THE EFFECTS OF TECHNICAL PROGRESS AND SALES TURNOVER ON EMPLOYMENT OF LABOUR IN KANO AND KADUNA TEXTILE FIRMS

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Certification

This thesis titled "The Effects of Technical Progress and Sales Turnover on Employment of Labour in Kano and Kaduna Textile Firms" meets the regulation governing the award of the degree of doctor of Philosophy of the Department of Economics, Ahmadu Bello University, Zaria and is approved for its contribution to knowledge and literary presentation.

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DEDICATION

I dedicate this thesis to my parents and all members of my family.

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DECLARATION

I wholeheartedly declare that this thesis is the product of my own research work and all sources of information used in the course of writing it have been duly acknowledged by means of a bibliography. The thesis or any part of it has not been sent or accepted anywhere for publication or the award of any other degree.



Badayi M. Sani

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March, 1999.

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List of Abbreviations

R&D	=	Research and Development
LDCS	=	Less Developed Countries
IATA	=	International Airlines Transport Association
RMRDC	=	Raw Materials Research & Development Council
NTMA	=	Nigerian Textile Manufacturers Association
NTWU	=	Nigeria Textile Workers Union
MNES	=	Multinational Enterprises
HYV	=	High Yielding Variety
SNCF	=	French National Railways
SLAC	=	Standford Linear Accelerator
GNP	=	Gross National Product
ODM	=	British Ministry of Overseas Development
FOS	=	Federal Office of Statistics
IMF	=	International Monetary Fund
NCM	=	Numerical Controlled Machines
FFCC	=	Forward Facing Crew Cockpit
OLS	=	Ordinary Least Squares
ISI	=	Import Substitution Industrialization
FGN	=	Federal Government of Nigeria
UNIDO	=	United Nation Industrial & Development Organization
NEPD	=	Nigerian Export Promotion Decree
MAN	=	Manufacturers Association of Nigeria
KCTC	=	Kano Citizen Trading Company

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THE EFFECTS OF TECHNICAL PROGRESS AND SALES TURNOVER ON THE EMPLOYMENT OF LABOUR IN KANO AND KADUNA TEXTILE FIRMS

ABSTRACT

There are two divergent views about the effect of technical progress on employment. One view states that technical progress is associated with an increase in the employment of labour owing to the introduction of new products and increased productivity, which help to create new demand for labour and material resources. The other view argues that technical progress displaces workers owing to automation and robotization of jobs/tasks formerly handled by several workers. Cross-sectional and time series data from Nigerian textile industry provide opportunity to evaluate these viewpoints. Employing regression model and OLS technique of estimation, the study establishes on the basis of economic, a priori, statistical and second order tests criteria that technical progress in the Nigerian textile industry appears to be associated with a decrease in the employment of labour. Specifically, it is found to have a negative effect on the employment of unskilled labour and a positive effect on the employment of skilled labour. The results also confirm that the negative employment effect outweighs the positive employment effect when the effects are considered simultaneously. The sales turnover variable was also found to be positively associated with the employment of labour. The values of R^2 in the three equations of the model were reasonably high indicating goodness of fit. Most of the parameter estimates were also found to be statistically significant. Equally, when the second order econometric tests such as Park (1966) heteroscedastic test and Ramsy (1969) model specification error test were conducted in order to test for the violations of the desirable properties of the technique of estimation used, the results of the various tests do not appear to invalidate the initial findings of the study. On the basis of the overall results, one major recommendation is that solutions to Nigeria's unemployment problems should not be found in massive control of techniques used by firms and technological progress in Nigeria textile industry, in the interest of higher productivity, long run growth and competitiveness in the world market. Instead a package or an economy wide approach should be adopted. This involves the rapid and massive promotion of small and medium scale enterprises that can integrate both forwardly and backwardly with bigger industries in conjunction with carefully designed tax and subsidy policies as well as the promotion of industrial research activities that can modify on gradual basis or find local substitute to our industrial raw materials, machinery and equipment. Future research in the area of this study should focus attention on a more rigorous econometric approach through richer data sets and disaggregated modeling to provide a more solid footing tor the results of this study.

CHAPTER I

INTRODUCTION

1.1 Background To the Study.

A country's economic system does not use its resource efficiently, if a large number of people in that country want a job but do not have one or if many people work fewer hours than they would like, a case of underemployment.

Unemployment however can be used to refer to any unused resource. A fertile agricultural land, a quarry or a copper mine can be unemployed as well as a professor in a University. In each case there is a cost to the economy.

On the production side of the national accounts, the cost is the value of the unproduced commodities; on the income side of the account, the cost is the loss of wages and salaries when labour is unemployed and the loss of rent, interest and profits when land or capital/resource are unemployed.

On the whole, most of the discussions about unemployment normally concentrate on the unemployment of labour for several reasons. First, statistics on unemployed labour serve as a fairly reliable indicator of total

unemployment. Two, the cost of human unemployment is usually more obvious and dramatic than the costs of other kinds of unemployed resource. For instance, an unemployed virgin agricultural land, a tin mine or a machine does not strike or riot; it does not have a family of little machines to support; it does not picket or show signs of malnutrition.

Another aspect of labour unemployment is that when labour resources are unemployed there is usually a loss of past, present and future potential output, because human capital depreciates much more quickly than other kinds of capital or natural resources. For, instance, when a man is unemployed for two years there is no way he can recover the two years output lost, because he is capable of working only a limited number of hours per day for a given number of days of his life span. He may after being employed, put in some overtime hours, but it is unlikely that he will be able to compensate for the lost hours or years. These hours of labour are lost forever, as are the additional skills or knowledge he would have gained by on the job training if he had been employed.

On the other hand, if a copper mine is shut down for ten years, there will be a loss of current output, but not of the total production capacity of the mine. To a lesser degree, the same is true of many capital goods. A drill press can be left idle for several years during a recession but the remaining

hours of its total productive life can still be realised at a later date, when economic conditions improve, provided that the machine has not been allowed to rust and that it has not become obsolete. This is why studies about unemployment usually focus on labour resources.

The first government in the world to acknowledge publicly a responsibility to keep unemployment to a minimum was that of the United Kingdom (Chambers encyclopaedia, 1969). In the white paper on employment policy issued in May 1944, the government declared its aim to be the maintenance of high and stable employment. During the following year, the government of Australia and Canada issued a similar declarations. In 1946, USA followed suit with the passage of the employment act which declared the intention of the government to use all practical means to promote maximum production, employment and purchasing power.

Here in Nigeria similar pronouncements on unemployment problems have been made time and again by successive governments at all levels as well as in policy statements that usually accompany all our development plans and budgeting speeches. Official unemployment statistics normally released by Federal office of statistics (FOS) which many scholars viewed with skepticism showed that between 1985 & 1986 , the rate of unemployment in Nigeria was 5.7 % on the average . Apart from 1987 when

unemployment rate rose to 7% , the average rate between 1987 & 1993 actually fell to 4.2%.

Table 1.1 gives specific figures on unemployment rates in Nigeria for the years 1985 - 1993.

Table 1.1 Nigeria unemployment rate 1985 - 1993.

Years	%
1985	6.1
1986	5.3
1987	7.0
1988	5.3
1989	4.0
1990	3.5
1991	3.1
1992	4.0
1993	2.7

SOURCE: First Bank Business and Economic Review, Dec .1995 P. 14.

The interpretation of these figures suggest for, instance, that in the year 1985 out of every 100 employ able Nigerians about 6 people are unemployed. This drops to about only 3 people in 1993.

1.2 Statement of the Research Problem.

The problem of unemployment has in most countries of the world become one of the major concerns of government and the present economic recession has aggravated it to such an extent that it has become the focus of much research and international debate.

Rapid technological changes or progress in advanced countries and some few developing countries as well as the adoption of these changes by the majority of developing countries is aggravating further the seriousness of the unemployment problem.

This is more so because technological change is normally accompanied with new production processes for manufacturing industries and these new techniques heavily rely on the demand for labour that is highly educated and skilled so that there is a danger of displacing a significant proportion of the labour force particularly in developing countries. This is because the available evidence has also shown that those requiring manual jobs constitute the largest number of the unemployed in many countries (Berg, 1978). This point also becomes highly relevant because analysis of the unemployment question is always associated with analysis of technology question, since technologies are largely categorised in terms of their employment effects. Another factor which is said to

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accentuate the prevalence of unemployment is the increase automation of the tertiary sector or white collar sector namely bank, insurance and related services as well as automation in some bureaucracies evidenced by computerisation of the accounting/payment system in some Universities as well as some state governments.

In the light of the large and growing urban unemployment in less developed countries (LDCs), much attention is currently being paid to the employment generating effects of their industrial development. Low labour absorption in the industrial sector due to highly capital intensive techniques has been widely held to be the key factor compounding the unemployment problems of these countries (Todaro, 1977; Berg, et-al 1978; Morawatezt, 1975). In the case of Latin America see Hirshman (1968). In the case of Nigeria, see Iyanda and Bello (1979), Ekuerhare (1986); Yahaya (1983), Fafohunda, (1979) , Iyoha (1982) , Odama and Kazi (1982) .

Traditionally, the question of why there has been low labour absorption in LDC's industrialisation process has been interpreted as calling for investigation into possibilities for capital labour (K/L) substitution, Pickett and Robson (1977).

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This view reinforces the notion that high unemployment as witnessed in LDCs has been aggravated by the repercussions of rapid technological

change and innovations made possible by the invention of machine capable of doing what several workers had formerly done by hand or invention of new processes or management techniques that make use of little amount of labour relative to capital.

However, the new view now is that technological progress is the right solution for economic progress and attainment of full employment. New techniques, it is argued, are mainly aimed at increasing productivity which means reduction in costs, reduction in prices, increase in demand, increase in profitability, increase in investment and hence increase in job creation.

On the other hand, lack of technical progress appears to be generally accepted as a barrier to increase in productivity, economic growth and full employment.

It is the view of this study therefore that the relationship between technical progress and the level of employment or the effect of technical progress on the employment of labour cannot be assessed on a priori grounds..

It is also the view of the study that scholars are unlikely to reach a fuller understanding about whether the continuous use or adoption of highly capital intensive techniques by Nigerian firms both indigenous and foreign and recent computerization in banks are actually displacing labour by

simply comparing the arguments of the opposing sides. What is needed is a series of case studies to show in specific countries and in specific industries or firms what is actually obtained. For, instance, a preliminary investigation conducted by the author in 1994 has revealed that at the initial stage, computerization process in Diamond Bank Plc., Nigeria International Bank (NIB) and in the three first generation banks namely United Bank for Africa (UBA), Union Bank and First Bank has not actually displaced labour or caused the banks to curtail employment substantially. The effect computerization had in all the banks was a reduction in the amount of hours spent to balance the daily operations.

The research problem of this study centers on examining the two opposing propositions on the relationship between technical progress and employment/job creation. The first proposition asserts that technical progress is detrimental to job creation because it makes possible the use of new machine/techniques/processes or new management techniques that make use of little amount of labour relative to capital. The second proposition argues that lack of technical progress has been universally accepted as a barrier to increase in productivity, economic growth and attainment of full employment. This view seems to suggest that technical progress is the right solution for economic progress and attainment of full

employment. Technical progress, it is further argued, is always associated with increase in productivity and efficiency which means reduction in costs, increase in output, reduction in prices, increase in demand, increase in investment, increase in profitability, increase in real incomes or wages which are then translated into higher demand for workers which means increase in job creation. At the same time innovation in product i.e the creation of new products and or services directly increases employment as demand for the these products is created.

One can therefore see a gap between the confidence of economists, businessmen, policy makers and workers about the effect of new technologies on jobs and this raises major policy challenges for many countries. It also underlines the importance of further assessment of the links between technology and jobs. In Canada for, example, high technology and high knowledge industries, although accounting for only about one third of total employment contributed more to employment growth than all other industries combined (Paye 1995). In the 1820s also, many commentators were arguing that the increased productivity from the introduction of machinery in the United Kingdom would reduce employment. Over the half - century that followed both wages and employment increased.

Similarly, fears about widespread job losses in the USA from the invention of the computer in the 1940s have been accompanied by higher wages and no appreciable rise in unemployment. On the whole one can see clearly that a problem exists in the sense that no one can say with absolute certainty that technical progress creates or destroys jobs.

It is perhaps only through accumulated empirical research in specific countries and in specific industries or firms that we can get close to knowing the actual effect of technical progress upon the level of employment.

1.3 The Objectives of the Study

The broad objective of this study is to examine the effects of technical progress and/turnover on the employment of labour in the Nigerian Textile Industry. Other objectives of the study are:

i. To determine the category of labour mostly displaced by technical progress. Is it the skilled, semi skilled or unskilled.

ii. To ascertain whether or not technical progress leads to an increase in the employment of skilled labour.

iii. To examine whether or not the negative effect of job loses as a result of technical progress outweighs the job gains in terms of increase in the employment of skilled labour.

iv. To uncover the nature and the form of technical progress in Nigerian industry.

v. To make suggestions for further research and recommendations with regards to employment policy.

1.4 The hypotheses of the study

From the foregoing research objectives, the following hypotheses have therefore been derived:

i. There is a positive relationship between technical progress, sales turnover and labour employment.

ii. There is a positive relationship between technical progress and employment of skilled labour.

iii. There is an inverse relationship between technical progress and the employment of unskilled labour.

1.5 SCOPE AND LIMITATIONS OF THE STUDY.

For convenience, cost consideration and fuller investigative study, the selection of the textile firms has been limited to Kano and Kaduna States. Even though the study areas namely Kano and Kaduna States of Nigeria are ranked second after Lagos in terms of concentration and size of textile firms, the relatively low number of the textile firms will easily allow for a

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complete survey of all the firms in the study areas. Therefore this study chooses to make a complete survey of all the textile firms in the study areas. This will give the rare advantage of placing high premium on the conclusion drawn from the study.

Complete survey in this type of study is also desirable because the firms to be surveyed will obviously be of different ages. Some will be new and some will be considered just old relative to those that are very old or those that might be considered as pioneer firms in the textile business. It is expected that the new firms might lead in adopting or acquiring the latest innovations in processing or management. It is also possible for the older firms to be more dynamic in adopting new techniques.

From the information available at the time of writing this thesis, the total number of textile firms in Kano State were 18 and those of Kaduna State were 12. These numbers include both operational and non-operation ones. However, the field work revealed those that were functional at the time of the survey and those that were not. This information has also been fully utilised in the section that analysed the data.

1.6 SIGNIFICANCE AND JUSTIFICATION OF THE STUDY.

Most studies concerning the relationship between economic growth and technology have concentrated on looking at the diffusion of new technologies through case studies of firms or industries, but the outcome in terms of employment are less frequently analysed, even though noteworthy exceptions do exist. (Nelson & winter, 1982; Freeman, 1982). So this study chooses to analyse the relationship between technical change or new technologies and employment. Unemployment constitutes a serious problem to the individual affected, his family, his community and the society at large. Research of this nature and the likely findings, recommendations and conclusion to be drawn from it could help arrest the prevalence of unemployment as well as help those affected to become useful to themselves, their families, their communities and society at large.

The low employment generating effect of industrialization process in LDCs has also led to the suggestions that future researches into these aspect should focus on micro studies of particular industries or firms in which more specific, detailed and definitive investigation of employment effects of different processes or technologies would be possible than in the earlier

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more aggregate studies, (Pickett & Robson, 1977). This research is an attempt to answer the call and contributes its quota for a more micro - specific studies of enterprises to find out actually whether or not acquisition or adoption of new technology actually displaces labour. All in all, the significance of the study lies in the fact that it may make contribution in four different directions:

i) From the point of view of policy making on how to reduce unemployment.

ii) Designing appropriate industrial policy that can promote employment. For, instance, if positive verification is made which shows that technical progress in Nigerian Industries destroys more jobs than it creates, then the case for government intervention to control the rate of automation will be strengthened.

iii) In terms of increasing the stock of knowledge in the area of economics of technological change and lastly.

iv) Provides an opportunity to validate or invalidate the popular held notion with no empirical evidence that Nigerian firms both indigenous and foreign have since independence and up till today been using highly capital intensive techniques with low labour

absorption thereby aggravating the high level of unemployment already prevalent in the country.

1.7 METHODOLOGY.

1.7.1 Type of data used in the study.

Since the study examined the relationship between technical progress, turnover and labour employment, both secondary and primary data, were used. Time series data showing the number of employees of the firms considered at different point in time, their volume of sales (turnover) either in quantity or Naira value and information relating to the nature or type of technical progress they experienced individually were used. On the other hand, the secondary data were used to supplement the needed data that could not be readily obtained from source.

1.7.2 Measurement of the data used in the study

For the level of employment and turnover (sales) data , absolute figures (values) were not used but rather percentage changes in those figures . For the qualitative variable namely technical progress , dummy variables was

used. A value of one (1) was assigned for firms that have experienced one form of technical progress or another be it change in its production process or technique , modification or improvement in its existing products, changes in management style or organisational structure or computerization of certain operations i.e accounting / payment system. Otherwise , a value of zero was assigned.

1.7.3 Time period covered by the study

As stated under the scope of the study in this chapter , , the textile firms surveyed were obviously of different ages. This suggest that the years they were established differs. This fact limits specifying the time period covered by the study. It also warrants the use of cross-sectional data along with time series data. However , relatively recent data pertaining to the level of employment of the firms considered , their turnover (sales) and technical progress were given prominence over older and more distant data.

1.7.4 Sources of data.

The data for the study were sourced through field work as well as through relevant textbooks , journals , government documents, bulletins or gazettes , periodicals , statistical publications, bulletins of private organizations or professional bodies , research documents , symposium , seminars , and conference papers and they have all been indicated in the biblography.

1.7.5 Method of data collection

Survey method was used to collect the primary data needed. Questionnaires were designed and administered on the number of firms covered. The questions in the questionnaire were formulated in both open and close ended formats. The language of the questionnaire was English. The data were summarised, tabulated, and coded after collection. Interview method was also used where applicable. On the other hand the dominant method of collecting the secondary data was by the use of library or desk research.

1.7.6 Sampling technique.

As indicated earlier under the scope and limitations of the study purposive or non - probability sampling technique was adopted

due to the manageable number of firms in the study areas. This approach is in line with complete enumeration survey.

1.7.7 Tools / Techniques used in the analysis.

Since the study examined relationships between economic variables, it became necessary to use correlation and regression techniques. The ordinary least squares (OLS) method was employed to estimate the parameters of the specified model. Analysis then followed by first looking at the sign and size of estimated coefficient as well as their standards error to see whether or not they accord with theoretical or a priori expectations. Secondly, test of significance and hypothesis testing were conducted to verify the validity or otherwise of the null hypothesis. Thirdly, the values of the coefficient of determination (R^2) were also examined to measure the goodness of fit of the estimated regression lines. Fourthly, Durbin-Watson statistics was used to test for autocorrelation as well as other appropriate tests to detect for the presence of multicollinearity, heteroscedasticity,and model specification error. Equally, simple statistical techniques such as the summary measures (mean or averages) , percentages, proportions, graphs and tables were also employed in the analysis of data where applicable.

1.8 Organisation of the study

The rest of the study was organised as follows. Chapter II constituted the theoretical framework and literature review. Chapter III presented an overview of textile development in Nigeria. Chapter 1V specified the model of the study as well as analysed and interpreted the results with a view to addressing the research objectives and the hypotheses of the study. Chapter V formed the summary, conclusion and recommendation part of the study.

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CHAPTER II

LITERATURE REVIEW

2.0 THEORITICAL LITERATURE

2.1 The Concept of Technical progress

There is almost a consensus in the literature in the use of the term technical progress, technical change, technological progress or change to mean one and the same thing. From the theoretical standpoint, according to solmon (1976) a stationary economy is one in which technical progress is absent and the capital stock is constant. As capital is used up in the production of goods and services, it must be replaced by new equipment, thus, in stationary economy, the amount of replacement investment is identical to the amount by which capital stock depreciates. In such an economy, all net national output consists of consumption and net saving will be zero.

Technical progress can lead to continuos decrease in the real resources required per unit of output as well as introduction of new products. Technical progressaccording to Ghatak and Ingersent (1984), has been a major historical factor in increasing the economy's productive

capacity. It has stimulated the rate of growth of demand though it impact on the rate of investment.It has also proved to be beneficial to both individuals and society as a whole. Producers or firms adopting improved techniques of production benefit from an increase in profits. Consumers and the nation stand to gain from increase in aggregate supplies, either through relief of actual physical scarcity or lower prices or both. The nation gains by way of improvement in the balance of payment account, if surpluses of firms are exported. Even in LDC's or where subsistence farming or activity dominates, farmers still stand to gain from adopting high yielding variety (HYV) because they will be able to produce more for their own consumption with the same effort or the same amount with less effort. But there tend to be losers as well whenever technical progress occurs and this is one of the things this study intends to verify.

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The production process is often over simplified into a 2 factor production function consisting of capital and labor in which capital encompasses all non-labour inputs or factors. But, according to Staadinge (1984) the production processes can be regarded as combining inputs, organizing work, and disposing of the output and proceeds in various ways Technological change may affect any part of it, from the form or combination of raw materials or means of production such as machines and

transport equipment to organizing the work process or modifying the form and composition of output primarily by introducing new commodities or services. Standing (1984), therefore concludes that it would be wrong for scholars to depict technological change as merely machine labour substitution. He further argues that some technological changes have been organizational as in the case of assembly line introduced in the 20th century at Ford. Others are electric or steam-powered vehicles. Technological changes may also occur without extra investment as with learning by doing and work process modification. Standing (1984), concludes.

Technical progress or change has been broadly defined to encompass both product innovation and process innovation (Hopkins, 1988).

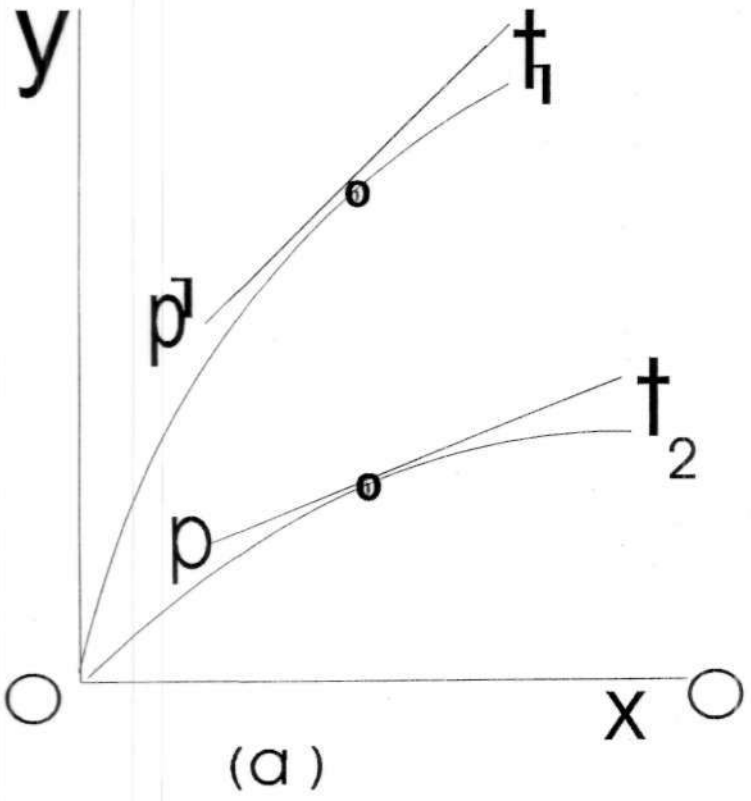
This definition does not limit process innovation to changes in production process or computerization of operations obtained mostly in manufacturing or service-oriented firms but extends to changes in style of management because they all result in higher output or significant reduction in costs, time and energy.

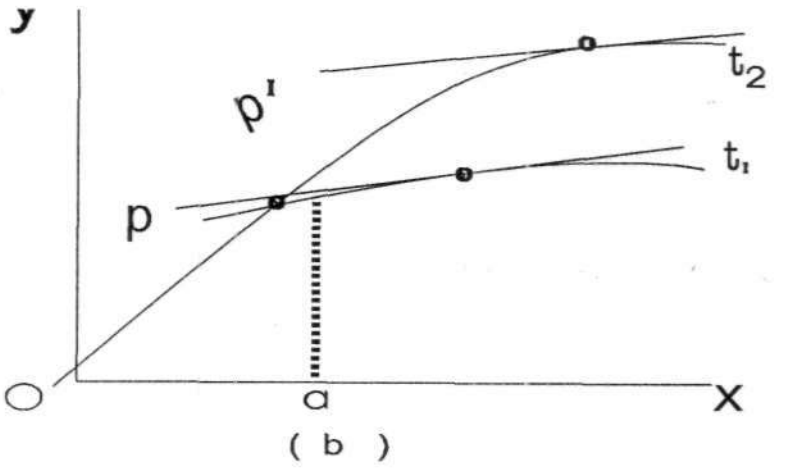
According to Ghatak and Ingersent (1984) technical progress possesses two general properties. First, a new production function is created such that any given quantity of resources yields a larger output. Second, the proportion in which resources are combined to produce given item at least cost are generally changed.

