisfied with the work situation or not.

The results of this study will be useful for those working on improvement of human resources utilisation in a developing economy.

1.3 AIM AND OBJECTIVES OF THE RESEARCH

1.3.1 AIM OF THE STUDY

The aim of the study is to generate labour resource information which will enhance its effective and efficient use in the Nigerian Construction Industry.

1.3.2 THE OBJECTIVES OF THE STUDY

The objectives of the study include:

- i. analysing the demographic/educational characteristics of the construction craftsmen in the public sector.
- ii. quantifying and analyse the departmental annual labour wages and the corresponding production values.
- iii. recommending appropriate ways of utilising the services of the craftsmen.

1.4 RESEARCH HYPOTHESES

While variations in labour input costs or in labour output values are also a measure of variability of usage of labour, values of labour outputs are a measure of the level of utilization of labour. The hypotheses for the study are as follows:

1. H_0 . There is no significant difference between the values of labour input and output among the departments.

H_1 . There are significant differences in the values of labour input and output

among the departments.

2. H_0 . There is no significant difference between the values of departmental productivity ratings by the supervisors and the productivity calculated.

H_1 . There are significant differences between the values of departmental productivity ratings by the supervisors and the productivity calculated.

1.5 JUSTIFICATION FOR THE STUDY

Optimally utilised workforce is a sign of positive development for any community or nation and an indication of economic independence and development (Okwa, 1981).

An unbiased assessment of public sector performance would involve comparison of the expenditure of the employer on labour resource with the benefits derived by the employer; that is, comparing labour input with labour output. It is understood that benefits are not necessarily all embedded in the output of the workers, especially for the public sector situation. Output however, has a significant relationship with capacity utilisation.

A casual observation of the main workforce of the operational departments (craftsmen) of any State or Federal Ministry of Works, Housing and Urban Development in Nigeria would most likely show that the workers are idle for most of a working day. The craftsmen report for work normally in the morning but by the third hour of the start of work, they have all disappeared leaving only the yard superintendent (YS) behind with the administrative staff. They (the craftsmen) have gone in search of work outside for immediate financial reward.

Whereas staffs of other departments such as Administration and Accounting are relatively busy all the year round. The staffs of the Accounting department are fully occupied all the days of the week preceding, and the week of payment of salary of the staff of the ministry. The workers of the Administrative department are occupied with meetings

and memo writings on various aspects of the existence of the human resources of the ministry. They spend most of the time taking decisions on matters of appointments, promotions, selections, training and retirements of workers of all the departments of the ministry.

The sensitively high contribution of the construction sector to the GDP of the economy coupled with the fact that not much exploration has been done in the sector's labour capacity utilisation and welfare (Emiola, 1982), makes this research a necessity. The research would be of use to the policy makers in the public sector in the area of policy formulation on labour recruitment and management. Furthermore, the study is urgently required as the Nigerian government has just created a road maintenance agency called Federal Road Maintenance Agency (FERMA) out of the Highway department of the Federal Ministry of Works. Such agency is required to optimise its use of labour. The study is to provide an insight into factors that account for the variation in characteristics and utilization of construction craftsmen in the Nigerian public sector. Moreover the study of utilisation of construction labour is likely to have a significant impact on improving the Gross Domestic Product (Ameh & Odusami, 2002).

1.6 SCOPE AND LIMITATION

The primary focus of this research is the optimum utilisation of labour service in construction industry. The limitation to the public service is due to the availability and near-uniformity of the following; data on wages, educational background, nature or type of employment (which is generally

tenure) and the conditions of employment of the craftsmen in the service, quantifiable total annual work output of the site operatives, near-uniform conditions of service and measurable quality and quantity of work output. Even though the public sector comprises of the ministries, parastatals and agencies, the study is limited to the Ministry of Works and Housing at both the state and federal levels, primarily because the craftsmen in the public sector are mainly in the Ministry of Works and Housing..

1.7 ASSUMPTIONS OF THE STUDY

The frequency, quantum and pattern of utilisation of the craftsmen capacities in the public service are not the same, among the department in the same establishment; and also in similar departments of the various establishments.

Though individual craftsmen got promoted at various times during the ten-year period covered by the study, the number of craftsmen on any particular salary grade level in each department remained constant. Neither the various wage increases that were carried out during the period covered by the study, the inflationary trends nor devaluations of the Nigerian currency, the naira, have any significant negative effect on the outcome of the research.

1.8 THEORETICAL FRAMEWORK

Characteristics and level of utilisation of any resource is directly related to economic (and technological) growth worldwide. The advanced countries show leadership in technology and dominance of the world

(economic) market, all because of proper utilisation of their productive capacities (Akerlele, 1991). Underemployment or capacity underutilisation is a problem that aggravates under-development which breeds low living standard. This study is based on the theory that labour output or labour performance is a measure of the efficiency of such labour given that all other resources of production are at their best. That is, labour productivity is said to be optimized when minimum labour input is used to achieve maximum labour output.

One way to avoid underutilisation of capacity of labour resource, when no other resource is in short supply in a work environment is by getting the workers motivated. According to Handy (1985), Fredrick Herzberg discovered nine factors that motivate workers. These he grouped into two, namely, the motivating factors and hygiene factors. Herrzberg (1966) maintained that in any work situation, factors that satisfy can be distinguished from those that dissatisfy. These factors interestingly are not opposites of each other. Dealing with the dissatisfying factors does not turn them into satisfying or motivating factors. In general the satisfiers or Motivating factors include: (i). Achievement, (ii). Recognition, (iii). Works, (iv). Responsibility and (v). Advancement (Handy, 1985). The dissatisfying or Hygiene (also called maintenance) factors are: (i). Working condition, (ii). Salary, (iii). Relationship with supervisor and (iv). Company policy (Handy, 1985).

While the presence of hygiene factors does not positively contribute to motivation, they serve to prevent workers from being dissatisfied. It was found out through experiments carried out by Harris and McCaffer (1985)

that the construction workers appear to concentrate mainly on two of these hygiene factors – salary and company policy.

Schein (1965) classified workers into five categories and in accordance with their attitudes:

- (1) Rational-economic man; Man is primarily motivated by economic needs. He is essentially a passive animal to be manipulated, motivated and controlled by the organization. His feelings are essentially irrational. Fortunately not all men are like this. There are those who are self-motivated, self-controlling and in charge of their emotions.
- (2) Social man; Man is essentially a social animal and gains his basic sense of identity from relationships with others. As a result of the necessary rationalization of work much of the meaning has gone out of work itself and must be sought in the social relationship of the job.
- (3) Self-actualizing man; Man is primarily self-motivated and self-controlled. He seeks to be matured on the job and is capable of being so. External controls and pressures are likely to be seen as reducing his autonomy and therefore will affect his motivation.
- (4) Complex man; Schein originated the concept of complex man that absorbed some of the earlier ideas especially those of Herzberg (Handy, 1985). The concept also made use of later empirical research findings (Armstrong, 1984). The scheme indicates that an individual can usefully be conceived of as a system of biological needs, psychological motives, values and perception. That is to say man is variable. He has many motives which have at any one time a

hierarchy, but the particular hierarchy may change from time to time and from situation to situation. He does not necessarily have to find fulfilment of all his needs in any one situation (Handy, 1985). The scheme further explained that the individual's system operates so as to maintain its internal balance in the face of the demands placed upon that system by external forces. The system develops in response to the man's basic needs to solve the problems presented by his external environment. However, Armstrong (1984) argued that each system will have unique characteristics and supported this assertion with the statement credited to Lawrence and Lorsch (1969) that 'Individual systems are not static but continue to develop as they encounter new problem experiences'.

- (5) Psychological man; Man is a complex, unfolding, maturing organism who passes through physiological and psychological stages of development. Man evolves an ego ideal towards which he strives. The most powerful motivating force in man, over and above such basic drives as hunger, sexuality, aggression, is the need to bring himself closer to his ideal. Work is part of a man's identity, his ego ideal, and opportunities must be provided for man to work towards his ego ideal in work if he is to be 'motivated' (Handy, 1985).

1.8.1 OUTPUT-ORIENTED TECHNICAL EFFICIENCY

Data Envelopment Analysis (DEA) was developed by Charnes, Cooper and Rhodes in 1978 to assess efficiency in many different areas of disciplines or specifically to calculate measures of productive efficiency and output capacity (Walden & Kirkley, 2000). DEA uses linear

programming methods to extract information about the production process of each Decision Making Unit (DMU) (e.g. department). The information extraction is accomplished by calculating a maximum performance measure for each department and comparing this measure to similarly calculated measures for all other departments. Each department's performance measure traces out a best-practice frontier and all DMUs lie either on or below the frontier (Charnes, Cooper, Lewin, & Seiford, 1994).

A best practice frontier maps out the maximum level of output (or minimum level of input) that could be produced (or used) for any given level of input (or output). The analysis is accomplished by requiring solutions that can increase some outputs (or decrease some inputs) without worsening the other inputs or outputs.

Charnes, Cooper and Rhodes (1978) proposed a model which in equation form is as follows

$$\text{Maximize } h_o(u, v) = \frac{\sum r u_r y_{ro}}{\sum i v_i x_{io}}$$

u, v

Such that

$$\frac{\sum r u_r y_{rj}}{\sum i v_i x_{ij}} \leq 1; \text{ for } j = 0, 1, \dots, n$$

Where:

y_{rj} = quantity of output r produced by department j

x_{ij} = quantity of input i produced by department j

u_r = weight for output r and

v_i = weight for input i

The estimated ratio provides a measure of technical efficiency for each DMU.

1.8.2 INPUT –ORIENTED TECHNICAL EFFICIENCY

An input-oriented technical model examines the vector of inputs used in the production of any output bundle, and measure whether a department is using the minimum inputs necessary to produce a given bundle of outputs. Efficiency is measured by the maximum reduction in inputs which will still allow a given output bundle to be produced. Färe, Grosskopf, and Lovell, (1994) proposed input-oriented DEA model to measure technical efficiency as follows:

Minimize λ

λ, z

Such that:

$$U_{jm} \leq \sum_{j=1}^J z_j U_{jm}, \quad m=1,2,\dots, M$$

$$\sum_{j=1}^J z_j X_{jn} \leq \lambda X_{jn}, \quad n=1, 2, \dots, N$$

$$z_j \geq 0, \quad j=1, 2, \dots, J$$

Where:

λ = efficiency measure,

U_{jm} = quantity of output m produced,

X_{jn} = quantity of input n used, and

z_j = intensity variable.

A value of $\lambda = 1.0$ means that a department is considered efficient while a value $\lambda < 1.0$ means a department is inefficient.

It should be noted that a department with capacity utilization, CU of less than one does not necessarily mean the department has excess capacity or is over-capitalized, it simply means the department has the potential for greater production given the capital stock, without having to incur major expenditures for new capital or equipment (Klein & Summers, 1960). When capacity

utilization is less than one, some of the capital stock is not fully utilized while full capital utilization and technical efficiency would yield $Y/Y^* = 1$ (or $Y = Y^*$ where Y = observed output and Y^* maximum potential output). It should be appreciated that for a primal- or technical-based measure, unlike economic- based measure, capacity utilization (CU) cannot exceed one in value.

1.8.3 PRODUCTION FUNCTIONS

The production function or technology describes how service-flows from the stocks of economic inputs are used for producing outputs, subject to, if any, various technological constraints (e g weather and non-discretionary inputs such as age of facilities or capital). In general, the production function or technology should depict the maximum possible physical output. In mathematical form, the production function may be specified as

$$Y = f(K, L, E, M, X, T)$$

Where: Y is output, K is capital, L is the services of labour, E is energy, M stands for Materials, X represents other inputs used to produce Y, and T represents the state of technology. Other inputs could be non-discretionary inputs (NDX); a non-discretionary input is an input that is beyond the control of the supervisor or departmental head. In the short-run, capital is usually fixed, that is, plant size and equipment cannot be increased or decreased.

In construction, the production process is stock-flow, that is, a bundle of inputs is applied to the resource stock to yield a flow of output or serviceable buildings/facilities. Total Productivity, P_t , according to Prokopenko (1987), is measured with the aid of the formula

$$P_t = \frac{O_t}{(L + C + M + Q)},$$

Where: O_t = total output

L = labour input factor

C = capital input factor

M = material and purchased parts

Q = other miscellaneous goods and services input factor.

Productivity indices help to evaluate economic performance and the quality of social and economic policies. However, it is worth noting that appraisal of the public sector productivity takes into consideration factors that are different from those of the private sector.

Input-oriented DEA model is not feasible for the focus of the study, which is the labour resource utilization. Labour input data (wages) are, in reality, not adjusted or varied downward. For the fact that workers may be productive without having their capacities fully utilised; and on the other hand workers may have their capacities fully utilised without being

productive the production function model will not serve the purpose of measuring capacity utilisation.

The handicap in employing the Production Functions formula is contained in the fact that: (i) the capital 'K' and the material & purchased part "M" are not two distinct parameters in the situation of the public sector construction craftsmen in Nigeria as their main jobs are maintenance work; (ii) cost of energy 'E' is borne by the direct consumer of the craftsman's service and it is lumped together with his (consumer's) energy costs in other areas. Thus the production function formula is found to be inappropriate.

The problem of using the Output-oriented technical efficiency formula is embedded in the fact that weightings for the inputs 'v' and the outputs 'u' are highly subjective under the Nigerian working cultural environment. The weights assigned to the domains, and each indicator within the domain, will influence the outcomes of the overall index. Weighting in an index will always be contentious. Judgements about the relative importance of indicators are, by their nature; highly subjective; for example, is an x per cent change in unemployment better than x per cent fall in inactivity?

Weights should be based on a measure of opportunity cost but practical difficulties mean labour market indices have largely confined themselves to equal weights. There is also an issue of compensation. Should high performance in one indicator cancel poor performance in another and, if so, should it be the same in all areas? For example, high income would counteract a negative low human capital effect. If, initially, equal weights are assigned to all variables within the domain and the

domains are also weighted equally, changes in the weighting structure can be employed to analyse the sensitivity of the results to the weighting scheme adopted.

To overcome this problem therefore and make the formula adaptable to the Nigerian situation each of the input and output parameters are given the weighting of 1. Thus the Output-oriented technical efficiency with the modification gives the appropriate model:

$$\text{Capacity Utilisation} = \frac{\sum r_u y_{ro}}{\sum v_i x_{io}} = \frac{\text{OUTPUT}}{\text{INPUT}}.$$

CHAPTER TWO

LITERATURE REVIEW

This chapter critically examined what other previous authors had written on various aspects that relate to the research topic. The relevant subtopics dealt with include; concepts of productivity and capacity utilization, the emergence of wage employment in Nigeria, the importance of wage, economic policy of Nigerian government, characteristics of the construction industry labour market and its contribution to capital formation and labour productivity in the industry.

2.1 CONCEPTS OF PRODUCTIVITY AND CAPACITY UTILIZATION

2.1.1 DEFINITION OF KEY TERMS

Capacity: The maximum amount that can be produced per unit of time with

existing resources, provided that the availability of variable factors of production is not restricted.

Capacity output (Technologically): Potential output that may be equated to a maximal output given the stock of capital, stock of resource, full utilization of the variable factors of production such as the energy, labour, materials and the state of technology.

(Economically): Optimum potential output which could be produced give the capital stock, the technology, input prices, output prices when outputs are not fixed, and technically efficient and fully utilized factors of production as appropriate to achieve maximum profit or minimum cost.

Productivity: Productivity is the relationship between the output generated by a production (or service) system and the input provided to create this output. Productivity value ranges between 0 and 1, no matter the result of the relationship $\frac{OUTPUT}{INPUT}$

It is the efficient use of resources – labour, capital, land, materials, energy and information (Prokopenko, 1987). Two of the various dictionary definitions of productivity are directly relevant to the focus of this study.

i Effectiveness of productive effort

ii The production per unit of effort.

The first is a measure of how well the resources are utilised, while the second is a rate to measure output of the factors of production over a defined period of time.

Okwa (1981), defined the basic concept of productivity as “the degree to which the power to make or provide goods or services having exchange value is utilised as measured by the output from the resource expended”. Levitt (1982) defined productivity as the ratio between the values of a unit of output and the cost of all the inputs. Fenske (1985) further improved on the definition of productivity. He defined it as ‘the amount of goods and services produced by a productive factor in a unit of time’.

The purpose of measuring productivity include, among others, according to Adamu (1991), to see how well something is being done. Productivity measurement is important for the effectiveness of the organisation. It indicates where to look for opportunities to improve and also shows how well improvement efforts are faring. It also helps to identify factors affecting income and investment distribution within

different economic sectors and helps to determine priorities in decision-making (Prokopenko, 1987).

Now, Partial Productivity = Total output / Partial input

While total input includes all factors of production, especially the five M's; that is Money, Manpower, Machine, Material and Management, a partial measure of input accounts for any single factor or an incomplete combination of the factors. Because the only input factor being considered is the labour factor, the productivity in focus here is partial productivity.

Productivity is not one and the same with profitability; for an example, high productivity may not yield high profit because of some other economic factors.

It should however be appreciated that improved productivity is as a result of improvement in any, some or all of the factors of production. While productivity is a relation of output to input, capacity utilization is a measure of efficient use of the factors of production.

Capacity Utilization: There is general agreement among economists that capacity is an output-based measure. Capacity and capacity utilization are defined or measured conditional on a fixed stock of capital and state of technology. Technologically, capacity is the maximum potential output (Y^*) attainable given the available technology, capital and the full and technically efficient utilization of the variable inputs or all factors of production

A major problem in measuring capacity and capacity utilization is the possibility of multiple products and multiple quasi-fixed factors. Berndt and Fuss (1989) have shown that in the presence of multiple products and

multiple fixed factors, capacity and capacity utilization may be indeterminate. Most construction and maintenance work in the building industry involve multiple- product production and have more than one quasi-fixed factor (for example; the capital of the Building/Infrastructural stock, the capital of budget allocation).

International concerns about capacity and capacity utilization in Building and Construction seem to be mostly related to capital and effort utilization (utilization of factors of production and overall total maximum potential production). The major issues relating to this latter concept are the frontier output, associated input levels and optimum configuration of a building and construction fleet (e g. resource stock, construction/maintenance policy, factors of production etc).

The concept of construction effort is based on the principle that effort is a measure of a composite input in which the technology is inseparable from all inputs such that decisions about input levels are completely dependent on resource levels. An economic- based definition of capacity equates potential output with the economically optimal or target levels of output (Morrison, 1985).

Lawal (2004) observed the manufacturing sector of Nigerian economy has continued to be characterized by low production as a result of capacity underutilization of all the resources. The CBN (2001) gave a compilation that shows that the average capacity utilization rates for the twenty-year period 1982 - 2001 oscillated between 29 and 43 per cent (Table 1).

Improving capacity utilisation in order to improve on productivity is a major concern of any profit-oriented organisation (Olomolaiye,

Jayawardane & Harris, 1998). Such organisations explore ways of effectively and efficiently converting their resources into marketable products that yield business profitability.

Table 1. Capacity Utilization (CU) of the Nigerian Manufacturing Sector 1982 – 2001

Year	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
C.U (%)	63.6	49.1	42.0	37.1	38.9	40.4	41.5	42.4	40.3	42.0
Year	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
C.U (%)	42.8	37.2	30.4	29.3	36.8	33.7	32.4	35.9	36.1	39.6

**Sources: CBN Bullion. 26 (1&3). 2001 CBN.
CBN Annual Report & Statement of Accounts for the year ended
31st December 2001. CBN.**

2.2 PRODUCTIVITY APPRAISAL

A nation's economic performance (productivity) can be measured by its gross national product (GNP) per capita. GNP is output while population size is input or Gross Domestic Product per unit of factor employed (such as labour, capital etc). An organisation's performance (or efficiency or productivity) is a measure of goods and services produced over resources consumed.

Productivity indices help to evaluate economic performance and the quality of social and economic policies. However, it is worth noting that appraisal of the public sector productivity takes into consideration factors that are different from those of the private sector. In the public sector the output compared with the input is its efficiency. Achievement of set objectives is the main determinant of how efficient a public organisation is. The impact the programme of a particular public sector organisation made on the beneficiary is a measure of its effectiveness or its efficiency.

For instance if a public sector organisation is able, from readily available records, to identify specific units of service which are; countable, fairly consistent over time and adjustable for quality changes, then the effectiveness indicators can be determined. An example is the square metres of buildings maintained by a given quantity of labour (and other factors) input in a given period of time.

Generally, lack of data makes measurement of productivity of labour in all sectors of Nigerian economy difficult. Wages are usually increased across the board, using other factors that exclude consideration of changes in average productivity (FOS, 1997a).

2.3 MEASUREMENT OF CAPACITY UTILISATION

Capacity utilisation is defined as the ratio of actual output to some measure of potential output given a firm's short-run stock of capital and perhaps other fixed inputs in the short run (Nelson, 1989). Capacity utilisation captures the output gap between actual output and capacity output.

There are four different measures of capacity output (Morrison, 1985 and Nelson, 1989). The four measures differ by the manner in which potential or capacity output is defined and whether or not the potential or capacity output is technologically determined, without an explicit economic foundation, or whether this capacity output represents the outcome of an explicit economic optimization process, such as cost minimization or profit maximization.

Capacity output defined by the economic approach can explicitly vary with changes in such economic variables as input prices, quantities of short-run fixed factors or outputs fixed by regulations or other reasons, overtime or added costs, and other factors (Morrison, 1985). The fundamental concept underlying the economic measures is that firms face short-run constraints, such as the stock of capital and other fixed inputs, and thus optimal short-run equilibrium output might differ from that in a long-run, steady-state equilibrium (Morrison, 1985).

The short-run constraints can include various existing regulations - which could include constraints on social objectives such as minimum employment levels. The economic capacity and capacity utilisation literature was developed around firms that minimize the costs of producing exogenously fixed outputs. Hence, no distinction is made

between capacity with and without constraints that may exist in addition to a fixed factor such as the capital stock.

2.3.1 Primal-based Capacity and Capacity Utilization:

The technological approach to capacity utilization defines the capacity output as the maximum potential output (**Y***) which could be produced if all departments produced at maximum technical efficiency – full utilisation of all inputs and produced the maximum output – given variable inputs, the stock of capital, and the state of technology. The capacity output may be easily obtained from the frontier output of the production schedule (Morrison, 1985).