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In graphical terms as shown in figure 2.1 below, technical progress is commonly conceptualized as a shift variable because it shifts the production function positively and vertically.

Figure 2.1 **EFFECT OF TECHNICAL PROGRESS ON THE PRODUCTION FUNCTION**





In figure 2.1 (a) & (b) above, x represent any variable input with all complimentary inputs assumed fixed and y represents output. The functional relationship between x and y depends on the choice of technology, with t_2 representing an improvement on t_1. Thus, supposing x is the fertilizer application rate and y is the yield of wheat, t_1 might represent a traditional wheat variety and t_2 a new higher yielding variety. It should be noted that in this case the technological improvement is not embodied in the variable input (fertilizer) but in one of the fixed inputs, (the seed). The new higher yielding variety is more responsive to fertilizer than the more traditional variety in two senses:

a) The yield per unit of fertilizer is higher above the threshold application rate. In this case 0 in figure 2.1 (a) and a in 2.1(b) and

b) The economic response to fertilizer extends to a higher rate of application. Tangents p and p^1 represent a constant fertilizer usage, wheat price ratio and the points of tangency between p or p1, while t1 or (t2) signify the optimum application rates subject to the usual neo-classical assumption. That is profit is maximised, where dy/dx= the ratio of prices of factors px/py.

A slightly different perception of the term technical progress have been given by Cobeljic and Stojanovic, Kregel and Schumpeler . Kregel (1988) sees technical change to mean altering the skills of people, education and training process. It also means changes in work organization, informatization of office jobs to reduce middle level management, use of home computers, fast foods and use of new models for plant and office organization.

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Schumpeter (1934) even argues that technical progress can be said to occur if there is an improved social relations between blue and white collar workers because improvement in social relations has the same effect as the installation of new machinery, small in terms of improving productivity and efficiency. Cobeljvic and Stojanovic (1969) have also viewed the concept of new technology and or technological progress to imply new techniques that

are at higher level than the existing national standards, but need not represent the world is peak. This view suggests that what constitutes technical progress in Nigerian textile industry may not be considered as such in say British textile industry because of their different levels of industrial development. This definition equally suggests that technical progress can be regarded as a relative concept and as an evolving process, It is also consistent with the wider notion of technical progress as merely representing a marginal advance from existing technology or mechanization of communication in firms , that is the use of telephone , fax and installation of video cameras for security and as a means reducing pilferage by workers to enhance profitability.

Parikh (1985) and Levacic and Rebman (1982) have viewed technical change as referring to differences or changes in input or output coefficients resulting in more output with the same input levels, or same output with lower input levels. Parikh for instance, exemplified technical progress in agriculture to take one or a combination of the following forms:

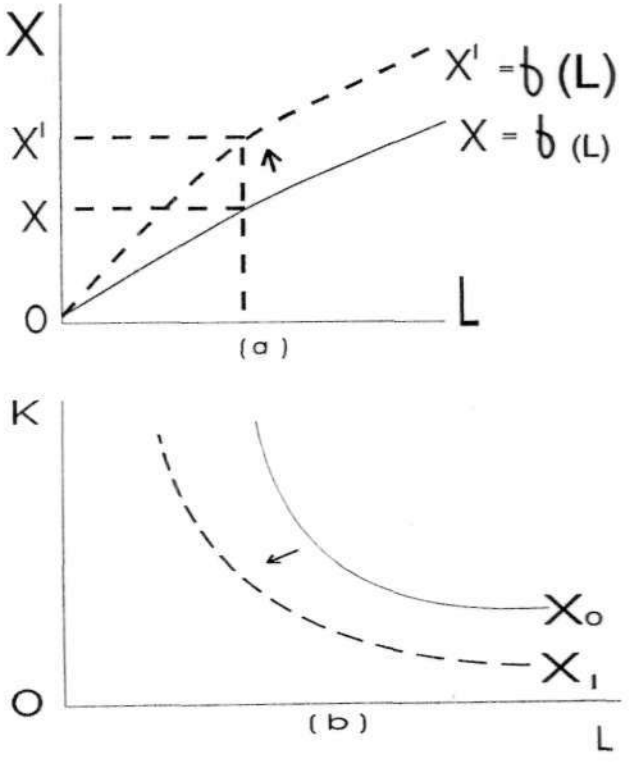
(i) improvement in irrigation or its introduction

(ii) introduction of short duration new variety seeds or fertilizer and

(iii) use of tube wells (pumps), tractors and mechanical threshers or harvesters. These are summarized as 3 kinds of innovations or 3m., namely new methods, new materials and new machine.

According to Kontsoyannis (1979) technological progress constitutes a new and more efficient methods of production as well as inventions that result in increase efficiency of all methods of production. Graphically, the effect of innovation in process can be shown as an upward shift of the production function figure 2.2 (a) or a downward movement of the production isoquant figure 2.3 (b). The shift shows that the same output may be produced by less factor inputs or more output may be obtained with same inputs.

Figure 2.2.



According to Dernburg et - al (1968) the neo-classical growth theorists assume that full employment saving is automatically invested and attempt to analyse the properties of the full employment growth path by making various

assumptions about the rate of technical change, the rate of growth of the labour supply and the possibility of technical substitution between factors of production. They further argue that much of the analysis of neo-classical theory quite complicated, but its essential ingredients can however, be illustrated if we assume that the production potential of the economy is represented by what is called the "Cobb-Douglas" production function:

$Y = Ak^a N^{1-a}$

Where the exponent ^{a} is a positive fraction and represents the fraction of income that accrues to capital and also equals the elasticity of output with respect to changes in the capital stock.

The full employment level of output in the above formulation is a function of the quantity of capital K, the supply of labour N, and of a scale factor A which we can assume grows at a steady rate and represents the effect of technical change. Implied in this formulation are the following assumptions:

i) The production function is homogenous of degree one. In other words, if both K and N increase by same proportion, Y increase in the same proportion.

ii) Technical change is neutral. This means that technical change will raise the marginal product of both factors in the same proportion and that the marginal rate of substitution will be constant.

iii) Production is subject to diminishing returns, which means that if the quantity of

capital is held constant, increases in the quantity of labour will yield successfully smaller increments to output. This suggests that capital coefficient will only rise with an improvement in technology and with a rise in the labour - capital ratio.

The presence of diminishing returns produces the important result that an increase in the fraction of income which is saved may not raise the growth rate. If the fraction of income saved increases, the required amount of investment increases and the stock of capital and the level of income initially grow more rapidly, which implies that the labour capital ratio falls. This means that the increased relative supply of capital causes the capital coefficient to fall. Therefore, each dollar of investment adds less to potential output and the growth rate tends to diminish and to return to its initial level. On the basis of the above analysis Dernburg et-al (1968) conclude that :

a) growth in per capita output is not possible in the absence of technical progress.
b) the rate of growth cannot be a function of the fraction of income that is saved since any decrease in the ratio of N / K is brought about by an increase in saving immediately reduces the capital coefficient and the rate of growth. This is because the growth rate cannot be permanently raised by an increased in the fraction of income that is saved and invested due to the presence of diminishing returns to capital.

However, the above model of growth has been criticised by Phelps and

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Frankel (1962) on the ground that it assumes that technical change is entirely organizational, (see Dornburg, 1968). They argue that most technological improvements enter the productive process by being embodied in new machinery and equipment. Therefore, in order for the growth rate to be raised by an increase in the saving rate, it would have to be the case that the rate of technical progress is itself a function of the quantity of investment. Equally, it was observed that societies that have a high capital labour - ratio tend to be the most technologically advanced. The idea is that although a rise in capital / labour ratio (K / N) will tend to cause a fall in the marginal product of capital, the increased capital brings with it improved technology that offsets the tendency toward diminishing returns. In conclusion, one can say that the rate of growth of output in the long run depends upon the rate of technical change and the rate of growth of the supply of labour. Changes in the fraction of income saved and invested will not affect this rate of growth, unless the effect of the increase in saving and investment is to raise the rate at which technical progress gets into the productive system. This point made Dernburg (1968) to argue that the traditional notion that more savings is always good must apparently be rejected even on non - Keynesian grounds.

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2.2 Factor-Biased technical progress

According to Ghatak and Ingersent (1984), economic theorist usually distinguish between 3 types of technical progress based on factor input ratios as follows:

I. Hicks-neutral technical progress under which despite the change in output, the capital labour (K/L) ratio remains constant.

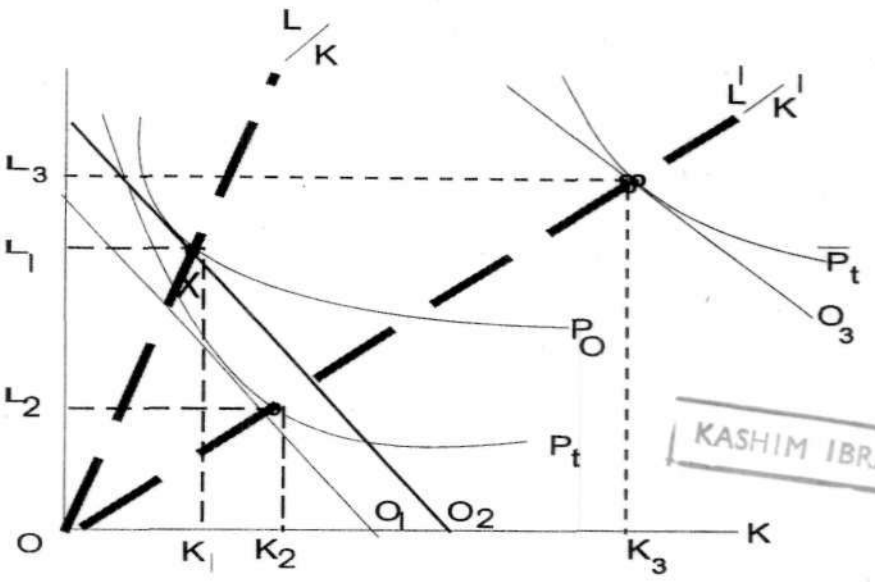
II. Harrold-neutral technical progress under which the capital-output (k/o) ratio remains constant, so that factor proportions are biased in favour of saving labour. That is, the capital-labour (k/L) ratio increases.

III. Solow-neutral technical progress under which the labour-output (l/o) ratio remains constant, so that factor proportions are biased in favour of saving capital. That is, the capital- labour (k/l)ratio decreases.

However, the adoption of factor biased technical changes does not necessarily imply that in total , less of the disfavored factor will be employed. For, example, far from decreasing the total demand for labour, the adoption of labour-saving Harrod-neutral technology may initiate a process of economic adjustment which actually creates more jobs or lengthens working hours.

A 2-factor isoquant diagram labeled figure 2.3 below will help clarify the argument.

FIGURE 2.3 FACTOR BIASED TECHNICAL CHANGE.



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In figure 2.3 above, isoquants p_o and p_t represent identical levels of output but different techniques of production i.e they exist on different production surfaces. But the technique underlying po is more labour intensive or less capital intensive than the technique underlying pt. The higher level isoquant pt belongs to the same family as p_t. The slope of the isocost line 01 represents the K/L price ratio and similarly with the isocost lines 02 and 03, representing the higher levels of total outlay. Suppose that the initially the producer is in profit maximising equilibrium where p0 is tangent to O2 giving employment to OL1 labour and OK1 capital. Factor proportions are signified by the slope of the ray L/K. Suppose now that the producer switches to a more capital intensive production without adjusting the level of output. At the new equilibrium where p_t is tangent to 01, a lower labour

input of 0L2 is combined with a higher capital input of Ok2. The difference in slope between the rays of L/K and L^1 / K^1 signifies the capital-using bias of the shift to the new technique.

But, assuming constant prices, pt is not the profit maximizing level of output. Compared with the initial equilibrium on Po, total costs have been reduced from the level O2 to level O1. Thus, assuming that factor proportions are now fixed at L^1/K^1, the new profit maximizing level of output must be further from the origin than OL2, OK2. Expanding output along any scale-line such as L^1/K^1 necessarily entails employing more of both factors. Suppose that, following the switch to the more capital-intensive production technique, the profit maximizing level of output increases to pt. Then, the factor inputs level are correspondingly increased to OL3 labour and OK3 capital. So at OL3 the employment of labour is in fact more than at the original profit maximizing equilibrium of OL1 on Po.

The above graphical analysis suggests that depending upon the direction of the change , a simultaneous change in the factor price ratio may either reinforce or offset the effect of a change in the choice of production technology on total factor employment levels. For this reason, it is impossible to determine on a priori, whether , for example, the adoption of

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labour saving technology will really displace labour or actually create more jobs.

2.3 Embodied and Disembodied Technical Progress

Uri (1984) has demonstrated that classification of technical progress may be approached from two perspectives. On one hand, interest may centre on whether the initial impact is capital saving, labour saving or neutral in its input saving effect. On the other hand, technical progress can be classified by the way it affects the efficiency of the inputs. By definition , technical progress is called disembodied if its effects are reflected in the increased efficiency of all existing labour or capital stock despite their age. On the other hand, technical progress is called embodied, if it affects productivity of the capital stock which is newly introduced into the production process. Classification of the technical progress are also expressed according to Hicks (1932) and Harold(1948).

Hicks (1932) defines technical progress to be capital using, neutral or labour using depending on whether the marginal rate of technical substitution of capital i.e (MRTs) decreases, remains unchanged or increases at a given capital-labour ratio.

Harrod (1948) defines technical progress as capital using , neutral or labour using according to whether the capital-output ratio increases, remains

unchanged or diminishes for a given cost of capital. In other words, technical progress is capital using, neutral or labour using according to whether the output elasticity of capital increases, remains fixed or diminishes.

2.4 Indicators or measures of Technical progress

Lall (1992) has provided two indicators or measures of technical progress , namely output and input measures. To a large extent these measures have appeared to be widely accepted and used.

The output measures or indicators include the number of new products introduced, the number and rate at which the existing ones are improved or modified as well as statistics on patents right and trade marks. Other output measures include the number of scientists and engineers engaged in research and development (R&D) as well their ratio to the total population.

The input indicators or measures include the magnitude of firms expenditure on research and development (R &D) , the percentage expenditure on (R&D) relative to a Nation's GNP , the introduction , adoption or acquisition of new production process , technique or machines as well as the introduction or adoption of new management style.

Other measures according to Kregel (1988) include the extent and magnitude to which employees of a firm or industry are sent for training and retraining or alteration of workers skills to meet the demand of new processes . Computerization of accounting / auditing and payment system can also be regarded as another indicator or measure of technical progress. So also mechanization of communication system within a firm which involves the use of telephone , fax machines and intercoms. To Schumpeter (1934) , improvement in the social relations between blue and white collar workers can also be regaraded as a measure or indicator of technical progress. Other measures include informatization of office jobs to reduce middle level management, use of home computers and fast foods and use of new models for plant and office organization.

2.5 MODELS/THEORIES OF EMPLOYMENT

2.5.1 CLASSICAL OR AUCTION MODEL

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This model treats labour market just like a commodity market (see Gordon, 1974). Labour is presumed to be sufficiently homogenous within classes so that the level of wages for a particular class of labour or skill can be observed by all participants. Wages are therefore assumed to fluctuate just like commodity prices fluctuate in response to demand and supply and

potential employees can always find employment at this going wages. The model assumes perfect knowledge on the part of employees and employers about the market conditions. Wages are also assumed to be flexible upwards and downwards in response to changes in demand and supply of labour. A fictitious auctioneer is assumed to clear all excess supply and demand of labour. Therefore, the market will always clear and that any unemployment that results can be regarded as transitory or voluntary; otherwise it might be caused by labour union action or minimum wage legislation. Thus, the labour market is in equilibrium at that real wage which equates the demand for labour with the supply of labour. The equalibrium level of employment established at the market clearing real wage will be consistent with full employment. Nobody who is willing to work at the equilibrium real wage rate is unemployed except while searching for a job. The existence of unemployment and vacancies do not imply that labour markets remain permanently uncleared. The unemployment which arises when the real wage is greater than the market clearing real wage is termed classical unemployment. One prediction of the model which is consistent with its assumptions is that wages and prices move pro-cyclically, that is they rise during boom and they fall during recession.

There is no doubt that the classical or auction model of the labour market is an abstraction, but nevertheless, useful. First, it provides part of the explanation for the association of boom periods with an increased employment for certain types of casual labour the young, the old and married females who are frequently in and out of the labour market as well as for overtime and wartime increases in output.

Secondly, there are many respects in which it does not seem to coincide with widely known short period facts of employment and unemployment . It suggests that the downward phase of a recession is typically characterised by cuts in money wages and by workers quitting in response to such cuts. Infact, there is usually a decrease in quit rates during recession. Thirdly, while the model explains unemployment of labour, it is hard to see how it would explain the unemployment among non-human factors of production which does occur. In typical recession, for, example, rental residential housing suffers a significant increase in vacancies together with sticky prices. But the owners of such resources have no motive to withdraw them from the market as with labour services unless if they cannot even earn their operating cost. Fourthly, a period of recession appears to be one in which labourers either search for jobs at reasonable wages or in some

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cases while they can observe the wages without search, they cannot get a job at that wage because of job rationing.

Fifthly, even in the case of industrialised countries which may happen to be working near full employment, the classical theory is unlikely to apply because the costless and instantaneous adjustments assumed in the theory do not hold. Long time lags and high adjustment costs often lead to outcomes which are very different from the frictionless world of the theory.

2.5.2 KEYNESIAN OR WAGE FLOOR MODEL

This model in direct contrast to classical model does not agree that the labour market always clears and that it is characterised by costless and instantaneous adjustments. The model according to Malinvaud (1977) asserts, however, that wages move sluggishly and are rather flexible upwards but inflexible downwards. According to keynes with sticky money wages, labour market will not clear if demand is low and decreases in demand would cause decreases in output and increases in unemployment. The simple explanation given for this is that in the period of slump, the employer will have redundant labour because of the discrepancy between the current money wage and the current marginal revenue product and hence will be turning away new workers at that money wage. The result will be involuntary unemployment.

The distinguishing feature of Keynesian unemployment is that it is attributed to an insufficient level of aggregate demand. In the general theory, Keynes assumes that workers are willing to accept a cut in money wages to secure more employment even though they would accept an equivalent deduction in the real wage brought about by an increase in the price level, while money wage rate remain unchanged. Keynes, did not attribute this to irrationality on the part of worker but a desire to preserve their wage relativity.

One important prediction of keynesian model which is consistent with its assumption of sluggish movement of prices and wages particularly downwards is the assertion that real wages move counter cyclically (Levacic & Rebman, 1982). The explanation for this is that during boom or high level of economic activity wages and prices are both rising, but the rate of increase in prices is higher than the rate of increase in wages and this makes real wages to be falling. On the other hand, the recession period is characterised by fall in wages and prices, but because of the sluggish movement of wage downwards, one discovers that prices fall faster than wages and this makes the real wages of workers to rise. This validates keynesian assertion, that real wages move anti-cyclically due to rigidity of wages down wards.

2.5.3 Classical and Keynesian Unemployment Theories Compared

The fundamental difference between the Keynesian theory and Classical theory is that while the Keynesian model attributes the growth of unemployment to defiance in aggregate demand the classical theory emphasises non demand deficient factor - that is due to an excessive real wage level in the unionised sector of the economy. The classicists therefore suggest that weaker unions and lower benefits are required to make wages fall and therefore raise the level of employment (Minford, 1983). Keynesian theory on the other hand suggests, the expansion of aggregate demand through a less stringent fiscal policy targeted towards the unemployed and backed up by an income policy (Layard, 1986) .

In other words, when the economy is in disequilibrum, the Classists suggest that the economy can be returned to nomalcy only through price adjustment while Keynesians argue that price adjustment is sluggish and that quantity adjustment is the only solution. This is how his followers derived the name – Supply side Economists

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2.5.4 SEARCH MODEL

This model seems to explain unemployment as the outcome of job search by both workers and employers in market characterised by imperfect information which is costly to acquire . The model postulates that because it takes time for workers to search for jobs and for employers to hire new ones there will always exist some frictional unemployment and some unfilled vacancies. The model therefore sees labour market as a dynamic process of rational search by unemployed workers for available vacancies (Levacic & Rebman, 1982; Fleisher, 1970). Imperfect information is a crucial element of the theory, for it implies both a need for contracting and a need for rationale search. Therefore, a positive rate of frictional unemployment may exist in equilibrium denoted as "the natural rate" and this may not be caused by deficiency in aggregate demand. Workers, it is said may quit their current job to enter the unemployment pool in order to search among available vacancies for a more preferred position. Three or more weeks may elapse between leaving a job and getting a new one and during this time workers may be counted as unemployed. This type of unemployment is what the model refers to as frictional unemployment.

The existence of frictional unemployment is explained in terms of special characteristics of the labour market which distinguishes it from most product or service market. Transactions are conducted on a highly personal basis and involves individual contract between workers and employers. In any market buyers and sellers need to get information on prices at which exchanges are likely to occur. However, because of their characteristics labour markets require a more extensive search than any other market where prices are posted daily as in stock or commodity market or as displayed by the retailers. To obtain information about the going wage rate for one's labour services it is often not sufficient to examine posted price as indicated in the job advertisement. Personal applications are required to discover if the individual would in fact receive a job offer. Similarly, a firm needs to advertise vacancies and hold interview in order to discover what quantity and quality of job acceptances it will get at the wage rate it offers. (Minford, 1983).

The opportunity cost of searching for workers according to the theory is the time taken for either leisure pursuit or work time as well as any other additional transport cost. When an unemployed worker obtains a job offer at a particular wage, he or she needs to estimate the relative cost and benefits of accepting the offer. The benefits will be the present value of extra income earned over the future year of that job. The cost will be the expected

value of the additional income from searching longer and possibly obtaining a better job offer. The expected income from job search depends on the workers estimate of the best offer he is likely to get and how long it will take to get such an offer. At the beginning of the job search process a worker will base his idea on the real wage he can command on his previous work experience. As job search proceeds he will revise his estimate according to the money wage offers he receives. Thus, an unemployed worker has a reservation real wage and will not accept a job below this wage and is likely to revise the reservation wage downward as the duration of unemployment lengthens.

Another variant of search model according to Malinvaud (1977) assumes that a prospective employee can make an intelligent decision to accept or reject a job only if he has some ideas not only on the current wage but of future wage and employment at that wage. In general, search theory predicts that unemployed workers may reject job offers because of incorrect information. They may think they can obtain better wage offers and fail for sometime to realise that market conditions have changed and that the equilibrium wage rate has also changed. If this happens, unemployed workers will extend their duration of unemployment until they get that piece of information. Finally, search model; predicts that quit rate should rise in a recession and fall in a boom.

2.5.5 IMPLICIT OR QUASI - CONTRACT MODEL

This model views owners of human capital as besieged with a lot of risk and uncertainties just like owners of non -human capital. It therefore, assumes the existence of quasi-contract in the labour market. A quasi-contract according to the model exists when an individual or firm by behaving consistently in a particular manner induces another individual or firm to act to a large degree as if the former where legally constrained to act in that manner. For, instance, in the context of getting cheaper labour, employers can enter into implicit long term quasi-contract with their employees by guaranteeing them some reasonable security. However since that guarantees will be unenforceable on the employer, he must some how persuade the employee to accept the implied lower real wage. With this a mutual gain is available to employers and employees. Employees' will to some degree prefer a lower expected wage with a similar variance to a larger more uncertain income. Equally, if for example wages fluctuate over a long period with a 5% trend such an employer will not take advantage of a slack market by lowering real wages. On the other hand the employee must be deterred from leaving to join other employers in boom time. He would be constrained by the thought that his present employer will not be hiring during the next recession.

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His present employer will at that future time have redundant employees' to whom he feels honour bound to maintain at a wage above market clearing wage.

The implicit contract model has been equated with the Japanese system of guaranteed life time utility and the presumption that the firm will employ workers for their whole working life.