2.4 THE EMERGENCE OF WAGE EMPLOYMENT IN NIGERIA

Wage employment was not in existence in the British colony, Nigeria until very recently (Fajana, 2000). The people of the colony were mainly self-employed peasant farmers. This self-employment as opposed to wage employment afforded them the dignity that is in freedom of movement to and from work. The freedom was cherished and jealously guarded by the people. Yesufu (1984) further stated that in most of the Nigerian cultures working for another man, unless when governed by custom, was traditionally associated with slavery.

Nigeria is still extremely short of trained, skilled and professional manpower, but in terms of the totality of the labour market, in the opinion of the researcher, the former scarcity of wage labour supply has been transformed into almost a permanent surplus. The era of unemployment seems to be rearing its ugly head as a permanent feature of the Nigerian labour market.

2.5 THE IMPORTANCE AND FUNCTIONS OF WAGES

Wage and salaries are a substantial form of income to high proportion of the economically active population, namely persons in paid employment. Although the worker satisfaction depends on many job characteristics (risk, working conditions), labour market income enables the consumption of goods and services, which are major determinants of economic well-being. Thus, the earnings from employment provide an incentive to participate in the labour market. Separate indicators are included to capture the level and distribution of earnings, since measures of average earnings, on their own, ignore the importance of low pay and earnings inequality. It has also been found that regional average earnings have converged at the same time that earnings' inequality increased (Dickey, 2001).

The efficiency wage paradigm proposes that higher earnings increase staff morale and commitment, thus reducing labour turnover and encouraging investment in training, both of which may increase capacity utilisation. There is also concern about trying to compete with low wage producers in a global market. It is argued that increasing productivity, through, for example, technological improvements, is the only way to improve sustained competitiveness.

Information on wage levels is essential in evaluating the living standards and conditions of work and life of any group of workers. Reasons that made wages to be a basic issue in every country include the fact that wages are the main source of income for workers and a major

production cost for the enterprise (Eyraud, 1992). That is, the worker and his family depend mainly on his wages to meet their basic and social needs.

According to Schettkat (1992), the function of wages include, apart from its being the most important source of income for most workers, productivity promotion, the employment –preserving and employment creating functions. The role that wage determination plays in increasing efficiency of production within the enterprise can not be over-emphasized. Wage determinations systems should always ensure stability in the living standards of workers and their families, otherwise confidence in money economy will be much eroded.

One cannot be oblivious of the dangers of too high a minimum wage (standard rate). Small enterprises may be forced out of business as a result of high standard rate. This aggravates unemployment problem and destabilizes the industry leaving only the highly efficient firms as the survivors. This phenomenon came into play when the Federal Government of Nigeria, in May 2000, fixed a minimum wage of ₦7500 monthly for its workers. Most state governments were left with the options of retrenching workers or paying wages far lower than the set minimum. The researcher observed that some of the state governors opted for both retrenching and paying below the minimum. See Appendix B1 for the wages of the public service (1992 - 2000).

The best for any economy is to have standard rate vary according to industry's ability to pay. ILO (1992) also support varying wages according

to industry or economic activity, as is the practice in France and Franco-phone African countries.

If the standard rate is set in cognisance of its effect on unemployment, structure of the industry and strict adherence to it, then the profit share of the specific industry can be raised. That is all stakeholders would have increased benefits.

Akintunde (1993), asserted that “An underpaid staff is less creative and will be of greater waste than asset to the employer”. With all these at the back of the mind, a pertinent question is: Are there rational bases for determining workers’ pay in the Nigerian public service? Equitable system of pay is paramount to appreciable productivity.

2.6 ECONOMIC POLICY OF NIGERIAN GOVERNMENT

The post independent Nigerian government had the idea that public-owned companies were better than the private ones with regards to stimulation and acceleration of national economic development. Building on that premises, both the Federal and State governments established many state-owned enterprises with the increase in the investment rising substantially between 1960 and 1986 (Alo, 2000). The enterprises covered a broad spectrum of economic activities; from agriculture to abattoirs, transportation, telecommunications, electric power, petrol-chemicals, mineral exploration steel plant, housing and construction companies, banking and insurance.

Over the years there developed the world over, a growing contrast between the performance of the public and private enterprises. While the

latter displays thrift in its spending, the former tends to be wasteful. This development gave the Nigerian government an encouragement to seek solution to this problem of the public enterprises (Abubakar, 2000).

Some of the major factors that contributed to the poor performances of public enterprises in Nigeria as observed by Abubakar (2000) include:

- i. Official interference.
- ii. Failure of government to allow the Boards of Directors to function properly.
- iii. Resistance by government to develop appropriate conditions of service that are commensurate with the responsibilities placed on the workers in those enterprises.
- iv. Government tardiness in providing working capitals for those enterprises that needs it.

From the observations of Abubakar (2000) it is more viable for government to limit its involvement in entrepreneurship to legislating, regulating and tax collection, than to be operating entrepreneurship.

2.7 WAGE DETERMINATION POLICY IN NIGERIA

The policy of Nigeria on wage fixing, and wage structure with the general levels of wages in both the private and public sectors are examined under this section.

2.7.1 Wage -fixing

Any wage-fixing Policy serves three main objectives, which are (i) Macro-economic stability (ii) efficient allocation of manpower and (iii)

efficiency of production (ILO, 1992). The objectives of fixing realistic minimum wages, include:

- (i) preservation of purchasing power of the individual worker,
- (ii) prevention of industrial conflict and
- (iii) promotion of economic growth and stability.

The purchasing power of the workers instead of being enhanced at wage increases is diminished as both inflation rates and frequent currency (naira) devaluations operate at levels higher than wage increases. Industrial conflicts (disagreements, strikes and lock-outs) were rife and many across the various industries of the economy. Economic growth, whether at micro- or macro- level, is a product of increase in purchasing power of the worker and minimum industrial conflicts. (Starr, 1981)

The wage determination system of a country dictates the level of stability of its macro-economy (ILO, 1992). A worker and his family depend almost entirely on his wages to meet their needs: the basic (food, shelter clothing), esteem and self actualisation needs. Therefore the worker is always concerned with increasing (or at least maintaining) his purchasing power.

On the other hand an employer judges any increase in wages in terms of its effects on the enterprises finances and positions vis-à-vis its competitors. The concerns of employees and employers are therefore opposing to each other. Any wage determination system that fails to ensure some stability in the living standards of workers and their families runs the risk of eroding confidence in a money economy. (ILO, 1992)

2.7.2 General Levels of Wages in Public and Private Sectors

While restraint on wages and salaries has been strictly enforced in the public sector of the Nigerian economy, the same has not been the case in

the private sector. Therefore, as can be seen from Tables 3 and 4 below, the differentials in wages and salaries of the workers in the public and private sectors have been widening over the years in favour of the private sector. It is argued that employees in the public sector have better working conditions than those in the private sector. The better working conditions which result in increase in real wages as enjoyed by the public sector workers include job security and retirement benefits (Hollinshead & Leat, 1995).

2.7.3 Wage Structures

Wage structures generally indicate the wage differentials among workers according to their particular occupational situation. That is the kind of work and sector. Wage differentials, according to Eyraud (1992), serve as a reward to the particular groups or as compensation for the nature of the work they do.

Relevant factors considered in making up the structure of wages of any group include:

- (a) Differences in level of training
- (b) Differences in working condition
- (c) Every other thing that differentiates between workers' contributions to productive efficiency
- (d) Every other thing that compensates workers for the negative peculiarities of their job (Eyraud, 1992).

These considerations show that wage differentials cannot be measured according to a single variable. In attaching the same salary scale to all jobs valued as belonging to the same grade regardless of differing occupations with different duties, the system matches pay differentials to differences in

the difficulty, responsibility and qualifications required of the work performed. It offers the opportunity for vertical and lateral mobility in the service and thereby avoids the problem of inter-area and inter-industrial wage differentials.

The determination of wages that are fair is defended, sometime, on the ground that it permits closer adaptation to the circumstances of individual industries and occupations.

Earnings as applied in wages statistics, relate to remuneration in cash and kind paid to employees, as a rule at regular intervals, for time worked or work done together with remuneration for time not worked, such as for annual vacation, other paid leave or holidays.

Statistics of earnings should relate to employee's gross remuneration, which is the total before any deductions are made by the employer in respect of taxes, contributions of employees to social security and pension schemes, life insurance premiums, union dues and other obligations of employees.

Geographical zone differentials, is a normal practice recognized by the International Labour Organisation. Wage rates should include basic wages, cost of living, allowances and other guaranteed and regularly paid allowances, but exclude overtime payments, bonuses and gratuities. Family allowances and other social security payments in kind, supplementary to normal wage rates are also excluded (Eyraud, 1992).

Statistics of wage rates fixed by or in pursuance of laws or regulations, collective agreements or arbitral awards (which are generally minimum or standard rates) should be clearly distinguished from statistics referring to wage rates actually paid to individual workers. Time rates of wages for

normal periods of work should be distinguished from special and other rates such as piece rates, overtime rates, premium rates for work on holidays and shift rates.

In theory both demand and supply factors are important in the determination of wages and in assessing the behaviour of unions and employers in the labour market. The factors according to Fashoyin (1986) include the following:

- i. If level of price paid by workers increases, the trade union demands for wage increase.
- ii. Increase in wages in other sectors causes the trade union to demand wage increase.
- iii. If the level of employers' profit increases the trade union is expected to agitate for wage increase.

Under the democratic setting of employment operation, wages and salaries are fixed jointly by the trade union and the Nigeria Employers' Consultative Assembly. (NECA). Otherwise the National Wages Commission is responsible for fixing wages and salaries in the public sector of the Nigerian economy. The private sector on the other hand is jointly controlled by the operation of the free market economy and the Federal Ministry of Employment, Labour and Productivity.

2.8 WAGE POLICY INSTRUMENTS

In most British colonies especially, minimum wages were often fixed through ad hoc measures and machinery established by law was not used regularly and according to Starr (1981), the coverage were limited to a few

trades. Starr (1981) specifically stated that the fixing of legally enforceable minimum wages appears to have been abandoned in Nigeria.

The rate of the lowest paid public servant plays an important role as a “reference wage” in Nigeria. A change in it can trigger off a series of changes in the basic wage of other wage earners. Since higher – income public servants invariably prefer the established wage and salary differentials and relativities to remain undisturbed, increases in the lowest public service wage have typically resulted in increases in salary levels for higher – paid public servants too. However, the differential between bottom and top salaries in the public sector can be diminished by deliberate policy.

The Government in Nigeria as the largest employer of labour, is in a dominant position to set the example and the pace for collective bargaining. The public sector wages are supposed to be the regulator for those in the private sector. The informal private sector, instead of responding to actions in the public sector is only responsive to the dictates of the market forces. As brought out by the pilot survey, the wages of the informal private sector had gone up twice within 20 months of the wage adjustment in the public sector.

The low level of wages in the public sector can be attributed to low level utilisation of resource capacities in the sector. If the job is properly designed capacity utilisation can improve.

2.9 CHARACTERISTICS OF THE BUILDING INDUSTRY LABOUR MARKET

Like any other industry, labour market for the building industry is comprised of: (a) public service sector (PSS), (b) organised private sector (OPS) and (c) informal private sector (IPS). It is basically understood that the buyer of the construction labour is the Employer while each construction worker constitutes the seller of labour. In Nigeria, the first two sectors operate a buyer's market but the informal private sector is the seller's market.

The public sector: This is a regulated market with the inflows (and sometimes the quits) highly under the control of the employer either by way of governments planning embargoes on employment and periodic retrenchment of labour force. This public sector policy prevents employment from growing. The direct labour projects with which the public sector building operatives were associated are seldom done any longer. Where it is carried out, it is of minimum extent and application. It more often ends up either abandoned or completed with compromised quality, excessive delays, high overhead costs or a combination of these.

Organised private sector: This comprises mainly, of the multinational (foreign but indigenised) construction firms and wholly indigenous firms employing ten or more staff. The employer group here is dominated by the multinationals that are serviced by the Nigerian tradesmen. Mogbo (2002) observed that salaries and remuneration received by the tradesmen working in the multi-national firms, which although are higher than those offered by indigenous contractors of the same sector, are but a pittance

compared with the volume of profits made by the multinationals. Mogbo (2002) further stated that generally, the multinationals always repatriate their huge profits to their own home countries.

The bulk of Nigeria's capital spending goes to the organised private sector, especially to the multinational contractors. (Mogbo, 2002) asserted that a close study of the annual budgets of Nigeria may indicate that once the multinationals are paid for major construction works, the residue is only for the running of the status quo (payment of salaries and general administration) with nothing left for other meaningful development projects.

The informal private sector: The informal private sector of the industry consists mostly of individuals and small firms; small in terms of any or a combination of the followings; capital employed, labour turnover, profit margins, category of registration and the sizes of projects handled. These small firms operate at low profit margins and so they try to avoid high labour turnover by recruiting as occasion demands. This is by far the sector containing the largest proportion of the Nigerian labour market mainly because it is the easiest to enter and the demand for its service is always high. This sector controls about 60% of labour force in urban areas and the figure is put at 80% for the rural area (Fajana, 2000). Fajana (2000) believes the sector to be experiencing the lowest wages in the country. This assertion may be valid when the number of days of non-employment per annum is considered.

The firms in the informal private sector, especially in Nigeria, depend mainly on casual labour, meaning that job security is non-existence for

this group of the labour force. For the want of assurance of supply of steady income to the household, such casual labourers are always on the lookout for permanent employments in other sectors of the industry.

On the whole, the need to maintain a continuous stream of trained manpower (especially the craftsmanship disciplines) for the building and construction industry cannot be over-emphasised if the industry must be kept alive. Bateman (1989) stressed that properly trained craftsmen would help to create better quality production.

2.9.1 Peculiar Characteristics of the Construction Industry

Universally the Construction Industry is unique and is very much different from other industries in several ways. The major peculiarities include:

- (i) Designs and productions are carried out by different organisations (El-Rufai, 1989). This aspect gives the producing organisation (contractors or the builders) the arduous task of understanding and interpreting the concepts of the various designing team organisations (architectural and engineering) and building exactly what was designed.
- (ii) Building projects are custom-built. El-Rufai (1989) and Odeyinka and Iyagba (2000) affirmed that one building project is quite different and distinct from another in many facets. The difference comes as a result of varying topography, completion periods, soil-bearing capacities, sub-soil water levels and costs.

- (iii) It is difficult to mass produce every component of the building. Simulating completely the production of buildings is not easily realisable as a result of differing building design factors (criteria).
- (iv) Because of the long completion periods of the products, the accounting system of the industry is also made complex and unique since the complete manufacturing of any product that is being accounted for cannot be tied completely to any financial year.
- (v) Construction sites (Factories of production) are scattered all over the country and each product is immobile, fixed to the site with high unit cost per product.
- (vi) Construction industry belongs to the sector of the economy that produces investment goods or fixed assets. This role as a producer of investment goods renders the industry highly vulnerable to fluctuations in business activity (United Nations, 1976).
- (vii) The products of the industry add to the stock of the wealth of the country and makes up the infrastructural facilities of the economy that remain in use for several decades. Each product has a long life span—80 years and above.
- (viii) The industry has such significant interdependent relationship with other industries that:
 - (a) A demand on it depends on the fortunes of other industries.
 - (b) It uses the products of other industries for its raw materials.

- (c) The products (buildings and infrastructure) are used by other industries for their products.
- (ix) Production of a building, a dam or a road, especially in developing economies like Nigeria is labour intensive and involves varying disciplines.
- (x) The industry is characterised by poor continuity of work, that is, big gaps of time elapse between construction projects. This results, in short terms, in unemployment of labour. This aspect cuts short the sense of 'mutual belonging' between the organization and the employees (Mansfield & Odeh, 1991). The feeling of job security is non-existence as far as the workforce in the construction industry is concerned.
- (xi) For production of each building, the team members are often new to each other. Since it is customary to recruit and train the workforce for any new site, the supervisors are faced with the necessity to mould the new teams before the desired performance can be attained.
- (xii) Production of buildings or other facilities is not carried out under controlled environments (El-Rufai, 1989). It is rather done in the open where both the work and the workers may be subjected to the adverse effects of the environment (weather). Working under such conditions induces physical and psychological effects that impair performance and productivity (Mansfield & Odeh, 1991). This is unlike factories of other

industries that could be air-conditioned and have elaborate quality and production control systems.

- (xiii) Building and Construction industry holds the record for lowest profits among manufacturing industries and it is top of the bankruptcy league as observed by Cormican (1985).
- (xiv) The industry has very high rate of accidents and most of the accident victims are members of the industry. It is sometimes tagged the industry that kills its members (Cormican, 1985).
- (xv) Prior to the advent of the Global System of Mobile (GSM) telephone in Nigeria, the industry was characterised with poor communication syndrome. Communication among the site workers was poor, so also was the communication between the site and design teams on the one hand and between the site and the contractor's project managers in the contractor's head office on the other.
- (xvi) While production managers of other industries can and do plan production of their products per year, managers of the construction industry do not find such planning feasible. This is due to the fact that there is a need to receive orders from customer first. Moreover, unlike managers of other industries, construction managers cannot dictate the price, since the selling is done through bidding process along with other competitors and in advance of commissioning to produce.

These peculiarly harsh working environments make construction workers to be unique because this group of workers are perpetually subjected to physical strain and stress.

2.9.2 The Economy of Labour

Studies consistently find human capital to be an important determinant of employment and income in the local labour market. Individual educational attainment has a positive effect on labour market earnings and employment probabilities (O'Leary et al., 2002).

Mansfield and Odeh (1991) observed that when labour supply is high, productivity is also high and that the converse is true during low supply period. They attribute the reason to job security. That is, workers tend to compete and show better performance in order to keep their jobs when jobs are harder to come by – high labour supply period.

2.9.3 Labour Demand Characteristics

The demand characteristics of construction labour are inelastic with tendency towards perfect inelasticity or zero elasticity coefficient. A change in price causes no response at all to quantity demanded. A specific amount of labour is required for a specific project, no matter the amount of labour available. Similarly no matter the change in unit price of the labour, the quantity of labour required for a piece of work under the normal circumstances, remains constant.

2.9.4 Labour Supply Characteristics

The supply characteristics of building labour have some elements of elasticity. Generally when little change in price of labour occurs the supply tends to respond to it correspondingly. Increase in unit price of

labour attracts increase in supply, and vice versa for the decrease in unit price (Bronfenbrenner, 1984).

2.9.5 Labour Market Benchmarking

The form of a benchmark depends crucially on which labour markets and what labour market features are being compared. Indices can be constructed to monitor performance of a single labour market over time. For example, Watson (2000) considers the Australian labour market from 1988-1999. Alternatively, Storrie and Bjurek (2000) compare labour markets over countries in the EU and Osberg, Sharpe and Smith (2002) use spatial and temporal comparisons, when analysing the national labour markets of the US and Canada.

Definitions of performance vary considerably between studies. Mosley and Mayer (1998) follow targets set out by EU labour market guidelines, whereas Watson (2000) considers the 'health' of the labour market using measures of the quantity and quality of employment. In contrast, Osberg, Sharpe and Smith (2002) focus on the labour market well-being of workers, which is assessed using the domains of returns from work, accumulation, equality and security.

Several alternative techniques have been applied to monitor labour market performance, including both quantitative and graphical performance measures. The most common composite measure is an index, in which an index number can be compared to an optimal value. Examples include Watson (2000), where the index runs from 1 to 10 and the optimal value is justified theoretically, and Osberg, Sharpe and Smith (2002), where the index has a base of 1.0 in the initial period. Attention has focused on the radar chart approach, which allows graphical

representation of a range of indicators. Schutz, Speckesser and Schmid (1998) and Mosley and Mayer (1998) use this technique. Indicators are standardised and represented by values from 0 to 1, where performance is assessed relative to the best observation (country) for each indicator or a theoretical ideal.

All the above studies, however, share the notion that labour market performance can be assessed using outputs of the labour market production process. Anxo and Storrie (1997) develop the concept of an efficiency frontier; where labour market performance is assessed using both outputs and inputs to the production process. In this case the input is spending on labour market policy. The concept of benchmarking labour market efficiency has had limited empirical investigation (Jones, 2002).

2.10 MOBILITY OF CONSTRUCTION WORKERS

For the skilled labour of the industry, mobility to other industries is not laterally feasible as the skill is peculiar to the industry. To fit into other industry will necessitate retraining which may not augur well for the economic life of the transferee. Hence the skilled worker is fixed to the industry.

In developing economies new entrants to the labour market would prefer to avoid such industries or sectors with low mobility capability. Understandably labour markets are not a one-commodity market but are distinct markets with varying working conditions, skill requirements of

jobs, motivation of workers and wages existing from sector to sector (Phelps, 1970 and Schettkat, 1992).

2.11 CONTRIBUTIONS OF CONSTRUCTION SECTOR TO CAPITAL FORMATION and GROSS DOMESTIC PRODUCTS (GDP)

The product of the industry adds to the stock of the wealth of the country. The products make up the infrastructure facilities of the economy and they remain in use for several decades. Each product has a long life span—80 years and above. Tables 2 and 3 below present some economic indicators of Nigeria over a period of years.

Though the contribution of the building sub-sector of the construction industry to the total Gross Domestic Products oscillate around 2 per cent (column 6 of Table 3), the sector makes an average annual contribution of well over 60 per cent to the fixed capital formation of the Nigerian economy (Table 2).

Table 2. Composition of Nigerian Fixed Capital Formation 1990 - 1999
(in percentages).

Year	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
Building & Construction	61.01	59.90	62.11	58.89	63.31	74.00	69.84	68.27	71.71	71.01
Land Improvement	12.30	11.19	11.60	11.00	11.83	13.83	13.03	12.75	13.39	13.26
Transport Equipment	7.55	8.18	7.42	8.53	7.02	3.59	3.38	7.03	4.50	4.76
Machinery & Equipment	18.73	20.30	18.42	21.18	17.41	8.08	13.27	11.49	9.94	10.52
Breeding Stock	0.41	0.43	0.44	0.40	0.42	0.50	0.48	0.45	0.46	0.45
Total	100	100	100	100	100	100	100	100	100	100

Sources: FOS (1998).

CBN (2002).

Table 3. Some Indicators of Nigerian Economy (1988 – 1998)

Indicator	GDP (₦bn)	GDP Per Capita	Exchange Rate (US1\$)	Inflation	Building sector GDP(₦m)	Building: Total GDP
Year	(1)	(2)	(3)	(4)	(5)	(6)
1988	77.75	25.9	4.5	56.1	1579	0.0203
1989	83.50	25.8	7.38	50.5	1645	0.0197
1990	90.34	27.1	7.94	7.5	1727	0.0191
1991	94.61	27.5	9.90	12.9	1796	0.0190
1992	98.70	27.5	17.45	44.6	1866	0.0189
1993	99.80	27.3	22.06	57.2	1959	0.0196
1994	100.60	30.1	21.89	57.0	2018	0.0200
1995	103.50		21.89	72.6	2073	0.0200
1996	107.00		21.89	29.3	2093	0.0196
1997	111.10		21.89	8.5		
1998	116.20		21.89	10.3		

Sources: CBN Statistical Bulletin

FOS (1997b)

FOS (1999)

Fajana. (2000)

FOS (2002). Calendar

However there are some setbacks that make the published GNP or GDP of Nigeria unrealistic. They include the following.

1. Unpaid services:

Services rendered by the friends, relatives, charitable organisations or service of housewives which are usually not paid for are not included in the national income accounting and therefore lead to under-estimation of the accounting system.

2. Owner Occupants of Houses: These don't pay the rent for the house they own and occupy

3. Subterranean Economy: Illegal activities such as gambling, smuggling and illegal mining are not accounted for.

4. Marketed and Un-marketed Goods: There is no accurate account of the GNP (when output method of measurement is used) since the cost of the goods consumed by the producers is usually not accounted for.

All items 1-4 above result in gross under estimation of the GNP

5. Problem of Data: Where available, figures of data in Nigeria are found many at times to be fictitious and unrealistic. They are either inflated or under- estimated because of some political, religious or institutional reasons.

Yesufu (1984) expatiated on this problem of inaccurate data as follows:

“Nothing so epitomizes the tragedies of Nigeria's political and social history as its inability since independence to conduct and produce a reliable census count. The census result of 1962 and 1973 were abandoned because of vicious and uncompromising recrimination

among the component governments of the federation, that of 1963 which was intended to correct the impasse of that of 1962 had its results validated after a court ruling, yet the underlying demographic, statistical and social issues have never been resolved. That of 1973 was out-rightly rejected. Therefore the authentic census for Nigeria remains that of November 1963”.

These setbacks have a very serious effect on the computation of the national income accounting.

2.12 PECULIARITY OF CONSTRUCTION LABOUR MOTIVATORS

Herzberg () discovered some nine factors that motivate workers. These he grouped into two namely the motivating factors and hygiene factors. The Motivating factors he listed as: (i). Achievement (ii). Recognition (iii). Work (iv). Responsibility, and (v). Advancement
The Hygiene factors are: (i). Working condition (ii). Salary (iii). Relationship with supervisor and (iv). Company policy.

While the presence of hygiene factors does not positively contribute to motivation, they serve to prevent workers from being dissatisfied. It was found out through experiments carried out by Harris and McCaffer (1985) that the building and construction workers appear to concentrate mainly on two of these hygiene factors – salary and company policy. Based on this, Andawei (2002) concluded that it can be deduced that the building and construction industry has only provided a part solution to the problem of improved productivity.

2.13 LABOUR PRODUCTIVITY IN THE NIGERIAN CONSTRUCTION INDUSTRY

Labour productivity is the total value of goods and services produced (total output) divided by the entire spending on the economically active population (total labour input).

National Productivity = GNP / Population.

Underutilization of labour in post-independent Nigeria was at a very high level for over fifteen years spanning the second and third decades of its nationhood; and it even pose a serious threat to future development prospects (Fashoyin, 1988). Much has also been said by researchers about issues or factors affecting individual worker's productivity. Some of the researchers carried out actual quantitative measurements of individual or gang output rates (Lim & Alum, 1995; Proverbs, Holt, & Olomolaiye, 1999; and Winch & Carr, 2001).

Problem of labour productivity in Nigeria seems not to be an issue of wage, wage policies, Herzberg's hygiene factors or collective bargaining. The productivity problem seems to be that of non – issuances regularly of avenue or instruction to produce. Indeed, since independence of Nigeria in 1960, there was, up to 1976 an absence of coherent and well articulated policy on how to promote labour productivity.

The Nigerian Second National Development Plan 1970 – 74, was primarily targeted at using productivity as the determinant for labour remunerations. As a result of this aspiration the PPIB was established in 1976. The PPIB was to serve the purpose of laying down guidelines on productivity improvement (Fashoyin, 1988).

Pay Research Unit (PRU) was established purposely to continuously assemble such economic data as (i) changes in cost of living (ii) productivity and (iii) levels of pay in the private sector, for adjusting wages in the public sector.

Need for formation of productivity to establish productivity teams to various industries were advised from time to time on appropriate rewards for successful efforts to increase productivity.

Fashoyin (1988) observed that throughout the 1976 – 1979 period, a period of military rule, there was no specific productivity improvement programme in place. The primary concern of the management during that period was the achievement of wage stabilization.

Some experiments carried out in the past affirm that commercialisation or privatisation brings about improved productivity. Oloko (1991) reported a comparative study carried out on five private and one public companies based in Sapele Nigeria and published as a book “Industrialisation in An Open Economy in Nigeria 1945 – 1966”. From the point of view of management, two of the private firms had the highest labour productivity with the distinct exhibition of the following characteristics problem formulation;

1. Considerable division of labour.
2. The setting of the daily production quotas.
3. Rigorous control of the pace of work.
4. Close supervision.
5. The use of incentive payment system.

Oloko (1991) listed the following as some of the socio cultural factors affecting productivity and excellence in Nigerian organisations.

1. Low level of national consciousness on the part of the bureaucrats.
2. Existence of widespread corruption evidenced in the tendency on the officials to appropriate the powers of their office to their own private ends.
3. Reluctance of superiors to delegate responsibilities to subordinates which like bribery and corruption is another evidence of the personalisation and monopolisation of their offices by the bureaucrats.
4. Reluctance of subordinates to accept responsibility which is a rational reaction to the fixed sum view of power held by their superiors.
5. Absence of cooperative relationship between and within grades of employees in the bureaucratic hierarchies.
6. Intense and negative class consciousness on the part of bureaucratic elite in their relationship with their subordinates.
7. Absence of a keen sense of punctuality on the part of the bureaucrats.
8. Treatment of numbers and time with careless abandon.

2.14 PRIVATIZATION OPTIONS FOR THE PUBLIC SECTOR ENTERPRISES

That the public sector of the Nigerian economy has been performing very poorly is not an overstatement. Its poor performance has been attributed to a number of factors which include, according to Ezeuduji (1994):

- i. functions being carried out by the government for which it had no adequate resources to manage,
- ii. widespread corruption which had been highlighted by several commissions of inquiry in public institutions. These weaknesses lend support to the necessity for privatisation and commercialization of most of if not all the economic ventures of government in Nigeria.

While Olorunshola (2002) asserted that by the end of the third National Development Plan period (1975-80), the public sector (State) had become by far the largest and most significant single entity with its operation accounting in 1979 for an estimated 55 per cent of Gross Domestic Product and 66 per cent of total investment. Privatization and commercialization drive has its hurting side to the social life e.g. inevitable retrenchment of workers will swell the unemployment market. Conflicting interests will require delicate balancing.

The economic performances of the state-owned enterprises (SOEs) in Nigeria are generally acknowledged, by all classes of its people, to be unsatisfactory. It is also perceived that the construction craftsmen in the public sector of the economy, like workers in some other disciplines of the sector, have their capabilities underutilised. On the other hand the private sector of the Nigerian economy relatively utilises the capacities of its labour force to the full.

Battling with dwindling incomes, as characterised by deficit annual budgeting and compounded with the fast growing population which produce an ever increasing unemployment figure, the Nigerian government is confronted with the privatization option for its numerous enterprises. Moreover, both the political and academic classes, among others, are convinced that private owners would provide improved services if the present public utilities are privatised (Akinsanya, 2000 and Oladimeji, 2000). I strongly subscribe to this view.

Privatization is on the rise worldwide as there is a growing consensus that privatization can result in improved efficiency and budgetary savings (Mogbo, 2000). For the simple economic reasoning, private ownership of

an enterprise is a vital determinant of successful business performance. In what is currently obtainable in public enterprises in Nigeria, business entrepreneurship is observed to be lacking. For the public sector employer to achieve tangible level of productivity, it would have to enter the full market economy. Some of the infrastructure of market economy that allow free enterprises labour market to thrive, according to Jackman and Rutkowski (1994), include: (i). Private ownership, (ii). Competition, (iii). Capital markets and (iv). Labour mobility. The existence of the infrastructure makes the labour market function efficiently. Under market economy, for an enterprise to operate successfully, the productivity must not be below minimum standard set down in the production plans. If productivity gets low, it leads to eventual lay-offs and redundancy. This in turns produces negative social and economic developments for the community or country. The negative development is characterised by vices such as increase in unemployment figure, drop in the Gross National Product (GNP) and reduction in the standard of living.

In the researcher's opinion whenever the Nigerian public sector enterprises for instance adopt privatization option, the workers then would have to either adapt to the demand of the 'new' work situation or find themselves thrown out of employment.

On the other side of the divide are the civil servants and their trade unions who would normally resist privatisation as it is a threat to their job security, for it is generally known that state-owned enterprises pay higher wages and maintain larger workforces than the private sector (Aharoni, 1991). Managers of the public enterprises would likely prefer privatisation as this will increase their autonomy power to run the enterprises free of

government constraints. Managers also anticipate higher pays under private ownership than under government. Importantly to note is the fact that the public cannot register approval or disapproval of the government's move to sell out the enterprises since the public do not directly hold shares in those public enterprises.

CHAPTER THREE

METHODOLOGY

3.1 SOURCES OF DATA

The chapter contains the description of methods used in gathering, collating and analysing the data. Survey research approach was adopted in collecting the data. This approach, Babbie (1983) observed to be the best method for collecting original data in describing a population too large to observe directly.

Data collection procedure was by both secondary and primary sources. This involves the use of historical (recorded) data, interview and structured questionnaire. This approach was adopted for gathering information on worker productivities, work force strength, motivation factors and categories of the craftsmen with other demographic characteristics. Historical data collection approach only was adopted for collecting information on salaries and for the craftsmen strength (total number).

Three middle belt states (Kwara,, Niger and Plateau) serve as the research area coverage, representing the middle-belt of Nigerian situation. These states were chosen due to the fact that they were known to be relatively up-to-date in keeping accurate records of their activities, especially in respect of issuance of work to their craftsmen. The states were also chosen for ease of collecting unadulterated data within a reasonably short period of time. Element of familiarity is known to contribute positively a lot to facilitation of gathering authentic data. Opportunity of acquaintance with the custodians of the required data of the research was high in those states. This researcher is of Kwara State

origin, his place of employment is in Niger State while the university, the centre of the research work, is located in Plateau State.

The questionnaire had an introductory letter highlighting the research objectives. The supervisors of the craftsmen in each department of the Ministry of Works and Housing supplied, by filling in spaces provided in a questionnaire format;

(a) the historical data on the population, salary grade levels and population per salary grade level of the construction craftsmen

(b) the established quantity (in naira) of work done collectively by the craftsmen.

The Federal Pay Office, Accounts department of the Ministry or the Office of the Head of Service (as the case may be), supplied the salary structure operational in the ministry.

For the questionnaire targeted at the craftsmen (Appendix A4), the questions were asked in the simplest English possible because the level of education of the surveyed group may not cope with high-level English grammar. This was part of the strategies adopted to get precise answers to the questions. Personal administration of the questionnaire to the targeted groups also further enhanced this.

3.2 TYPES OF DATA

For the purpose of this study, data were required on the following aspects of capacity utilisation and productivity of the public service construction craftsmen.

3.2.1 Demographic Variables

Gender

Information on this is to establish the gender bias or dominance in the building and construction industry. Is it a male (or female) dominated industry? If yes is it an indication of gender discrimination or some special requirement of the industry such as strenuous job activities which tend to preclude job seekers of a particular sex. A percentage of 75 and above indicates dominance of a gender for the industry

Age

Average age of the respondents was sought for in order to establish their level of maturity, how responsible they are expected to be and the responsibility attached to the job. This was also to show the general spread of the age group that does this type of work – construction work. If the average age of the craftsmen is below twenty years, this is regarded as ‘not matured enough’ age grouping. Equally average age of above fifty years (approaching retirement) may not be keen at attending to this type of questionnaire work with any element of seriousness.

Marital status

This was to further confront the level of maturity and responsibility of workers of the industry, especially the craftsmanship group. A proportion of over fifty per cent married (widowed inclusive) indicates maturity and fairly good level of responsibility.

3.2.2 Working Experience/Period with Present Employer

This was to establish whether the recruitment policy of this group by the public sector employers gives room for periodic expansion of the labour

force or replacement plan for elderly stocks of labour. If between ten and twenty per cent of respondents have less than five years working experience, this signifies good expansion policy or good plan for replacing old stocks or both. If over twenty per cent of workers have above twenty years working experience, then it is an indication that the policy is poor in both the expansion programmes and replacement plans. It is generally to establish the pattern of entrance into and exits from the employments or the employer's replacement plans for the ageing stocks of labour. This was to establish existence of motivation of the employee to remain with the employer. If the number of years spent by the craftsman with the present employer was more than half of his working experience, then there is evidence of motivation to remain with the present employer.

3.2.3 Socio-economic Variables

Educational level

Question on education level was to provide information on the level of educational investment on the craftsmen group and their level of understanding of the questions. If over fifty per cent of respondents have post-primary education it then means high education investment was made on this group of workers. It also portends good understanding of the questions. Productivity in terms of ease of understanding of instruction and ability to work unsupervised are expected to be high with post-primary education attainment.

Salary grade level

This was to verify the spread of the class of this group in terms of income level. Were they mainly in the lower or upper end of the scale? Lower end of the scale may connote that they are either mainly recent

entrants or promotion takes longer than the 'normal' stipulated three yearly period. This latter situation affects work motivation negatively. Upper- end cluster may suggest low rate of employing new entrants. This may lead to the situation of employer encountering difficulty in replacing the aged (retiring) labour stocks with experienced ones.

Other sources of income

This was to establish whether the workers were able to cope with the income from the full employment or not. If over fifty per cent of the responses indicate engagement in other businesses, this means dissatisfaction with the income from the salaries.

3.2.4 Occupational Variables

Trade group

This was to verify the proportion of each professional trade group that are available in the Ministry of Works in the middle belt (North Central) zone of Nigeria economy. The trade types include: mason/tiler, carpenter/glazier, welder/blacksmith, plumber, painter, driver/mechanic/plant operator, road overseer/road assistant and electrician. Percentage of the total was used for each group.

Provision of safety devices & welfare items

This was to probe into the attitudes of the public sector employers towards safety and welfare of the workers. Availability of these enhances productivity capability of the workers. Absence of these poses a threat to workers' motivation to work.

Levels of maintenance activities

This establishes if there was adequate allotment of jobs to workers or not, in order to justify the keeping of such workers on full employment.

Inadequate issuance of work indicates the workers had more idle times throughout the week.

Overtime work

This was to find out whether the volume of work made available to the workers was sufficient to engage them through the official working hours (or much more to involve overtime working) or not.

3.2.5 Variables Indicating Levels of Motivation

Job satisfaction/dissatisfaction

This was to establish the level of employment satisfaction or dissatisfaction of the worker. Further questions were asked the unsatisfied worker to indicate the aspect(s) causing dissatisfaction. Factors such as job adequacy, pay adequacy, working tools or working environment adequacy or relationship with supervisor were listed as options to pick from. Those who desire to remain with the employer whenever opportunity to opt out arises were asked to state their reasons for such decision.

Performance level of the department

A self- appraisal question was asked the craftsmen to assess their departmental level of work output. This was to test the level of bias of the respondents and to get the general assessment of the workers' perception of performances in the departments.

3.3 PROCEDURES OF DATA COLLECTION

Following are the steps taken in gathering the data for the research.

3.3.1 Instruments of the Survey

Personally administered questionnaire and historical data collection method were the main instruments for the investigation in this study. While requesting a permission to conduct the survey, the published “Harmonised Public Servants Salary Structure” (HAPSS) was computed. Four sets of instruments have been designed for the study of the capacity utilisation of craftsmen in the Ministry of Works, Housing and Transport. The craftsmen were the target of the study as they were the trained workforce that carries out construction/maintenance work in the ministry. Appendix A1 – A5 listed the various questionnaires used for the data collection.

Three sets of questionnaire went to the departmental heads of the craftsmen. The first two sets of questionnaire were open-ended type (Appendix A1 & A2). The third questionnaire is mainly in matrix format with some questions being open-ended to allow for input from the respondents (Appendix A3). A questionnaire, the fourth set, was served on the craftsmen through their heads of departments. This was also in matrix format and with a few open-ended questions (Appendix A4).

Each of the first two questionnaires contained a question requiring precise quantitative figurative answers. The first sought information on the number of the craftsmen in the department and their salary grade levels (Appendix A2). The second was requesting for the estimated cost (in ranges of Naira figure grouping) of the departmental craftsmen work output annually for a ten-year period, 1992 – 2001 (Appendix A2). The

third (Appendix A3) sought among others, information on: (a) total departmental staff strength, (b) relationship between work budget and production and (c) relationship between capital and recurrent spending. The three instruments were responded to by the departmental heads.

The fourth (Appendix A4) was the questionnaire for the craftsmen and was subdivided into three parts. The first segment covered preliminary data on the demographic characteristics of the craftsman that is, data on gender, age, marital status and working experience. The second part requested for information on socio-economic characteristics of the craftsman. This includes length of period with present employer, educational qualification and salary grade level. The last segment covered the occupational characteristics of the craftsman. This was to establish, in the main, the level of involvement of the craftsman in productive activities and also to verify if environment for production was available or not. Each director/supervisor personally gave the records of the annual work output of the department to the researcher.

The data on the work output for the federal establishments were based on the financial allocations from the headquarters while those for the states were based on the budgets for maintenance works.

For the data on the quantity of the craftsmen in each salary grade level in the department, the deputy or the secretary to the supervisor/director was verbally instructed to look into the appropriate files and supply the figures to the researcher. Other set of data were directly collected from the craftsmen through questionnaire. The questionnaire was served to each selected craftsman through their departmental heads. The selection was randomly carried out by the supervisors/head of department. However,

the researcher requested each of the supervisors to introduce elements of bias in distributing the questionnaire to the craftsmen; specifically to involve both genders in the project (the filling of the questionnaire) and to spread the coverage across all the salary grade levels of the craftsmen in each department.

3.3.2 The Field work Procedure (Administration of Questionnaire)

The field survey consisted of collecting both secondary – historical data on number of craftsmen in each salary grade level and the salary structure for the category of workers – and primary data. After the satisfactory result of the pilot survey had been obtained, the field work commenced. An introduction letter on the mission of the research was written by the department and addressed to the Directors/Heads of the departments of the State/Federal Ministry of Works and Housing respectively. The letter was seeking permission and assistance of the officers in carrying out the questionnaire survey. It also explained the mission of the research (Appendix A5).

Secondary data responses

The first part of the data collection involved administration of two different formats to each ministry of works' departmental Director. In the first format (Appendix A1), the respondent was to insert the number of craftsmen of each trade by their salary grade levels (03-07). This sought to obtain the staff strength of the site operatives in that Ministry of Works. In the second format the respondent filled in the appropriate box the amount of work carried out by the department annually for the ten-year period, 1992 –2001 (Appendix A2). This sought to obtain the production output of each department per year. The Federal Pay Office, the Accounts

department of the Ministry of Works or the Office of the Head of Service supplied a copy of the approved salary structure in use in the ministry.

The research questionnaire

The second part of the data collection involved questionnaire of nine questions for the supervisor/director and that of twenty-three questions for the craftsmen/technical assistant (Appendices A3 & A4).

The questionnaire to the craftsmen was for a selected number of each trade in each department of each Ministry. Each trade of the craftsmanship available in the ministry covered proportionately as oral instruction was given to that effect to the supervisor who directly issued the craftsmen in his department. While taking permission to conduct the survey, the published Harmonised Public Servants Salary Structure (HAPSS) was computed (Appendices B1, B2 & B4).

Data Collation

The questionnaire were designed and coded for treatment under the Statistical Packages for Social Sciences (SPSS), the ninth version and the Microsoft Excel computer software.

3.4 RESEARCH POPULATION/ SAMPLE FRAME

All craftsmen in the employment of the state Ministry of works with their counterparts in the Federal Ministry of works in each of the Kwara, Niger and Plateau States serve as the population sample for the fieldwork of the research.

3.4.1 The Target Population of the Study Area

- (i) Assistant Craftsman (Grade III Trade-tested Artisan) Salary grade level 03

An attendant is an unskilled labourer who declares interest in learning a particular construction trade or craft and he learns on-the-job under a craftsman in that trade for a period of apprenticeship.

An attendant could have previously been on salary grade level 01 or 02 depending on the number of years of service put in before passing the grade III trade test. In other words moving from salary grade level 01 to level 02 is by promotion. This and the rest grade levels are as stipulated in the conditions of service of each ministry.

- (ii)** Craftsman (Grade II Trade tested) –Salary grade level 04
- (iii)** Senior Craftsman (Grade I Trade tested) –Salary grade level 05
- (iv) Foreman --Salary grade level 06
- (iv) Senior Foreman – Salary grade level 07

Appendix B1 presented the various salary structures of the Nigerian civil servants in the category of the study, that is, salary grade levels 03 – 07.

The population for the study is fifty-two departments. This is made up of four functional departments (Building, Civil/Highway Engineering, Electrical Engineering and Mechanical Engineering) in each of the six middle belt states Ministry of Works, Housing and Transport with the six state offices of the Federal Ministry of Works and Abuja.

A complete investigation of a statistical problem is expensive both in time and money. Therefore the usually accepted approach is to study a

proportion of the subject matter and apply the result to the whole population.

3.4.2 Sample Size

Since a sample size needs to be representative of the population, a total of twenty-four departments were picked from the sampling frame of fifty-six departments. The twenty-four departments are constituted from six establishments (state & federal Ministry of Works & Housing) located in three middle-belt states. The three states were carefully chosen because of their fairly uniform conditions of service, weather and relative ease of data collection. Present among the sampled states are the economic and political characteristic features of the middle belt entity.