The model also has rationalised and explained adequately the usual practice of some firms to lay – off workers when faced with a fall in demand and to continue paying the remaining workforce the pre-recession hourly money wage. The alternative of lowering money wage and maintaining employment level does not usually occur. These consideration have led to a number of economists to explain lay off and sticky wages as the outcome of utility maximising and hence rational behaviour by firms and workers. Thus , firms make an implicit contract with their employees by paying a wage rate which does not vary with the state of demand and by operating certain rules for determining layoffs such as least senior workers being laid off and laid off employees being recalled at their previous wage rather than being replaced by new workers at lower wages. Workers in return agree to be laid off and to wait for recall rather than seek permanent work with other firms.

Grossman (1978) , for example , argues that more senior workers are both more productive and less likely to default on their contracts by quitting the firm in good times. It is the skilled workers who are spared lay off because they are expensive to replace if they quit. Unskilled workers on the other hand get laid off because to keep them while still paying skilled workers pre-recession wage would require such a low wage rate that these workers prefer unemployment. Feldstein (1976) also reports that about ¾ of adult male employees laid off in U.S. Manufacturing industry are subsequently re-hired by their original employees. Azariads (1975) and Baily (1977) among others have presented models in which firms make an implicit contract with workers not to vary wages. Instead , workers are laid off in response to a fall in demand.

The implicit contract theory also predicts that quit rates should fall in a recession and rise in boom. It predicts that firms with relatively stable demand for their product over the cycle will have more stable and lower wages than other firms. It asserts that if there is risk-sharing between employer and employee real wages will fluctuate pro-cyclically, so also productivity. The model also asserts that returns to equity holders should fluctuate more than wages and that self-employed workers should have higher income with a greater variation than employed workers.

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Finally, it is clear from the foregoing that implicit contract model has rationalised lay-offs and the associated wage stickiness as the outcome of utility maximising behaviour by employers and employees.

2.5.6 LABOUR TURNOVER MODEL

According to this model firms economise on turnover by adopting an appropriate wage policy. Salop (1973) and Stiglitz (1974) attribute the down ward rigidity of wages to a desire on the part of firms to reduce labour turnover because cutting wages will induce quit which will further increase labour costs.

Turnover is costly to firms through its direct costs such as formal orientations programmes, expenditure to foremen for breaking "in" new employees as well as indirect costs such as lowered productivity during adjustment process. As a result firms utilise wage policy to economise on turnover. Experienced workers are more valuable to the firm than new ones because of training cost. According to the model firms may also offer wages in excess of market clearing to reduce costly labour turnover. Workers will be more reluctant to quit the higher the relative wage paid by the current firm and the higher the aggregate unemployment rate. If all firms are identical then one possible equilibrium has all firms paying a common wage above market clearing with involuntary unemployment

serving to diminish turnover (Salop, 1979, Schlicht, 1978 and Stiglitz, 1974). As Salop (1979) further explains, the market fails to clear because an identical wage is paid to both trained and untrained workers. The model therefore has placed high premium in the cost of advertising vacancies, conduct of interview, screening and training of new workers,. Hence, the model asserts that in the event of unemployment or low demand for products firms do not cut wages so as to avoid losing experienced workers, which are difficult to replace.

In another variant of the labour turnover model it is stated that firms may choose not to lower wages when confronted with a queue of job applicants and the rejected applicants will not even be able to increase their probability of employment by lowering their acceptance wages. According to Weiss (1986), when the management of the Stanford Linear Accelerator (SLAC) in 1975 declared its intention to lay-off 10% of its workforce, the workers voted to take a 10% wage cut voluntarily to stop the lay-off. This offer was refused by the management of SLAC. The reason offered by the SLAC was "If wages were cut, the best workers would quit".

In summary, the major contribution of this model is that it has also offered a satisfactory explanation on why firms refuse to cut wages when they are faced with low demand and long queues of job seekers willing to work

at lower wage than is prevailing. The model has also unveiled the high premium firms place in the cost of recruiting new workers.

2.5.7 EFFICIENCY WAGE MODEL

This model starts with an observation that wage cuts would have a disastrous effect on morale and seriously damage productivity if not inducing outright sabotage. The efficiency wage model is based on a coherent and convincing explanations as to why firms may find it unprofitable to cut wages in the presence of involuntary unemployment.

According to the model, labour productivity depends on the real wage paid by the firm. If wage cuts harm productivity, then cutting wages may end up raising labour costs. In the context of less developed countries for which the model was first advanced, the link between wages, nutrition and illness where emphasised. It is further explained that unemployed workers would want to at a lower wage than is prevailing but firms will not hire them at that wage because any reduction in the wage paid would lower the productivity of all employees already on the job. Thus, this is how the model explains involuntary unemployment. The model has also explained three other labour market characteristics namely: (i) wage rigidity (ii) dual labour market and existence of wage distribution for workers of identical

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characteristics and (iii) discrimination among observationally distinct groups.

Real wage rigidity at the firm or individual level is a straight forward implication of the model. Suppose there exists a decline in the relative price of the product sold by particular firm. There will be no change in the efficiency wage for the firm. The firms optimal response to a reduction in the value of he marginal product of labour is to lay off workers. Dual labour market can be explained by the implied wage productivity relationship of the model. It is also observed that wage differentials between workers in the same firms with the same readily observable characteristics could cause resentment that would lower productivity of each worker. For, instance, friction between workers might increase quit rate and cause some employees to hinder the efforts of the co-workers and the negative impact on productivity or output of the firm could be dramatic. Discrimination among workers with different characteristics is also explained by the preference of some firms to employ men rather than women. Hence the model is sometimes referred to as sexist model.

There is also an empirical evidence that firms pay workers a more or less uniform wages despite ability differences. Lewis (1960) found that only

27% of U.S. production workers had their pay linked either to their own output or output of a group of workers.

Leibenstein (1957) explained the downward rigidity of wages in underdeveloped countries as due to the direct effect of income on the nutrition and hence productivity of workers. Firms would not cut wages because the fall in output per worker would outweigh the saving in the wage per worker. In each of the variant models, the labour force is homogenous and wage offered affects the productivity of workers , the efficiency wage model therefore has also offered another explanation of why firms lay off workers in response to a fall in demand.

2.5.8 SHIRKING MODEL

This model argues that under certain circumstances, it is rational for firms to pay its workers more than is required to cover the dis-utility of labour effort despite the presence of unemployed workers.

According to Calvo (1979), the high wage is in a sense a bribe offered to employees to keep him from shirking. It is further argued that in most jobs, workers have some discretion concerning their performance. Piece rates are often impracticable and rarely can employment contracts rigidly specify all aspects of a worker's performance. Piece rate system may not be viable because it can create moral hazard problem. Under this

circumstances, the payment of a wage in excess of market clearing may be an effective way for firms to provide workers with the incentive to work rather than shirk.

However, the models of Bowles (1981), Calvo(1979) Eaton and White (1982), Foster-wan (1984) and Stoft (1992) postulate that it is possible to monitor an individual performance on the job even though imperfectly. In another model attributed to shaphiro and stiglitz (1984) it is posited that workers can decide whether to work or to shirk. Workers who shirk have some chance of getting caught with the penalty of being fired. This has been termed "cheat threat" theory by Soft (1982). If there is a cost to being fired, then the threat of being sacked if caught cheating, creates an incentive not to shirk. If all firms pay an identical wages and if there is full employment, there would be no cost to shirking and it would pay all workers assuming that they get pleasure from loafing on the job to shirk.

When all firms do this, average wages rise and employment falls. In equilibrium all firms pay the same wage above market clearing and unemployment which makes jobs loss costly, serves as a worker discipline device. Unemployed workers can not bid for jobs by offering to work at lower wages. If the firm were to hire a worker at lower wage it would be in the workers interest to shirk on the job. The firms know this and the worker

has no credible way of promising to work if he is hired. The inability of employers to costlessly observe workers on the job effort has been used by the shirking model as one explanation for the occurrence of involuntary unemployment. This absence of perfect monitoring gives workers the incentive to shirk on the job. To induce workers not to shirk, the firm attempts to pay more than the "going wage", then if a worker is caught shirking and is fired, he will pay a penalty, of losing his job. But, if all firms raise their wages the incentive to shirk then re-appears, since workers who lose their jobs as a result of shirking can get another one at the same wage level. However, as all firms raise their wages their demand for labour decreases and unemployment results. With unemployment even if all firms pay the same wages, a worker has no incentive to shirk. For if he is caught and fired he will not immediately obtain another job. So its pays workers to work fully rather than to take the risk of being caught shirking.

In summary, the major contribution of shirking model in the field of employment theory is its factual observation that in most jobs workers have some discretion concerning their performance and therefore it pays rational firms in the presence of unemployment to pay its workers more than is required to cover the disutility of labour effort or to help prevent shirking; it

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has therefore offered another explanation for sticky wages and involuntary unemployment.

2.5.9 RADICAL-MARXIAN AND GREEN THEORIES OF EMPLOYMENT

For radical-marxian economists there are two types of unemployment. The first is associated with excess capacity and low profits and results from a cyclical decline in aggregate demand for labour (see king, 1990). This crisis unemployment is closely related to what both neo-classical and post-keynesian writers term keynesian unemployment. The second called technological unemployment was a major precondition for the maintenance of profitability. It was the outcome of the tendency for technical progress to increase the constant capital required in production faster than the variable capital (human labour power). Marx believed this type of unemployment to be a normal feature of capitalist economic life and to be consistent with both full capacity utilisation and high profits since it held down real wages. This argument assumes technical change to be associated with labour saving bias. For Marx, the history of production techniques in advanced capitalist economists could be summarised as a continuos leftward pivoting of the machine-worker ray. Even neo-classical economists have often been

prepared to concede that Third world unemployment can be explained in this way.

Shumacher (1973) a green economist has also argued that the use of inappropriate western technology in underdeveloped countries was responsible for excluding the majority of their people from any effective participation in economic activity, with a machine worker ratio somewhere between that of traditional methods of production and the excessive capital intensity of western techniques. Somewhat ironically, his greatest critics have come from the ranks of the Marxists with the claim that economic backwardness can best be overcome by the use of advanced methods which maximise the production of surplus value per worker employed and permit the fastest rate of capital accumulation. This essentially Stalinist argument does entail if it is correct, a faster rate of job creation in the future than would occur with intermediate technology (King, 1990).

The assertion that advances in micro electronics were responsible for much of the great increase in unemployment in the West particularly in the decade after 1973 unites many radical-marxian and most, if not all Green economist, in addition to less theoretically minded trade union leaders and management experts (Ekins, 1986; Handy, 1984).

There are three principal difficulties with the radical-marxian and green analysis. The first is theoretical. Capital must be measured in monetary not physical units so that changes in the prices of machines are as important as the quantity employed. Technical progress in machine making industry tends to reduce machine prices allowing a given sum of money to purchase a larger number of machines. Thus, a rapid increase in the physical ratio of machines to workers may be consistent with no change whatsoever in the capital labour ratio measured in money. The second and third problems are empirical and concerned with the effects and timing of technological change. Evidence of technological unemployment is revealed by the failure of unemployment to fall as output increases or recovers. Another is the strong increase or recovery of profits in the same period. So also an increase in productivity without a commensurate increase in employment.

2.5.10 THE NATURAL RATE OF UNEMPLOYMENT HYPOTHESIS

This is a hypothesis that is associated with neo-classical theory of employment. According to the hypothesis, the natural rate of unemployment is that level of unemployment at which flows in and out of unemployment just balance each other (Salop, 1979). In other words unemployment is at its natural rate when aggregate demand for labour by firms balances quits and

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layoffs. It is also the rate of unemployment in which the expectations of firms and workers as to the behaviour of prices and wages are correct or converge. This natural rate of unemployment is also regarded as the full employment level of unemployment or the long run equilibrium level of unemployment.

The determinants of the natural rate of unemployment can be thought of in terms of the duration and frequency of unemployment. The duration depends on the organisation of the labour market with regard to the presence or absence of employment agencies, youth employment services e.t.c. It also depends on the demographic make up of the labour force, the ability and desire of the employed to keep looking for a better job and the availability and types of jobs. If all jobs are the same and employed person will take the first one offered. If some jobs are better than others, it is worthwhile searching and waiting for a good one. If it is very expensive to remain unemployed, say, because there are no unemployment benefits, an unemployed person is more likely to accept a job offer than to continue looking for a better one. If unemployment benefits are high, then it may be worthwhile for the unemployed person to continue looking for a better job rather than to accept a poor job when one is offered.

The behaviour of workers who have been laid off is also important when considering the duration of unemployment (Dornbush & Fischer, 1978). Typically, a worker who has been laid off returns to the original job and does not search for another job, the reason is quite simple: once a worker has been with a firm for a long time, he has a special expertise in the way the firm works which makes him valuable to that firm but is not of great benefit to another firm or employer. In addition he may have built up seniority rights, including a pension. That means that such an individual could not expect to find as good a job if he searched for a new one. His best course of action may be to wait to be recalled.

The frequency of unemployment, another determinant of the natural rate of unemployment, is defined as the average number of times per period a worker becomes unemployed. There are two basic determinants of the frequency of unemployment. The first is the variability of the demand for labour across different firms in the economy. The second is the rate at which new workers enter the labour force: The more rapidly new workers enter the labour force, the faster the growth rate of the labour force and the higher the natural rate of unemployment. The contracting firms loose labour and the growing ones gain more labour. The greater this variability of the demand for labour across different firms, the higher the unemployment rate. Equally,

the variability of the aggregate demand itself will affect the variability of the demand for labour.

Finally, the natural rate of unemployment is indeed difficult to measure and estimates of it have changed over the past years and the percentage varies from one country to another. For, instance, it was estimated to be 4% in U.S.A. in 1960 and then 6% in the early 1980s (Dornbush & Fischer, 1978). Estimate of the natural rate generally start from some period when the labour market was thought to be in equilibrium.

2.5.11 TYPES OF UNEMPLOYMENT

Whenever, theories of unemployment are discussed, a distinction is normally made between voluntary (classical), involuntary (keynesian), cyclical, frictional and structural or technological type of unemployment.

According to classical or auction model of the labour market, workers are voluntary unemployed if entrepreneurs or firms are willing to employ them at a lower wage than is prevailing, but the workers are not ready either individually or collectively through their union leaders to accept work at the lower wage. This idea is based on the strong assumption of the classical model that prices and wages in both product and labour market are flexible upwards and downwards in response to changes in

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demand and supply and that once the equilibrium price or wage is established both the product and labour markets clear.

Involuntary unemployment or keynesian type unemployment is said to exist when people are willing to work at the current real wage but are unable to find jobs. The distinguishing feature of keynesian unemployment is that it is attributed to insufficient level of aggregate demand. So, in keynes analysis, when the amount of labour willing to work at the existing money wage and price level exceeds the demand for labour, employment can be raised by policies which raise the price level relative to the money wage or by government engaging in deficit financing in order to raise aggregate demand.

Cyclical unemployment emerges as result of a general decline in demand by government, consumers and business firms caused by inadequate volume of effective demand associated with the recession and depression of the trade cycle, a period when people decide for one reason or another to buy fewer goods and services and to save more. As a result therefore, some workers are no longer needed and are laid off until the overall level of demand picks up again. This type of unemployment takes its name from the fact that it tends to appear and disappear with the irregular up and down

cyclical swings in nation's production of goods and services which is measured by GNP.

Frictional unemployment is the type of unemployment caused by temporary, often voluntary economic adjustments or due to search activity as for, example, when people voluntarily change jobs to search for better ones or when workers in seasonal industries such as construction or agriculture are laid-off at certain times of the year. It also arises due to short term adjustment which people make as a result of acquiring wider experience and higher educational attainment. Cyclical unemployment is also termed 'transitional' or 'seasonal' type of unemployment, because the demand for labour sometimes fluctuates with the seasons. For, instance, winter season limits the progress of building and civil engineering works, while summer season creates a strong demand for labour in hotels, catering trades, holiday camps and transport. Agriculture in advanced countries is now less important than it used to be as source of seasonal fluctuations in employment because its importance as an employer of labour has declined. However, its importance as the largest employer of labour in less developed countries (LDCs) still remains. Therefore, the extent of seasonal unemployment varies greatly from country to country, because of

differences in climate, level of development and involvement of labour in agriculture.

Structural or technological unemployment refers to the type of unemployment in which workers loose their jobs because the industry in which they work is decreasing output due to obsolescence of its products. It also refers to the type of unemployment in which workers lose their jobs because the firms in which they work has introduced or substituted a new product, or acquired a new technique of production in which case the firm does not require their skill. For example, according to (Solmon, 1976), the decline of the shoe industry in the New England State produced a number of structurally unemployed workers. Many who lost their jobs were reluctant to move to new locations or to enter re-training programs. These men and women were potentially employable, but no firm in their area was willing to pay the salaries they were asking for the type of skills that they had.

Therefore, structural unemployment can be caused by obsolescence of products or processes, obsolescence of firms or workers due to irrelevance of their skills, training or education. In other words, it is the type of unemployment that arises due to a mismatch between the skill workers have and the type required by firms. This is the type of unemployment that is usually said to have been caused by technical progress.

2.6 APPROACHES TO MEASURING UNEMPLOYMENT

2.6.1 Measurement According to Age, Sex, Race and Duration.

The employment rate according to Dornbush and Fischer (1985) is defined as the fraction of the labour force that is currently employed. The rate of capacity utilisation or capital utilisation is measured similarly. It can therefore be said to represent the fraction of capital stock that is currently being used. The striking point about these two series:- employment rate and capacity utilisation rate is that they both tend to rise during boom and fall during recession.

An unemployed person on the other hand is defined as one who is out of work and who (i) has actively looked for work during the previous four weeks or (ii) is willing to be recalled to a job after having been laid off or (iii) is waiting to report to a new job within four weeks. The requirement of having looked for a job in the past four weeks is included to try to ensure that the person is actively interested in a job and not merely expressing an interest if a job should happen to show up.

Unemployment could also be measured according to groups, sex, age and or race. For, instance, according to United States employment statistics, it was found that as at April 1983, nearly one in every two black

teenagers was unemployed. However, it was only one in every five white teenagers and less than one in ten white adult.

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Unemployment can also be measured according to whether it is cyclical, non cyclical, frictional or structural. Structural unemployment is the unemployment that exists when the economy is at full employment. It corresponds also to the natural rate of unemployment. On the other hand, cyclical unemployment is that portion of unemployment that is in excess of structural unemployment and occurs when output is below its full potential employment level. This confirms the observed fact that a person may become unemployed for one of four reasons. He / She may be a new entrant into the labour force, looking for work for the first time or else be a re-entrant i.e. some one returning to the labour force after not having looked for work for more than four weeks. A person may quit a job in order to look for other employment and register as unemployed while searching. The person may be laid off i.e. suspension without pay lasting or expected to last more than seven (7) consecutive days, initiated by the employer without prejudice to the worker. The latter qualification means that the worker was not fired but rather will return to the old job if demand for the firm's product recovers. A firm will typically adjust to a decline in product demand by laying off some labour. A firm may also rotate lay- off among its labour

force so that the individual laid-off worker may expect a recall even before product demand has fully recovered. In manufacturing, it was found that over 75% of laid off workers returned to their jobs with their original employers (Dornbush and Fisher, 1985). A worker may lose a job also to which there is no hope of returning either because he is fired or because firm closes down. This last way of becoming unemployed is referred to as involuntary quits.

These sources of inflow into the pool of unemployment have a counterpart in the outflow from the unemployment pool. There are essentially three ways of moving out of the pool of unemployment. First, a person may be hired into a new job. Second, someone laid off may be recalled. Third, an unemployed person may stop looking for a job and thus by definition leave the labour force. Such a person may plan to look for a job in the future, but is not considered as part of the unemployed.

2.6.2 Measurement According to Vacancy Statistics

Classifying unemployment requires not only a measure of the demand for labour, but also knowledge of the characteristics of labour in demand and supply (Thirlwall & Dixon, 1975). In Britain, there are vacancy statistics available on both regional and occupational basis and also by occupation within regions. The existence of such data provides the possibility of establishing a framework

for measuring objectively types of unemployment by region on a consistent basis.

As already stated in the previous section to separate demand deficient unemployment from non-demand deficient unemployment, one obvious criterion as a dividing line would be the point of balance between the available supply of labour and the unsatisfied demand for labour. The amount of unemployment in excess of the point of balance could justifiably be called demand deficient unemployment and unemployment at the point of balance could be called non-demand deficient unemployment. The major practical difficulty in using this criterion lies in identifying the level of unemployment at which the labour supply available equals unsatisfied demand. An approximate solution to the problem is to equate unemployment itself with the supply of labour available for employment and to use unfilled vacancy statistics as proxy measure of unsatisfied demand for labour. On this basis, the amount of unemployment at which unemployment equalled the number of vacancies would be non-demand deficient unemployment and unemployment in excess of this amount would be demand deficient unemployment.

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The important question is whether, it is reasonable to equate unemployment with the supply of labour available and unfilled vacancies

with the unsatisfied demand for labour. On the supply side it would have to be admitted that a proportion of the unemployed are unemployable, but offsetting this, there would be people available for work but who are not registered as unemployed. On the demand side there are also 2 problems. One is the possibility of vacancy over- reporting by manufacturers when there is a chronic shortage of labour; the other is general under-reporting of vacancies through official channels because many employers prefer to advertise job vacancies through other media which are not then recorded in the official vacancies statistics.

It should also be readily apparent that unfilled vacancy statistics can be used as a means of breaking down non demand deficient unemployment into structural and frictional unemployment, if the skill composition of vacancies and unemployment are both known. Given the composition of the unemployed, total vacancies could be split into those which are of the right type and those which are of the wrong type to absorb the unemployed. Taking the two extremes, if all vacancies exactly matched the characteristics of the unemployed, all non-demand deficient unemployment would be frictional. On the other hand, if there was no matching at all , all non-demand deficient unemployment would be structural.

Using vacancy figures therefore, it is possible to construct a complete framework for the classification of unemployment in any geographic labour market with the three types of unemployment namely structural, frictional and cyclical. It should, however, be noted that in measuring the components of total unemployment in practice 2 cases must be distinguished.

a) Measurement when aggregate unemployment exceeds aggregate vacancies. In this case, unemployment will be frictional if there are suitable vacancies for the unemployed to fill, and structural if the vacancies are not suitable. This classification is applicable to any labour market if unemployment and vacancy data are available on a disaggregated basis by occupation.

b)Measurement when aggregate vacancies exceed aggregate unemployment. In this case, when aggregate vacancies exceed unemployment, there is no demand deficient unemployment. Therefore, all unemployment is either frictional or structural.

Inherent in the above classification of types of unemployment, based on the level and composition of vacancies, is the dependence of the measure of non -demand deficient unemployment on the pressure of demand for labour and the fact that structural unemployment will be a feature of good times than bad. The dependence of total non demand deficient

unemployment on the pressure of demand for labour arises from the fact that unless the demand for labour consists entirely of the people with the skills and in the locations represented by the unemployed, unfilled vacancies are bound to rise at the same time unemployment is falling.

The dependence of the structural unemployment on the tightness of the labour market will be a feature of any measure of structural unemployment defined on the basis of an excess demand for labour in particular sectors of the economy. When the aggregate economy is depressed, there are likely to be few shortage occupations and therefore very few jobs for the unemployed to fill if they possessed the skills. When aggregate demand is buoyant, however skill shortages are likely to develop and excess labour demand in some occupation and excess supply in others will exist by side. This is the essence of structural unemployment defined in terms of a lack of occupational mobility. The tighter the labour market the more structural unemployment will tend to manifest itself. It should also be noted that whether the measure of structural unemployment based on the use of vacancy data rises more or less than in proportion to the total level of non-demand deficient unemployment as the demand for labour rises can not be determined a priori. It depends on the distribution of new vacancies between occupations.