The study was limited to these twenty-four departments for ease of data computation management, considering the ten year period covered by the study. All the twenty-four departmental heads were personally served with the 'Supervisor's questionnaire (Appendix A3).

The total population of the craftsmen in the twenty-four departments was one thousand and fifty-five. See Tables 6a and 6b for this. The questionnaire for the craftsmen was served on one hundred and forty-six of them. Each of the departments was served with a minimum of five sets of questionnaire for the craftsmen. The choice of who of the craftsmen was served with the questionnaire in each department was purely left at the discretion of the head of the department of the craftsmen who conducted the distribution and retrieval of the questionnaire. However the researcher advised the head of department to make the distribution as representative of salary grade levels and genders as much as feasible.

3.5 PROBLEMS OF DATA COLLECTION

Apart from several futile visits to the offices of supervisors/directors who were either attending meetings outside their premises or were out to sites or to unspecified places, some of the establishments were on strike for many months. This gave delays to the completion of the fieldwork aspect of the research. Also some of the supervisors did not easily appreciate the implication or essence of the study, and so they were for quite sometimes reluctant to positively respond to the questionnaire on the estimated annual labour outputs of their departments.

3.6 RELIABILITY OF DATA

Overcoming problems associated with data collection was achieved through human-relations approach, endurance and ingenuity. The confidence of the heads of the 24 departments was secured and they all responded to the questionnaire frankly and objectively. They were equally implored to persuade the craftsmen under their leadership to do the same. For those who were not easily accessible, call back approach was employed. Apart from the formal letter of introduction that was carried by the researcher to the field, informal introduction letters, from some colleagues of the researcher who were acquaintances of some of the heads of the selected field departments, were carried along as well. All of the supervisors/directors concerned in each establishment eventually completed the questionnaire. The minimum qualification of each of the supervisors was Higher National Diploma (HND) or first degree. Quite a number of them had, in addition, professional qualifications.

A year after the collection of the data the head of each of the twenty-four departments was revisited to cross-check if there had been any appreciable changes in the level of productive engagements of the craftsmen in the department. It was established from all the responses that there was no significant change in the level of engagements of the craftsmen with work in the period.

3.7 PILOT STUDY

Craftsmen under similar geographical work environment and with similar training, qualification and skill acquisition or experience are normally expected to have little or no difference in their work output. It is customary for the employers in the private sector to optimise the use of their labour force. Therefore it is logical to take the work output of such workers as standard upon which the job performance of the craftsmen in the public sector will be evaluated. Consequently, a pilot survey of the wages of the construction craftsmen in the private sector, within the region, was conducted.

A survey of average daily wages of construction craftsmen of the private sector was carried out in two middle-belt towns (Abuja and Minna) during the last quarter of 2001, (Table 4). This was done against the background that the sector is characterised with optimising the usage of its labour force and that it serves as a basis for wage comparison between the private and the public sectors

Table 4. A Pilot Survey of Private Sector Construction Operatives' Daily Wages (Abuja and Minna – Nov. 2000)

Operation	Daily Wages		Daily Wages	
	Skilled Labour		Unskilled Labour	
	Abuja (₦)	Minna (₦)	Abuja (₦)	Minna (₦)
Concreting	700 – 900	800 – 1000	300 – 400	400 – 500
Block laying	600 – 700	700 – 800	350 – 400	300 – 400
Plastering/Screeding	600 – 700	700 – 800	250 – 350	300 – 400
Carpentry	600 – 700	700 – 800	N.A	N.A

N.A = Not Available

A comparison of the wages of craftsmen in the public sector, on monthly basis, with those in the private sector was carried out (Table 5). It was found out that the wages of the federal government employee craftsmen were between fifty-one per cent and seventy per cent of those of the craftsmen in the private sector. The comparison was based on twenty-two working days per month and at the rate of ₦700 per day (2001 price for the daily paid private sector craftsman), giving ₦15400 per month). The same comparison between the private sector craftsman and that of a state (Niger) revealed that the state worker receives between thirty-eight and fifty-four per cents of what is obtainable in the private sector (Table 5).

3.7.1 Pre-testing of the Questionnaire

A pilot survey of some public service establishments was carried out, in respect of the questionnaire to the craftsmen, in order to get a feeler of the extent of the understanding the craftsmen had of the questions. It is appreciated that the conditions for their employment in their various establishments indicate they were supposed to be able to read and write with at least primary school education. The pilot survey questionnaire was served on public service craftsmen both within and outside ministry of works. The result of the pilot survey showed the questions were understood by the craftsmen. Some of them even indicated they would be interested in the outcome of the experiment by writing their names and addresses on separate sheets of paper as instructed in the questionnaire.

Table 5 Comparison of Wages of Craftsmen - Public and the Private Sectors -Year 2001 (₦)

	Level 3 Step 1	level 4 step 1	level 5 step 1	level 6 step 1
Federal Government	7919	8220	9103	10752
As %of Private (15400)	51.4	53.4	59.1	69.9
State Government (Niger)	5859	6117	6874	8285
As % of Private (15400)	38.0	39.7	44.6	53.8

Extracted from Appendices B1 – B3

3.8 SURVEY POPULATION

The total population of the craftsmen in the six Ministries of Works that are covered by the survey are tabulated on the basis of departmental characteristics and sub-divided into salary grade level (cadres) groupings. All the craftsmen in the three state offices of the Federal Ministry of Works are 401 in all. The departmental characteristic classifications with the cadre sub-divisions are as presented in Table 6a.

The same procedure was adopted for the craftsmen in the three states Ministries of Works. The total number of craftsmen in this group is 654 (Table 6b).

Table 6a. Distribution of Craftsmen by Salary Levels - Federal Ministries

Trade	Salary Levels	03	04	05	06	07	Total
Building		7	19	28	27	6	87
Civil		68	35	16	12	6	137
Electrical		12	17	10	8	7	54
Mechanical		22	48	26	17	10	123
Total		109	119	80	64	29	401

Table 6b. Distribution of Craftsmen by Salary Levels - State Ministries

Trade	Salary Levels	03	04	05	06	07	Total
Building		15	20	49	45	82	211
Civil		29	31	17	39	45	161
Electrical		3	9	10	19	39	80
Mechanical		15	27	24	32	104	202
Total		62	82	100	135	270	654

3.9 METHODS OF DATA ANALYSIS

The data used in the study were analysed using the appropriate techniques which include; averages, percentages, relative returns, linear regression, correlation analysis and analysis of variance (ANOVA). Computer software used for the analyses includes the Statistical Packages for Social Sciences (SPSS) and Microsoft Excel.

3.9.1 Statistical Tests

The hypotheses to be tested, which include the null (Ho) and the alternative (H1), are:

1.H₀. There is no significant difference between the values of labour input and output among the departments.

H₁. There are significant differences in the values of labour input and output among the departments.

2.H₀. There is no significant difference between the values of departmental productivity ratings by the supervisors and the productivity calculated.

H₁. There are significant differences between the values of departmental productivity ratings by the supervisors and the productivity calculated

Percentages

Percentages and frequency analysis were applied to the socio-economic, educational and other characteristics of the craftsmen.

Performance averages

Averages of each of the following group of data were calculated for the ten year period covered by the research.

- i. Values of annual labour output per department
- ii. Values of labour outputs for all departments per annum
- iii. Values of labour outputs for all Federal departments per annum
- iv. Values of labour outputs for all States departments per annum

Relative returns (output – input)

This is the return on the investment of the employer on the labourers per annum per department. Relative return is derived from the differences between the values of labour output and the corresponding labour cost (input) per year over the ten-year period. The values derived are relative values.

Further tests carried out include:

- (i) Averages of the returns per department for the ten year period
- (ii) Averages of the returns per year for all the departments
- (iii) Averages of the returns per year for all Federal departments
- (iv) Averages of the returns per year for all State departments.

This is to verify which of the ministry of Works impacts more on the construction and maintenance activities of the two levels of government (Federal and State) in any particular state in the studied region of the country.

Linear regression analysis method

This method would be able to capture analyses which could not be carried out by the use of percentages or averages. For instance one would

be able to establish some other types of relationships that might exist between the pairs of output and input factors in order to be able to make some reasonable predictions. The dependent variable y , is work output and the independent variable x , is annual pay, regression analysis can be performed on the hypothesis for the 24 departments. The following linear regression analyses were carried out.

- i, Ten year departmental average labour costs regressed against the corresponding average values of labour outputs.
- ii. Average labour costs of all departments per year regressed against the average values of labour outputs of all departments per year.
- iii. Average labour costs of all Federal departments per year regressed against the average values of labour outputs of all Federal departments per year.
- iv. Average labour costs of all state departments per year regressed against the average values of labour outputs of all States departments per year.
- v. Ten year average labour costs of each Federal department regressed against the corresponding ten-year average values of labour outputs.
- vi. Ten year average labour costs of each state department regressed against the corresponding ten-year average values of labour outputs.

Correlation analysis Method

This is to cater for aspects of analyses that might not have been captured by the linear regression analysis. This includes areas such as the relationship that might exist between the productivity rating of the supervisor and the calculated productivity.

Analysis of Variance (ANOVA)

ANOVA is a statistical tool used for testing relationships that may exist

between the mean values of variables. It assumes that population samples are drawn from normal population of the public sector construction craftsmen in the middle-belt region of Nigeria with the same variance but with the means that differ. ANOVA helps in finding out information such as the magnitudes of the differences of the population means. Relationship between the means of the input costs and output values were tested under the following groupings:

- i. all departments
- ii. federal departments
- iii. state departments
- iv. all four departments of each federal ministry
- v. all four departments of each state ministry

CHAPTER FOUR

DATA ANALYSIS AND PRESENTATION OF RESULTS

4.1 INTRODUCTION

Between five and twelve copies of questionnaire were given to each of the various heads of departments for distribution to the craftsmen in their departments. Each of the departmental heads organized the completion and the return of the questionnaire issued to the selected craftsmen. The return was within a stipulated number of days. A total of one hundred and forty-six copies of the questionnaire were filled and returned to the researcher through the twenty-four heads of departments. The trade classifications of the craftsmen are as in Table 7.

From the analysis of the one hundred and forty-six questionnaire returned by the sampled craftsmen, the following are the results of the characteristic classifications

4.1.1 Demographic and Educational

The study revealed that 92.5 per cent of the craftsmen were male leaving the female population proportion to be only 7.5 per cent. From the result of age grouping of the craftsmen, 87 per cent of them were between the ages of twenty to fifty years. In actual fact 81.5 percent of the group were in the age brackets of thirty to fifty years. 91.8 percent of the group surveyed were married. 76.7 percent of the respondents had post primary education qualifications. Those who were over fifty years of age were 5.5 per cent. Thus the questions were well understood. The pilot survey responses were another confirmation of this.

Table7. Distribution of the Sampled Craftsmen by Trade Groupings

Trade Group	Total No	% of Total
Mason/Tiler	23	15.8
Carpenter/Glazier	14	9.6
Welder/Blacksmith	5	3.4
Plumber	7	4.8
Painter	9	6.2
Plant Operator/Driver Mechanic	33	22.6
Road Overseer/Road Assistants	25	17.1
Electrician	30	20.5
Total	146	100.0

Source: Field Survey, 2002

On the working experience of this group there is a close relationship between the working experience and length of period with the present employer. The proportion of the respondents that had been working with the public sector for between ten and thirty years was eighty-seven percent. Only 9.6 per cent percent have been with the employer for ten years or less.

4.1.2 Level of Utilization

Only 14.3 per cent of the workers had sufficient work to within the eight hours available to them do on daily basis. 24.7 per cent stay idle at work (lack of what to do) for a continuous period of one to four weeks. Still another thirty-seven per cent stay at work continuously for over two months without being assigned any work. The proportion of the respondents that did not answer this question on the level of their engagement at work was twenty-four per cent.

On the question of getting involved in overtime work in the last ten years, only 39 per cent had more than sufficient volume of work to warrant overtime engagement. Those who prefer a change of employment were 54.1 per cent and their preferred new places include self employment or private construction firm jobs. Preference of change of employment is synonymous with dissatisfaction with the present employment.

4.2 METHODS OF ANALYSIS

Values of the annual departmental work output were computed from the field data (the two sets of questionnaire returned by all the twenty-four

heads of departments). The same computation procedures were carried out for the values of labour input costs. Averages, relative returns, regression analysis and analysis of variance (ANOVA) were the analysis methods used for the output and input data.

4.2.1 Values of Work Done Per Annum by Departments

The departmental annual work outputs over a ten-year period were as tabulated in Table 8. The table was obtained by adding the total monetary values of the work output of all the craftsmen in each department per annum in millions of naira for the ten-year period of the study. These values were obtained from the responses of the supervisors to the questionnaire on the annual labour output of the department over the ten year period 1992 – 2001 (Appendix A2).

Averages of annual labour output values

The outputs of all the craftsmen of the twenty-four departments were taken annually and the averages were found for each of the ten years. The same steps were taken for the combined twelve federal departments. The combined state departments were treated the same way. The outcome was presented at the bottom of Table 8.

Table 8. Value of Work done Annually (₦m) by each department 1992 – 2001

Dept/year	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
F01B	0.05	0.05	0.05	0.05	0.10	0.05	0.05	0.05	0.05	0.05
F01C	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	0.10	0.10
F01E	0.05	0.05	0.05	0.05	0.05	0.05	0.10	0.10	0.10	0.10
F01M	0.05	0.05	0.05	0.05	0.05	0.10	0.10	0.10	1.00	1.00
F02B	0.40	0.50	0.50	0.50	0.50	0.50	0.60	0.60	0.60	0.05
F02C	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
F02E	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
F02M	0.05	0.05	0.05	0.05	0.05	0.10	0.10	0.10	0.05	0.05
F03B	0.10	0.05	0.05	0.05	1.00	1.00	1.00	0.10	0.10	0.10
F03C	0.25	0.30	0.65	0.10	0.05	0.05	0.05	0.05	0.05	4.75
F03E	0.10	0.10	2.00	2.00	1.00	1.00	0.10	0.10	0.10	0.10
F03M	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	1.00	0.10
S01B	0.05	0.05	0.05	0.05	0.10	0.05	0.05	0.05	0.05	0.05
S01C	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
S01E	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
S01M	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
S02B	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
S02C	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
S02E	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
S02M	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
S03B	0.10	0.40	0.05	0.05	10.30	0.30	5.60	8.20	1.70	0.05
S03C	0.25	0.30	0.65	0.10	0.05	0.05	0.05	0.05	0.05	0.05
S03E	1.00	1.00	0.10	0.10	0.10	0.10	0.10	0.05	0.05	0.10
S03M	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	1.00	0.10
All Av	0.17	0.19	0.25	0.20	0.62	0.20	0.44	0.51	0.27	0.30
Fed Av	0.19	0.20	0.38	0.34	0.33	0.34	0.36	0.28	0.27	0.54
State Av	0.15	0.18	0.11	0.06	0.92	0.08	0.52	0.73	0.27	0.06

-
Source: Field Survey, 2002

KEY TO DEPARTMENT CODES

F01 = Federal Ministry of Works, Kwara State branch
 F02 = Federal Ministry of Works, Niger State branch
 F03 = Federal Ministry of Works, Plateau State branch
 S01 = Kwara State Ministry of Works
 S02 = Niger State Ministry of Works
 S03 = Plateau State Ministry of Works
 B = Building Department
 C = Civil Engineering/Highway Department
 E = Electrical Engineering Department
 M = Mechanical Engineering Department.

Analysis

From Table 8 (page 72), taking all departments together, there were only five (20.8%) operating with labour output values above the regional averages in the four years 1992, 1994, 1997 and 2000. while six departments in 1993 had outputs that were above the average. In 1995 and 1999, three departments (12.5%) operated above the average. In 1996 and 1998 only 16.7% (four departments) yielded labour output values that were above the average. Year 2001 produced the least number of departments (two or 8.3%) with the labour output above the average.

Considering only federal departments, those that performed above the regional averages are as follows: in each of 1992, 1995, 1998 and 2000 there were only three (25%); in each of 1993, 1994, 1996 and 1997 there were four (33%); while in either of 1999 and 2001 there were only two (16.7%).

Annual labour output values under 'state department' groups are the worst in terms of proportion of states that perform above regional averages in all the years. Three departments were above the average in each of 1993, 1995 and 1997. Two departments performed above the average in 1992, 2000 and 2001. Only one department was above average in each of the four years 1994, 1996, 1998 and 1999.

4.2.2 Annual Costs of Labour Input per Department

Findings from the survey of the strengths (total population) of the craftsmen in the various departments which are as reported in Tables 6a and 6b, are used along with the wage bills to compute the departmental annual labour costs as presented in Table 9. The table is the result of the data collected from records in terms of how much was spent in paying the

wages of the craftsmen. Input of the craftsmen was measured in terms of the total payments made as the wages of the craftsmen each year over the period 1992 – 2001. Table 9 was the total emoluments paid by the employer to all the craftsmen in each department per annum for the ten-year period.

4.2.3 Performance Averages

Averages of annual labour input cost

Averages of the total annual expenditure of the employers on emolument payments to the craftsmen of all the twenty-four departments were taken over the ten year period. The same procedures were followed for all the twelve Federal departments separately and for the twelve state departments as well. The results were as in bottom of Table 9.

Analysis

From Tables 9, it was found that eight departments out of twenty-four operated with annual labour input costs that were above the regional average for each of the ten years under consideration. The remaining sixteen departments operated below the average. Among the Federal departments five of them (41.7%) operated above the regional average per year, while the remaining seven were below the average. For the state department groups, four or 33% operated with the employers input costs on labour above the regional average.

Table 9. Departmental Annual Labour Input Costs (Nm) 1992 – 2001

Dept	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
F01B	0.22	0.23	0.24	0.24	0.26	0.27	2.00	1.35	2.98	2.98
F01C	0.29	0.30	0.32	0.33	0.35	0.36	2.70	1.82	4.02	4.02
F01E	0.28	0.30	0.31	0.32	0.34	0.35	2.63	1.77	3.90	3.90
F01M	0.54	0.57	0.59	0.62	0.64	0.67	5.02	3.38	7.47	7.47
F02B	0.28	0.29	0.30	0.32	0.33	0.34	2.57	1.73	3.81	3.81
F02C	0.52	0.54	0.57	0.59	0.62	0.64	4.83	3.25	7.18	7.18
F02E	0.13	0.13	0.14	0.15	0.15	0.16	1.19	0.80	1.76	1.76
F02M	0.44	0.46	0.48	0.50	0.52	0.54	4.04	2.72	6.01	6.01
F03B	0.34	0.35	0.37	0.38	0.40	0.41	3.11	2.09	4.62	4.62
F03C	0.35	0.36	0.38	0.39	0.41	0.43	3.21	2.16	4.76	4.76
F03E	0.09	0.10	0.10	0.10	0.11	0.11	0.85	0.57	1.26	1.26
F03M	0.13	0.14	0.14	0.15	0.16	0.16	1.22	0.82	1.81	1.81
S01B	0.72	0.75	0.78	0.81	0.85	0.88	6.64	4.47	9.86	9.86
S01C	0.02	0.02	0.02	0.02	0.02	0.02	0.18	0.12	0.27	0.27
S01E	0.08	0.09	0.09	0.10	0.10	0.10	0.77	0.52	1.14	1.14
S01M	0.30	0.31	0.33	0.34	0.36	0.37	2.78	1.87	4.12	4.12
S02B	0.73	0.76	0.80	0.83	0.87	0.90	6.78	4.56	10.06	10.06
S02C	1.10	1.15	1.20	1.25	1.30	1.35	10.18	6.85	15.12	15.12
S02E	0.34	0.36	0.37	0.39	0.40	0.42	3.15	2.12	4.67	4.67
S02M	1.24	1.29	1.35	1.41	1.47	1.53	11.47	7.72	17.04	17.04
S03B	0.43	0.45	0.47	0.49	0.51	0.53	4.01	2.70	5.96	5.96
S03C	0.19	0.20	0.21	0.21	0.22	0.23	1.75	1.18	2.60	2.60
S03E	0.33	0.34	0.36	0.37	0.39	0.41	3.05	2.05	4.53	4.53
S03M	0.32	0.33	0.35	0.36	0.38	0.40	2.96	1.99	4.39	4.39
All Av	0.39	0.41	0.43	0.44	0.47	0.48	3.63	2.44	5.39	5.39
Fed Av	0.30	0.31	0.33	0.34	0.36	0.37	2.78	1.87	4.13	4.13
State Av.	0.48	0.50	0.53	0.55	0.57	0.68	4.48	3.01	6.65	6.65

Source: Field Survey, 2002

Averages of annual labour input costs/output values per department

Averages of the ten year period performances of each of the twenty-four departments were evaluated in terms of the craftsmen's labour costs and corresponding values of work done by the craftsmen and were presented in Table 10.

Analysis

From the table (Table 10), the following can be seen:

1. For the whole ten year period average of the labour input costs in all departments was ₦1.91million, leaving eight departments above and the rest sixteen below the average; the average for the federal departments was ₦1.49million leaving five out of twelve departments above the average; the state departments had the overall annual average of labour input cost of ₦2.33million with four departments standing above the average.

Table 10. Averages of Annual Labour Input Costs with Output Values per Department (₦m)

Dept	Input	Output
F01B	1.08	.06
F01C	1.45	1.02
F01E	1.42	.07
F01M	2.70	.26
F02B	1.37	.48
F02C	2.59	.05
F02E	.64	.05
F02M	2.17	.06
F03B	1.67	.36
F03C	1.72	.63
F03E	.46	.66
F03M	.65	.19
S01B	3.52	.05
S01C	.09	.05
S01E	.41	.05
S01M	1.49	.05
S02B	3.64	.05
S02C	5.46	.05
S02E	1.69	.05
S02M	6.16	.05
S03B	2.16	2.68
S03C	.09	.16
S03E	1.64	.27
S03M	1.59	.19

Extracted from Tables 8 & 9

2. In the same ten year period average of the annual average output of ₦308000 with only one department above the average.