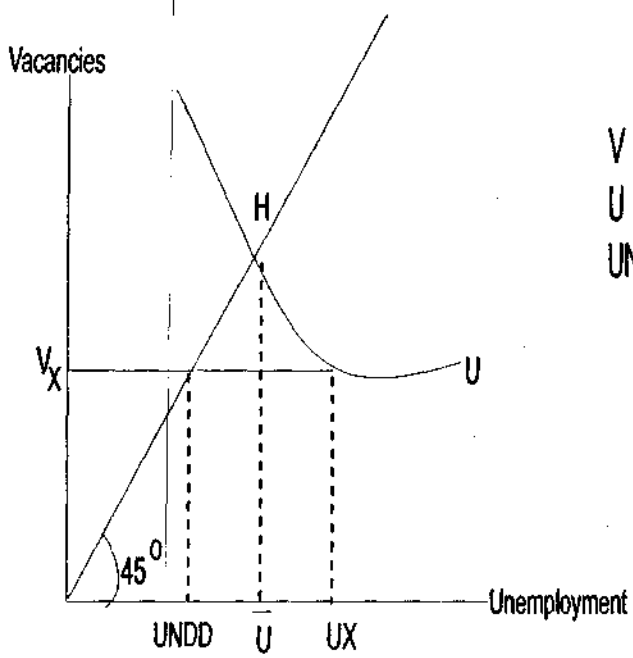
To overcome the dependence of measurement of total non demand-deficient unemployment on the pressure of the demand, four approaches have been used, Thir/wall and Dixon (1975). One is to plot the number of vacancies and unemployment on a time series graph and to take an average of the number or percent that are unemployed at the point of intersection of the two curves. At the point at which vacancies have matched unemployment there can be no doubt that the unemployment existing is truly non demand-deficient.

Another approach is to regress the percentage level of unemployment against the excess demand for labour over-time and to use the constant term in the linear regression equation as the measure of non-demand deficient unemployment.

A third approach is to plot the trade-off curve between unfilled vacancies and unemployment as a percentage of the work force for any market over time and to calculate the percentage level of unemployment at which a least square regression line tilted to the observation cuts the 45

degree line from the origin as shown in figure 2.4 below:

FIGURE 2.4 **MEASUREMENT UNEMPLOYMENT ACCORDING TO VACANCY**



V = Vacancy
U = Unemployment
UNDD = Demand deficient unemployment

At any point on the 45 degree line V=U or V-U = 0. What form the function fitted to the data should take must depend on the nature of the observed relation between the two variables V and U. The general presumption is one of a convex relation since unemployment will be decreasingly sensitive to increases in demand.

A fourth approach is to take the classificatory scheme outlined in the equations below (1-V) and apply it to the data year by year and then take an average of the measures of non demand-deficient unemployment.

(I) $U = UDD + UF + US$

Where U = denotes total unemployment.

UDD = denotes demand-deficient unemployment.

US = denotes structural unemployment.

UF = denotes frictional unemployment.

(II) $UDD = U - V$

Where V= denotes vacancy.

(111.) $US + UF = V$

(1V) $UF = V - Vw = VR$ and

$US = V - VR = VW$

Where Vw = denotes number of vacancies of the wrong type.

VR =denotes number of vacancies of the right type

(V) $V = Vw + VR$

Using the above equation (I-v) Structural unemployment can be measured as

$US = VW = E (Vi - Ui)$

Where T= is the number of occupations.

T - n = is the number of occupations in which Vi > Ui

n = is the number of occupations in which Ui > Vi

Equally, frictional unemployment can be measured as

$$UF = VR = \sum_{i=1}^{n} Vi + \sum_{i=1}^{n} Ui$$

Then demand-deficient unemployment can be simply measured as

$$UDD = U - V$$

Then demand-deficient unemployment can be simply measured as

$$UDD = U - V$$

Whereas total unemployment can be measured as

$$U = UDD + UF + US.$$

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2.6 .3 Measurement of the Natural Rate of Unemployment

As stated in the previous section, the natural rate of unemployment is defined as that rate of unemployment at which flows in and out of unemployment just balance each other and at which expectations of firms and workers as to the behaviour of prices and wages are correct. Estimates of the natural rate of unemployment typically try to adjust for changes in the composition of the labour force and perhaps for changes in the natural rate of the various groups in the labour force such as teenagers and women.

Estimates of the natural rate generally start from some period, when the labour market was thought to be in equilibrium and when aggregate unemployment rate and the unemployment rate of the groups were at their natural levels. For, instance, in the mid 1950's the natural rate of unemployment in the U.S.A. was estimated to be 4%. But, the natural rate for each group differs from 4%. It was found to be much higher for teenagers, lower for prime-age males and so on and so forth. The first adjustment made to the 4% rate follows from the fact that the composition of the labour force has been changing overtime. The weight of teenagers and women in the labour force has been rising.

The second adjustment that is typically undertaken is to assume that the natural rate for each group may depend on the relative size of that group in the labour force. The idea here is that one type of labour is not a perfect substitute for another and that the more of some type of labour there is the higher the unemployment rate for that group. There are other estimates of the natural rate that differ in their method of their calculation but they all include adjustments for the composition of the labour force.

It should also be noted that what is considered as the percentage natural rate of unemployment varies from country to country and from time to time. For, instance, in the U.S.A. The natural rate of unemployment was revised upward to be 6% in the 1980's as opposed to 4% in the 1950's.

2.7 THEORETICAL AND PRACTICAL APPROACHES TO CURING UNEMPLOYMENT

2.7.1 Classical and Keynesian Remedies

Unemployment rates in the U.S.A. and Europe in the early 1980's were far higher than they had been in the 1960's or even in the 1970's. The high unemployment rates led to a discussion especially in Europe of whether excessively high real wages or insufficient aggregate demand was the chief source of the problem.

One interpretation of unemployment problem of the 1980's was that firms in the economy hire only an amount of labour which falls short of full employment because the real wage is too high. The economy suffers from classical or real wage unemployment. The cure is a reduction in the real wage (w/p).

An alternative interpretation is that firms in the economy are not willing to hire more workers because they can not sell the output. Aggregate demand is insufficient to absorb more output than is produced. Therefore, firms do not hire more workers and accordingly there is Keynesian unemployment. The cure in this case is not a cut in real wages but rather an expansion in aggregate demand through monetary or fiscal policies.

In both cases, there is unemployment In both cases it is unprofitable for firms to hire more workers. In one case, the problem is that labour is too expensive, in the other there is no market for the increased output. Therefore,it is essential to identify what kind of unemployment the economy faces before designing policy action. In other words, it is essential to determine whether the unemployment that is prevalent is classical or keynesian. If it is found to be keynessian, the appropriate remedy should be

expansionary aggregate demand policies while if it is classical, attempt should be made to cut labour cost relative to labour productivity.

The counter argument to classical prescription is that if wages were reduced, costs would fall and therefore enterpreneurs would find it profitable to produce more goods. But money wage/ income falls as much as costs and therefore money demand is reduced correspondingly. Any one entrepreneur by cutting the wage rate which he pays can increase his profits but at the same time he is reducing the receipts of other entrepreneurs. And if they all cut wages together none of them is any better off. So a change in money wage is not likely to lead to any great change in employment.

On the other hand, the counter argument to keynesian prescription is that if entrepreneurs agree to pay their workers higher wage rates, money demand for goods is increased and it is argued from this that activity and output will increase. But this rise in demand merely offsets the rise in cost of production due to higher wages. A larger expenditure of money is now needed to buy the same goods and the increase in money income is not an increase in real purchasing power. There is no simple remedy for unemployment to be found merely in raising wages.

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2 .7. 2 Non -Theoretical Remedies to Unemployment

a) Reducing the natural rate of unemployment .

Discussion of methods for reducing the natural rate of unemployment tends to focus on the high unemployment rates of teenagers and on the very high population of total unemployment accounted for by the long-term unemployed.

Unemployment among teenagers could be reduced if the length of time teenagers take to find a first job were reduced, and also if their entry and exit from the labour force were made less frequent. In order to reduce delays in the finding of jobs, it has been suggested that a youth employment service be set up to help those who leave school to locate jobs.

One of the main reason teenagers enter and leave the labour force often is that the jobs they hold when they are working are not particularly attractive. It is a matter of controversy as to how to improve existing jobs. Feldstein (1973) has suggested that part of the reasons jobs are unappealing is that the minimum wage is too high to make it worthwhile for employers

However, Doeringer and Piore (1975) have expressed doubt that measures such as that of reducing the minimum wage will do much to improve the nature of jobs in what they call the secondary labour market. They suggest that there are host of non economic factors affecting the kinds of jobs that are typically available in the economy . The major economic variables they cite as determining the nature of jobs are the stability and the level of aggregate demand. They argue that the instability of the aggregate demand is the major reason why firms rely on temporary labour and sub-contracting to meet high levels of demand. If demand were maintain at a high and stable level, firms would have more incentive to create good stable jobs for their entire work force.

b) Reducing the unemployment benefit

It is also a common believe by some economist in the western advanced countries that unemployment benefits may also be one of the factors excerbating the unemployment problem in those countries and reducing it therefore may reduce the incentive to remain unemployed for a long period of time.

It is therefore suggested that one way in which unemployment can be reduced is by reducing the value of unemployment benefit.

Unemployment benefit add in three separate ways to the measured rate of unemployment. First, the presence of unemployment benefits makes it less urgent for the unemployed person to obtain a job. The second channel through which unemployment benefits raise the measured unemployment rate is through reporting effects. To collect unemployment benefit, people have to be in the labour force looking for work even if they do not really want a job. They therefore get counted as unemployed in the absence of unemployment benefits. Some people might not be in the labour force and hence, measured unemployment rates would be lower. An estimate according to Dornbush and Fischer (1984) using 1978 U.S data suggests that elimination of unemployment insurance would have reduced the unemployment rate by more than one half percentage point below the 6% level of that year. The employment ratio would have risen by one half percentage point and the non-participation rate would have increased by more than a full percentage point.

The third channel through which unemployment benefits raised the measured unemployment rate is explained as follows. With unemployment

insurance, the consequences of being in and out of jobs are less severe and accordingly, workers and firms do not find as much in their interest to create highly stable employment (Thirlwall & Dixon, 1975). All in all, there seems to be little doubt that unemployment compensation does add to the natural rate of unemployment. This does not imply that unemployment compensation should be abolished. What is appropriate is a scheme that will create less incentive for firms to lay off labour while at the same time ensuring that the unemployed are not exposed to economic distress.

c) Increasing the mobility of labour

It is usual to attribute unemployment to frictions which prevent workers from moving readily from one occupation or locality to another (a case of structural rigidity). This lack of mobility of labour from one occupation to another or from one locality to another can be said to be a cause of unemployment only when there are unfilled vacancies in some places and idle people in others (Laynard, 1986). Therefore, the solution to this kind of unemployment rests in increasing the mobility of labour through training schemes.

d) Reducing the supply of labour.

This policy entails raising the school leaving age or forbidding married women to take jobs since their husbands are likely to be employed. It also

entails reducing the hours of works. This has the effect of spreading a given amount of work round amongst more individuals. It is not, however, proper to regard it as an increase in employment. (Laynard, 1986).

e) Establishing Job advertising Employment Agencies or Banks

This idea is derived from the search model which argues that unemployment arises due to voluntary quits by workers to look for better jobs necessitated by wage differentials and lack of perfect information about job vacancies and location of firms that pay better wages (Bailey, 1977). Therefore establishing job advertisement/ employment agencies or job banks can help reduce unemployment because they would make it possible to match the characteristics of available jobs with those workers looking for jobs and the percentage of fictional unemployment in the economy will substantially be curtailed.

2.8 MICRO ECONOMIC FOUNDATION OF THE DEMAND AND SUPPLY FOR LABOUR SERVICES

a.) The Long -run Demand for labour.

In the long run the level of output that can be produced depends on the quantities of labour and capital and on the state of technical progress or knowledge. This relationship is normally expressed in terms of aggregate production function as follows (Levacic & Rebman,1982).

$Y = f(L, K, T.)$

Where y = is the real output per period of time

L= is the flow of labour services used per period of time

K= is the capital stock which yields a proportionate flow of capital services per period of time.

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T= is the state of technical knowledge.

The above expression is a highly aggregated production function. National output is in effect treated as if it were made up of a single type of good. Labour and capital are also assumed to be homogenous factors of production. Other factors of production do not enter the analysis of this level of aggregation since net national product (NNP) is defined to be the final product. Intermediate stages of production are netted out in the aggregation procedure and in an open economy imports of raw materials and intermediate goods are subtracted from the value of firms production. Thus, net national output is calculated as the value added by the application of labour and capital to raw materials.

In neo-classical theory labour and capital are assumed to be substitutable ex-ante. This suggests that there is a whole range of possible production techniques, each representing a particular combination of labour and capital, available to produce a given level of output. Once, a particular

technique is chosen as being the least-cost technique at that time, capital becomes embodied in specific types of goods. This means that there is a smaller degree of substitutability between labour and capital ex-post than ex-ante.

Therefore, given the above scenario, it follows that in a growing economy equilibrium in the labour market can only be maintained , at the current real wage if the stock of capital equipment grows in line with the expansion of the labour force. Unemployment will result if the labour force grows more rapidly than the stock of capital and if factor price adjustments fail to increase the demand for labour so that it matches the supply of labour. This kind of unemployment will not respond to increase in aggregate demand unless these are accompanied by a more rapid increase in the capital stock.

b) The short-run demand for labour

Since the stock of capital and the state of technology are regarded as fixed in the short- run, output will vary only with the quantity of labour employed (Feldstein, 1973). The short-run aggregate production function can therefore be written as

$$Y = f\{L, K, T\}$$

Where k and T are constants.

The short-run demand for labour is derived from the short-run aggregate production function. In short- run macro models, it is normally assumed that a certain degree of substitutability between capital and labour does exist in the short-run so that the proportions in which the two factors are used may be varied. The marginal product of labour is positive but declines as employment increases. An additional assumption in the model of the type is that the level of employment is not constrained by an insufficient stock of capital. Given that firms operate in perfectly competitive goods and labour markets, the price of goods will be unaffected by the amount of output produced by any single firm. The addition to marginal revenue from employing an extra unit of labour – the marginal revenue product of labour is thus the marginal physical product of labour times the product price.,

MPL X P

A profit maximising firm will therefore hire labour until marginal revenue product of labour is just equal to the marginal cost of that labour which is its money wage rate . In symbolic form, it can be expressed as :

MPL X P= W

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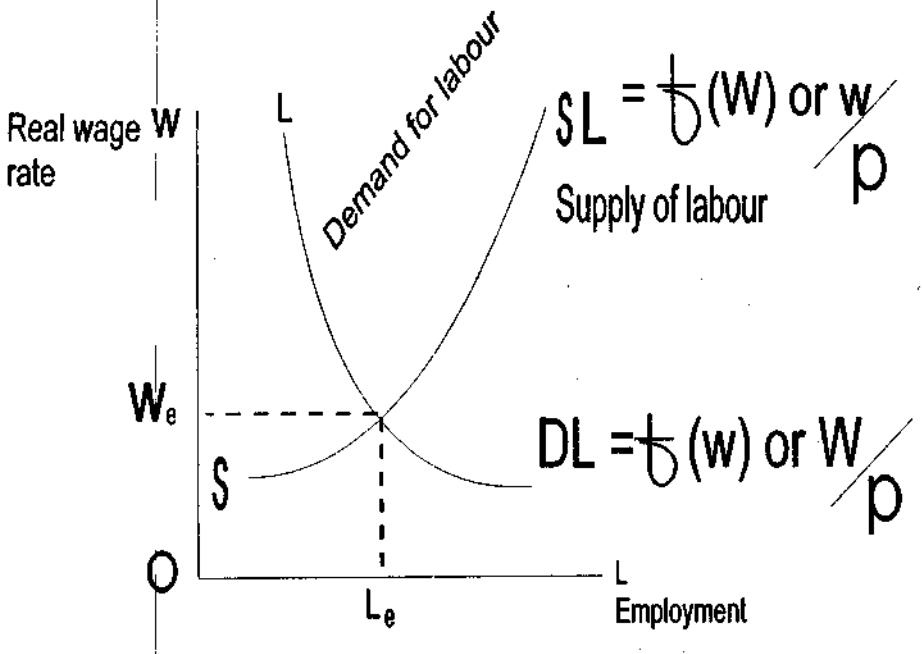
Dividing both sides by P, we get

MPL = W/P = w = real wage rate

The real wage rate per unit of labour is the money wage rate divided by the price of the product labour makes. It therefore measures the cost of labour in real terms since it is the number of physical units of output that can be exchanged for one time unit of work. When the additional unit of output produced by hiring an extra unit of labour (MPL) exceeds the marginal cost of labour in real terms (W), then a firm will make a positive profit on the marginal labour unit. Thus, a profit maximising firm will hire labour until the marginal product of labour is positive but declining as output increases in the short-run. Equally, the lower is the real wage, the greater will be the firms demand for labour.

The demand for labour therefore varies inversely with the real wage rate as shown in figure 2.5 below.

Fig. 2.5 **Labour market equilibrium**



The figure suggests that in a neo-classical model the labour market is in equilibrium at that real wage rate which equates the demand for labour with the supply, so that the labour market is cleared. From the figure, this is established at equilibrium real wage rate **We** and equilibrium level of employment **Le**. This equilibrium level of employment established at the market clearing real wage rate is consistent with full employment. Nobody who is willing to work at the equilibrium real wage is unemployed, except while searching for a job.

(c) The supply of labour.

In the long run, the supply of labour is determined by such factors as population growth and the rate of participation of population in the work force. The rate of participation of the labour force in both U. S and U . K over the post war period has increased due to greater participation of married women seeking for work (Levacic and Rebman, 1982).

The supply of labour in technical term is not the total potential labour force, but the amount of labour willing to work at a particular real wage rate. Like the demand for labour, the labour supply function has a choice-theoretic basis. Each worker is assumed to obtain utility from leisure time and from real income which can only be increased by forgoing leisure. The labour supply decision for each individual involves maximising the utility over some time horizon from leisure and work given maximum number of possible working hours and the real wage rate per hour that can be earned. The main question at this stage is what will be the effect on labour supply of a rise in the real wage rate. A rise in the real wage increases the opportunity cost of leisure. Leisure becomes more expensive. The substitution effect of this relative price change is to reduce leisure time and increase work time. But, an increased real wage rate raises the real income for a given work time. This income effect raises the demand for leisure.

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Thus, an increase in the real wage will increase the supply of labour hours per worker only if the substitution effect outweighs the income effect. Over the long-run, it is apparent that the income effect has been stronger. As real wages have risen over time, so people's working hours per week have fallen. The evidence for the short-run is much less clear cut . A rise in real wages is likely to increase the labour supply by increasing the number of people who wish to participate in the labour force. Workers already in employment are induced to supply more labour by the payment of overtime rates.

Some empirical studies associated with Lucas and Rapping (1969) have shown that women and teenagers have a more elastic supply of labour than adult males so that the proportion of the population participating in the labour force tends to increase when real wages rise, though the hours supplied by workers already employed tend to fall. Empirical work also suggests that while the long-run labour supply function is inelastic with respect to the real wage rate, over the short-run, the supply of labour does respond positively to the increase in the real wage rate.

2.9 EMPIRICAL LITERATURE

The link between technical progress and employment has always been a major topic in political economy as well as modern economic analysis. New technologies and their effects upon employment levels and structure have become a major concern for economist in such a way that old debates are again relevant. The optimists emphasize the long run positive influences of technical change upon employment whereas, the pessimists point to the large reduction in industrial employment produced by the application of labour saving innovations. In some cases the present mass unemployment is directly related to the introduction of new technologies. Thus, the question is so huge and the analyses so involved that any survey should not be regarded as exhaustive.

Krishna (1975) undertook an empirical study of the direct employment effect of agricultural technical change in the Indian Punjab from 1968 - 1974 using wheat and rice as the principal crops. The findings showed an overall decline of 64 man hours per hectare per annum in the total labour input for both crops over five years. But the crop mix and

intensity effect were both positive totalling a gain of approximately 45 man hours per hectare. Thus, the net loss in direct employment was entirely due to large negative technology effect.

The results of a study by Roy and Blase (1978) of introducing tractors to farms also in the punjab confirmed Krishna's finding that more intensive cropping is favourable to on-farm employment. An on-farm sample survey of farm tractors supplied to India under the British overseas programme reached a similar conclusion namely that although tractor had affected cropping and increased farm profits, they had not displaced human labour (ODM, 1976).

However, the results of a cross sectional study similar to the one conducted by Roy & Blase in India, indicated that large scale mechanisation is generally labour displacing (Yudelman et-al, 1971). Equally, a review of some studies in East Africa concluded that although tractor mechanisation is often profitable, especially on large farms, it is usually labour displacing (Clayton, 1972). One can therefore see that the evidence provided by geographically separate studies on whether technological change displaces labour or not is mixed.

Jayasuriya and Shand (1986) have also studied the impact of technical change on labour absorption in Asian agriculture. They observed using

evidence from village studies in Thailand, Indonesia and the Philippines that even though new seed - fertiliser technology associated with expansion of irrigation and cropping intensity has initially increased labour absorption and productivity in wheat and rice production , it has however , results in net reductions of agricultural labour use. This is as revealed in table 2.1 below

Table 2.1 Changes in labour use per hectare per crop season in rice Production

	Years	Labour use	Years	Labour use
Thailand (Central plain)	1972	117	1979	86
Indonesia (Java)	1969	201	1978	132
Philippines (Laguna)	1966	110	1980	74

Source: Jayasuriya & Shand (1986) p 419

The table shows data from Thailand, Indonesia and the Philippines on labour use trends. A comparison of the figures in the periods clearly shows a decline in labour use (Man-days) per hectare per crop season in all cases.

On balance the trends observed in these village studies of South-East Asia cast doubts as to whether technical change will substantially increase

labour absorption in agriculture. However the authors cautioned that more evidence is needed as conclusion drawn from this effects of technical change on employment can lead to misleading policy judgements. A call is therefore made for re-assessment through studies that will rigorously explore this in a general equilibrium framework.

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Ogungbenro et-al (1995) studied the effect of monetary expansion on unemployment in Nigeria. Using OLS estimation techniques, the data for the study sourced from IMF and FOS covered a period of 33 years (1960 - 1993). The period covered different phases of economic policies i.e. 1960 - 1985 a period of regulatory policies and 1986 - 1993 a period of liberalisation. In order to capture the effect of the civil war period (1967 - 1970) a dummy variable was used.The major findings of the study was that monetary expansion has a positive and significant influence on the unemployment rate. However, the study cautioned that the result should nevertheless be considered as an evidence of long-run relation between monetary growth and the rate of unemployment.

Ekpo (1992) has studied the relationship between unemployment and inflation under structural adjustment programme of Nigeria. Drawing time series data from secondary source for the period 1985 - 1990, his regression results show that the Nigerian economy has experienced high rates of

inflation and unemployment. The results also suggest that government expansionary demand as well as supply side policies have been ineffective in reducing inflation and unemployment. It was therefore concluded that the expected trade off between inflation and unemployment was not obtained.

Iyanda & Bello (1979) have also studied the employment effects of multinational enterprises (MNES) in Nigeria. A sample of 25 enterprises were selected using Nigeria's industrial directory.

A questionnaire was then developed and administered. 14 firms responded out of which 10 were Multinational enterprises and the remaining 4 indigenous. This provided a basis for comparative analysis. Relating the employment effects of MNE's interms of their size measured by either the amount of paid up capital or sales, it was found that average employment is higher in the indigenous than in the MNE's . While indigenous firms employ an average of 766 workers per #1 million of paid up capital , the MNE's employ only 244 workers. It was also found that a larger percentage of MNEs employees were in the managerial cadre. One other interesting finding was the preponderance of unskilled workers in the indigenous and the skilled in the MNEs. While the skilled workers constituted 72.3% of MNEs employees, the corresponding figure for indigenous enterprises was

only 13.6%. Another finding of the study was that 60% of the MNEs have training departments as compared with 50% for indigenous enterprise.

Ndebbio (1987) has studied the employment generation capacity of small and large scale industries using Cross River state as a case study. His results show that small scale industry employs more than large scale industry. More specifically, he discovers using estimated demand function for small scale industries that more people would have been employed to work in the state if the money invested in large scale industries had been invested in small scale industries. He also found that small scale industries maintain a considerable percentage of unskilled & semi - skilled workers. Whereas not more than 20 percent of such category of workers are found in large scale industries average of 766 workers per N1 million of paid up capital, the MNEs employ only 244workers . It was also found that a larger percentage of MNEs employees was in the managerial cadre. One other interesting finding was the preponderance of unskilled workers in the indigenous and the skilled in the MNEs. While the skilled workers constituted 72.3% of MNEs employee, the corresponding figure for indigenous enterprises was only 13.6%. Another finding of the study was that60% of the MNEs have training departments as compared with 50% indigenous enterprises.