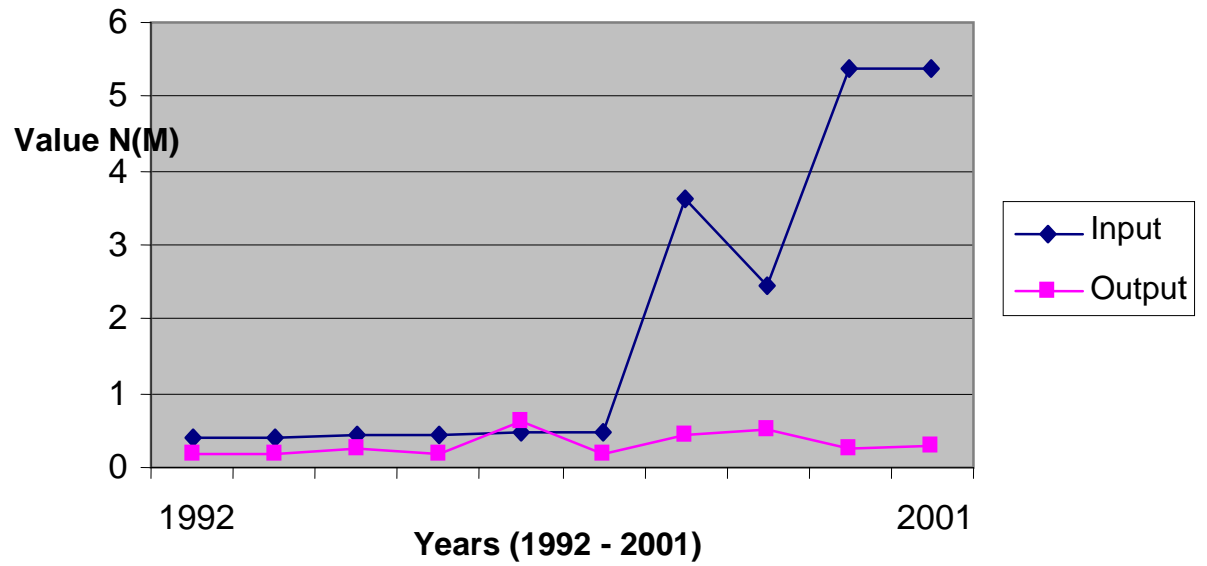
It can further be observed that employers' inputs on labour are more in the state departments (average of ₦2.33m) than in the federal departments. Ranking the departments in sizes of input costs on labour the highest four departments are from the states. The reason for the figure of input cost being higher in the states than in the federal departments is most likely due to the population size.

On the output value consideration, the federal departments have higher average (₦324000) than the states (₦308000). Though the department with the highest average annual labour output value (department S03B with ₦2.68m) is a 'state department', the next five in rank to it are federal departments. In general the craftsmen in the states collectively costs the employers more than those in the federal employment; and, at the same time it was those in the federal employment that generally had better output values.

All departments average annual labour input costs/output values

For each of the ten year periods, the values of craftsmen's labour costs in all of the departments were totalled and tabulated against the corresponding total annual values of the labour outputs (bottoms of Tables 8 and 9). This wide disparity between the values of the labour input and the output is made clear by the Fig.1 below. The gap between the output level and that of the input portrays the extent of utilization of the capacity of the craftsmen labour. When the output curve is above that of the input, it shows an efficient utilization of the labour capacity. On the other hand, the output curve being below that of the input shows

redundancy of the labour force. In Figure 1 the level of labour underutilization (redundancy) for the combined 24 departments was very little during 1992 – 1995 period. 1995 – 1996 shows an improvement that gave an efficiently utilized labour capacity with a positive net labour output. 1996 – 1997 produced a negative turn of the 1995 – 1996 trends. Beginning with 1997 a wide gap between output and the input (redundancy) started and became the reality to the end of the study period (2001). The widest of the gap (highest level of redundancy occurred in the year 2000, though there was a sharp drop in the trend in the 1998 – 1999 period. The sharpest rise occurred during both 1997 and 1999 years.



**Figure 1: All Departments Average Annual Labour
Input/Output Values**

Federal departments average annual labour input costs/output values

Annual averages of values of labour inputs and labour outputs of all the twelve federal departments were computed. Output values, generally for most of the departments, were far lower than the employers' input costs in retaining the craftsmen labour force in the period, but 1996 was an exception. What gave 1996 a collective output value (₦0.62m, Table 8 page 88) that was higher than the value of the collective labour input (₦0.47m, Table 9 page 91) was the exceptional output performance of department S03B (₦10.30m, Table 8). The last four years of the ten year period in focus (1998 – 2001) produced wide gaps between the values of annual input and output. The pictorial presentation of the profiles of the labour output and input values is given in Fig.2 below.

State departments average annual labour input costs/output values

The combined annual labour input values with the corresponding annual labour output values of all twelve departments of the three state Ministries of Works were added and the averages were found for each of the ten-year period being investigated.. the graphical relationships between the annual output and input values are shown in Fig.3 (page 98).

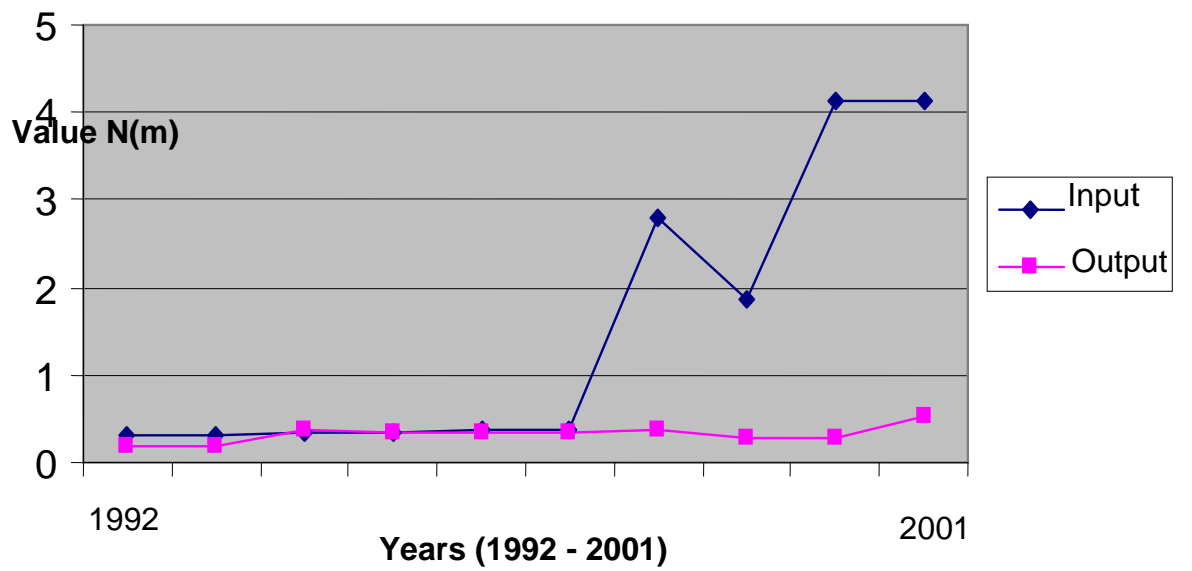


Figure 2: All Federal departments Average Annual Input/Output(Nm)

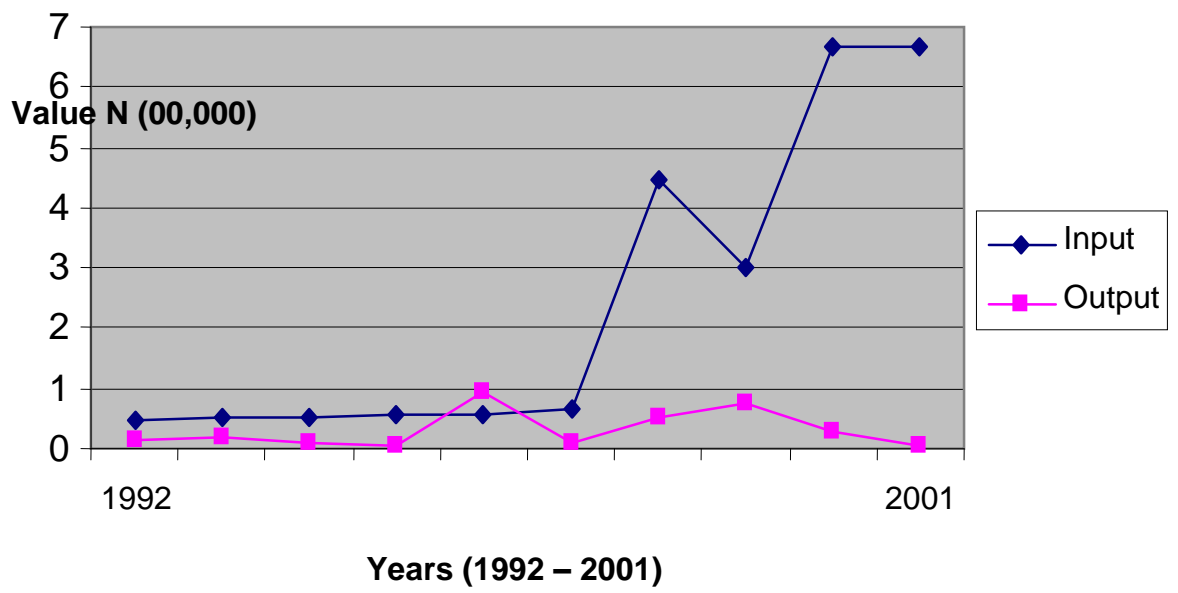


Figure 3: All States departments Average Annual Input/Output(N0.10m)

4.2.4 Relative Returns of Employer's Investment on Labour

Relative Returns are the net values of labour output after the deduction of all costs incurred in maintaining the labour force (Output – Input).

Table 11 gives the net values of the returns of the employer's investment on the craftsmen per department, in millions of Naira, for the ten year period. The monetary gains made by the employer on all the craftsmen in each department annually after deducting all payments made to the craftsmen from the value of work carried out during the period.

Table 11. Relative Returns of the Employer's Investment on Labour (Nm)

Dept	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
OIB	0.17	-0.18	-0.19	-0.19	-0.16	-0.02	-1.95	-1.3	-2.93	-2.93
FOIC	0.71	0.7	0.68	0.67	0.65	0.64	-0.7	0.18	-3.92	-3.92
FOIE	-0.24	-0.25	-0.26	-0.27	-0.29	-0.3	-2.53	-1.67	-3.8	-3.8
FOIM	-0.49	-0.52	-0.54	-0.57	-0.59	-0.57	-4.92	-3.28	-7.37	-7.37
FO2B	0.12	0.21	0.2	0.18	0.17	0.16	-1.97	-1.13	-3.21	-3.76
FO2C	-0.47	-0.49	-0.52	-0.54	-0.57	-0.59	-4.78	-3.2	-7.13	-7.13
FO2E	-0.08	-0.08	-0.09	-0.1	-0.1	-0.11	-1.14	-0.75	-1.71	-1.71
FO2M	-0.39	-0.41	-0.43	-0.45	-0.47	-0.44	-3.94	-2.62	-5.96	-5.96
FO3B	-0.24	-0.3	-0.32	-0.33	0.6	0.59	-2.11	-1.99	-4.52	-4.52
FO3C	-0.1	-0.06	0.27	-0.29	-0.36	-0.38	-3.16	-2.11	-4.71	-0.01
FO3E	0.01	0	1	1.9	0.89	0.89	-0.75	-0.47	-1.16	-1.16
FO3M	-0.03	-0.04	-0.04	-0.05	-0.06	-0.06	-1.12	-0.72	-0.81	-1.71
SOIB	-0.67	-0.7	-0.73	-0.76	-0.75	-0.83	-6.59	-4.42	-9.81	-9.81
SOIC	0.03	0.03	-0.03	0.03	0.03	0.03	-0.13	-0.07	-0.22	-0.22
SOIE	-0.03	-0.04	-0.04	-0.05	-0.05	-0.05	-0.72	-1.56	-1.09	-1.09
SOIM	-0.25	-0.28	-0.28	-0.29	-0.31	-0.32	-2.72	-1.82	-4.07	-4.07
SO2B	-0.68	-0.71	-0.75	-0.78	-0.82	-0.85	-6.73	-4.51	-10.01	-10.01
SO2C	-1.05	-1.1	-1.15	-1.2	-1.25	-1.3	-10.13	-6.8	-15.07	-15.07
SO2E	-0.29	-0.31	-0.32	-0.34	-0.35	-0.37	-3.1	-2.07	-4.62	-4.62
SO2M	-1.19	-1.24	-1.3	-1.36	-1.42	-1.48	-11.42	-7.67	-16.99	-16.99
SO3B	-0.33	-0.05	-0.42	-0.44	9.79	-0.23	1.59	5.5	-4.26	-5.91
SO3C	0.06	0.1	0.44	-0.11	-0.17	-0.18	-1.7	-1.13	-2.55	-2.55
SO3E	0.67	0.66	-0.26	-0.27	-0.29	-0.31	-2.95	-2	-4.48	-4.43
SO3M	-0.22	-0.23	-0.25	-0.26	-0.28	-0.3	-2.86	-1.89	-3.39	-4.29
All Av	-0.224	-0.220	-0.222	-0.245	0.160	-0.266	-3.189	-1.979	-5.158	-5.127
Fed Av	-0.109	-0.118	-0.020	-0.003	-0.024	-0.016	-2.423	-1.588	-3.936	-3.665
Sta Av	-0.329	-0.323	-0.424	-0.486	0.344	-0.516	-3.955	-2.370	-6.380	-6.588

Extracted from Tables 8 & 9

Average relative return of all 24 departments per annum

Combining all the departments and calculating the net average annual relative return of the employers' investments on labour, the result is as presented in bottom row of Table 11 above. From the averages per annum of all the twenty-four departments (bottom row Table 11 above), it was only in one year (1996) that the combined relative return on investment was positive. The largest negative value of ₦5.158million was produced in 2000. This implies that the combined output of the craftsmen of all the departments could not meet up with the investments of the employer on the craftsmen (input) in nine out of the ten years covered by the study. The recovery of the investment was achieved in only one year (1996).

Average relative return of all federal departments per annum

The relative returns of all the 'Federal' departments for each year were added together for the year and the result is as presented at the bottom of Table 11. This analysis was carried out in order to capture the relationship between the employer's investments on craftsmen with the corresponding output in the federal ministry of works. The result shows that for the entire ten year period, there was no year that produced a combined relative return that is positive. This interprets to mean that the combined spending of the departments of the Federal Ministry of Works on their craftsmen was higher than the value of combined work output of their craftsmen in any of the years covered by the investigation. The highest figure of negative relative returns (about ₦4million) was attained in the year 2000.

Average relative return of all states departments per annum

The procedure of calculating the values of relative returns per annum

for the combined state departments was followed in the same way as was done for the combined Federal departments. Table 11 (bottom rows) presents the report. The table shows that the states made a positive combined return of ₦ 0.344 million in 1996.

Average relative return of each department in the ten years

Subtracting the total expenditure of each department in the entire ten year period on its craftsmen from the total values of work output of the craftsmen, the figures in Table 12 were obtained. The table shows that it was only the Electrical Engineering department in State F03 (a federal department) that made a positive ten-year average relative return of ₦ 0.115 million, while the Building department in State S03 (a state department) made a positive ten-year average relative return of ₦ 0.524 million. The two departments belong to different governments but are situated in the same state.

Table 12. Average Relative Return of Each Department in the ten years

Dept	Nm
F01B	-1.094
F01C	-0.431
F01E	-1.341
F01M	-2.622
F02B	-0.903
F02C	-2.542
F02E	-0.587
F02M	-2.107
F03B	-1.314
F03C	-1.091
F03E	0.115
F03M	-0.464
S01B	-3.507
S01C	-0.052
S01E	-0.472
S01M	-1.441
S02B	-3.585
S02C	-5.412
S02E	-1.639
S02M	-6.106
S03B	0.524
S03C	-0.779
S03E	-1.366
S03M	-1.397

Extracted from Table 11.

4.2.5 Regression Analysis

Regressing total annual input costs 'X' as independent variables against the corresponding total annual outputs 'Y' as dependent variables in the Equation $Y = a + bX$; the results are as below while the detailed analyses are in appendix B6.

The analysis show that there is some relationship between the averages of the total cost per annum and the total values of labour output per annum when the Federal departments were combined, though the relationship is a weak one with the understanding that the output values offer 20 percent explanation of input costs (Table 13).

Summary of regression analyses

Table 13. Regression of performances of Federal Departments per Annum

Dependent Variable:	Annual Output Values
Independent Variable:	Annual Input Costs
f- Value:	2.015
Significance Value:	0.194
Remark:	Not significant
t- Value:	1.419
Significance Value:	0.194
Remark:	Not significant
R:	0.449
R ² :	0.201

The Regression equation is

$$\text{Output Value} = 0.282 (\text{Nm}) + 2.758 \times 10^{-2} (\text{Input cost (Nm)}).$$

With the R² value of 20%, the relationship between the input and the output values is weak.

It was found that linear regression analysis of out put with input did not produce any significant relationship in the following cases.

- (i). Ten-year average of each department
- (ii). All departments per annum and
- (iii). State departments per annum.

Analysis of outputs of similar departments (state & federal) in a state

Experiments were carried out to establish the type of relationship between the performances of pairs of similar departments (State ministry and Federal ministry) within a state. This was to assist any employment seeking craftsman to decide which of the two departments to seek employment from on the basis of labour capacity utilization level. The performances of Federal department were made the independent variables while those of the State departments were the dependent variables. Those with strong or very strong significant relationships indicate that an applicant can seek employment with either of the departments, if the criterion is based on the level of capacity utilization.

Following are the outcome of the analyses while the details are in Appendix B6.

Regressing similar departments (federal & state) within a state

In State 01;

i. Building Departments

There is no significant relationship between the performances of Building department in the State Ministry (S01B) and that of the Building department in the Federal Ministry (F01B). R^2 value of the analysis is 0.1 per cent.

ii. Civil Engineering Departments

There is a significant but weak relationship between the performance indices of the Civil Engineering department of the State Ministry (S01C) and those of the Civil Engineering department of the Federal Ministry (F01C). The relationship is expressed with the linear regression equation: $S01C = 0.122 + 0.753(F01C)$. The strength of the relationship is expressed with R^2 value of 64.6 per cent.

iii. Electrical Engineering Departments

There is a significant relationship between the performance indices of the Electrical Engineering department of the State Ministry (S01E) and those of the Electrical Engineering department of the Federal Ministry (F01E). The relationship is expressed with the linear regression equation: $S01E = -9.43 \times 10^{-2} + 3.958(F01E)$. The strength of the relationship is expressed with R^2 value of 98.9 per cent. This is a very strong relationship.

iv. Mechanical Engineering Departments

There is no significant relationship between the performance indices of Mechanical Engineering department in the State Ministry (S01M) and the indices of the Mechanical Engineering department in the Federal Ministry (F01M). The R^2 value of the analysis is 1.8 per cent.

In State 02:

i. Building Departments

There is a significant relationship between the performance indices of the Building department of the State Ministry (S02B) and those of the Building department of the Federal Ministry (F02B). The relationship is expressed with the linear regression equation: $S02B = -7.52 \times 10^{-3} +$

7.04×10^{-2} (F02B). The strength of the relationship is expressed with R^2 value of 97.1 per cent. The relationship is very strong.

ii. Civil Engineering Departments

There is a significant relationship between the performance indices of the Civil Engineering department of the State Ministry (S02C) and those of the Civil Engineering department of the Federal Ministry (F02C). The relationship is expressed with the linear regression equation: $S02C = -3.57 \times 10^{-3} + 0.51(F02C)$. The strength of the relationship is expressed with R^2 value of 97.2 per cent. The relationship is very strong.

iii. Electrical Departments

There is a significant relationship between the performance indices of the Electrical Engineering department of the State Ministry (S02E) and those of the Electrical Engineering department of the Federal Ministry (F02E). The relationship is expressed with the linear regression equation: $S02E = -3.26 \times 10^{-4} + 0.388(F02E)$. The strength of the relationship is expressed with R^2 value of 99.7 per cent. The relationship is very strong.

iv. Mechanical Engineering Departments

There is a significant relationship between the performance indices of the Mechanical Engineering department of the State Ministry (S02M) and those of the Mechanical Engineering department of the Federal Ministry (F02M). The relationship is expressed with the linear regression equation: $S02M = 2.705 \times 10^{-3} + 0.257(F02M)$. The strength of the relationship is expressed with R^2 value of 66 per cent. The relationship is fairly strong.

In State 03;

i. Building Departments

There is no significant relationship between the performance indices of Building department in the State Ministry (S03B) and the indices of the Building department in the Federal Ministry (F03B). R^2 value of the analysis is 15 per cent.

ii. Civil Engineering Departments

There is a significant relationship between the performance indices of the Civil Engineering department of the State Ministry (S03C) and those of the Civil Engineering department of the Federal Ministry (F03C). The relationship is expressed with the linear regression equation: $S03C = 0.129 + 0.673(F03C)$. The strength of the relationship is expressed with R^2 value of 43 per cent. The relationship is weak.

iii. Electrical Engineering Departments

There is a significant relationship between the performance indices of the Electrical Engineering department of the State Ministry (S03E) and those of the Electrical Engineering department of the Federal Ministry (F03E). The relationship is expressed with the linear regression equation: $S03E = -4.44 \times 10^{-2} + 0.569(F03E)$. The strength of the relationship is expressed with R^2 value of 46.9 per cent. The relationship is weak.

iv. Mechanical Engineering Departments

There is a very strong significant relationship between the performance indices of the Mechanical Engineering department of the State Ministry (S03M) and those of the Mechanical Engineering department of the Federal Ministry (F03M). The relationship is expressed with the linear regression equation: $S03M = -2.30 \times 10^{-3} + 0.414(F03M)$. The

strength of the relationship is expressed with R^2 value of 99.8 per cent.

On the whole, state 02 paired departments with the Mechanical Engineering departments in state 03 and the Electrical Engineering departments in state 01 have very strong or fairly strong significant relationships.

4.2.6 Productivity Ratings by the Supervisors

At a visit different from the previous ones the researcher gave each of the heads of departments another questionnaire asking them to insert as percentages the level of achievement of the annual pre-planned programmes of work for a period of ten years covering 1992 to 2001. Their self-assessments, which were in percentages, were converted to decimals to form a rating for the productivities of the departments annually over the ten-year period and shown in Table 14. The table represents the perceptions of the supervisors/departmental heads with regards to the level of utilisation of the labour capacities of their craftsmen. The departmental heads supplied the data through their responses to the question 4a of the questionnaire (Appendix A3).

Table 14. Productivity of the Craftsmen – As rated by the Supervisors.

Dept	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	Av
F01B	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.000
F01C	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.000
F01E	0.87	0.70	0.90	0.60	0.60	0.65	0.85	0.70	0.80	0.60	0.727
F01M	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.000
F02B	1.00	1.00	1.00	1.00	1.00	1.00	0.80	0.80	0.70	0.70	0.900
F02C	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.000
F02E	0.45	0.52	0.56	0.60	0.63	0.71	0.76	0.80	0.82	0.85	0.670
F02M	1.00	1.00	0.70	0.60	0.60	0.60	0.50	0.50	1.00	0.01	0.651
F03B	0.80	0.76	0.76	0.72	0.70	0.69	0.69	0.65	0.63	0.55	0.695
F03C	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.000
F03E	0.90	0.85	0.85	0.95	0.95	0.99	0.80	0.80	1.00	1.00	0.909
F03M	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.000
S01B	0.50	0.50	0.40	0.40	0.50	0.60	0.60	0.80	0.90	0.90	0.610
S01C	0.70	0.75	0.75	0.65	0.40	0.40	0.45	0.70	0.70	0.70	0.620
S01E	0.40	0.20	0.45	0.35	0.45	0.29	0.30	0.28	0.15	0.10	0.297
S01M	0.80	0.80	0.70	0.75	0.75	0.60	0.60	0.50	0.20	0.25	0.595
S02B	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.000
S02C	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.480
S02E	0.90	0.80	0.80	0.70	0.70	0.90	0.90	0.80	0.70	0.65	0.785
S02M	0.90	0.80	0.80	0.70	0.70	0.90	0.90	0.80	0.70	0.65	0.785
S03B	0.60	0.75	0.84	0.80	0.65	0.65	0.62	0.40	0.40	0.45	0.616
S03C	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.000
S03E	0.42	0.40	0.30	0.25	0.25	0.20	0.10	0.05	0.01	0.01	0.199
S03M	0.18	0.18	0.17	0.15	0.15	0.13	0.12	0.10	0.10	0.10	0.138

Source: Field Survey, 2002.

4.2.7 Productivity Ratings Observed (Calculated)

These are based on responses to the survey (on mainly the naira values) of departmental annual labour input and output computed for each department over the ten year period and presented in Table 21 which was derived from relating “Work output” (Table 8, page 70) with “Labour input” (Table 9, page 74) using the equation “Work Output/Labour Input =Workers’ Productivity. This gives the utilisation levels or productivities of the capacities of the public sector construction craftsmen in the middle belt over the period 1992-2001.

The resultant productivity ratings or capacity utilization can only take the maximum value of 1. For the situations where the values of $\frac{OUTPUT}{INPUT}$ is greater than or equal to one, it had been defined (Section 1.9) that the accepted (or acceptable) value is one.

Table 15. Productivity as Observed (Calculated)

Dept	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
F01B	0.23	0.22	0.21	0.21	0.38	0.19	0.03	0.04	0.02	0.02
F01C	1.00	1.00	1.00	1.00	1.00	1.00	0.74	1.00	0.02	0.02
F01E	0.18	0.17	0.16	0.16	0.15	0.14	0.04	0.06	0.03	0.03
F01M	0.09	0.09	0.08	0.08	0.08	0.15	0.02	0.03	0.13	0.13
F02B	1.00	1.00	1.00	1.00	1.00	1.00	0.23	0.35	0.16	0.01
F02C	0.10	0.09	0.09	0.08	0.08	0.08	0.01	0.02	0.01	0.01
F02E	0.38	0.38	0.36	0.33	0.33	0.31	0.04	0.06	0.03	0.03
F02M	0.11	0.11	0.10	0.10	0.10	0.19	0.02	0.04	0.01	0.01
F03B	0.29	0.14	0.14	0.13	1.00	1.00	0.32	0.05	0.02	0.02
F03C	0.71	0.83	1.00	0.26	0.12	0.12	0.02	0.02	0.01	1.00
F03E	1.00	1.00	1.00	1.00	1.00	1.00	0.12	0.18	0.08	0.08
F03M	0.77	0.71	0.71	0.67	0.63	0.63	0.08	0.12	0.55	0.06
S01B	0.07	0.07	0.06	0.06	0.12	0.06	0.01	0.01	0.01	0.01
S01C	1.00	1.00	1.00	1.00	1.00	1.00	0.28	0.42	0.19	0.19
S01E	0.63	0.56	0.56	0.50	0.50	0.50	0.06	0.10	0.04	0.04
S01M	0.17	0.16	0.15	0.15	0.14	0.14	0.02	0.03	0.01	0.01
S02B	0.07	0.07	0.06	0.06	0.06	0.06	0.01	0.01	0.00	0.00
S02C	0.05	0.04	0.04	0.04	0.04	0.04	0.00	0.01	0.00	0.00
S02E	0.15	0.14	0.14	0.13	0.13	0.12	0.02	0.02	0.01	0.01
S02M	0.04	0.04	0.04	0.04	0.03	0.03	0.00	0.01	0.00	0.00
S03B	0.23	0.89	0.11	0.10	1.00	0.57	1.00	1.00	0.29	0.01
S03C	1.00	1.00	1.00	0.48	0.23	0.22	0.03	0.04	0.02	0.02
S03E	1.00	1.00	0.28	0.27	0.26	0.24	0.03	0.02	0.01	0.02
S03M	0.31	0.30	0.29	0.28	0.26	0.25	0.03	0.05	0.23	0.02

Extracted from Tables 8 & 9

4.2.8 Correlation Analysis

Testing whether the ratings calculated by the researcher reflects the opinion of the supervisor or not, correlation analysis of the average of all departments productivity ratings per annum was conducted for the supervisor's ratings and the calculated ratings. The Pearson correlation analysis result showed that the two are significantly related. The correlation coefficient between the two ratings is approximately 82 per cent at the significant level of 99% (Table 16).

4.2.9 Analysis of Variance

Comparison of means of the labour input costs with those of the corresponding labour output values were carried out using the SPSS software package (one way ANOVA). The analyses were carried out at 5% significant level. The ANOVA results of the various experiments showed there is no significant relationship between the means (Table 17).

Table 16. Correlation Analysis of Productivity Ratings

		Correlations	
		Productivity as rated by the Supervisors	Calculated productivity
Productivity as rated by the Supervisors	Pearson Correlation	1.000	.816**
	Sig. (2-tailed)	.	.004
	N	10	10
Calculated productivity	Pearson Correlation	.816**	1.000
	Sig. (2-tailed)	.004	.
	N	10	10

** . Correlation is significant at the 0.01 level (2-tailed).

Table 17 ANOVA of Means of:**(a) All departments**

Labour Output values

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	7.284	22	.331	54.728	.106
Within Groups	6.050E-03	1	6.050E-03		
Total	7.290	23			

(b) Federal Departments

Labour Output values

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	23.755	8	2.969	6598.642	.010
Within Groups	4.500E-04	1	4.500E-04		
Total	23.756	9			

(c) State Departments

Labour Output Values

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	.833	8	.104	4.719	.342
Within Groups	2.205E-02	1	2.205E-02		
Total	.855	9			

CHAPTER FIVE

DISCUSSION OF FINDINGS

5.1 DEMOGRAPHIC CHARACTERISTICS

The fact that female population proportion of the craftsmen was only 7.5 per cent confirms the construction discipline to be a male dominated industry, especially for those in the craftsmanship [skilled] grouping. Perhaps reasons for this male dominance might be due to the fact that the construction work is strenuous and that female craftsmen are just taking up the challenges of gender sensitivity initiatives because gender-biased employment is not known to be in operation in the middle-belt region of Nigeria.

The fact that less than 10 percent of the craftsmen were recent employees of not more than ten years working experience suggests that the public sector construction workers tend to remain with a single employer for most periods of their working lives; and that the rate at which new craftsmen were being recruited was low.

There was found to be some tendency of the craftsmen to remain with the single employer, which was also confirmed by the 45.2 percent respondent who preferred to remain with the first employer.

The reasons adduced to the preference of remaining with the employer include mainly:

- (a) Contentment with the work

Contentment as used here by the respondents is not consistent with the dislike they have for under-utilization of their capacities. This contentment is as a result of fear of the prevalent unemployment in the labour market.

(b) Consideration of effects of relocation on family life stability

Desire to avoid problems of merging the services rendered to various employers for the purpose of retirement benefits. This last problem may become a thing of the past when the proposed pension scheme becomes operational.

5.2 SOCIO-ECONOMIC CHARACTERISTICS

The total proportion of the craftsmen on level 05 and above was 71.3 percent of the total. Those in salary brackets 06 and 07 were 55.5 percent of the group. All of these factors: working experience, length of period with present employer and salary grade level indicate upper-end clustering of the workers and that most of them had been with the employer for over 20 years. This confirms a suggestion that there was a low rate of employing new entrants. It also agrees with the idea that the method of replacing the ageing workers is very poor in the public sector of Nigerian economy.

A linear relationship was found to exist between the demographic variable working experience and the socio-economic variable length of period with employer. The public service employee craftsmen were found to be sticking to one employer for their working life. A linear regression of the two variables: working experience and length of period with the present employer showed an existence of this relationship. The variable working experience was made the independent variable, while length of period with the present employer was the dependent variable. The 'R' value is 0.782 and R^2 value is 0.612 with the adjusted R square value of 0.610.

Surprisingly those who expressed desire to remain with the employer were not suggesting that the income from the full employment was

satisfactory.

41.1 per cent of the group engage in other businesses apart from their full employment. This suggests that the income from the employment could not satisfy the financial needs of the employees. Those who prefer a change of employment were 54.1 per cent and their preferred new places include self-employment or Federal Ministry jobs.

5.3 WORKERS' PRODUCTIVITY LEVELS

The factors that contribute to the level of utilisation of the capacities of the craftsman include in the main: Lack of fund to execute the planned work 54.1 per cent of the craftsmen supported this reasoning while 27 per cent disagree with the suggestion that lack of fund is responsible for the craftsmen's low level of productivity. The public sector employers have its doubts on the ability of the craftsmen to do the job. This factor or reason was not strongly supported by the respondents to the questionnaire as only 9.6 per cent affirmed this to be a factor while 56.8 per cent disagree, 33.6 per cent did not answer this question.

Apart from the two reasons above, the employers' representatives had other reasons for not adequately utilising the capabilities of the construction craftsmen. Such reasons were wide ranged but they cluster around the preference of the contract job by the employers' representatives to giving out the work on direct labour basis to the employees. 41.8 per cent of the respondents agreed the employer representatives had other motives, 23.3 per cent of them disagreed while the remaining 34.9 per cent did not respond to the question. Oral interviews done with the heads of departments revealed that most Ministers of Works and the state

Governors were issuing out construction/maintenance work by unorthodox means. This singular factor is fundamental to the level of utilization of the craftsmen capabilities and capacities.

While five departments gave that they did not do any work in the entire ten-year period under consideration, three other departments said they were fully utilised all the time through the same period.

From the research it was found that, departments that employ construction craftsmen in the ministries of works in the middle-belt of Nigerian do have annual production plans of maintenance work. Most of the plans were not adequately backed with fund to carry out the budgeted programmes. Consequently the capacity utilisation of the craftsmen was mostly below 50 per cent. Indeed one of the investigated ministries could not attain 16 per cent capacity utilisation level in any of its four departments throughout the ten-year period covered by the research. The Civil Engineering/Highway department of the state F01 attained the highest ten-year average capacity utilisation level of 77.8 per cent.

Annual wage bills of the production line staff per operational department of the Ministries investigated were in millions of Naira while the annual labour outputs were in most cases less than two hundred thousand naira worth. The analysis of the annual cost of the labour input as grouped into federal ministries and state ministries, shown in Table 10 (page 87) reveal that the total annual spending on labour by state ministries was always higher than the spending of the federal ministry (state offices) in the corresponding period. This is most likely as a result of the population of the craftsmen in the state ministries being higher than that of the federal ministry state offices, as shown in Tables 6a and 6b

(pages 80 and 81). However, it is more revealing to note that the combined work output of the craftsmen in the federal ministry was higher than the combined output of those in the state ministries, with the exception of the years 1996, 1998 and 1999 (Table 11 page 88). In the year 2000, the combined output of each of the two groups is equal Table 11. This suggests that the craftsmen in the federal ministries in the middle belt of Nigeria were given more work to do than the craftsmen in the state ministries in those seven out of ten years under the study. The wide gap between the values of labour input and output observed in the period 1998 – 2001 is probably due to the salary increases carried out for the civil servants by both the state and the federal governments during the period; and without the period recording any appreciable increase in the work output of the craftsmen.

With regards to the comparison of the performances of the like-departments (federal and state) within a state, the inference from the results is this: the prospective applicant craftsman to all the departments in state 02, Mechanical Engineering departments in state 03 and the Electrical Engineering departments in state 01 may not have clue as to which of the department of the pair performs better than the other.

From all the analyses in chapter four, the hypothesis that ‘There is no significant variation between the productivity ratings given by the supervisors and the observed (calculated) ratings’ should be accepted.

CHAPTER SIX

SUMMARY, CONCLUSION AND RECOMMENDATIONS

6.1 SUMMARY

Comprehensive literature review and field surveys have enabled the appraisal of the productivity or capacity utilization of the public sector construction craftsman in the middle-belt to be carried out. From the levels of output attained with the given labour input levels by departments, labour productivity ratings were formulated for each of the departments. Generally it was found that there was insufficient supply of work to the craftsman in the public sector.

Most of the craftsmen (81.5 per cent) were in the age bracket 30 – 50 years.

There was a high tendency for the public sector construction craftsman to remain with a single employer for all his working life. 87 per cent of them had been working with their employers for between ten and thirty years.

The annual average returns of the employers investment on craftsmen was always negative, indicating that the craftsmen were not mainly employed to have work output of bigger values than the costs of labour input. It was further found that part of what contributed to the insufficient supply of work to the public sector construction craftsmen was an orthodox means by which construction/maintenance works were given out on contracts by the state or federal executive as well as the unavailability of fund to execute the budgets.

Further still, it was found that there were no significant differences between the wages of construction craftsmen in the public sector and those in the private sector; however the work output of the craftsmen in

the public sector is poor, indicating very low level of capacity utilization. The work output of this group of craftsmen has no bearing with the wages they are paid. Less than 15 percent of the craftsmen get work to do on daily basis and almost 62 percent stay idle continuously for over a week. Most craftsmen do not get involved in overtime work as a result of insufficient available work. This research work further established that the skilled labour force (craftsmen) in the construction related departments of the public sector of the Nigerian economy is gender biased with male craftsmen as dominant. It was also found that well over 91 percent of the craftsmen were married while more than 81 percent of the population were in the age bracket of thirty to fifty years. Moreover 87 percent have spent ten to thirty years with the present employer and about 71.5 percent of them were on salary grade level 05 to 07. This makes the craftsmen group to be top heavy in terms of wage bill and the frequency of replacement of old stock of craftsmen low.

It was discovered that most of the craftsmen had post primary education and, the population of craftsmen in the state ministry of works was higher than that in the Federal ministry of works located in the state. This fact notwithstanding, it was found that, in the middle-belt region of Nigeria, the work output of the craftsmen in the Federal ministry of works was higher than that of the craftsmen in the state ministry of works.

It was found that majority of the craftsmen were dissatisfied with under utilization of their capacities to work and they, as a result, prefer to change employment if such opportunity arises. They were however found not to be changing their employments. The tendency to remain with the first employer was prevalent amongst them, and they (the craftsmen)

adduced this to their desire to avoid family relocation problems associated with job change and to avoid problems of merger of service.

The research has also established a set of labour productivity ratings for the public sector construction craftsmen in the middle belt region of Nigeria. The ratings are a useful tool for assessing labour efficiency. The study has created data bank for construction labour performances in the public sector. It can be inferred from this work that policy simulation in establishing public sector construction/maintenance outfit in Nigeria does not accord sufficient priority to optimal utilisation of labour resource in which case the staff strength of such departments does not have any relationship with workload or output.

6.2 CONCLUSION

The following conclusions were made from the result of this research. The tests of average annual returns on the investment of the employer on craftsmen labour established that there is a significant difference between the work out put values and the labour input costs. The employer has negative average returns, indicating that the employer did not recover his investment on the craftsmen, through the ten-year period covered by the study. The linear regression analyses further established that there is no significant relationship between the values of work output of the craftsmen and the costs of labour input. These results show that craftsmen labour capacity is seriously under utilized in the public sector. The main factor responsible for this under utilization is the non-availability of fund to the departments for implementing the planned annual production. The withholding of fund from the departments to execute the work could be

traced to the background reason of the unorthodox means by which the executives (Governors or Ministers) were issuing out the work to the private sector by contracts.

These results suggest that employment of the construction craftsmen by the public sector bears very little relationship with labour productivity. Among the issues raised in the analyses of the craftsmen responses to the questionnaire was the dissatisfaction of the craftsmen with the capacity underutilization that they were subjected to. Most of them preferred change of employment to enhance full utilization of their skills.

With the level of labour performance indices found operating in these public sector departments it is evident that there is the need for government position in responsibilities and functions to be shifted. The following recommendations are made so that the departments will be made more economically viable.

The problem of redundancy of the craftsmen, which in itself is an economic waste as wages are paid for work not carried out, should be addressed by the public sector employers of labour. The employers should implement the policy of allocating work to the craftsmen and properly monitor the implementation of the policy. Furthermore the erstwhile Direct Labour Programme (DLP) of the Nigerian public sector should be rejuvenated.

The practice, whereby the chief executive of the federal ministry or the state governor gives out the construction/maintenance jobs to contractors by unorthodox means should be totally discouraged.

The study of labour performance in the public sector should be a continuous and consistent project. By this, there would be well built-up

data banks, which should be published regularly. The published data will be useful for various forms of evaluation of the public sector labour market. This, in turn, will facilitate proffering of appropriate solutions to the problems of labour capacity utilization.

Expected benefits to be derived from Public-Private Partnership of the public enterprises include;

1. Reduction in the number of unproductive investments of government in the public sector thereby relieving the treasury of funding such.
2. The operating efficiency of such enterprises will improve.

6.3 RECOMMENDATION FOR FURTHER RESEARCH

A detailed study of the utilization of the capacities of the construction craftsmen in the public sector of the middle belt region of Nigeria was carried out as part of the present research and, data were collected through historical means (record in the departmental files), questionnaire administration and oral interviews with the heads of departments. The following recommendations are therefore made.

- (i) A similar study should be carried out on the capacity utilization of public sector construction craftsmen in the remaining regions of Nigeria.
- (ii) A study should also be carried out on the labour output and capacity utilization of senior cadre technical workers (Architects, Builders, Structural/Services Engineers and Quantity Surveyors) in the construction related departments of the government establishments

6.4 CONTRIBUTION TO KNOWLEDGE:

This work has contributed to knowledge through the sets of findings that it has established. The research generated a set of parameters for evaluating capacity utilization of construction craftsmen in the Nigerian Public Sector, on the premise of productivity ratings.

The work has further established that the craftsmen group in the construction related departments is gender biased with male craftsmen as dominant.

It was also found that the group consisted of old men in the age bracket of thirty to fifty years who had been with the same employer for ten to thirty years, consequently they were mostly on salary grade level 05 to 07, making the craftsmen group to be top heavy in terms of wage bill and very low rate of replacement of old stock of craftsmen.

While the population of the craftsmen in the state ministry of works was higher than that in the Federal ministry of works located in the state, the work output of the craftsmen in the Federal ministry of works was higher than that of their counterparts in the states.

The craftsmen desired to change their employments but were not doing so in order to avoid family relocation problems associated with job change and to avoid problems of merger of service.

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APPENDIX A1**QUANTITATIVE SURVEY OF CONSTRUCTION SITE
OPERATIVES (CRAFTSMEN) IN PUBLIC SERVICE**

DEPARTMENT	CRAFTSMEN	IN GRADE LEVEL				
		07	06	05	04	03
Building	Carpenters					
	Masons/Bricklayer					
	Glaziers					
	Painters					
	Plumbers					
	Labourers					
Civil	Technical assistances					
	Road attendant					
Mechanical	Blacksmiths/ Welders					
	Mechanics					
	Operators/ Drivers					
	Plumbers					
Electrical	Electricians					

APPENDIX A2

QUESTIONNAIRE FOR THE DEPARTMENTAL SUPERVISOR (DIRECTOR)

1. Rate the approximate total volume of work carried out by the craftsmen under your supervision in the last 10 years.

Year (a) N 0 - 50,000 (b) N 50,000 – 100,000 (c) N 100,000 – 1m (d) over N 1m

1992

1993

1994

1995

1996

1997

1998

1999

2000

2001

APPENDIX A3**QUESTIONNAIRE FOR THE DEPARTMENTAL SUPERVISORS**

1. What is the total staff strength of the department?
2. Among the craftsmen/technical assistants how many are females?
3. From whom do jobs for your department originate?
 - (a). The Governor/ Minister
 - (b).The Director General
 - (c). Users/Occupants of the buildings/facilities.
 - (d). Others, please specify.
4. Does your department have work plan/budget for each year?
 - 4a. If yes, what percentage of each year's plan did the department achieve for each of the 10 years 1992 – 2001? 1992 ---- 1993 ---- 1994 ---- 1995 ---- 1996 ---- 1997 ---
1998 ---- 1999 ---- 2000 ---- 2001 ----.
 - 4b. If the achievement in (a) above is below 100% in any year, what accounts for the disparity?
 - (a). The plans were bogus and unrealistic.
 - (b). The plans were not backed with adequate fund.
 - (c). The workers could not cope with the demand of the jobs.
5. What is the average ratio of the annual capital spending to recurrent spending of the department?
6. Do you agree that, in the last 10 years, there has been drastic reduction in the amount of work handled by your department? Yes / No.
 - 6a. If you agreed with the above, what do you consider to be the reason for the reduction?
 - (a). There was virtually no work to be done.
 - (b). The Ministry had work but the human resources (workers) were inadequate.
 - (c).The Ministry had work but allocation of inadequate fund/equipment prevented execution.
 - (d).The employer has devised other means of executing the work.
7. If truly the employer has devised other ways of doing its jobs, what do you know to be the employer's reason?
 - (a). The site staff had been performing poorly on the jobs.
 - (b).The staff always delayed excessively in completing the work.