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Idowu (1987) studied graduate unemployment in Nigeria with a view to determining the factors that might have been causing it. His analysis implies that it will be improper to discount the impact of the world economic recession, but of equal importance is the low absorptive capacity of Nigerian economy brought about by the use of packaged technology, import substituting industrialisation strategy and over - valued currency. This suggests that part of the cause of graduate unemployment in Nigeria might be the result of structural imbalance in the economy with regards to the demand and supply of graduates. These findings lend support to over-production hypothesis which asserts that graduate unemployment was

caused by the proliferation of Universities in Nigeria . They also lend support to "Fields demand trap" which suggests a low elasticity of demand with respect to the supply of educated workers. In this case graduate output in Nigeria.

Watanabe (1986) in his study of automobile industry in Japan, United states, France and Italy has found that the labour-displacement effect of micro electronic machinery especially numerically controlled machine (NCM) tools and robots has been exaggerated and that people tend to confuse the impact of intensified international competition and the consequent rationalisation programs with that of the new technology. He pointed out further that in production work, the new technology is less labour saving than conventional fixed automation. Its flexibility tempts users to put more work into each unit of final output which offsets itself to a large or smaller degree, labour savings in pre-production work.

According to table 2.2 below, the maximum job losses possibly attributable to the new technology are marginal compared with the total

number of robots introduced to replace human labour, except perhaps in Italy.

TABLE 2.2
ESTIMATES OF LABOUR SAVINGS MADE POSSIBLE BY ROBOTISATION IN THE AUTOMOBILE INDUSTRY IN SELECTED COUNTRIES.

Country	No of robots	No of workers replaced
Japan	10,000	7000
United states	5000 - 7000	10,000 - 15,000
France	800	1,000
Italy (fiat)	800	2,400

Source: Watanabe (1986) p.247.

Watanabe therefore concludes that the decreased employment in the automobile industry in most countries has been essentially a consequence not of micro-electronic equipment but of reduced automobile production as well as of general rationalisation programmes.

Gil (1986) has studied the impact of technological changes in railway and air transport on the level employment and found that the new technologies have altered both the volume and structure of employment.

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Table 2.3 below reveals a drop of 10.6 % and 4.2% in the number of other cockpit personnel i.e flight Engineers in 1981 and 1982. This drop in employment was attributed to the impact of the forward facing crew Cockpit (FFCC) and its two man crew while the 95% drop in ticketing and sales personnel in 1982 may be due to shift of tickets sales from airlines to travel agents.

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Table 2.3 EMPLOYMENT TRENDS IN IATA AIRLINES

Employees (at end of Calendar year)	1979	Change in %	1980	Change in %	1981	Change in %	1982	Change in %	1983	Change in %
Pilot & co-pilots	48 077	8.4	47 656	- 1.9	48 156	0.1	46 537	- 4.6	45 899	-1.6
Other cockpit Personnel	14 989	-2.9	16 185	6.9	14 444	-10.6	13 992	-4.2	14 047	0.9
Cabinet attendants	101 653	7.6	102 840	0.7	103 327	-0.3	105 361	0.9	107 096	1.6
Maintenance & overhaul personnel	195 048	5.7	193 362	-1.5	195 469	0.6	189 773	- 4.2	84 897	-2.4
Ticketing & sales personnel	128 941	4.8	128 371	- 1.3	129 952	0.4	119 412	-9.5	18 446	1.6
Traffic-handling	171 775	2.8	171 566	-1.1	172 927	0.3	166 838	-4.5	168 968	1.8
All other personnel	229 275	3.1	244 174	4.7	233 783	-3.8	241 140	1.2	236 427	-3.5
Total	889 758	4.5	904 154	0.6	898 058	-1.0	883 053	-3.0	875 780	-0.8

SOURCE: Gil (1996) P.12

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Table 2.4 below also shows that in 1975 French National Railways (SNCF) employed 24,560 semi skilled workers and 37,060 unskilled workers.

Table 2.4 French National Railways Employment (Permanent & Auxiliary) by Occupational Category

Category	1995	1970	1975	1980	1981	1982
Engineers	7830	8092	8117	8790	8869	8998
Top Management	630	1682	3629	3966	3935	3999
Technicians	23408	23393	20547	21288	21413	22399
Middle Management	8250	8588	10002	9924	9731	9722
Qualified office workers & Young Trainers	77104	65581	64307	58844	54746	56771
Foreman	0694	9065	13970	10677	10434	10799
Skilled workers	101555	84307	92646	101859	105079	106772
Semi-skilled workers	77831	61266	24560	15496	15302	14806
Unskilled workers	50929	35471	37060	19572	17809	17263
Training staff, police, etc.	2088	1621	1989	1659	1702	1809
Total	355319	302666	276827	252075	249020	253338

Source : Gil , (1986) P.15

By 1982, their numbers had dropped to 14,806 and 17,263. On the other hand, the number of technicians rose from 20,547 to 22,399. This shows that new jobs are created in some occupational categories but they are few in number, hence the overall savings.

Wood (1983) has also studied the effects of tractor mechanisation on employment on privately owned firms in Mexico from 1949-1969. Using agricultural census data to run multiple regression, he found overall that

tractors have tended to reduce employment. Wood uses two alternate ways to analyse the effects of tractors on labour use. First, by comparing changes in tractor use with changes in employment over time in each of the Mexican states. Secondly, by comparing the number of tractors used with employment in each state in a certain year. Employment was estimated using supporting evidence from firm-level studies of differences in labour requirements using mechanised and non mechanised technology, controlling for other factors such as irrigation, fertiliser use and crop type.

Using changes in the number of man-days worked in agriculture to measure labour use, estimates of changes in man-days of labour by state from 1949-1969 were regressed on corresponding changes in the number of tractors, as well as those changes in each of the following expenditures on chemical fertilisers, expenditures on improved seeds, quantity of irrigated crop land and quantity of total crop land. It was found that one additional tractor added between 1949 and 1969 was associated with a reduction of between 2,550 and 3,333 man-days of labour a year during this period.

Equally, the relationship was statistically significant at the 99% confidence level for all the four equations. All other independent variables were positively associated with labour as expected. It should be noted that most Mexican farmers who use tractors also use substantial amount of improved seeds, fertilizers and irrigated land. Consequently, the labour saving effect of tractors appear to have been partly offset by the labour using effect of these other inputs.

Since regional variations in agricultural production are especially important in Mexico, each of the five regions was assigned a dummy variable (a value of 1) in each of the five regressions in order to test the effects of these regional variations on the model. In each case labour days were regressed on tractors and one of the regional dummy variables. The reduction in man-days associated with each additional tractor used varied from 1,232 to 1,649. The relationships were again statistically significant at the 99% confidence level. The coefficient for the North Mexico regional dummy was negative and statistically significant at 95% level, as might have been expected because of the proximity of this region to the United States. Those for the center and the North pacific region were positive, though these relationships were not statistically significant. The

correlations for the two remaining regions, the south pacific and the gulf were very weak.

Even when real wages were used instead of man-days of labour, tractors were still negatively associated with this measure. However the relationship were statistically significant at the 95% confidence level in only two of the four regression equations employed, namely those with total crop land and fertilizers as control variables. Thus, though estimates of labour replacement varied, these regressions clearly support the view that tractors have displaced labour.

In addition to the comparison of tractors use and employment over time, the two variables were examined for a given year, using cross sectional data. The total number of days of labour supplied by hired workers, operators and family members was estimated for 1969 using census information on wages paid, the average minimum wage by state and the ratio of the number of hired workers to total workers, including operators and their families. This estimate of labour was regressed on the number of tractors, the amount of cultivated crop land, the value of crops and the value of livestock production. After controlling for crops and livestock values and land, there was again statistically significant imaginative association between tractors and labour. An additional tractor

was associated with 1,500 fewer days of labour. This also tended to support the hypothesis that tractors do displace a significant amount of human labour.

Ebel (1986) has also analysed the effects of Robotisation on employment, from three perspectives, at the plant, enterprise and macro-economic levels.

At the plant level, he argues that the industrial robot is generally a direct replacement of human labour. Certain jobs mostly simple and monotonous often also hazardous jobs such as spot welder, press operator, spray painter, machine loader, grinding and polishing machine operator are generally lost to the machine. In some cases the introduction of robots has in fact led to a sharp reduction in employment especially in manufacturing of discrete parts and in medium size batch production. It is also an established fact that it is primarily unskilled and semi skilled jobs in manufacturing that are potentially vulnerable to robotisation. Many of these jobs are held by women or older workers. In the high labour cost countries, there is in fact, a considerable incentive to use robots instead of human labour. In the United states for example, each worker in the automobile industry costs about U.S

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$23-24 an hour in wages and benefits. The average robot does the work for U.S $6 an hour, including depreciation and maintenance.

At the enterprise level a number of measures can be taken to alleviate the labour dislocation effects of robots and to keep workers in employment. These include limitation of overtime, flexible working hours, reduction of working time, early retirement of older workers, marketing of new products and services, expansion of production by improving competitiveness and retraining and further training of workers . One problem is that while some new jobs in research, design, production, marketing and maintenance of robots are created they are usually at a higher level of skills than that possessed by the displaced workers.

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In his conclusion, Ebel (1986) argues that assessing the macro-economic effects of robotisation on employment is a very complex matter. Unemployment is caused by many factors namely, slowdown of economic growth, structural imbalances, demographic development and the shedding of hoarded surplus labour. There would seem to be no positive correlation between high unemployment rates and the use of robots. For, instance, in western Europe unemployment rates are high and relatively few robots are in operation. While in Japan, Unemployment is low and the robot population is fairly large.

CHAPTER III

AN OVERVIEW OF TEXTILE DEVELOPMENT IN NIGERIA

3.1 TEXTILE DEVELOPMENT IN NIGERIA

By African standards, Nigerian textiles consumption was very high even during the pre-colonial period (Beckman and Andrae, 1978). Trade in textiles was prominent in the long distance with Europe and the Arab world. There was a flourishing domestic crafts industry based on local cotton. During the colonial period, Nigeria experienced a high rate of commercialization of peasant production. She became a major exporter of not only cocoa , groundnut and palm-produce but also cotton. Textile was therefore given prominence not just for basic cloth but for a wide range of ceremonial purposes. The cloth trade was the backbone of the colonial merchant firms. The first mill to be set up in the late 1950s were Kaduna textiles mills Ltd and the Nigeria textiles mills Ltd, Ikeja , Lagos. These early enterprises were basically oriented to cotton textile production, understandably because cotton was and has been a major cash crop in

Nigeria. Its local availability therefore lent itself easily to exploitation in the country's process of import substitution strategy (Okeke, 1990).

In 1969 , the federal government of Nigeria issued a policy guide line to the effect that the textile industry in the country should backward integrate. The rationale of the guidelines was to reduce the import dependence of the sector there by saving foreign exchange. It was also aimed at fostering the emergence of appropriate intra and intersectoral linkages. Naturally this was expected to enhance the manufacturing value added to the sector . In response to the 1969 directive , a number of existing weaving mills went into yarn spinning. At the same time, new mills devoted entirely to spinning began to spring up the productions of all types of cotton, synthetic and blended yarns.

After independence textiles rapidly became the leading sector for import substitution industrialization (ISI). Protectionist policies and the expansion of incomes from petroleum exports in the post civil war also encouraged fresh investments in textile ventures.

In terms of value added, the textile industry in Nigeria showed an upward trend rising to 19% in 1971 from 12% in 1965. This is as revealed by table 3.1 below.

Table 3.1 PERCENTAGE OF VALUE ADDED BY INDUSTRIAL GROUP

Industrial Group	1965	1968	1971	1972
(1) Food Manufacturing	27.0	14.0	11.0	11.0
(2) Drinks & Beverages Drinks	16.0	16.0	16.0	15.0
(3) Tobacco	15.0	14.0	10.0	9.0
(4) Foot Wear	1.3	0.5	1.1	0.3
(5) Leather Training & Leather Products	1.0	0.7	0.4	0.5
(6) Textiles & Textiles Products	12.0	18.1	19.0	14.0

Source : Olayide (1976), p.60

In terms of employment the industry contributed 17.1% of total manufacturing employment in 1965, 29.3% in 1969 and 24.2 % in 1972 as revealed by table 3.2 below.

Table 3.2 PERCENTAGE EMPLOYMENT OF NIGERIAN MANUFACTURING INDUSTRY BY GROUPS

Industrial Group	1965	1969	1971	1972
Food Manufacturing	20.6	10.4	14.3	15.7
Drinks & Beverages	4.0	3.8	2.5	3.3

Tobacco	3.0	3.0	2.9	2.5
Footwear	1.9	1.6	2.0	1.4
Leather Training & Products	1.1	1.4	1.1	1.0
Textiles & Textiles Products	17.1	29.3	25.1	24.2

Source : Olayide (1976) p. 62

According to Olaloku et-al (1979), the number of establishments in the Nigerian textile industry also rose to 125 in 1973 from 46 in 1964 Indicating a 3 fold increase within just a ten year period.

By 1980, Nigeria had developed the 3rd largest textile industry in Africa surpassed only by Egypt and South Africa with some 100 factories and some 100,000 workers. This even excludes vast number of small garments firms and craft producers (Brandell, 1991). The Nigerian textiles industry is concentrated in Lagos, Kano and kaduna. Between them they house about 80% of total capacity in the industry with variations for different processes. The rest are scattered over smaller cities, mainly in the southern states, where only Aba and Benin city have more than one factory each. In terms of type of processes, available data indicate that more than 30% of the spindles and 46% of the looms are located in Lagos area. Another center of concentration is Kaduna. Both centers together account

for about 74% of the total numbers of the spindles and 77% of the looms in the country (Okeke, 1990).

According to federal government of Nigeria (FGN) report (1981), the Nigerian textile industry was one of the leading sectors with about 20% of employment and 15% of total value added in the manufacturing., The industry is said to posses the capacity to produce between 400-600 million metres of cloth. The products range from gray baft to shirting, dyed cloths, prints of various quality and pattern as well embroidered lace. They Also include a smaller share of tube wells, bedsheets, blankets and carpets as well as some knitted goods. Others are gold prints, dressprints, bobbys, brocades, head ties and African prints which account for 35-40% of total fabric production. The table below labeled 3.3 shows the output of textile products in the period 1972-1985.

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Table 3.3 **OUTPUT OF TEXTILE FABRICS 1972-1985 (MILLION METRES)**

Years	Cotton & Cotton Blends (1)	Woven Fabrics,Synthetic and artificial fabrics (11)	Total (1&11)	Knitted Fabrics (111)
1972	190.3	5.0	195.3	-
1973	291.6	9.6	301.2	-
1974	274.8	21.4	296.2	12.9
1975	333.4	38.1	3.72.5	16.8
1976	367.9	52.7	420.6	25.8
1977	398.9	47.0	445.9	36.0
1978	385.7	56.6	442.3	31.2
1979	297.3	40.8	328.1	21.4

1980	426.8	60.0	486.8	14.9
1981	491.3	51.6	542.9	14.9
1982	596.9	58.9	655.8	5.0
1983	337.7	63.3	401.0	12.8
1984	239.8	26.8	206.6	12.4
1985	230.0	25.0	275.0	-

Source: UNIDO Industrial development review series, Nigeria 21Dec. 1988.

The trend from the table suggests that in absolute terms the total output of woven fabrics has increased at a somewhat fluctuating trend from 1972-1982 when it reached it peak, before it subsequently dropped in 1984 and 1985 to a level lower than that of 1973. The deadline from the year 1983 was a feature that characterised virtually all the manufacturing sectors of the economy. This trend was the product of the dramatic decline in the foreign exchange earnings that has persisted since the slump in the international oil market following the world recession of 1980-83.

The same picture emerges from a comparison of the manufacturing value added of selected industries as shown by table 3.4 below.

Table 3.4 MANUFACTURING VALUE ADDED OF SELECTED INDUSTRIAL GROUP (%)

Industrial groups	1976	1981	1983	1984
Food beverages & tobacco	23.1	27.9	27.2	32.1

Textile & Garments	**12.4**	**8.7**	**10.5**	**15.2**
Petroleum products	**1.9**	**9.5**	**6.5**	**8.4**
Pharmaceuticals	**2.0**	**9.2**	**6.5**	**8.4**
Metal products	**7.4**	**4.5**	**5.8**	**6.9**

Source : UNIDO. Industrial Development review : Nigeria 1985 and 1988

It can be seen from the table that value added by textile sub-sector rose from 12.4% in 1976 to 8.7% in 1981, 10.5 % in 1983 and 15.2% in 1984. It was also second to food beverages and tobacco sub-sector which accounts for 32.1% in 1984. Developments in the textile industry continued to show an upward trend . The installed capacity of the industry as of 1986/87 was put at 675, 920 spindles and 17,541 looms (Okeke) 1990. This is a healthy development realising that prior to 1969 the textile industry in Nigeria had confined itself to weaving and all that concentrated primarily on cotton textiles.

With regards to ownership structure of the Nigerian textile industry, it has been found to be under the control of the private sector, involving both domestic and foreign equity participation. However , the foreign equity participation is found to have dominated. According to (RMRDC , 1996) over 90% of Textile ownership in Nigeria is foreign and so also the technical management teams .Under the Nigeria promotion decree (NEPD)

of 1972 and 1977, the textile industry falls within schedule 3, which provides for a maximum of 60% foreign equity participation, hence, the dominance of foreign ownership and management of the major existing textile and enterprises in the country. A new national industrial policy released in 1988 has amended the NEPO decree with the possibility of a 100% foreign ownership of new textile enterprises. The major foreign investors in the country come from India, China, Hong kong, Lebanon, Netherlands, Colombia, U.K and U.S.A.

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According to the Nigerian Manufacturers association (NTMA) the existing spinning mills are capable of satisfying the weaving/knitting requirements of the industry. Consequently, it has made a case for adequate tariff protection of the local spinning mills, which number about 178. In response to the call., the federal government in 1987 imposed tariff rates of 60% for synthetic yarns and 80% for cotton yarns. Reliable and adequate information is lacking about the actual total investment in the industry. But, according to the chairman of the NTMA Mr. .M. Abubakar a rough estimate of the investment in the textile may be of the order of # 9.5billion for an overall production capacity of about 700 million square metres per annum (Okeke, 1990).

The Nigerian textiles industry is still proving to be an important sub-sector of the manufacturing sector in the Nigerian economy even in the 1990s, when there was a general economic downturn. It is reported that apart from government, textile industry in Nigeria used to be the largest employer of labour (this day, 1996 ; RMDC , 1996) . It is also said to be producing 98% of the ECOWAS sub-region textile products requirements .(Business time , 1997). According to manufacturers association of Nigeria (MAN) 1996 half yearly economic review, in terms of capacity utilization and local sourcing of raw materials, the textile industry sub-sector is still found to have surpassed or at least at par with other sub-sectors of the manufacturing industry in Nigeria. This is portrayed by the figures in table 3.5 below.

Table 3.5 CAPACITY UTILIZATION AND LOCAL SOURCING OF RAW MATERIALS. (%)

Sub Sector	1995 Jan-Jun	1995 Jul-Dec	1996 Jan-Jun	1995 Jan-Jun	1995 Jul-Dec	1996 Jan-Jul
Food Beverages & Tobacco	29.7% (22)	33.75 % (25)	30.61 % (36)	60.23 % (18)	65.70% (20)	68.45% (28)

Textiles, weaving , apparels, foot - wear , leather products , carpets and Rug.	35.12 % (22)	41.25 % (30)	40.37 % (30)	70.0% (18)	64.14% (19)	66.4% (18)
Wood & wood products including Furniture	21.6% (3)	33.8% (3)	56.0% (1)	100% (3)	80% (3)	60.0% (2)

Source : MAN, 1996 half yearly review .

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N.B The figures in brackets represent the number of observations in the survey.

In terms of employment for the year 1995 and 1996 the textile sub sector is almost at par with food , beverages and tobacco sub sector. when the three groups are compared as a whole. this is as revealed by table 4.6 below.

3.6 MANUFACTURING EMPLOYMENT BY SECTOR

Sector	1995 Jan-Jun (1)	1995 Jul-Dec (11)	1996 Jan-Jun	% Change (1&11)
Food , beverages and tobacco	11 , 889 (21)	11 , 489 (24)	11 , 949 (34)	+0.5
Textiles, weaving , apparel , foot-wear , leather products, carpets & Rugs	10 , 876 (21)	13 , 621 (22)	9 , 012 (22)	-17.1
Wood & wood Products	94 (3)	784 (3)	304 (2)	+223.4

Source: MAN, 1996 half yearly Economic Review

{N.B. The figures in bracket represent the number of observations in the survey returns , while positive or negative indicate an increase or decrease in employment.}

Just like any other industry, development in the Nigerian textile industry were , however, not without problems. The industry has also faced a turbulent period in the history of its growth. As far back as 1976, there was a steady decline in the ability of the domestic cotton production to meet the increasing need of the textile industry (Okeke1990). In 1980 crisis started hitting the industry because of distortions brought about by the oil boom of the 1970s which lead to sharp rise in external value of the Nigerian Naira, the erosion of its domestic purchasing power and sectoral dislocations caused by massive spending of oil revenue and heavy imports(Andrae $ Becman, 1985). The problem was exacerbated by a sharp increase in the minimum wage in a market situation already exposed to heavy competition from cheaper, smuggled imported substitutes.

Following a steep fall in oil earnings that began also in 1981, the full impact of which was postponed by borrowing, made the domestic textile industry to shrink, with capacity utilization coming down to 30% (African textiles , 1991). Having become critically dependent on imported raw

materials, industrial production fell further as the import capacity of the economy collapsed.

A survey made by textile employers associations shows that in 1984 one quarter of a sample of 47 factories employed below 50% of their full labour force. Only about 1/3 employed over 75% while overall reduction in employment for the sample was about 40% (Brandell, 1991), which means 40,000 jobs looses assuming the industry level of employment remains at 100.,000 as reported

Other crises in the industry was witnessed by reduction of daily shift from three to one. The erratic and insufficient supply of raw materials also resulted in the common application of compulsory leave and temporary closures, sometimes with or without pay.

For those that were lucky to remain employed, the prospects for maintaining their income were slim, as wage freeze was imposed by Nigeria in 1983. This caused a deterioration of real wages all over as cost of living rose. By 1986, it was estimated that it would require an increase of wages by 40% to restore the 1983 levels of real income.

The annual bonus payments were cancelled by some companies as in the case of Bagauda textile in 1986. In some factories, the management used the situation to step up the work load of the workers which their union

termed as 'overloading' (Andrae and Beckman, 1987. Brandell, 1991). This even led some workers to quit as they found the new working condition unacceptable. For, instance, in United Nigeria textile Ltd (UNTL), Kaduna, the number of workers per 100m in the weaving section went up from one operator on eight machines (1968) to one operator on 24 machines in 1985. This was further stepped up to one on 36 machines in 1986 and according to the workers union, the output of cloth in the factory had not gone down inspite of the reduction of the work force by over 400 workers from 1985-1986.

So the years 1980-1986 were years of mass redundancy in the history of textile development in Nigeria. By 1986 only 20% of the cotton requirements of the industry could be met by local cotton production (Okeke, 1990) . Domestic cotton production in 1985 harvesting year was 15,000 tones against 100, 000 tonnes national requirements (African textiles, 1991). In 1985 also according to Andrae and Beckman (1987) the industry had lost about 40,000 workers at some 40% of its installed capacity.

The relevant question at this stage of discussion is how did the textile industry respond to these problems of low capacity utilization and fast receding domestic raw material base. Given the declining foreign exchange

earnings from the country's major export product-crude oil, the massive import of raw material requirements for the textile industry could not be sustained. There are however raw materials that cannot be sourced locally at least for now. These include dyestuff, viscose, fibre and chemicals owing to lack of Petrochemical base in the country. It is also true with regards to machinery, equipment and spare parts because of lack of domestic engineering capacity to produce them.

Consequently, in response to the government drive for local sourcing of raw materials, the NTMA embarked on the rehabilitation of the cotton industry, by an infusion of N4 million in public campaigns, grants to cotton growing states, seed distribution, breeding and multiplication (Okeke, 1990).

On the part of the textile industry or firms their response was in the form of direct and indirect involvement in cotton production through a strategy of backward integration. The textile firms that have engaged in this strategy of backward integration include At print through its subsidiary Afcott, Nigeria textile mills, Ikeja, President industries Ltd, Bhojson Ltd and Sunflag textile Nigeria ltd .(Andrae & Beckman , 1987; African textiles, 1991).