(c) . The final costs of the jobs had always been higher than if contracted out.

(d).The policy makers have their reason for the change in job execution approach.

8. Which of the reasons in No.7 above would you adduce to the reduction (or stoppage) of Direct Labour Projects programme?

9. What effect did the era of direct labour programme produce on the lives of the craftsmen?

(a). Their morale to work was high

(b). Their social/economic lives were improved.

(c). They obtained enhanced working experience.

(d). All of the above.

(e). Others, please specify.

APPENDIX A4**QUESTIONNAIRE FOR MAINTENANCE/CONSTRUCTION SITE
OPERATIVES (CRAFTSMEN & TECHNICAL ASSISTANTS)**

The research work is titled “CAPACITY UTILIZATION OF THE CONSTRUCTION CRAFTSMEN IN THE PUBLIC SECTOR”. This questionnaire forms part of National Survey on Productivity of the craftsmen in the public sector. As an important but extremely under – researched area, your co operation in the completion of this short questionnaire, would very much be appreciated. There are no right/wrong answers.

Please give your honest and spontaneous opinion.

A. DEMOGRAPHIC CHARACTERISTICS

1. Gender ----- (male, female)

2. Age ----- under 20 20-30 30-40 40-50 above 50

3. Marital status ----- (married, single, widowed, divorcee)

4. Working experience ----- Below 5 year, 5-10, 10-20,20-30, above 30 years

B. SOCIO/ECONOMIC CHARACTERISTICS

5. Numbers of years with present employer

Below 5 year 5-10 10-20 20-30 above 30 years

6. Educational qualification ----- (Secondary, tertiary)

7. Salary grade level ----- 03 04 05 06 07

8. How do you spend your “free” time after working hours

- I engage in other type of trade or business e.g. buying and selling or farm work.
- I go on leisure and visit relations and friends.
- I stay around my house doing no money fetching job.

C. OCCUPATIONAL CHARACTERISTICS

- 9. Your trade is _____ (Masonry/Tiling, Carpentry/Glazier, Painter, Electrician, Welder/Blacksmith, Plumber, Mechanic, Driver/Operator)
- 10. Professional Qualification C & G, Trade Test, F.T.C., Other specify
- 11. How long have you been in the profession? ____ years.
- 12. How long have you been in the civil service? ----- years.

In answering questions 13 – 17, cast your mind to the last job assigned to you or to your team.

- 13. Were you always provided with adequate safety devices when working on site, (e.g. carpenter with helmet, welder with goggles, Mason with boot, Electrician with glove0

Yes always	<input type="checkbox"/>
Yes some of the times	<input type="checkbox"/>
Never	<input type="checkbox"/>

13a.If your answer is “yes always” yes sometimes”, list the safety tools/equipment used by you.

- 14. Which of the followings were available on the site where you officially worked the last time?

Canteen	<input type="checkbox"/>	Food vendor/hawker	<input type="checkbox"/>	Latrine or Toilet	<input type="checkbox"/>
First-aid box	<input type="checkbox"/>				
- 15. For how many hours per day do you come to work? ----- hours.
- 16. Do you engage in overtime work? Yes/No.
- 16a. If yes when last did you do an overtime work? -----
- 16b. How many hours in all did you spend on that last overtime job? ---- hours.
- 17. How long ago were you last assigned a job? -----.
- 17a. How many hours or days did that work take you or your team to complete? -----

17b. How many of you carried out that job? -----.

18. If you are given the opportunity to change your employment do you prefer a change or not? ----- (Yes/No)

18a. If you answered “No”, what is your reason? Medical
Religious
Others, please specify

18b. If your answer is “Yes”, which of the following would you prefer to work with?

Self-employment.	<input type="checkbox"/>
A big construction company.	<input type="checkbox"/>
A State Ministry.	<input type="checkbox"/>
A Federal Ministry.	<input type="checkbox"/>

19. If you answered “Yes” to 18 above, your desire to change employment is attributable to the following reasons:

	SA	A	D	SD
Agree				
a. Lack of adequate job is killing my morale to work.				
b. Lack of adequate job deprives me of gaining experience.				
c. Opportunities of overtime work and remunerations are cancelled by lack of adequate jobs.				
d. My supervisor is difficult to work with.				
e. My department is poor at recommending staff for promotion.				
f. Working tools are inadequate and old				
g. The pay is poor.				
h. Conditions of work are poor				
i. Opportunity of further training is scarce .				
j. Other reasons, please specify.				

20. The drastic reduction or total stoppage of direct labour projects in the ministry was, in your opinion, due to:

	SA	A	D	SD
a. The workers poor quality jobs				
b. The work gets delayed most of the time by the workers				
c. The work gets delayed most of the time by the Ministry authority.				
d. The final cost of the job was always higher than if given on contract.				
e. The policy makers had other motives for stopping it.				
21. The reason why you have not been having sufficient work from your employer is:				
a. The Ministry does not have work at all.				
b. There is work but there is no money to do the work.				
c. My employer doubts my (our) capability to do the work properly.				
d. My employer has some other reasons.				

22. If your answer to 18 above is “No”, which of the following is a main reason for your desire to remain with your present employer?

- a. Relocation to other towns will affect my family life stability.
- b. I prefer to take my gratuity and pension from only one employer.
- c. I may not get a salary from other employers as good as I am getting now.
- d. Assurance of regular salary is not as certain with other employers.

23. Do you agree that your department has low productivity? Yes No

APPENDIX A5**UNIVERSITY OF JOS
DEPARTMENT OF BUILDING**

The Director

 Ministry of Works
 Dear Sir/Madam

RESEARCH QUESTIONNAIRE

Capacity utilisation in the public sector of the Nigerian economy has been of much concern to all interested parties – political and academic class inclusive. Generality of the citizenry talk of the near – zero productivity of the sector. The academic class writes on it and the political leaders take steps to privatize or commercialize some of the units that are to be directly making money.

The building and construction sector of the public service has also had its share of capacity utilisation problems. The high reduction of direct labour work, the pruning down of fund allocation for maintenance of the facilities and the retrenchment of the site operatives (field workers) of the Ministries in some states are some of these problems.

It is therefore necessary for us to gain insight into how best we can reverse the low productivity trend in the building and construction unit of the public sector, redirect the attitude to work by both the employer and the employee. We therefore solicit your help.

On the attached questionnaire each Craftsman/Technical Assistant is requested to insert his/her answer as a matter of fact. All we expect from each craftsman is to respond as realistically as possible.

We wish to assure you that all data supplied in completing this questionnaire will be held in **STRICTEST CONFIDENCE** and will be reported only in the form of statistical summaries without mentioning your ministry.

We would however be very glad to acknowledge your help in future publication, if only you permit us. Your prompt help in this present exercise will be most appreciated.

Sincerely yours
 P.O. LAWAL
 Research student

Professor J.O. KOLAWOLE
 Research Supervisor

APPENDIX B**APPENDIX B1****Gross Monthly Salary of Federal Civil Servant (Step 1)**

	Level 03	Level 04	Level05	Level 06	Level 07
2000	7919.00	8220.00	9103.00	10725.00	14522.00
1999	3665.00	3784.00	4132.00	4784.00	6425.00
1998	5615.00	5741.00	6110.00	6799.00	9511.00
1997	713.16	772.65	842.82	972.32	1163.49
1996	689.16	744.16	810.92	933.16	1108.83
1995	665.16	716.16	778.82	894.10	1053.33
1994	644.50	688.16	746.82	854.66	998.15
1993	629.50	662.10	714.82	815.50	943.49
1992	614.17	644.50	683.50	776.32	888.49

Source: Federal Pay Office, Federal Ministry of Finance Minna Office

-

APPENDIX B2
Craftsmen's Average Monthly Wages (Public & Private Sectors)

		Organised			
		Public Service		Private sector	
Monthly		Federal	%	NJIC	%
wage components		Level 03	Increase	Qualified	Increase
		Step 3		Artisan	
		₦		₦	
1999	Basic	1497		1810.38	
	Housing	1048		1100.00	
	Transport	800		1300.00	
	Meal	400		300.00	
	Medical	300		500.00	
	Utility	200		--	
	Child Educ.	1000		--	
	Qtrs Maint	200		--	
	Furniture	200		--	
	Total	5415		5010.38	
2000	Basic	4299	207.73	4010.38	121.52
	Housing	1720	53.85	1600.00	45.45
	Transport	1100	37.50	1300.00	0.00
	Meal	500	25.00	700.00	133.33
	Medical	-		600.00	20.00
	Utility	300	50.00	300.00	New
	Total	7919	46.24	8510.38	69.85
2001	Basic	As 2000	As 2000	4610..38	14.96
	Housing			1844.15	15.26
	Transport			2000.00	53.85
	Meal			700.00	0.00
	Medical			600.00	0.00
	Utility			300.00	0.00
	Total	7919		10054.53	

Source: Field Survey 2002.

APPENDIX B3**STAFF STRENGTH OF PUBLIC SERVICE CRAFTSMEN IN DEPARTMENTS**

(i) Federal Ministry of Works' State Offices

	Salary Levels	07	06	05	04	03	Total
State F01	Building	4	9	2	1	5	21
	Civil	1	7	1	7	18	34
	Electrical	6	3	7	9	4	29
	Mechanical	9	12	16	15	3	55
	Sub-total	20	31	26	32	30	139
	State F02	Building	1	11	10	7	-
Civil		1	2	9	18	34	64
Electrical		1	3	3	4	3	14
Mechanical		3	2	14	22	9	50
Sub-total		6	18	36	51	46	157
State F03	Building	1	7	6	11	2	37
	Civil	4	3	6	10	16	39
	Electrical	-	2	-	4	5	11
	Mechanical	-	1	3	5	7	16
	Sub-total	1	10	19	57	48	135

Source: Field Survey 2002.

APPENDIX B3 (CONT'D)

(ii) States Ministries of Works, Housing and Transport

	Salary Levels	03	04	05	06	07	Total
	Building	10	15	19	23	19	86
	Civil	1	2	-	-	-	3
State 01	Electrical	1	1	1	2	4	9
	Mechanical	5	5	6	9	10	35
	Sub-total	17	23	26	34	33	133
	Building	5	5	20	6	44	80
	Civil	24	25	15	34	38	136
State 02	Electrical	2	6	7	8	16	39
	Mechanical	2	18	14	17	80	131
	Sub-total	33	54	56	65	178	386
	Building	-	-	10	16	19	45
	Civil	4	4	2	5	7	22
	Electrical	-	2	2	9	19	32
State 03	Mechanical	8	4	4	6	14	36
	Sub-total	12	10	18	36	59	135

Source: Field Survey 2002

APPENDIX B4**Adjustments in Nigerian Civil Servants Salaries**

<u>Year</u>	<u>Level 03</u>	<u>Level 04</u>	<u>Level 05</u>	<u>Level 06</u>	<u>Level 07</u>	<u>Average</u>
1993	1.02	1.03	1.05	1.05	1.06	1.04
1994	1.02	1.04	1.04	1.05	1.06	1.04
1995	1.03	1.04	1.04	1.05	1.05	1.04
1996	1.04	1.03	1.04	1.04	1.05	1.04
1997	1.04	1.04	1.04	1.04	1.05	1.04
1998	7.87	7.43	7.25	6.99	8.18	7.54
1999	0.65	0.66	0.68	0.70	0.68	0.67
2000	2.17	2.17	2.20	2.25	2.26	2.21
2001	1.00	1.00	1.00	1.00	1.00	1.00

Source Field Survey: 2002

APPENDIX B5

Regression Constants of Departmental Inputs & Outputs

i. Regression of Each Department's ten-year Average

Variables Entered/Removed

Model	Variables Entered	Variables Removed	Method
1	Input Cost	.	Enter

a All requested variables entered.

b Dependent Variable: Output Value

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.072	.005	-.040	.5742

a Predictors: (Constant), Input Cost

ANOVA

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	3.794E-02	1	3.794E-02	.115	.738
	Residual	7.252	22	.330		
	Total	7.290	23			

a Predictors: (Constant), Input Cost

b Dependent Variable: Output Value

Coefficients

Model		Unstandardized Coefficients	Std. Error	Standardized Coefficients	t	Sig.
1	(Constant)	.367	.190		1.929	.067
	Input Cost	-2.661E-02	.078	-.072	-.339	.738

a Dependent Variable: Output Value

Regression of Each Department's ten-year Averages

 Dependent Variable: Annual Output Values
 Independent Variable: Annual Input Costs
 f- Value: 0.115
 Significance Value: 7.38
 +Remark: Not significant
 t- Value: 0.339
 Significance Value: 7.38
 Remark: Not significant
 R: 0.072
 R²: 0.005

The Equation is

$$\text{Output Value} = 0.367 (\text{Nm}) - 2.66 \times 10^{-2} (\text{Nm}) (\text{Input cost (Nm)})$$

With the R² value of 5%, there is no significant relationship between the input and the output values.

ii. Regression of All Departments Per Annum

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.172	.029	-.092	.1620

a Predictors: (Constant), Input Cost

ANOVA

Model	Sum of Squares	df	Mean Square	F	Sig.
1 Regression	6.374E-03	1	6.374E-03	.243	.635
Residual	.210	8	2.623E-02		
Total	.216	9			

a Predictors: (Constant), Input Cost
 b Dependent Variable: Output Value

Coefficients

Model	Unstandardized Coefficients B	Standard Error Std. Error	Standardized Coefficients Beta	t	Sig.
(Constant)	.291	.071		4.077	.004
Input Cost	1.255E-02	.025	.172	.493	.635

a Dependent Variable: Output Value

Regression of All Departments per Annum

 Dependent Variable: Annual Output Values
 Independent Variable: Annual Input Costs
 f- Value: 0.243
 Significance Value: 0.635
 Remark: Not significant
 t- Value: 0.493
 Significance Value: 0.635
 Remark: Not significant
 R: 0,172
 R²: 0.029

The Equation is

$$\text{Output Value} = 0.291 (\text{Nm}) + 1.253 \times 10^{-2} (\text{Input cost (Nm)}).$$

With the R² value of 2.9%, the relationship between the input and the output values is not significant

iii. Regression of Federal Departments Per Annum

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.449	.201	.101	9.470E-02

a Predictors: (Constant), Input Cost

ANOVA

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1.807E-02	1	1.807E-02	2.015	.194
	Residual	7.174E-02	8	8.968E-03		
	Total	8.981E-02	9			

a Predictors: (Constant), Input Cost

b Dependent Variable: Output Value

Coefficients

Model		Unstandardized Coefficients	Standardized Coefficients	t	Sig.
		B	Beta		
1	(Constant)	.282		6.763	.000
	VAR00018	2.758E-02	.449	1.419	.194

a Dependent Variable: Output Value

iv. Regression of State Departments Per Annum

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.018	.000	-.125	.3268

a Predictors: (Constant), Input Cost

ANOVA

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	2.785E-04	1	2.785E-04	.003	.961
	Residual	.854	8	.107		
	Total	.855	9			

a Predictors: (Constant), Input Cost

b Dependent Variable: Output Value

Coefficients

Model		Unstandardized Coefficients	Std. Error	Standardized Coefficients	t	Sig.
1	(Constant)	.303	.144		2.101	.069
	VAR00015	2.131E-03	.042	.018	.051	.961

a Dependent Variable: Output Value

Regression of State Departments per Annum

Dependent Variable: Annual Output Values

Independent Variable: Annual Input Costs

f- Value: 0.003

Significance Value: 0.961

Remark: Not significant

t- Value: 0.051

Significance Value: 0.961

Remark: Not significant

R: 0.018

R²: 0.000

The Equation is

$$\text{Output Value} = 0.303 (\text{Nm}) + 2.131 \times 10^{-3} (\text{Input cost (Nm)}).$$

With the R² value of 0%, there is no significant relationship between the input and the output values.

Regression Constants of similar Departments – Federal & State- in a State

Regression of F01C & S01C

Variables Entered/Removed

Model	Variables Entered	Variables Removed	Method
1	F01C	.	Enter

a All requested variables entered.

b Dependent Variable: S01C

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.804	.646	.601	.2413

a Predictors: (Constant), F01C

ANOVA

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.849	1	.849	14.576	.005
	Residual	.466	8	5.822E-02		
	Total	1.314	9			

a Predictors: (Constant), F01C

b Dependent Variable: S01C

Coefficients

Model		Unstandardized Coefficients	Std. Error	Standardized Coefficients	t	Sig.
1	(Constant)	.122	.171		.711	.497
	F10C	.753	.197	.804	3.818	.005

a Dependent Variable: S01C

Regression of F01E & S01E

Variables Entered/Removed

Model	Variables Entered	Variables Removed	Method
1	F01E	.	Enter

- a All requested variables entered.
b Dependent Variable: S01E

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.994	.989	.987	2.834E-02

- a Predictors: (Constant), F01E

ANOVA

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.566	1	.566	705.203	.000
	Residual	6.426E-03	8	8.033E-04		
	Total	.573	9			

- a Predictors: (Constant), F01E
b Dependent Variable: S01E

Coefficients

Model		Unstandardized Coefficients	Standardized Coefficients	t	Sig.	
		B	Std. Error	Beta		
	(Constant)	-9.429E-02	.019		-4.977	.001
	F01E	3.958	.149	.994	26.556	.000

- a Dependent Variable: S01E

Regression of F02B & S02B

Variables Entered/Removed

Model	Variables Entered	Variables Removed	Method
1	F02B	.	Enter

a All requested variables entered.

b Dependent Variable: S02B

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.985	.971	.967	5.562E-03

a Predictors: (Constant), F02B

ANOVA

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	8.153E-03	1	8.153E-03	263.515	.000
	Residual	2.475E-04	8	3.094E-05		
	Total	8.400E-03	9			

a Predictors: (Constant), F02B

b Dependent Variable: S02B

Coefficients

Model		Unstandardized Coefficients	Std. Error	Standardized Coefficients	t	Sig.
1	(Constant)	-7.521E-03	.003		-2.202	.059
	F02B	7.040E-02	.004	.985	16.233	.000

a Dependent Variable: S02B

Regression of F02C & S02C

Variables Entered/Removed

Model	Variables Entered	Variables Removed	Method
1	F02C	.	Enter

a All requested variables entered.

b Dependent Variable: S02C

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.986	.972	.968	3.685E-03

a Predictors: (Constant), F02C

ANOVA

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	3.731E-03	1	3.731E-03	274.782	.000
	Residual	1.086E-04	8	1.358E-05		
	Total	3.840E-03	9			

a Predictors: (Constant), F02C

b Dependent Variable: S02C

Coefficients

Model		Unstandardized Coefficients	Standardized Coefficients	t	Sig.	
		B	Std. Error	Beta		
1	(Constant)	-3.565E-03	.002		-1.674	.133
	F02C	.510	.031	.986	16.577	.000

a Dependent Variable: S02C

Regression of F02E & S02E

Variables Entered/Removed

Model	Variables Entered	Variables Removed	Method
1	F02E	.	Enter

a All requested variables entered.

b Dependent Variable: S02E

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.999	.997	.997	3.624E-03

a Predictors: (Constant), F02E

ANOVA

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	3.510E-02	1	3.510E-02	2672.722	.000
	Residual	1.051E-04	8	1.313E-05		
	Total	3.521E-02	9			

a Predictors: (Constant), F02E

b Dependent Variable: S02E

Coefficients

Model		Unstandardized Coefficients	Std. Error	Standardized Coefficients	t	Sig.
1	(Constant)	-3.257E-04	.002		-.160	.877
	F02E	.388	.008	.999	51.698	.000

a Dependent Variable: S02E

Regression of F02M & S02M

Variables Entered/Removed

Model	Variables Entered	Variables Removed	Method
1	F02M	.	Enter

a All requested variables entered.

b Dependent Variable: S02M

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.812	.660	.617	1.131E-02

a Predictors: (Constant), F02M

ANOVA

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1.986E-03	1	1.986E-03	15.511	.004
	Residual	1.024E-03	8	1.280E-04		
	Total	3.010E-03	9			

a Predictors: (Constant), F02M

b Dependent Variable: S02M

Coefficients

Model		Unstandardized Coefficients	Std. Error	Standardized Coefficients	t	Sig.
1	(Constant)	2.705E-03	.006		.431	.678
	F02M	.257	.065	.812	3.938	.004

a Dependent Variable: S02M

Regression of F03C & S03C

Variables Entered/Removed

Model	Variables Entered	Variables Removed	Method
1	F03C	.	Enter

a All requested variables entered.

b Dependent Variable: S03C

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.656	.430	.359	.3484

a Predictors: (Constant), F03C

ANOVA

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.732	1	.732	6.030	.040
	Residual	.971	8	.121		
	Total	1.703	9			

a Predictors: (Constant), F03C

b Dependent Variable: S03C

Coefficients

Model		Unstandardized Coefficients	Std. Error	Standardized Coefficients	t	Sig.
1	(Constant)	.129	.157		.820	.436
	F03C	.673	.274	.656	2.456	.040

a Dependent Variable: S03C

Regression of F03E & S03E

Variables Entered/Removed

Model	Variables Entered	Variables Removed	Method
1	F03E	.	Enter

a All requested variables entered.

b Dependent Variable: S03E

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.685	.469	.403	.2938

a Predictors: (Constant), F03E

ANOVA

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.610	1	.610	7.070	.029
	Residual	.691	8	8.633E-02		
	Total	1.301	9			

a Predictors: (Constant), F03E

b Dependent Variable: S03E

Coefficients

Model		Unstandardized Coefficients	Std. Error	Standardized Coefficients	t	Sig.
		B		Beta		
1	(Constant)	-4.445E-02	.167		-.267	.796
	F03E	.569	.214	.685	2.659	.029

a Dependent Variable: S03E

Regression of F03M & S03M

Variables Entered/Removed

Model	Variables Entered	Variables Removed	Method
1	F03M	.	Enter

a All requested variables entered.

b Dependent Variable: S03M

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.999	.998	.998	5.570E-03

a Predictors: (Constant), F03M

ANOVA

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.127	1	.127	4097.124	.000
	Residual	2.482E-04	8	3.102E-05		
	Total	.127	9			

a Predictors: (Constant), F03M

b Dependent Variable: S03M

Coefficients

Model		Unstandardized Coefficients	Std. Error	Standardized Coefficients	t	Sig.
		B		Beta		
1	(Constant)	-2.297E-03	.004		-.630	.546
	F03M	.414	.006	.999	64.009	.000

a Dependent Variable: S03M

APPENDIX C

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PRODUCTIVITY APPRAISAL OF THE NIGERIAN PUBLIC SERVICE CONSTRUCTION CRAFTSMEN

P.O. Lawal, J.O Kolawole
 Department of Building,
 University of Jos,
 Jos.