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Afcot, a subsidiary of Afprint raised cotton production in Gongola State from 750 tonnes in 1985/86 to 9000 tonnes in 1987/88 season. Its achivement in servicing its mills and providing employment to local farmers is a good example of backward integration. Accordingly, nearly 3000 small farmers covering an area of 3,200 hectares have benefited from the programme. Allied programme include the setting up of a ginning mill with an installed capacity of ginning 36,000 tonnes of seed cotton per annum at an investment of #20 million (African textiles 1991).

Sunflag textile Nigeria Ltd was another firm that has made giant strides in promoting backward integration . The company went into manufacturing of spinyarn by the ring spinning method. Subsequently, a new plant was commissioned to manufacture cotton and spin yarn by the open end method.

President industry also sourced about 75% of its yarn requirements locally. The overall result was that in the late 1980s capacity utilization of the industry increased to about 67% from 30% in early 1980 (African textile 1991) . Equally, by 1988/89 domestic production of cotton has risen to 48,000 metric tonnes or 40.8 percent of the total requirement of the textile industry, (Okeke, 1990). It can therefore be said that some measures of success has been achieved in enhancing the local sourcing of cotton.

Apart from the turbulent period of 1980-1986 which the textile industry went through, the problem it faces in the early 1990s up to 1996 are of a different nature . They are much more general in the sense that they affect manufacturing industry as a whole, while some are specific to particular textile firms. For instance, owing to the 1993 June 12 political impasse, 8 textiles firms have wound up as at the 2nd quarter of 1996. The Indians who dominate the ownership of the industry had feared war and as such had massively withdrawn their capital from the industry and repartriated same abroad (This day 1996) .

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In 1994 This Day newspaper also reported that President textiles in Lagos had shut its factories throwing over 2,000 workers into the unemployment market. The cause of this action was attributed to distress and mismanagement. Despite all the aforementioned problems, the Nigerian textile industry possesses great potentials in accelerating the industrial development of the country. One area that can be promoted is the development of textile exports. This was evidenced by the performance of the sector in the late 1980s. Prior to 1986 the export of textiles products, just as other manufactured exports in Nigeria was almost non existent. The situation started to change when the government introduced structural adjustment programme (SAP) in 1986 along with a package of incentives to

encourage the development of non-oil exports. Beginning from that year textile exports have been on the increase. It rose by 1316.8 percent from 1,715,475kg in 1986 to 24,305,139kg in 1987 (Okeke, 1990). It is sad to note that since this excellent performance of 1987, decline were recorded in the subsequent years, even though they have surpassed the pre-sap period performance. For instance, the total quantity exported in kg in the years 1988 and 1989 were 4,486,077kg and 7,451,406kg respectively.

UNTL Kaduna is one of the major exporters of African Print to US , while Afprint group , Royal spinners , Sunflag group , Nortex and General cotton mills are involved in export to Europe and America (RMRDC, 1996). The bilateral government trade agreement between Nigera and U.S approved an export quota of 8 million metres of cotton fabrics of different kinds valid for only three years starting from 1991. This has since expired in 1993 and is still yet to be negotiated .

Drawing from the peak and impressive performance of the industry in 1987 , one can safely conclude that the Nigerian textile industry has tremendous potentials in pioneering the development of non oil exports, if only appropriate policies and incentives are put in place and effectively implemented.

One of the basic raw material used by textile industry of which it exportation by some unpatriotic Nigerians is detrimental to the country is cotton lint . The cotton lint is in short supply as the country can only meet 60% of the industry(s) demand, while the short fall is imported . Equally , since the spinning capacity of the industry has increased , so also the demand for the importation of fibres and this has been encouraged by the government as the importation of fabrics attracts a 10% tariff only .

Finally , one other area that is bothering the industry is the 5 - 10% excise duty. The industry is the only one paying that much on its finished products. According to (This day , 1996) The Textile industry has been campaigning for the removal or reduction of the excise duty and the government is still yet to respond positively .

5.2 TEXTILE DEVELOPMENT IN KANO STATE

Kano is the capital of Kano state and is one of the most populous states in the federation with a densely populated hinterland that has been under permanent and intense agricultural cultivation for centuries. Kano is a pre-colonial city with a strong commercial and cultural activities as well as a center for trans-saharan and west African trades for centuries (Brandell, 1991, and Forest, 1994). In the last quarter of the 19th century Kano city alone is said to support between 3-4 million people alone. Kano formed

part of the textile belt in the Northern region of Nigeria because it was integrated into a wider region of cotton and grain production. This partly explains why the state possesses an indigenous merchant class that has taken a strong interest in the textile industry. Kano can also boast of having one of the first textile mills to be set up in Nigeria namely Kano citizens trading company (KCTC). Established in 1952, the mill was part of the textile development skill launched in 1946 as part of the project of the department of commerce and industry.

A loan of N35,000.00 was granted to a group of local merchants by the Northern region development loan board in 1949. The KCTC had subscriptions from 300 local business men who held 59% of the equity alongside the Northern Nigerian development corporation (NNDC). The department undertook the management of the company and imported used equipment from Lancashire. After a second loan for working capital, production started and the mill operated at a modest level. In the 1960s it secured contracts for army and police uniform and by 1965 had 300 looms (Brandell, 1991).

The modern industry that grew in the post war year was based on local merchant capital as well as partly indigenized Lebanese family firms. The textile factories numbering about 19 are concentrated in Bompai industrial

estate. The most highly integrated in the State is Gaskiya textile mill, which has a capacity of employing 1600 workers. The firm is owned and capitalised by a Nigerian who happened to be an indigene of the area as well. In the mid 1980s 12 million Naira was the total investment made in the firm and by 1986 the company had a fixed assets that was valued at #60 million. Nigerian Industrial and Development Bank (NIDB) also had an equity share of 12% . One other mill, a blanket factory known as the Northern Textile Manufacturers (NTM) had a capacity for 1500 workers.

The typical size for the remaining mills is smaller. They either spin or weave or make embroidered lace and most of them were established in 1970s. Table 4.6 below shows list of textile firms in Kano state and the years they were established.

TABLE 3.7

LIST OF SOME TEXTILE FIRMS IN KANO STATE BY YEAR OF ESTABLISHMENT.

NAME	YEAR
1. Universal group company (Integrated firm)	1979
a) Universal textile Ltd.	
b) Universal spinners Ltd.	1980
c) Holborn Ltd.	1986
2. Gaskiya textile mill Ltd.	1970
3. Bagauda textile mill Ltd.	1970
4. Kano textile printers Plc	1974
5. Kano textile industry Ltd.	1972

6. Northern textile manufacturers Ltd. Kano.	1960
7. Dangote textile Ltd.	1989
8. Nigerian braiding and brocade manufacturing company Ltd.	1964
9. Nigerian spinners and dyers Ltd.	1980
10. Terytex nigeria Ltd.	1980
11. Fahid dayekh & Company Ltd.	1963
12. Lakhi textile industry Ltd	1977
13. Nornit Nigeria Ltd.	1962
14. Adharma textile and Garment Ltd.	1979
15. Kayfad spinners Ltd.	1992
16. Sutura textile Ltd.	1980
17. Leader textiles	1992
18. Sutura textiles limited	1980
19. Ilbo industry Ltd.	1985
20. Madfratex Ltd.	1976
21. Garment Manufacturing Ltd.	1974
22. Tropical tarpaulin Nigeria Ltd.	1971

Source: i) Kano State Commercial and Industrial handbook (1988) Tofa Commercial Press, Ltd.

ii) Potential investors guide to Kano State, Creative prints, (Undated)

iii) Brandell, I. (1991) Workers in Third World Industrialization. (Macmillan).

iv) Field work.

It is however established that most of textile firms in Kano state have substantial Lebanese interests and management. It is only Terytex and Norspin that have an Indian and Egyptian owner respectively.

Local Kano merchants and businessmen as well as industrial capital have also got some level of participation in the textile industry. For instance, there is Gashash in Northern Textiles Manufacturing Ltd. (NTM), Dandawaki in Nigeria Textile Products Limited (NTP), Dantata together with Lebanese in Nigeria Universal Textile Industry Ltd. (UTIL) and Universal Spinners Ltd. (USL). There is Isiyaka Rabi'u in Bagauda Textile Ltd. (BTL)and one Kano State owned factory as Kano State Textile Printers (KTPL). The combined work force of Kano Textile Factories was estimated to be between 5000-6000 in 1987 (Brandell, 1991). Table 3.8 below shows the employment level of some textile firms in Kano state.

TABLE 3.8

EMPLOYMENT SIZE OF SOME TEXTILE FIRMS IN KANO STATE AS AT (1988)

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S/NO	NAME	EMPLOYMENT SIZE
1.	Gaskiya textiles Limited	1.001
2.	Universal textile Limited	638
3.	Bagauda textile Limited	600
4.	Northern textile manufacturing Limited	497
5.	Universal spinners Limited	460
6.	Fahid Dayekh & company Ltd.	450
7.	Kano textile Ind. Liumited	400

8. Nigerian spinners and dyers Limited	381
9. Kano textile prinbters Ltd.	230
10. Garment manufacturing Company Ltd.	150
11. Lakhi textiles industry limited	127
12. Nigerian braiding Manufacturing Limited	125
13. Brocade Manufacturing company Ltd.	98
14. Tery tex Ltd.	64
15. Nornit Ltd.	62
16. Madratex Limited	60
17. Satura textiles Limited	28
18. Tropical tarpaulin Limited	15
19. Adharma textile and garment Ltd.	12
20. Fablon Limited.	NA
21. Libo industry Limited	NA
22. Magwan textilkes Limited	NA
23. Spinners weavers Limited	NA

Source : i) Kano State commercial and industrial handbook (1988) Tofa commercial press, Ltd.

ii) Potential investors guide to Kano State, Creative prints, (Undated)

N.A = Not available

With respect to the type of textile products, Kano State firms can boast of a wide variety. The product range includes blankets, baby shawls, bed sheets, napkins, towels, carpets and prayer mats. Others include textiles, fabrics for furnishing and automotive industries, plastic mats and so on and so forth.

Table 3.9 below gives details pertaining to the range of products and the specific firms that produces each.

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TABLE 3.9

LIST OF KANO TEXTILE FIRMS AND THEIR PRODUCTS

NAME	PRODUCTS
1. Angels spinning and dyeing Limited	Cotton yard and polyester yard.
2. Fahid Dayekh & Co. Ltd.	Spinning of cotton/polyester yard, polypropylene plastic mats, being straps, Cotton and Polyester thread, Bias tape, braided Thread.
3. Holborn Nigeria Limited	Recycled soft waste, towels, Hand 100m yard-dyeing.
4.Intertex Limited	Textile fabric for furnishing & automotive industries.
5. Kano textile industries Limited	Embroidery lace, prayer mats, Bed covers, Big floor carpet & Sassorted woved textile piece good.
6. Lakhi textile Ltd.	Carpets, Textile knitted fabrics, Elastic, Braiding and threads.
7. Madratex Limited	Embroidered lace.
8. Nigerian spinners and Dyers Ltd.	Sewing thread, knitting wool robin, knitting wool yeye, Embroidered Ball Thread.
9. Nornit Limited	housed textiles, knitted fabrics for various uses
10. North textile manufacturers Ltd.	Blankets (wool and cotton blankets)
11. Rotorspin Nigeria Ltd	cotton yard.
12. Tery tex Nigeria Ltd.	Tery towels, Napkins, Baby shawls, bed linings
13. Universal textile Ltd	Towel and nappies, Bed covers & prayer mats, Furnishing fabrics Hand
14. Kano textile printers Limited	100m yard and kents. textile goods in general.

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15. Universal spinners Ltd	Textile yarn Manufacturers
16. Nigerian Textile product Ltd	Embroidered Lace, Grey cloth, Dobby.
17. Bagauda Textile Mills Ltd.	Textile suiting and products in general
18.Brocade Manufacturing Co. Ltd	Textiles products in general
19. Gaskiya Textile Mill Ltd.	Textile in general, African prints & etc.
20. The Nigerian Braiding Manufacturers Ltd.	Thread manufacturers
21. Sutura Textile Ltd.	Socks Manufacturers
22. Libo industries Ltd.	Garment nad wearing apparels
23. Garment Manufacturing Co. Ltd.	Manufacturers of singlet and pants.

Source : I) Kano State Commercial and Industrial Handbook (1988) Tofa Commercial Press, Ltd

ii) Potential Investors Guide to Kano State, Creative Prints, (Undated).

3.3 TEXTILE DEVELOPMENT IN KADUNA STATE

Unlike Kano with its long commercial history, Kaduna was a colonial creation. It was the administrative center of the former northern Nigeria and attracted immigrants from all over the North. It was also the seat of Northern Nigerian Development Corporation which later become New

Nigerian Development Company (NNDC) a regional investment institution which played a major role in attracting foreign investors as well as training ground for local managers, investors and business men.

In Kaduna, the timing of industrial investment at the end of the 1970s was similar to a broader pattern witnessed in Ibadan, Onitsha , Aba and to some extent Lagos in which investment was undertaken after financial surpluses had been accumulated through the oil boom (Forest, 1994).

The presence of numerous Federal, regional and state agencies as well as regional headquarters of banks, Insurance and other financial houses makes Kaduna primarily an administrative center and this help it to grow fat industrially. Its industrial base is characterized by large companies based on state and multinational capital and to a lesser extent on indigenous entrepreneurs or some combinations (Brandell, 1991).

Big industry in the state includes a petroleum refinery, a motor vehicle assembly plant, Nigeria Breweries Ltd., United Oil Mills Ltd., Ideal Flour Mills Ltd., and Nigerian Tobacco Company Ltd. But it is the textile industry that dominates with a concentration of about 12 firms, out of which 9 are very large ones. Four of the nine big textile factories are integrated mills with spinning, weaving and finishing processes.

Table 3.10 below shows the range of products produced by the textile firms which include tarpaulin a product produced only by Kaduna state in the whole of Nigeria. This suggest that whole country's demand or market for tarpaulin product is supplied by Zaria tarpaulin industry Ltd.

TABLE 3.10

LIST OF SOME KADUNA TEXTILE FIRMS AND THEIR PRODUCTS

S/NO.	NAME	PRODUCT
1.	Chellco industries Ltd	Blankets. Bed spreads, baby shawl, Furnishing material.
2.	Kaduna textiles Limited	Yarn (Av.count 20s), Fabric (shirting), polypropylene sacks.
3.	United Nigeria Textiles Ltd.	Cotton real wax prints, cotton Roler prints, cotton & polyester/cotton Blended Dyed Good
4.	Zaria industries Ltd.	Tarpaulin product
5.	Unites(Nig.) Ltd.	100% cotton & blended yarn.
6.	Supertex (Nig.) Ltd.	Super wax, Deluxe wax, Dyed cracle etc.
7.	Arewa textile Ltd.	Yarn Corey, Batt, African Print, Super print, white shirting Dyed Goods, e,t,c
8.	Dagazan Limited	Carpets
9.	Harco Limited	General textile products
10.	Finetex Limited	N.A
11.	Nortex Limited	N.A
12.	Blanket Manufacture company Limited	Blanket products

Source: Guide to commercial / industrial investment oppourtunities in Kaduna State (undated)booklet produced by Kaduna State Ministry of Commerce .

N.A = Not Available

The state involvement is strong in all of the textiles firms but in particular Kaduna textile Ltd.(KTL) which has a Nigerian management. Two of the remaining five namely United Nigerian Textile Ltd. (UNTL) and Nortex have Chinese management and capital participation. Arewa textile Nigerian Limited is run by Japanese.

The potential workforce of the four integrated mills was estimated to be between 3000-8000 workers each. Unitex and Supertex follow with a capacity to employ 700 and 350 workers respectively at full production. The remaining three namely Chellco, Dangazan and the Blanket factory together have below 1000 workers at full capacity (Brandell, 1991). Employment of KTL in 1979 was almost 5000 workers. Table 3.11 below shows the employment level/capacity of the Kaduna State textile firms.

TABLE 3.11

EMPLOYMENT SIZE OF SOME TEXTILES FIRMS IN KADUNA STATE AS AT 1991

S/NO	NAME	EMPLOYMENT SIZE
1.	Chellco industries Limited	1000
2.	Kaduna textile Limited	2,500
3.	United Nigerian textiles limited	5,000
4.	Zaria Industries Limited	269
5.	Unitex Nigeria Limited	700
6.	Arewa textile limited	3000-8000
7.	Supertex (Nig.) Limited	350
8.	Harco textile Limited	NA

9. Dagazau Limited	1000
10. Nortex Limited	3000-8000
11. Finetex Limited	NA
12. Blanket manufacturing company Ltd.	1000

Source: I) Guide to commercial and investment opportunities in Kaduna state undated booklet produced by Kaduna state ministry of commerce

(II) Brandell, I (1991)Workers in third world industrialization,

N.A =Not Available

In terms of their age, Kaduna textile Limited (KTL) was the oldest and one of the first textile factories in Nigeria, having been established in 1957.

Table 3.12 below shows the list of textile firms by their year of establishment.

TABLE 3.12 LIST OF TEXTILE FIRMS IN KADUNA STATE BY YEAR OF ESTABLISHMENT

NAME	YEAR
1. Kaduna Textile Limited (KTL)	1957
2.Arewa textile Nigeria Limited	NA
3.United Nigerian textile Plc	1964
4. Unitex Ltd.	1982
5. Chellcotex Limited	1965
6. Blanket Manufacturing Company Ltd.	1985
7.Supertex Ltd.	1983
8. Finetex Ltd.	1993
9. Nortex ltd.	1963
10.Harco textile	NA

11.Zaria Tarpaulin Industry Ltd	1973
12. Dangazau Ltd.	1980

Source:

1) Guide to commercial/Industrial Investment opportunities in Kaduna state (Undated) booklet produced by Kaduna state ministry of commerce, industry and tourism

II) Brandell, I (1991)Workers in third world industrialization,

Field work

N.A =Not Available

The other three integrated mills were established between 1963 and 1965. Supertex, Unitex and the remainingones were established in the 1980s.

The concentration of big textile firms in Kaduna state has been said to justify its position as the headquarters of the national textile workers union (NTWU).

3.4 THE SOCIAL CHARACTERISTICS OF KANO AND KADUNA TEXTILE WORKERS

Owing to different history, administrative set-up and cultural background, there are marked differences in the social characteristics and gender structure between Kano and Kaduna Textile workers. For instance ,

only a few of the factories in Kano were members of the employers association and adherence to collective agreement was weak. In Kaduna all companies were members and agreements are effectively enforced . (Brandell, 1991, Andrae and Beekman, 1987).

With regards to workers political consciousness, unionization in Kano far lagged behind Kaduna, which explains why union rights were not respected in Kano to nearly the same degree in Kaduna. The concentration of as many as 12-16000 textile workers in a small numbers of a large companies in Kaduna has ensured a high degree of political visibility. Concentration easily facilitates agitation, unified action and organization. The other advantage Kaduna textile workers have is that almost all the factories are concentrated within a short distance from each other, within the industrial area of Kaduna South. The majority of the workers also live in housing estates adjacent to the factories.

Numerical strength and concentration is less in Kano. The combined work force of the 19 factories reached some 5000-6000 at the most in 1987 or may reach 10,000 under more favourable conditions. The worker is spread over many small factories. Only Gaskiyea textile factories near the large size of common in Kaduna. The remaining factories have 100-500 workers only (Brandell, 1987). Many are located at Bompai industrial

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estate and the workers live in a more scattered dwellings than those of Kaduna.

The educational background of textile workers differs between the two cities. In Kaduna, primary school certificate is a prerequisite for employment which enables all their workers to read and write English. Some even have not completed secondary school education, teacher training, technical or clerical courses. Some improve their literacy by attending evening classes or by undertaking correspondence courses.

The Kano textile workers are a combination of a long distant migrants with characteristic similar to those that dominate Kaduna and those from Kano origin whose background is rather different. Many of the workers from Kano town have not been to western schools and do not speak or read English, but have received Koranic education. So some are literate in Hausa the native language and Arabic. Their types of education makes them more expose to cultural values that are supportive of traditional authority and structures (Lubeck, 1983). This difference in educational background create obstacle to effective unionization among the workers in Kano. It reinforced

other cultural divisions to the advantage of the employers. More western educated union workers can be branded as trouble shooters who wants to destroy relations of respect and understanding between workers and management, based on the values of Hausa society (Brandell , 1991).

Education even though affects peoples consciousness about their rights and welfare it has also tremendous effect on skill development. The level of skill required in the textile industries in the two cities is modest for the majority of the workers. The highest skill categories are the technicians for maintenance and repairs of the machinery. Investment on training on the job are greatest in the large factories. The Kaduna textile firms in particular do send personnel for external training at Kaduna polytechnic.

With regard to the demographic structure of the workers, the work force in the 2 cities were male dominated. The age range of the workers falls between 25-40 with more older workers found in Kano. In terms of ethnic origin of the workers, those in Kaduna factories are mostly from non-Hausa area of the middle belt, that is to the south of the city. Others come from areas still farther away from the southern states. In Kano, the local component of the workers is large . They constitute mainly the Hausa Muslim dominated tribe as well a more educated migrant outsiders with characteristics similar to those of Kaduna textile workers.

3.5 ANALYSIS OF THE NATURE AND FORM OF TECHNICAL PROGRESS IN THE NIGERIAN TEXTILE INDUSTRY.

From the data collected, technical progress in the Nigerian textile industry has shown various forms ranging from changes in production process through the replacement of plants or machinery, computerization of accounting/payroll system, changes in management style and acquisition of patent right. However, in the discussion that follows we would be able to know the form of technical progress that are more prevalent or domineering in the study areas.

Out of all the firms surveyed, it is only Finetex Ltd. Kaduna that has claimed to have acquired patent right for wax print product in 1997. This suggests that if we are to consider patent right as the only measure or indicator of technical progress, then 95% of the firms surveyed have not experienced technical progress. Equally, if we restrict measurement of technical progress to the possession of research and development (R&D) departments only, the data seems to suggest that only 24% of the textile firms have experienced technical progress, since it was found that Finetex Ltd, Arewa Textiles, Northern Textile Manufacturers Ltd (N.T.M.), Universal Spinners and Holborn are the only textile firms that possess R&D Units. This is as shown in table 3.13 below.

Table 3.13 List of Textile Firms that Possess R&D Departments.

S/N	NAME	LOCATION
1.	Finetex Ltd	Kaduna
2.	Arewa Textiles Ltd.	Kaduna
3.	Northern Textile Manufacturers Ltd (N.T.M.)	Kano
4.	Universal Spinners	Kano
5.	Holborn Ltd.	Kano

Source: Field work, 1998.

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In terms of expenditure on R&D Finetex has claimed to have spent over N5 million to date. Arewa textile has claimed also to spend about N5 million annually. So also N.T.M. Kano. However, Universal Spinners has not disclosed the amount spent on its R&D, while Holborn Ltd claims to have spent 5-8% of it annual budget on R&D.

Limiting also the measurement of technical progress to purely a change in management style, the data reveal that about 43% of the textile firms surveyed have experienced this form of technical progress. This is as shown in table 3. below.

Table 3.14 List of Textile Firms That Have Experienced Technical Progress in the Form of Change in Management Style.

S/N	NAME	LOCATION
1.	Zaria Tarpaulin Industry	Kaduna
2.	Integrate Fibres Ltd	Kano
3.	Dangote General Textiles	Kano
4.	Kaduna Textile Ltd (K.T.L.)	Kaduna
5.	Nortex Ltd	Kaduna
6.	Terrytex Ltd	Kano
7.	Universal Spinners	Kano
8.	Holborn	Kano
9.	Universal Textiles	Kano

Source: Field Work, 1998.

In the same vein, if technical progress is restricted to the computerization of accounting/auditing/payroll system only, then about 57% of the surveyed firms could be said to have experienced technical progress of this form. This is as revealed by table 3.15 below.

Table 3.15 List of Textile Firms That Have Experienced Technical Progress in the Form of Computerization.

S/N	NAME	LOCATION
1.	Angel Spinners Ltd	Kano
2.	Dangote Textiles Ltd	Kano
3.	Gaskiya Textiles Ltd	Kano
4.	Kaduna Textiles Ltd (K.T.L.)	Kaduna
5.	Nortex Ltd	Kaduna
6.	Universal Textiles Ltd	Kano
7.	Arewa Textiles Ltd	Kaduna
8.	Terrytex Ltd	Kano
9.	N.T. M. Ltd.	Kano
10.	Universal Spinners	Kano
11.	Integrated Fibres Ltd	Kano
12.	Holborn Ltd	Kano

Source: Field Work, 1998.