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ABSTRACTS *The study investigated the productivity of construction craftsmen in the public sector of the Nigerian economy. Ministry of Works Housing and Transport in three middle states of Nigeria was used as the case study. Estimated cost of the work carried out annually by each of the four operational departments of each state Ministry of Works Housing and Transport was computed and listed as the labour output for each department. The gross annual salaries of the craftsmen only were computed and used as the total labour input. The result showed an abysmal performance where input figures far outweighed those of output in virtually all the twelve departments considered over the ten years period. The very poor performance of the public service craftsmen calls for a change of approach to capacity utilization of this group of workers. Commercialization or privatization alternative is recommended as a feasible solution.*

INTRODUCTION

Typical of most developing economies, Nigeria has been identified as having a legion of construction productivity problems (Izam and Adeagbo, 1999). In an attempt to proffer solution to the problems much has been done on issues or factors affecting productivity with little or no success (Lim and Alum, 1995; Proverbs, et al, 1999; Winch and Carr, 2001).

The productive sector of the Nigerian economy is bedeviled with low productivity as noted by various observers (Okwa, 1981; Akerle, 1991). The productivity problems cut across both the public and the private sectors (FOS, 1997). Capacity utilization of the manufacturing industry in Nigeria was said to be 30% on the average from the time of Structural Adjustment Programmes (SAP) in Nigeria in 1986 (Sobowale, 2000).

Since the public sector is said to be the pivot on which the national development revolves, Olawole (2000) opines that the involvement of the sector in entrepreneurship is usually ideological. Productivity in the public sector is

the worse of the two sectors because the employees in the sector themselves, as represented by the Association of Senior Civil Servants of Nigeria (ASCSN), admitted that their productivity is far below expectation (ASCSN, 2001).

It is understood that the three levels of government – Federal, State and Local – established Public Works Departments (PWD), currently known as Ministry of Works at the Federal or State level, or Works department at the Local government level, recruited and trained employees with the main aim that such employees' productivity would justify the investment on them. The employer's total investment on the employee is the total labour cost which is defined by the International Standard Industrial Classification (ISIC) as: "the cost incurred by the employer in the employment of labour; the concept of which comprises of remuneration for work performed, payments in respect of time paid for but worked, bonuses and gratuities, the cost of food, drink

and other payments in kind, cost of workers' housing borne by employers, employer's social security expenditures, cost of employer for vocational training, welfare services and miscellaneous items, such as transportation of workers, work clothes and recruitment, together with taxes". It is nonetheless appreciated that productivity is not the sole reason for employment in the public sector. Employment in the sector is said to be concerned not only with meeting the economic (productivity) or political objectives of the employer, but also satisfying the economic and social needs of the employee. That is, the promotion of employment in the public sector should be seen as a means of improving social conditions and social integration (ILO, 2001).

Productivity Defined

Productivity is the relationship between the output generated by a production (or service) system and the input provided to create this output. It is the efficient use of resources – labour, capital, land, materials, energy and information (Prokopenko, 1987).

Two of the various dictionary definitions of productivity are directly relevant to the focus of this study.

1. Effectiveness of productive effort
2. The production per unit of effort.

The first is a measure of how well the resources are utilized, while the second is a rate to measure output of the factors of production over a defined period of time.

Okwa (1981), in Burch (1979) defined the basic concept of productivity as "the degree to which the power to make or provide goods or services having exchange value is utilised as measured by the output from the resource expended". Levitt (1982) defined productivity as the ratio between the values of a unit of output and the cost of all the inputs.

Fenske (1985) further improved on the definition of productivity. He defined it as 'the amount of

goods and services produced by a productive factor in a unit of time'.

Productivity which though is a 'tangible reality' is beyond physical outputs and physical inputs since it includes invisible services.

Productivity = Output / Input

Partial productivity = Total output / Partial input

Craftsmen Productivity is the total work output of the craftsmen divided by their total Salary.

CONSTRUCTION CRAFTSMEN'S JOBS IN THE PUBLIC SERVICE

Craftsmen are employed basically to carry out maintenance or other works at the instance of the Permanent Secretary or the Controller of Works as the case may be. The craftsmen jobs arise as a result of complaints by the occupants of the public buildings classified to be within the domain of the Yard Superintendent (Y.S). The complaint which clearly states the nature of the problems are submitted to the permanent secretary through the appropriate channels.

On receipt of the complaints, relevant foreman(en) goes on inspection to ascertain the extent of the complaints and the materials with tools requirements. A 'job card' is then raised for the work and the Maintenance Officer (MO) thereafter raises a requisition for the materials/tools. The MO hands-over the materials to the foreman and dispatches him along with the relevant craftsmen to the site to carry out the maintenance work. The team carries the job card (or the written request of the occupant) along to the site as an evidence of being officially engaged in that premises. This evidence notwithstanding, the occupant is expected to have his representative present on site throughout the duration of the maintenance activity.

RESEARCH METHODOLOGY

Data Collection

Self-administered questionnaire were used to obtain the population and salary grade-levels of

craftsmen in each of the four operational departments of the state Ministry of Works, Housing and Transport (i.e. Building, Civil, Electrical and Mechanical Engineering). The questionnaire also solicited for the monetary value of the work executed by each of the operational departments over a period of ten years (1992 – 2001). The state Ministry of Finance and Supplies, through the same medium supplied the salary and allowances structure for grade level 03 to grade level 07 – a range specifically chosen to cover the remuneration of the craftsmen under study. Findings from the survey of the strengths (total population) of the craftsmen in the various departments are used along with the wage bills to compute the departmental labour inputs

The departmental directors volunteered the information to the effect that the state governors, for the past few years, had been carrying out maintenance of public facilities through the use of contract arrangements. Such contractors were single handedly appointed by the governors. The directors get to know of such contracts when they are called upon by the governor to dispatch a team of inspectors to verify quality of the work and sign the mandatory valuation certificates. The certificates are the documents the contractors present to the Finance Ministry for payment for construction/maintenance contracts. The data obtained were mainly from three randomly selected states of the middle-belt geo-political region of Nigeria. The choice was mainly for ease of data collection, fairly uniform weather and conditions of service.

Documentation of Data

Total population of the craftsmen in each department was obtained for each of the states. Gross annual salary of each employee craftsman was computed for each salary grade level of the surveyed group, using the third step of the salary as the base for the basic salary. Product of annual gross salary of each craftsman and total population of the craftsmen per department gives the labour input for the department. The figure

supplied as the total departmental annual output for ten years was computed from the questionnaire responses received from the departmental heads and tabulated for each of the states.

Data Analysis

The gross annual pay of a craftsman for each grade level was calculated and multiplied by the population of the craftsmen in the level in each department. The sum of these products gives the total annual labour input for the department (See Table 1). Total annual labour input for each department over the ten-year period was obtained and tabulated (Table 2). Total annual labour output for a ten year period had previously been obtained (Table 3). Thus labour productivity of the craftsmen in the various departments over the ten-year period was derived (See Table 4), using the equation: $\text{Labour productivity} = \text{labour output/labour input}$. To verify if there is some type of relationship between the labour input figures and those of the labour output, Microsoft excel was used to produce the graphs of the relationship per department.

FINDINGS

Over the period of ten years under consideration, none of the four departments of state 02 had productivity higher than 14 per cent (Table 4). The Building department of the Ministry in State 03 had the single year highest productivity figure of 20.20 (2,020 per cent) in 1996. Civil Engineering department of state 01 had the highest average productivity of 70.80 per cent over the period. As productivity is said to be a measure of how an establishment or a nation is faring economically, it is evident from these findings that the construction craftsmen in the Nigerian public service have productivities with inputs far outweighing the outputs.

The purpose of measuring productivity is, according to Adamu (1991), to see how well something is being done.

CONCLUSIONS AND RECOMMENDATIONS

The states studied are representative of the situations in all the States of Nigeria. The productivity in the States Ministries of Works and Housing do not justify the amount of investment on the labour resources. Improving productivity being a major concern of profit-oriented organization, should lead to a drive for finding ways of effectively and efficiently converting their resources into marketable products that yield business profitability. The craftsmen should either be given work to do or be reassigned to other establishments. In the events that the reassignment of these workers to other areas is not feasible; the employer is advised to commercialize the departments and gear the commercialization to a viable level. What will most likely bring about optimizing labour capacity utilization includes privatization of the functions of the Ministry. The privatization option will improve the micro and

macro-economy of Nigeria in the areas of: reduction in government fiscal burden, improved national orientation towards greater discipline, better attitude to work, private sector capacity development, development of capital market and increased participation of citizens in the ownership and management of productive enterprises among others.

Another alternative is to spring back into action the direct labour programmes with the preconditions that it is from the work output that the salaries emoluments and other welfare packages like loans for the Ministry workers will be advanced. All maintenance, small and medium construction works of various organs of the government should be awarded to the ministry of works and housing corporations and federal housing authority.

In presenting these data, information from different states are coded 01 - 03 to ensure confidentiality.

Table 1 Computation of Departmental Annual Labour Input --States
S01 - S03.

Dept	Salary grade level	03	04	05	06	07	Total
	Monthly Basic	4607	4884	5575	6847	9126	
	Annual pay	80736	84732	94680	112992	142740	
	Annual leave grant	5528	5861	6690	8216	10951	
	Total annual pay/craftsman	86764	90593	101370	121208	153691	
S01	Building: No of craftsmen	10	15	19	23	19	86
A	Total annual pay to Dept.	867640	1358895	1926030	2787784	2920129	9860478
	Civil: No of craftsmen	1	2	-	-	-	3
B	Total annual pay to Dept.	86764	181186	-	-	-	267950
	Electrical: No of craftsmen	1	1	1	2	4	9
C	Total annual pay to Dept.	86764	90593	101370	242416	614764	1135907
	Mech: No of craftsmen	5	5	6	9	10	35
D	Total annual pay to Dept.	433820	452965	608220	1090872	1536910	4122787
	Annual pay	74736	78732	88680	106992	139812	
	Total annual pay/craftsman	80264	84593	95370	115208	150763	
S02	Building: No of craftsmen	5	5	20	6	44	80
E	Total annual pay to Dept.	401320	422965	1907400	691248	6633572	10056505
	Civil: No of craftsmen	24	25	15	34	38	136
F	Total annual pay to Dept.	1926336	2114825	1430550	3917072	5728994	15117777
	Electrical: No of craftsmen	2	6	7	8	16	39
G	Total annual pay to Dept.	160528	507558	667590	921664	2412208	4669548
	Mech: No of craftsmen	2	18	14	17	80	131
H	Total annual pay to Dept.	160528	1522674	1335180	1958536	12061040	17037958
	Annual pay	76536	80532	90480	108792	152832	
	Annual leave grant	5528	5861	6690	8216	10951	
	Total annual pay/craftsman	82064	86393	97170	117008	163783	
S03	Building: No of craftsmen	Nil	Nil	10	16	19	45
I	Total annual pay to Dept.	--	--	971700	1872128	3111877	5955705
	Civil: No of craftsmen	4	4	2	5	7	22
J	Total annual pay to Dept.	328256	345572	194340	585040	1146481	2599689
	Electrical: No of craftsmen	Nil	2	2	9	19	32
K	Total annual pay to Dept.	--	172786	194340	1053072	3111877	4532075
	Mech: No of craftsmen	8	4	4	6	14	36
L	Total annual pay to Dept.	656512	345572	388680	702048	2292962	4385774

Source: Field Survey 2002

Table 2. Departmental Annual Labour Input (Nm) (1992 – 2001)

	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
Dept										
A	0.72	0.75	0.78	0.81	0.85	0.88	6.64	4.47	9.86	9.86
B	0.02	0.02	0.02	0.02	0.02	0.02	0.18	0.12	0.27	0.27
C	0.08	0.09	0.09	0.10	0.10	0.10	0.77	0.52	1.14	1.14
D	0.30	0.31	0.33	0.34	0.36	0.37	2.78	1.87	4.12	4.12
E	0.73	0.76	0.80	0.83	0.87	0.90	6.78	4.56	10.06	10.06
F	1.10	1.15	1.20	1.25	1.30	1.35	10.18	6.85	15.12	15.12
G	0.34	0.36	0.37	0.39	0.40	0.42	3.15	2.12	4.67	4.67
H	1.24	1.29	1.35	1.41	1.47	1.53	11.47	7.72	17.04	17.04
I	0.43	0.45	0.47	0.49	0.51	0.53	4.01	2.70	5.96	5.96
J	0.19	0.20	0.21	0.21	0.22	0.23	1.75	1.18	2.60	2.60
K	0.33	0.34	0.36	0.37	0.39	0.41	3.05	2.05	4.53	4.53
L	0.32	0.33	0.35	0.36	0.38	0.40	2.96	1.99	4.39	4.39

Source: Field Survey 2002

Table 3 Maximum Annual Labour Outputs (Nm) of Each Department of the Ministry of Works Over a 10 Year Period 1992 – 2001

		1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
A	Building	0.05m	0.05m	0.05m	0.05m	0.1m	0.05m	0.05m	0.05m	0.05m	0.05m
B	Civil	0.05m	0.05m	0.05m	0.05m	0.05m	0.05m	0.05m	0.05m	0.05m	0.05m
State	Electrical	0.05m	0.05m	0.05m	0.05m	0.05m	0.05m	0.05m	0.05m	0.05m	0.05m
01	C										
D	Mechanical	0.05m	0.05m	0.05m	0.05m	0.05m	0.05m	0.05m	0.05m	0.05m	0.05m
	State output	0.20m	0.20m	0.20m	0.20m	0.25m	0.20m	0.20m	0.20m	0.20m	0.20m
E	Building	0.05m	0.05m	0.05m	0.05m	0.05m	0.05m	0.05m	0.05m	0.05m	0.05m
F	Civil	0.05m	0.05m	0.05m	0.05m	0.05m	0.05m	0.05m	0.05m	0.05m	0.05m
State	Electrical	0.05m	0.05m	0.05m	0.05m	0.05m	0.05m	0.05m	0.05m	0.05m	0.05m
02	G										
H	Mechanical	0.05m	0.05m	0.05m	0.05m	0.05m	0.05m	0.05m	0.05m	0.05m	0.05m
	State output	0.20m	0.20m	0.20m	0.20m	0.20m	0.20m	0.20m	0.20m	0.20m	0.20m
I	Building	0.1m	0.4m	0.05m	0.05m	10.3m	0.3m	5.6m	8.2m	1.7m	0.05m
J	Civil	0.25m	0.3m	0.65m	0.1m	0.05m	0.05m	0.05m	0.05m	0.05m	0.05m
State	Electrical	1m	1m	0.1m	0.1m	0.1m	0.1m	0.1m	0.05m	0.05m	0.1m
03	K										
L	Mechanical	0.1m	0.1m	0.1m	0.1m	0.1m	0.1m	0.1m	0.1m	1m	0.1m
	State output	1.45m	1.80m	0.90m	0.35m	10.55m	0.55m	5.85m	8.40m	2.80m	0.20m

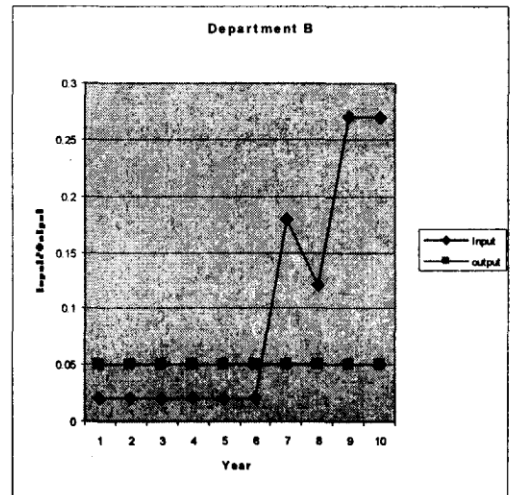
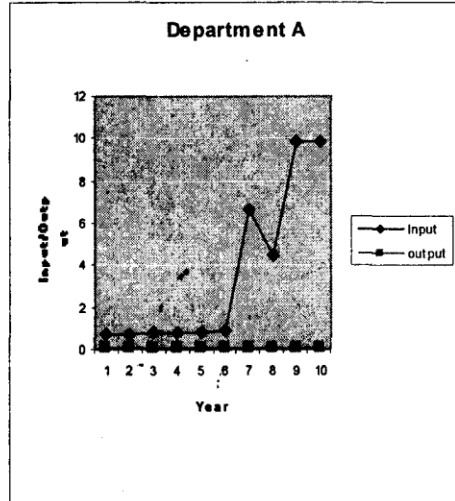
Source: Field Survey 2002

Table 4. Departmental Productivity of the Craftsmen

	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	Av
Dept											
A	0.07	0.07	0.06	0.06	0.12	0.06	0.01	0.01	0.01	0.01	0.048
B	2.50	2.50	2.50	2.50	2.50	2.50	0.28	0.42	0.19	0.19	0.708
C	0.63	0.56	0.56	0.50	0.50	0.50	0.06	0.10	0.04	0.04	0.349
D	0.17	0.16	0.15	0.15	0.14	0.14	0.02	0.03	0.01	0.01	0.098
E	0.07	0.07	0.06	0.06	0.06	0.06	0.01	0.01	0.00	0.00	0.040
F	0.05	0.04	0.04	0.04	0.04	0.04	0.00	0.01	0.00	0.00	0.026
G	0.15	0.14	0.14	0.13	0.13	0.12	0.02	0.02	0.01	0.01	0.087
H	0.04	0.04	0.04	0.04	0.03	0.03	0.00	0.01	0.00	0.00	0.023
I	0.23	0.89	0.11	0.10	20.20	0.57	1.40	3.04	0.29	0.01	0.520
J	1.32	1.50	3.10	0.48	0.23	0.22	0.03	0.04	0.02	0.02	0.404
K	3.03	2.94	0.28	0.27	0.26	0.24	0.03	0.02	0.01	0.02	0.365
L	0.31	0.30	0.29	0.28	0.26	0.25	0.03	0.05	0.23	0.02	0.202

Sources: Tables 2 and 3

Graphs showing relationships between departmental inputs and outputs are shown below (Fig. 1.)



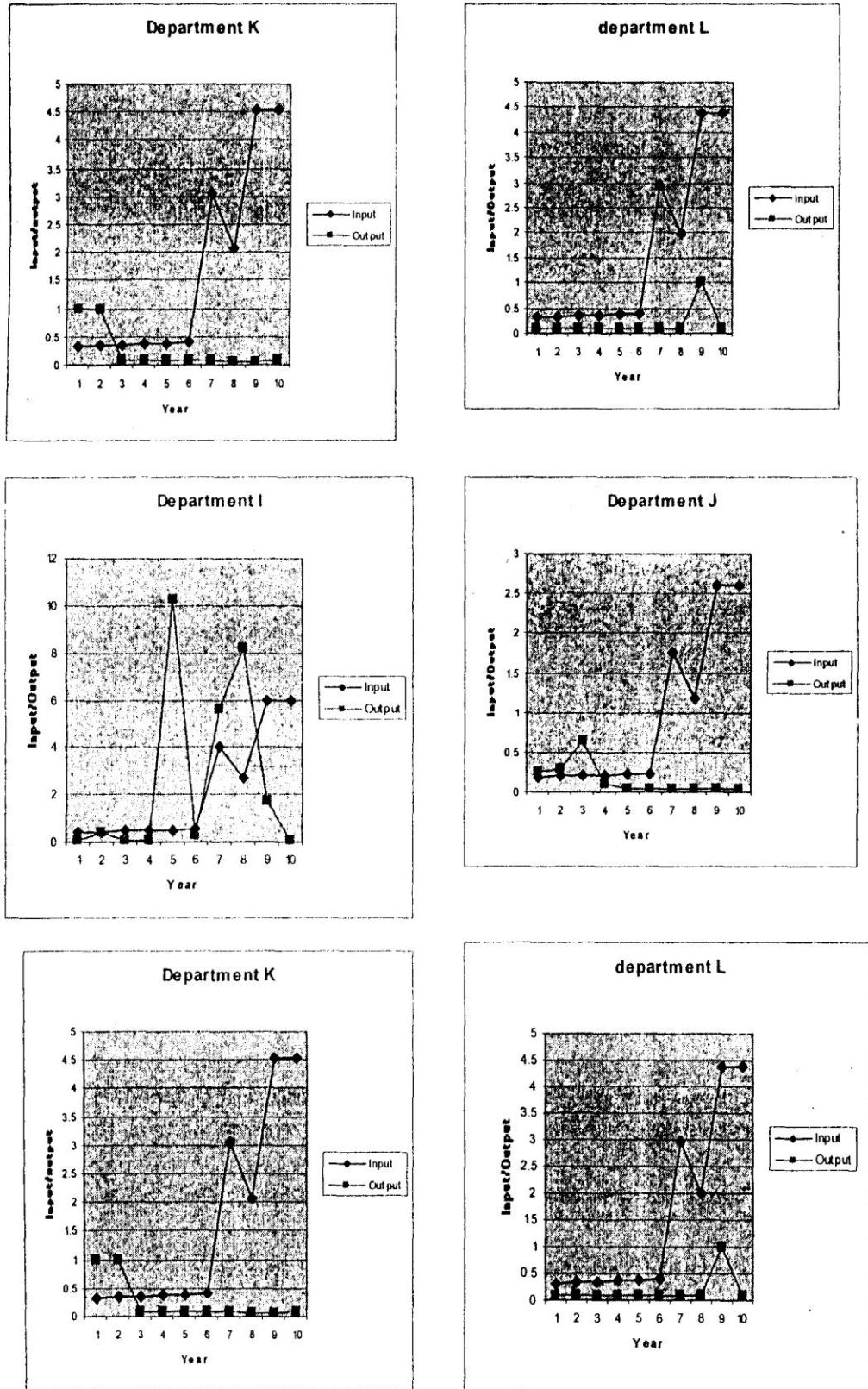


Fig 1. Relationships between departmental inputs and output

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