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Moreover, measuring technical progress purely on the basis of a change in production process or acquisition of a new plant or machinery, the data from the field work reveal that about 67% of the surveyed firms have experienced this form of technical progress. Fourteen out of the 21 firms were found to have changed their production process in terms of acquiring new machinery or plant. This is as revealed by table 3.16 below.

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Table 3.16 List of Firms That Have Experienced Technical Progress in the Form of a Change in Their Production Process, Plant or Machinery.

S/N	NAME	LOCATION
1.	Zaria Tarpaulin Industry	Kaduna
2.	Bagauda Textile Mill	Kano
3.	Integrated Fibres Ltd	Kano
4.	Lakhi Textile Ltd	Kano
5.	Dangote Textile Ltd	Kano
6.	Kaduna Textile Ltd	Kaduna
7.	Kano Textile Printers	Kano
8.	Nortext Ltd	Kaduna
9.	Arewa Textile Ltd	Kaduna
10.	Terrytex Ltd	Kano
11.	N.T.M. Ltd	Kano
12.	Universal Spinners	Kano
13.	Holborn Ltd	Kano
14.	Universal Textiles Ltd	Kano

Source: Field Work, 1998.

Examining and measuring technical progress in terms of purely introducing new products and or improving existing ones, the data suggest that equally about 67% of the surveyed firms have experienced this form of technical progress. This is because out of the 21 firms 14 were found to have either introduced new products and or improved existing ones. These firms are the same as those listed in table 3.16, with the exception of Lakhi Textile, Kano textile printers and Universal Spinners whose positions were replaced by UNTL, Kaduna, Angel Spinners, Kano and Gaskiya textile mill, Kano.

3.6 ANALYSIS OF THE TURNOVER AND EMPLOYMENT CAPACITY OF THE FIRMS.

In terms of turnover (sales revenue) UNTL Kaduna has the highest with a recorded turnover of N3,991,922,000.00 as at 1998. This was followed by Arewa Textile also in Kaduna which has a turnover of N1,560,000,000.00. The firm that has the least turnover was found in Kano namely Adhama Textiles which has a recorded turnover of N1,365,000.00 as at 1998. The table below shows the turnover of the surveyed firms as at the end of 1998.

Table 3.17 Turnover of Surveyed Firms As At 1998.

S/N	NAME	TURNOVER (N)
	KANO FIRMS	
01.	Angel Spinners Kano	125,000,000.00
02.	Leader Textile	151,200,000.00
03.	Adhama Textile	1,365,000.00
04.	Kano Gaskiya	728,296,448.00
05.	K.T.P.	25,641,671.00
06.	Dangote Textile	210,000,000.00
07.	Lakhi Textile	128,473,784.00
08.	Kayfad Spinetex Ltd	185,246,930.00
09.	Integrated Fibres Ltd	303,249,987.63
10.	Bagauda Textile	105,505,816.00
11.	Holborn Nigeria Ltd	666,583,247.00
12.	Universal Textile Ltd	586,368,538.00
13.	Universal Spinners	413,934,754.00
14.	N. T. M.	150,000,000.00
15.	Terry Tex	894,405,967.00
	Sub-Total	**4,865,272,132.63**
	KADUNA FIRMS	
16.	Arewa Textile	1,560,000,000.00
17.	Nortex Ltd	599,758,000.00
18.	KTL	1,245,773,000.00
19.	Finetex Ltd	1,309,287,000.00
20.	UNTL	3,991,922,000.00
21.	Zaria Tarpaulin Industry	-
	Sub-Total	**8,708,740,000.00**
	Grand Total	**13,513,012,132.63**

Source: Field Work 1998.

From the table it can be seen that the total annual turnover of the textile firms in Kano and Kaduna States alone amounts to about N13,513,012,133.00 with Kano accounting for N4,865,272,133.00 representing 36% of the total, while Kaduna State

accounting for N8,708,740,000.00 representing 64% of the total. This shows that Kaduna State firms have a higher production capacity and therefore higher turnover when compared with Kano State firms.

With regards to employment capacity of the firms surveyed in the 2 states, it was found that their total employment capacity was about 22,842 workers. The firm with the highest number of employees was UNTL, Kaduna which had 5,353; followed by Arewa Textile also in Kaduna which had 4,000. The firm with the least employees was found in Kano namely Adhama Textile which had just 23 workers as at the end of 1998. This is as revealed by table 3.18 below.

Table 3.18 Employment Capacity of the Surveyed Firms As At 1998.

KADUNA FIRMS		EMPLOYMENT			
S/N	NAME	Skilled	Semi-Skilled	Unskilled	Total
1.	Finetex Ltd Kaduna	24	31	517	572
2.	K.T.L. Kaduna	249	1300	1,218	2,767
3.	Nortex Ltd Kaduna	11	26	864	901
4.	Arewa Textile Kaduna	500	3,000	500	4,000
5.	UNTL Kaduna	153	4,404	796	5,353
6.	Zaria Tarpaulin Industry	38	150	30	218
	Sub-Total (I)	975	8,911	3,925	13,811
KANO FIRMS		EMPLOYMENT			
	NAME	Skilled	Semi-Skilled	Unskilled	Total
7.	Terrytex Ltd	5	140	35	180
8.	N.T.M. Textiles Kano	50	400	20	470
9.	Universal Spinners Kano	256	25	18	299
10.	Universal Textiles Ltd Kano	857	164	179	1,200
11.	Holborn Nig. Ltd Kano	80	520	35	635
12.	Bagauda Textile Kano	15	60	32	107
13.	Integrated Fibres Ltd Kano	256	25	18	299
14.	Kayfad Spinetex Kano	350	329	75	754
15.	Lakhi Textile Industry Ltd	50	25	35	110
16.	Dangote Textile Main Kano	20	950	480	1,450
17.	K.T.P. Textiles Kano	20	50	200	270
18.	Gaskiya Textiles Kano	176	190	998	1,373
19.	Adhama Textiles Kano	-	3	20	23
20.	Leader Textiles Kano	8	9	53	70
21.	Angel Spinners Kano	150	1,250	400	1,800
	Sub-Total (II)	2,293	4,140	2,598	9,031
	Sub-Total (I)	975	8,911	3,925	13,811
	Grand Total	3,268	13,051	6,523	22,842

Source: Field Work, 1998.

The table also shows that Kano State accounts for about 40% of the total employment while Kaduna State accounts for the 60%. The mean employment in the industry as a whole was calculated to be 1,087 workers. Out of this the average for Kano was just 502, while the average employment for Kaduna was 2,301.

Disaggregating the total employment into skilled and unskilled labour, the skilled labour employment constitutes about 14% of the total workforce, while the unskilled and semi skilled account for 86% of the total employment. All these computations were done using 1998 as a base.

CHAPTER IV

MODEL SPECIFICATION AND ANALYSIS OF RESULTS

4.1 Model Specification

In the light of a related work analysed by Gujarati (1988) the model of this study can be expressed as follows:

$$Y_1 = \alpha + \beta_1 X_1 + \beta_2 X_2 + B_3 X_3 + Ui$$

Where:

Y_1 = % change in the labour force of a firm

X_2 = % change in the firm's sales turnover

X_1 = The dummy variable which measures technical progress and takes a value of 1 if the firm visited has experienced any form of technical progress. Otherwise, it takes a value of 0.

X_3 = % change in the firm's total wage bill.

Ui = Represents the error term to take care of other factors that can influence the variations in Y_1 i.e. decreasing profitability, lack of raw materials or their inadequacy and lack of foreign exchange. etc.

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For the purpose of analysis, and on a priori and theoretical considerations the likely interpretation of the coefficients in this regression equation will be as follows:

α = Indicates the mean level of the employment in the industry when the firms have not experienced technical progress and changes in sales.

$\alpha + \beta_1$ = Indicates the mean level of employment in the industry when the firms have experienced technical progress.

$\alpha + \beta_2$ = Indicates the mean level of employment in the industry when the firms have recorded sales but have not experienced technical progress.

$\alpha + \beta_1 + \beta_2$ = Indicates the mean level of employment in the industry when the firms have experienced both technical progress and have recorded changes in sales.

β_1 = Indicates the % change in employment as a result of a unit change in technical progress.

β_2 = Indicates the % change in employment as a result of a unit change in sales.

β_3 = Indicates % change in employment as a result of a unit change in wage bill.

Equally, the constant term α is expected to be non negative and greater than ($0< a > 1$). This is because firms are expected to have employed people at managerial level as well as security personnel even before they start production or sales.

On a priori if α is positive but β_1 is negative, it implies that the level of employment in the industry has fallen as a result of technical change. On the other hand if β_1 is positive it implies that the level of employment in the industry has increased as a result of technical progress. Likewise if β_2 is negative, it implies that the level of employment in the industry has fallen as a result of increase in sales, while the reverse is the case if β_2 is positive. However, on a priori expectations (β_1 a measure of technical progress) can be either positive or negative, suggesting that technical progress can lead to either an increase or a decrease in the employment of labour. While β_2 (a measure of turnover) is expected to be positive, suggesting that increase in sales is associated with increase in employment. β_3 is also expected to be positive suggesting that when the wage bill is high, the level of labour employment is also likely to be high.

For ease of exposition and deeper analysis, three (3) regression equations were estimated. The justification of estimating three regression equations is discussed below.

It should be recalled that according to theoretical postulations and as discussed in chapter one under the statement of the research problem, technical progress can either create or destroy jobs. It creates jobs when it introduces new products or when it leads to an increase in demand and investment due to lower prices necessitated by a fall in the cost of production caused by the use of new more efficient methods. It destroys jobs because of automation/mechanization/robotization which leads to an increase in the substitution of labour for capital. However, in order to determine which of the effect is more dominant equation 1 as specified below is introduced to provide more clarification.

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Equation 1:

$$Y_1 = \alpha + \beta_1 X_1 + \beta_2 X_2 + B_3 X_3 + Ui$$

Where Y_1 = % change in total employment irrespective of which category of labor was affected by the change.

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X_1 = the dummy variable which measures technical progress and takes a value of 1 if the firm visited has experienced any form of technical progress. Otherwise, it takes a value 0.

X_2 = measures % change in turnover (sales revenue)

X_3 = measures % change in the total wage bill of a firm.

Ui = the error term introduced to capture the effects of other variables that may affect Y_1.

The justification for having equation 2 as specified below rests on the fact that discussions about technical progress almost lead to the universal conclusion that technical progress is associated with an increase in demand for skilled labour, which this study wants to test. Therefore equation 2 can be specified as:

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Equation 2:

$$Y_2 = \alpha + \beta_1 X_1 + \beta_2 X_2 + B_3 X_3 + Ui$$

Where Y_2 = % change in the employment of skilled labour only.

Where X_1, X_2 and Ui remain as they were interpreted in equation 1.

On a priori and theoretical expectation the value of β_1 is expected to be non negative while β_2 and β_3 are expected to be positive.

4.2 THE REGRESSION MODEL RESULTS

The results of the regression model for all the three equations have been summarised and presented in table 4.1 below. For the computer print out of the detail results and the raw data used see appendices (IX - XI).

Table 4.1 RESULTS OF THE REGRESSION EQUATIONS

Equations	Constant Coefficients	Coefficients for independent variables			R^{-2}	D.W
		X1	X2	X3		
1	6.00 (2.88)	-6.68 (2.76)	0.003 (0.045)	1.48 (0.048)	98.5%	2.01
2	-0.38 (10.52)	-3.30 (10.26)	0.122 (0.166)	1.30 (0.113)	86.8%	2.18
3	12.80 (6.194)	-12.24 (5.918)	-0.004 (0.096)	1.42 (0.088)	93.0%	2.06

N.B.(i) The figures in brackets are the standard errors.

(ii) The differences between the 3 equations is that for equation 1 the dependent variable connotes the percentage change in the total employment of labour while in equation 2 it connotes specifically the percentage change in the employment of skilled labour and in equation 3 that of unskilled labour.

4.3 INTERPRETATION AND ANALYSIS OF RESULTS

Analysis and evaluation of regression results consist first of deciding whether the estimates of the parameters are theoretically meaningful and accord with a priori expectations. This is usually determined by examining the sign and size of the parameter estimates to see whether they are in line with the theoretical postulations of the phenomenon being studied.

Thus, as can be seen from table 4.1, nine out of the twelve parameter estimates are appropriately sized and signed. The values of R^2 Were also high in all the 3 equations suggesting goodness of fit. The values range from 86.8% in equation 2 to 93% in equation 3 and 98.5% in equation I.

With regards to the constant term coefficients, the values in equation I and 2 for, instance, suggest a positive level of employment of between 6-13 workers even at zero level of output. This implies that a firm must incur the cost of employing personnel at security and managerial level even before it starts production.

The values of the coefficients for the explanatory variables also accord with the theoretical and a priori expectations. The values for X1 in equation 1 and 3 for, instance, suggest that at every time the textile industry experiences technical progress 7-12 employees are laid off on the average. Specially, the negative value of the coefficient for X1 in equation I suggests that the negative employment effect of technical progress outweighs its positive effect, while the negative value of X1 coefficient in equation 3 suggests that technical progress in the Nigerian textile industry is associated with a decrease in the employment of unskilled labour.

Equally, the positive values of the coefficients for the second explanatory variable in equation I & 2 namely X2, suggest that an increase in

sales or turnover impacts positively on the employment of labour. The positive values of the coefficients for the third explanatory variable (X3) in all the 3 equations suggest that increases in the total wage bill of the textile firms signifies an increase in the employment of labour. Specifically, the value of 1.48 in equation 1 for, instance, suggests that a 1% or a unit change in the total wage bill of a firm is associated with the employment of approximately 2 employees.

Having evaluated the regression results on the basis of theoretical and a priori criterion, evaluation on the basis of statistical criteria popularly known as first order test now follows. This criterion is determined by statistical theory and is aimed at evaluating the statistical reliability of the estimates of the parameters of the model. The most widely used indicators are the square of the correlation coefficient (R2) which has already been discussed, the standard errors of the estimates and the relevant statistical test of significance using t or F test. In the case of the standard error estimates, the larger their values the less reliable they are and vice-versa. Table 4.1 also signifies that the values of the standard errors for most of the parameter estimates are low.

Table 4.2 & 4.3 give a summary of the outcome obtained from this first order test.

Table 4.2 Computed & Tabulated t-ratios

Equations	Computed t-ratios				Tabulated t-ratios at 10% significance level	Remarks
	Cons-tant	$\hat{}$ b1	$\hat{}$ b2	$\hat{}$ b3		
1	2.08	2.42	0.07	36.03	1.73	2 tail test
2	0.03	0.32	0.73	11.50	1.33	1 tail test
3	2.07	2.07	0.04	16.14	1.33	1 tail test

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Table 4.3 Computed F values and tabulated F values.

Equations	Computed F Values	Tabulated F Values		Remarks
		0.05	0.01	
1	43.83 F2, 18	3.55	6.01	Statistically Significant
2	44.96 F2, 18	3.55	6.01	- do -
3	89.15 F2, 18	3.55	6.01	- do -

As can be seen from table 4.2 the computed t-values for most of the parameter estimates are greater than the tabulated values at 10% significance level and this suggests the statistical significance of the parameter estimates and hence the rejection of the null hypothesis from the conducted test of significance. These results have therefore added credence to the findings of the study.

The results of the F-test summarised in table 4.3 also support the overall statistical significance of the regression model in all the 3 equations as the values of the computed F-ratios are greater than the tabulated values at 1 and 5% levels of significance. This result has also added credence to the initial findings of the study and further confirms the statistical reliability of the parameter estimates.

The third and final stage in the evaluation of regression result is for one to conduct what is called second order test or apply what is termed econometrics criteria. This implies finding out whether the assumptions of the econometrics method employed in this case OLS method are satisfied or not. These assumptions include the non-violation of the properties of the random

term error that is, the absence of auto correlation and heteroscedasticity, as well as lack of multicollinearity between the explanatory variables, lack of simultaneous relationship, lack of model specification error and non-omission of other relevant explanatory variables. These various tests were done and the results as provided in the appendix strongly tend support to the findings of the study.

4.4 SUMMARY OF MAIN FINDINGS

What this chapter did was to specify the model of the study, present the results of the regression equations and analyses the results using various relevant criteria namely economic, statistical and econometrics criteria or what are called first and second order evaluation tests.

On the basis of economic, statistical, and econometrics criteria, the estimated results provide sufficiently robust evidence that technical progress in the Nigerian textile industry is inversely related to the employment of unskilled labour and directly related to the employment of skilled labour. When further assessment was made it was also found that the negative employment effect of technical progress with regards to unskilled labour outweighs its positive effect in terms of skilled labour employment. The sales turnover variable was also found to possess the correct size and sign and was positively correlated with the employment of labour which is in accordance with a priori expectations. This conclusion suggests that on a priori, statistical and economic criteria, the coefficients or parameter estimates in all the 3 equations of the model do possess the correct signs and size as predicted by economic theory. The values of the constant terms were also positive in all but one of the 3 equations suggesting that in the absence of technical progress

and zero level of sales, the employment level in the industry is still positive approximately 10 employees owing to the existence of management team and security personnel at zero level of output.

Equally, when the results were subjected to various sensitivity tests using various econometrics criteria such as Durbin-Watson test, Park (1966) heteroscedastic test and Ramsey's (1969) model specification error test as presented in appendices XII, XV, and XVI, the null hypothesis of non-autocorrelated error terms, absence of multicollinearity, absence of hereoscedasticity and correct specification of the model were not rejected at the conventional levels of significance. The results of these tests also give credence to the initial findings of the study. The basic results therefore remain unchanged.

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CHAPTER FIVE

SUMMARY, CONCLUSION & RECOMMENDATIONS.

5.1 SUMMARY

In recents years, unemployment has become a major problem in the Nigerian economy. With a reasonable percentage of the labour force unemployed total output has fallen, below its potential level and the costs to the society are high in terms of foregone output, welfare losses and violent crimes. There is an enormous waste of human resources. Armed robbery, social and political tension can be attributed to unemployment. Since 1980s unemployment has continued to rise and economic difficulties also continue to plague the country. This thesis has examined some of the causes of unemployment problems in Nigeria using the manafacturing industry as a case study.

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The background of this study has demonstrated a global concern about the low rate of labour absorption in the manufacturing sector of developing countries. Many people believe that the rise in unemployment is due to modern technology and for this reason, they are deeply pessimistic about whether we could ever have full employment. Rapid technological changes in advanced countries and adoption of those new techniques by the majority of Less Developed Countries (LDCS).

is said to have aggravated further the seriousness of the unemployment problem by causing widespread job losses particularly of workers with superseded skills. It is further argued that when technical change or progress takes place in an industry or firm new patterns of employment are created. There is usually an increase in the demand for skilled labour, while that of unskilled labour relatively falls.

All in all, there are two opposing views about the effect of technical progress on employment. One view states that technical progress creates jobs because it creates new products and therefore additional demand . This is translated into additional demand for factors of production both human and material resulting in an increased investment which in turn creates more employment. The other employment creation mechanism of technical progress is through its increased productivity effect. New techniques are usually associated with an increase in productivity which means reduction in costs, reduction in prices, increase in demand as a result of price reduction, increase in turnover (sales revenue) due to increase in demand, increase in productivity, increase in investment and hence increase in employment. It therefor follows that lack of technical progress can be a barrier to increase in productivity, economic growth and attainment of full employment.

The second view about the effect of technical progress is that it destroys jobs. This view reinforces the notion that high unemployment as witnessed by LDCS has been aggravated by the repercussion of rapid technical changes and innovation made possible by the invention of machine capable of doing what several workers had formerly done by hand or invention of new processes or management techniques that make use of little amount of labour relative to capital. Another factor which is said to accentuate the prevalence of unemployment in LDCs is the increase automation of the tertiary sector or white collar sector namely: bank, insurance and related services evidenced by computerization of their accounting/payroll/sales and auditing systems.

Therefore, the question of whether on balance, technology creates more jobs than it destroys is one of whether the indirect compensating beneficial effects through higher productivity and incomes are stronger than the job displacement effects.

It is the view of this study, therefore that the relationship between technical progress and the level of unemployment cannot be assessed on a priori grounds or by simply comparing the arguments of the two opposing sides. What is needed is a series of case studies to show in specific countries and in specific industries or firms what is actually obtained. The importance of further assessment of the links between technology and jobs was also made

apparent by Paye (1995) who found in Canada for, instance, that high technology and high knowledge industries although accounting for only 1/3 of total employment contributed more to employment than all other industries combined. On the whole one can see clearly that a problem exists in the sense that no one can say with absolute certainty that technical progress creates or destroys jobs. It is perhaps only through accumulated empirical research in specific industries or firms and in specific countries as well as at different periods of time that one can get close to knowing the actual effect of technical progress upon the level of employment, which this study sets to find out by formulating relevant hypotheses stated in chapter one and using appropriate statistical and economic techniques as spelt out in chapter four.

Much work remains to be done in the analysis of the effects of technical progress on the employment of labour in specific manufacturing sectors in developing countries . Also, given the importance of technology related unemployment problems, researches that will further investigate the true relationship should never be regarded as out dated or irrelevant. Therefore, any attempt at further verification will be significant if informed policies are to be adopted. This work is an attempt to make contributions in this area and given the vastness of what constitutes the industrial sector of a nation, this study focuses on the textile manufacturing sub-sector of Nigeria.

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For one, the industry was the leading sector for import substituting industrialisation (ISI) in Nigeria. Secondly, it contributed 29.3% of total manufacturing employment in 1969, and 15% of total value added. And by 1980, Nigeria had the 3rd largest textile industry in Africa surpassed only by Egypt and South Africa. Even in the 1990's the industry is still proving to be an important sub-sector in the Nigerian economy in-spite of the general economic downturn. It has also been reported that apart from Government, the textile industry is the second largest employer of labour.

It is also said to be producing 98% of the Economic Community of West Africa States (ECOWAS) sub-region textile products requirements. According to Manufacturers Association of Nigeria half yearly economic review, the textile industry was still found to have surpassed or at least at par with other sub-sectors of the manufacturing industry in terms of capacity utilisation and local sourcing of raw materials.

These and other related reasons justified the choice of the textile industry as the point of reference in the study.

The need for this study was further justified on the ground that past studies have mostly concentrated on looking at the diffusion of new technologies into firms or industries, but the outcome in terms of their effects

on employment are less frequently analysed. Other studies were also found to be aggregative or macro in focus and not country or industry specific. Yet, others have focused attention in finding out why the manufacturing sector in LDCS use highly capital-intensive techniques in-spite of relative scarcity of capital in these countries as compared to their abundant labour resources. Other shortcomings of previous studies include measurement inaccuracies and studying the employment effect of technical progress without differentiating the different types of labour affected by specifying whether it is the skilled or unskilled as well as the overall net effect.

5.2 CONCLUSION:

At the beginning of this work, the need to dissagregate the employment effects of technical progress in specific sectors, in specific countries was emphasized. From the results of the study, it was noted that such a desegregation assisted in highlighting a number of issues which would have been obscured in an aggregative analysis. First, as far as data drawn from Nigerian textile industry reveal, technical progress was found to be negatively associated with the employment of labour. Specifically, using a priori, statistical and economic criteria, it was also found that technical progress exerted a positive influence on the employment of skilled labour and a negative influence on the employment of unskilled labour.

The goodness of fit of the regression model was also found to be satisfactory suggesting that the explanatory variables in the model have explained adequately the variation in the dependent variables. The parameter estimates were equally found to be statistically significant when the relevant tests were conducted Park, (1966) Heteroscedastic test & Ramsy (1969) model specification error test have also validated the findings of the study.

. . . . . with reference to Nigeria's unemployment problems generally, one can say that Nigeria's unemployment problem is a post independence phenomenon. In 1960s most skilled workers had the problem of which job to choose among several but from late 1970's to date the reverse is the case. A lot of factors have been cited as causing the present state of high unemployment. These include demographic factors expressed

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in the form of high rate of population growth and decrease in mortality rate, the decline of agriculture and the ascendance of manufacturing sector particularly the oil industry, the low labour absorption of the industrial sector, high price of labour due to minimum wage laws, proliferation of Nigeria Universities and other tertiary institutions which results in over production of graduates with no where to work or be placed suggesting a haphazard, planless and non-functional educational system.

Other factors include high influx of immigrants from neighbouring countries, high rural-urban migration, wrong macro-economic policies of the central government which promotes the use of highly capital intensive techniques in manufacturing through setting low price of capital, low interest rate, low tariff for import of equipment and machinery, overvalued exchange rate and the recent increase in female labour participation in the Nigerian labour force, explained by the fact that jobs suited to women which were formerly handled by men are now captured by women particularly in the service industry, owing to a substantial increase in the number of educated women in the country.

Among all these aforementioned factors, technological progress at international level and the adoption of these techniques developed by advanced countries by LDCS have been singled out as the most dominant factor. So it is

often suggested that labour intensive technique be adopted. This suggestion is sensible and reasonable, but the obstacles in the way with regards to its proper implementation are many.

First, the industrial economy of Nigeria and most LDCS is controlled by MNCS, so it is difficult to control what you do not own. The choice of labour or capital intensive technique is made by private enterprise in the interest of both short and long run profitability. Secondly, in many industries the choice between capital and labour intensive technologies do not exist and if they exist, the labour intensive technique are often high cost processes. For, instance, there are very limited substitution possibilities in petrochemicals, oil drilling and iron and steel industry. This signifies limited choices and lack of control of certain factors and even if technological development and choices of techniques are controllable at the domestic front, there are constraints of long-run international competitiveness.

5.3 RECOMMENDATIONS

The study of un/employment problem entails the consideration of a variety of issues which suggests that it should not be restricted to aspects of technical progress alone, even though significant in this study. In view of this and in the light of the major findings of the study, the following recommendations are therefore made.

First, the problem of unemployment in LDCS and Nigeria in particular can be minimized if at least a proportion of research funds given to research institutions are devoted to the identification of labour intensive processes and techniques being used by both indigenous and multinational firms since many technologies "off the shelf" are not known to every decision maker. Therefore, from the point of view of technology policy or choice of techniques government may also resort to various measures to induce a change to labour intensive techniques. For, example, a wage subsidy or an increase in the nominal price of plant through the imposition of a tax, tariff or quota. If the government combines the subsidy with a package of measures including tax on equipment, the subsidy can be financed out of tax revenue.

Apart from the search for efficient labour intensive alternatives, appropriate adaptation of existing technology should also help to create more employment with limited investment resources. The necessary innovations may be made either by indigenous entrepreneurs and engineers or by multinational firms through government legislation or sanction.

Secondly, even though technological progress in the Nigerian textile industry is found to be associated with a decrease in the employment of labour particularly the unskilled, it is the recommendation of this study that solutions to the Nigerian unemployment problems should not be found by massive or complete control of technologies used by firms. Instead, the control should be gradual or in phases and sector by sector in the interest of higher productivity, economic growth and international competitiveness of Nigeria's products in the world market.

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Another area of concern from broad policy point of view is the wide gap between the needs and objectives of government in LDCS, the needs of their people and expectation of researchers. While the researchers are concerned about the appropriateness of technologies used in particular countries, the governments in these developing countries, Nigeria inclusive are more keen at importing whatever technology they can lay hands on for the purpose of modernizing their economies. The local people on the other

hand are more interested in the technology that enhance their jobs and incomes. This kind of difference between local people needs, government objectives/needs and researchers' expectation ought to be harmonized if proper and widely acceptable technology and employment policy is to emerge.

While the overall results of this study seem to support the broad view that technical progress is associated with displacement of human labour, the issue investigated merits further research in several directions. First, a more rigorous econometric approach would provide a more solid footing for the evidence. Secondly, a richer data set and a desegregated modeling is required to accommodate the various new conceptions given to technical progress.

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For, instance, further research in the area of this study can incorporate such variables as relative factor price changes, percentage change in the real GDP growth, growth in labour supply, wage changes for skilled and unskilled workers. Other variables that may be incorporated or considered separately include changes in productivity growth, increase in union militancy, job security legislation (employment protection), tax increases, contractionary fiscal and monetary policies, exchange rate changes, loss of competitiveness in world market and a fall in oil revenue.

It is also recommended that subsequent studies should examine not only the direct effect but equally the indirect effect and long-term effect, since it is the total effect that matters in the context of development economics.

Finally, from the point of view of policy recommendations that can promote employment, job creation strategy should comprise of a wide range of measures such as the promotion of small and medium scale enterprises, promotion of backward and forward linkage effects, tax allowances and other subsidies to promote new enterprises. These measures should be carried out simultaneously with industrial research activities that can find local substitutes to our industrial raw materials, machine and equipment. This idea is in line with the package approach to solving Nigeria's unemployment problems suggested by Agiobenebo et-al (1986).

One other policy recommendation drawn from this study is that effective national planning to contain the unemployment problem rests also on a thorough analysis of structural changes taking place in the manufacturing industry and labour markets through a propre understanding of the factors affecting the demand and supply of labour. This requires no doubt, integrating many other factors that are not only micro but macro in nature such as the effect of the rate of GDP change, wage changes, relative

factor price changes or ratio, exchange rate changes and changes in the supply of raw materials among others in subsequent investigations. It is hoped that this will set the stage for proper understanding of the sources or causes and composition of unemployment and provide insights into the unemployment problem.

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APPENDIX I

LIST OF TEXTILE FIRMS IN KANO STATE

	NAME	LOCATIONAL ADDRESS
1.	Universal Group Company (Integrated Firm)	
	(a) Universal Textile Ltd.	No.1 Independence Road, Bompai Kano
	(b) Universal Spinners Ltd.	No.1 Independence Road, Bompai Kano
	(c) Holborn Ltd.	No.1 Independence Road, Bompai Kano
2.	Gaskiya Textile Mill Ltd.	No.583 Nababa Badamasi Road, Bompai Kano.
3.	Bagauda Textile Ltd.	No.17 Nababa Badamasi Road, Bompai, Kano.
4.	Kano Textile Printers Plc	No.5 Independence Road, Bompai, Kano.
5.	Kano Textile Industry Ltd.	No.28 Dantata Road, Bompai, Kano.
6.	Northern Textile Manufacturers Ltd., Kano	No.9 Independence Road, Bompai, Kano.
7.	Dangote Textile Ltd.	Maimalari Road, Bompai (Near Holborn).
8.	Nigerian Braiding & Brocade Manufacturing Company Ltd.	No.12 Nababa Badamasi Road, Bompai, Kano.
9.	Nigerian Spinners & Dyers Ltd.	No.6 Independence Road, Bompai, Kano.
10.	Terytex Nigeria Ltd.	No.134 Mission Road, Bompai, Kano.
11.	Fahid Dayekh & Company Ltd.	No.1327 Independence Road, Kano.
12.	Lakhi Textile Industry Ltd.	No.102 Maganda Road, Bompai, Kano.
13.	Normit Nigeria Ltd.	No.18 Dantata Road, Bompai, Kano.

APPENDIX I (CONT.)

14.	Ila Industry Ltd.	Challawa Industrial Area, Kano. (Near Coca-Cola plant).
15.	Adhama Textile & Garment Ltd.	No.171 Mission Road, Bompai, Kano.
16.	Keyfad Spinners Ltd.	Sharada Industrial Estate, Kano
17.	Angel Spinners Ltd.	Sharada Industrial Estate, Kano
18.	Agroventures Ltd.	Hadejia Road, Kano.
19.	Daje Industries Ltd.	Sharada Industrial Estate, Kano.
20.	Leader Textile Ltd.	Gwammaja, Kano.
21.	Sutura Textile Ltd.	No. C-2 St. Louis Avenue Bompai, Kano.
22.	Libo Industry Ltd.	No. 80/82 Tafawa Balewa Road, Bompai, Kano.
23.	Madratex Ltd.	No. 50 Tafawa Balewa Road, Kano.
24.	Garment Manufacturing Company Ltd.	Plot 18 Sharada Industrial Estate Phase II, Kano.
25.	Tropical Tarpaulin Nigeria Ltd.	No. 167 Mission Road, Bompai, Kano.

Source:
i) Kano State Commercial and Industrial Handbook (1988) Tofa Commercial Press, Ltd.
ii) Potential Investors Guide to Kano State, Creative Prints, (undated)
iii) Brandell, I. (1991) Workers in Third World Industrialization (Macmillan)

APPENDIX II

LIST OF TEXTILE FIRMS IN KADUNA STATE

	NAME	LOCATION ADDRESS
1.	Kaduna Textile Ltd. (KTL)	No. 1 Textile Road, Kakuri-Kaduna South.
2.	Arewa Textile Nigeria Ltd.	D.T.C. Road, Kakuri-Kaduna South
3.	United Nigerian Textile Plc	Nassarawa Road, Kakuri-Kaduna South
4.	Unitex Ltd.	Opposite St. Gerrad Hospital Kakuri-Kaduna South
5.	Chelcotex Ltd.	Western Express Bye-pass by Flour Mills Kaduna.
6.	Blanket Manufacturers Company Ltd.	Western Express Bye-pass by Bridge, Kaduna.
7.	Supertex Ltd.	D.I.C. Road Kakuri-Kaduna South
8.	Finetex Ltd.	Inuwa Abdulkadir Road, Area 13, Kaduna South
9.	Nortex Ltd.	D.I.C Road Area 13 Kakuri-Kaduna South
10.	Harco Textile	Cikaji Industrial Area, Zaria
11.	Zaria Tarpaulin Industry Ltd.	Old Jos Road, Zaria
12.	Dangazau Ltd.	Western Bye-pass/Abuja Junction, Kaduna.

Sources:
i) Guide to Commercial/Industrial Investment Opportunities in Kaduna State – United Booklet produced by Kaduna State Ministry of Commerce, Industry and Tourism.
ii) Brandell, I. (1991) Workers in Third World Ind. (Macmillan)

APPENDIX III

OWNERSHIP STRUCTURE OF SOME KANO TEXTILE FIRMS

S/N	NAME	OWNERSHIP	PERCENTAGE
1.	Angel Spinners & Dyers Ltd.	Nigerian	100%
		Foreign	NIL
2.	Holborn Nigeria Ltd.	Nigerian	60%
		Foreign	40%
3.	Kano Textile Industries Ltd.	Nigerian	80%
		Foreign	20%
4.	Lakhi Textile Industry Ltd.	Nigerian	45%
		Foreign	55%
5.	Madratex Limited	Nigerian	45%
		Foreign	55%
6.	Nigerian Spinners & Dyers Ltd.	Nigerian	60%
		Foreign	40%
7.	Nornit Limited	Nigerian	43%
		Foreign	57%
8.	Northern Textile Manufacturing	Nigerian	61.7%
	Ltd.	Foreign	57%
9.	Terytex Nigerian Limited	Nigerian	60%
		Foreign	40%
10.	Universal Textile Ind. Ltd.	Nigerian	75%
		Foreign	25%

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APPENDIX III (CONT.)

11..	Gaskiya Textile Ltd.	Nigerian	100%
		Foreign	-
12.	Bagauda Textile Ltd.	Nigerian	100%
		Foreign	-
13.	Universal Spinners Ltd.	Nigerian	79%
		Foreign	21%
14.	Kano Textile Printers	Nigerian	100%
		Foreign	-
15.	Adhama Textile & Garment Ltd.	Nigerian	100%
		Foreign	-
16.	Integrated Fibres Ltd.	Nigerian	71%
		Foreign	29%
17.	Kayfad Spinetex	Nigerian	100%
		Foreign	-

Sources:

i) Kano State Commercial and Industrial Handbook, (1988) Tofa Commercial Press, Ltd.

ii) Potential Investors Guide to Kano State, Creative Prints, (undated).

iii) Brandell, I. (1991), Workers in Third World Industrialization, Macmillan

iv) Nigerian Industrial Directory (undated), Published by Manufacturers Association of Nigeria (MAN).

v) Field work

N. A. Not Available

APPENDIX IV

OWNERSHIP STRUCTURE OF SOME KADUNA STATE TEXTILE FIRMS

S/N	NAME	OWNERSHIP	PERCENTAGE
1.	Chellco Industries Limited	Nigerian	55%
		Foreign	45%
2.	Kaduna Textile Ltd.	Nigerian	78%
		Foreign	22%
3.	United Nigeria Textiles Ltd.	Nigerian	40%
		Foreign	60%
4.	Zaria Industries Limited	Nigerian	61%
		Foreign	39%
5.	Unitex (Nig.) Limited	Nigerian	N. A.
		Foreign	N. A.
6.	Supertex (Nig.) Limited	Nigerian	N. A.
		Foreign	N. A.
7.	Dagazau Limited	Nigerian	N. A.
		Foreign	N. A.
8.	Arewa Textile Limited	Nigerian	40%
		Foreign	60%
9.	Harco Textile	Nigerian	N. A.
		Foreign	N. A.
10.	Nortex Limited	Nigerian	47%
		Foreign	53%
11.	Finetex limited	Nigerian	73%
		Foreign	27%
12.	Blanket Manufactures Coy. Ltd.	Nigerian	N. A.
		Foreign	N. A.

Sources:
i) Nigerian Industrial Directory (undated), published by Manufacturers Association of Nigeria (MAN).
ii) Brandell, I. (1991) Workers in Third World Industrialization. Macmillan.
iii) Field work

N. A. Not Available.

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APPENDIX V

NIGERIAN TEXTILE INDUSTRY. TYPE OF PROCESS AND PERCENTAGE OF INSTALLED MACHINERY

Location	Spindles %	Rotors %	Shuttle Looms %	Shuttleless Loom %	Knitting %	Embroidery %
Lagos	33	40	39	69	97	60
Kano	9	42	3	22	0	7
Kaduna	33	18	33	8	0	
Other South	15	0	16	1	3	0
Other North	9	0	8	0	0	0
Total %	100	100	100	100	100	100
Number of Machines	662,268	4,893	18,409	2,060	811	215

Source: Adapted from Andrae & Beekman (1987), Page 23.

APPENDIX VI

List of Textile Firms that Responded Fully to the Questionnaire.

S/N	NAME
01	Finetex Ltd
02	Kaduna Textile Ltd
03	Nortex Nigeria Ltd
04	Arewa Textile PLC
05	Kano Textile Printers (KTP)
06	Leader Textile Mill Ltd
07	Terrytex Nigeria Ltd
08	Dangote General Textile Ltd
09	Angel Spinners Ltd
10	Lakhi Textile Ltd
11	Kayfad Spinetex Nigeria Ltd
12	Integrated Fibres Ltd
13	Adhama Textile Nigeria Ltd
14	Northen Textile manufacturers Ltd (NTM)
15	Universal Spinners and Dyers
16	UNTL Kaduna
17	Bagauda Textile Mill Ltd
18	Gaskiya Textile Ltd
19	Universal Textiles Ltd
20	Holborn Nigeria Ltd
21	Zaria Tarpauline Industry Ltd.

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List of Textile Firms That Did Not Respond

S/N	NAME
01	Nigerian Spinners & Dyers Kano
02	Chelcotex Ltd, Kaduna
03	Blanket Manufacturers Company Ltd, Kaduna
04	Supertex Ltd Kaduna
05	Nigerian Braiding and Brocade Manufacturing Company, Kano.

List of Closed Factories At The Time of Field Work.

S/N	NAME
01	Dagazau Ltd Kaduna
02	Harco Textile Kaduna
03	Tropical Tarpaulin Kano
04	Sutura Textile Kano

EQUATION I

ROW	Y	X2	X1	X3
1	1.6	7.4	1	2.5
2	1.1	22.1	1	4.4
3	6.2	5.7	1	1.5
4	10.1	39.2	1	7.5
5	8.8	55.3	1	6.0
6	46.2	13.4	0	24.5
7	20.8	14.2	1	16.8
8	5.2	30.0	1	3.6
9	30.9	46.1	1	19.5
10	144.0	41.1	1	98.0
11	19.7	55.9	0	15.2
12	2.0	12.9	1	1.5
13	45.2	5.2	0	23.2
14	46.8	50.0	1	24.9
15	19.6	13.3	1	15.5
16	5.9	80.6	1	5.0
17	54.5	51.0	1	35.8
18	102.0	10.2	1	72.0
19	22.6	1.1	1	17.0
20	30.0	34.1	1	22.0
21	0.0	6.5	1	0.5

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	Y	X2	X1
X2	0.063		
X1	-0.086	0.066	
X3	0.991	0.067	-0.019

The regression equation is
Y = 6.00 + 0.0030 X2 - 6.68 X1 + 1.48 X3

Predictor	Coef	Stdev	t-ratio
Constant	6.004	2.883	2.08
X2	0.00304	0.04473	0.07
X1	-6.677	2.755	-2.42
X3	1.47636	0.04098	36.03

s = 4.406 R-sq = 98.7% R-sq(adj) = 98.5%

Analysis of Variance

SOURCE	DF	SS	MS
Regression	3	25511.7	8503.9
Error	17	330.0	19.4
Total	20	25841.7	

SOURCE	DF	SEQ SS
X2	1	103.6
X1	1	209.4
X3	1	25198.7

EQUATION I (CONT.'D)

Unusual Observations

Obs.	X2	Y	Fit	Stdev.Fit	Residual	St.Resid
10	41.1	144.000	144.135	3.383	-0.135	-0.05 X
11	55.9	19.700	28.614	2.916	-8.914	-2.70R
14	50.0	46.800	36.240	1.409	10.560	2.53R

R denotes an obs. with a large st. resid.
X denotes an obs. whose X value gives it large influence.

Durbin-Watson statistic = 2.01

* LX1 has all values = 0
* LX1 has been removed from the equation

The regression equation is
LY = 0.275 - 0.050 LX2 + 1.07 LX3

20 cases used 1 cases contain missing values

Predictor	Coef	Stdev	t-ratio
Constant	0.2755	0.4262	0.65
LX2	-0.0498	0.1164	-0.43
LX3	1.0693	0.1059	10.09

s = 0.5391 R-sq = 85.8% R-sq(adj) = 84.1%

Analysis of Variance

SOURCE	DF	SS	MS
Regression	2	29.787	14.893
Error	17	4.941	0.291
Total	19	34.728	

SOURCE	DF	SEQ SS
LX2	1	0.170
LX3	1	29.617

Unusual Observations

Obs.	LX2	LY	Fit	Stdev.Fit	Residual	St.Resid
2	3.10	0.095	1.706	0.160	-1.610	-3.13R
3	1.74	1.825	0.622	0.274	1.202	2.59R
19	0.10	3.118	3.300	0.364	-0.182	-0.46 X
21	1.87	*	-0.559	0.364	*	* X

R denotes an obs. with a large st. resid.
X denotes an obs. whose X value gives it large influence.

Durbin-Watson statistic = 2.16

EQUATION II

ROW	Y	X2	X1	X3
1	12.2	7.4	1	2.5
2	0.8	22.1	1	4.4
3	13.3	5.7	1	1.5
4	25.0	39.2	1	7.5
5	11.1	55.3	1	6.0
6	0.0	13.4	0	4.5
7	23.1	14.2	1	16.8
8	150.0	30.0	1	98.9
9	9.6	46.1	1	19.5
10	150.0	41.1	1	105.0
11	30.0	55.9	0	15.2
12	6.2	12.9	1	1.5
13	60.0	5.2	0	43.2
14	16.9	50.0	1	24.9
15	21.9	13.3	1	15.5
16	6.3	80.6	1	5.0
17	58.1	51.0	1	35.8
18	43.1	10.2	1	72.0
19	7.6	1.1	1	17.0
20	100.0	34.1	1	72.0
21	2.7	6.5	1	0.5

	Y	X2	X1
X2	0.128		
X1	0.052	0.066	
X3	0.940	0.075	0.079

The regression equation is
Y = - 0.3 + 0.122 X2 - 3.3 X1 + 1.30 X3

Predictor	Coef	Stdev	t-ratio
Constant	-0.33	10.52	-0.03
X2	0.1217	0.1662	0.73
X1	-3.28	10.26	-0.32
X3	1.3025	0.1133	11.50

s = 16.37 R-sq = 88.8% R-sq(adj) = 86.8%

Analysis of Variance

SOURCE	DF	SS	MS
Regression	3	36152	12051
Error	17	4554	268
Total	20	40706	

SOURCE	DF	SEQ SS
X2	1	671
X1	1	77
X3	1	35404

EQUATION II (CONT.'D)

Unusual Observations

Obs.	X2	Y	Fit	Stdev.Fit	Residual	St.Resid
18	10.2	43.10	91.41	7.17	-48.31	-3.28R

R denotes an obs. with a large st. resid.

Durbin-Watson statistic = 2.18

* LX1 has all values = 0
* LX1 has been removed from the equation

The regression equation is
LY = 1.14 + 0.017 LX2 + 0.687 LX3

20 cases used 1 cases contain missing values

Predictor	Coef	Stdev	t-ratio
Constant	1.1403	0.5988	1.90
LX2	0.0171	0.1856	0.09
LX3	0.6873	0.1349	5.09

s = 0.8582 R-sq = 62.2% R-sq(adj) = 57.7%

Analysis of Variance

SOURCE	DF	SS	MS
Regression	2	20.595	10.297
Error	17	12.522	0.737
Total	19	33.116	

SOURCE	DF	SEQ SS
LX2	1	1.483
LX3	1	19.112

Unusual Observations

Obs.	LX2	LY	Fit	Stdev.Fit	Residual	St.Resid
2	3.10	-0.223	2.212	0.243	-2.435	-2.96R

R denotes an obs. with a large st. resid.

Durbin-Watson statistic = 2.77

EQUATION III

APPENDIX XI

ROW	Y	X2	X1	X3
1	0.2	7.4	1	2.5
2	4.6	22.1	1	4.4
3	6.5	5.7	1	1.5
4	13.0	39.2	1	7.5
5	10.3	55.3	1	6.0
6	53.1	13.4	0	24.5
7	7.1	14.2	1	16.8
8	4.0	30.0	1	3.6
9	43.7	46.1	1	19.5
10	133.3	41.1	1	98.0
11	25.7	55.9	0	15.2
12	12.5	12.9	1	1.5
13	48.7	5.2	0	23.2
14	16.7	50.0	1	24.9
15	20.0	13.3	1	15.5
16	9.3	80.6	1	5.0
17	67.2	51.0	1	35.8
18	110.1	10.2	1	72.0
19	22.6	1.1	1	17.0
20	30.0	34.1	1	22.0
21	0.0	6.5	1	0.5

	Y	X2	X1
X2	0.053		
X1	-0.142	0.066	
X3	0.962	0.067	-0.019

The regression equation is
Y = 12.8 - 0.0038 X2 - 12.2 X1 + 1.42 X3

Predictor	Coef	Stdev	t-ratio
Constant	12.798	6.194	2.07
X2	-0.00385	0.09609	-0.04
X1	-12.242	5.918	-2.07
X3	1.42118	0.08804	16.14

s = 9.466 R-sq = 94.0% R-sq(adj) = 93.0%

Analysis of Variance

SOURCE	DF	SS	MS
Regression	3	23962.7	7987.6
Error	17	1523.3	89.6
Total	20	25486.0	

SOURCE	DF	SEQ SS
X2	1	72.4
X1	1	539.9
X3	1	23350.5

EQUATION III (CONT.'D)

Unusual Observations

Obs.	X2	Y	Fit	Stdev.Fit	Residual	St.Resid
10	41.1	133.30	139.67	7.27	-6.37	-1.05 X
14	50.0	16.70	35.75	3.03	-19.05	-2.12R

R denotes an obs. with a large st. resid.
X denotes an obs. whose X value gives it large influence.

Durbin-Watson statistic = 2.06

* LX1 has all values = 0
* LX1 has been removed from the equation

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The regression equation is
LY = 0.276 + 0.064 LX2 + 0.947 LX3

20 cases used 1 cases contain missing values

Predictor	Coef	Stdev	t-ratio
Constant	0.2762	0.7550	0.37
LX2	0.0636	0.2062	0.31
LX3	0.9470	0.1877	5.05

s = 0.9551 R-sq = 60.7% R-sq(adj) = 56.1%

Analysis of Variance

SOURCE	DF	SS	MS
Regression	2	23.981	11.990
Error	17	15.507	0.912
Total	19	39.488	

SOURCE	DF	SEQ SS
LX2	1	0.753
LX3	1	23.228

Unusual Observations

Obs.	LX2	LY	Fit	Stdev.Fit	Residual	St.Resid
1	2.00	-1.609	1.271	0.395	-2.881	-3.31R
12	2.56	2.526	0.823	0.440	1.703	2.01R
19	0.10	3.118	2.965	0.645	0.153	0.22 X
21	1.87	*	-0.261	0.644	*	* X

R denotes an obs. with a large st. resid.
X denotes an obs. whose X value gives it large influence.

Durbin-Watson statistic = 1.28

APPENDIX XII Computed D.W. d Statistic & Tabulated Values.

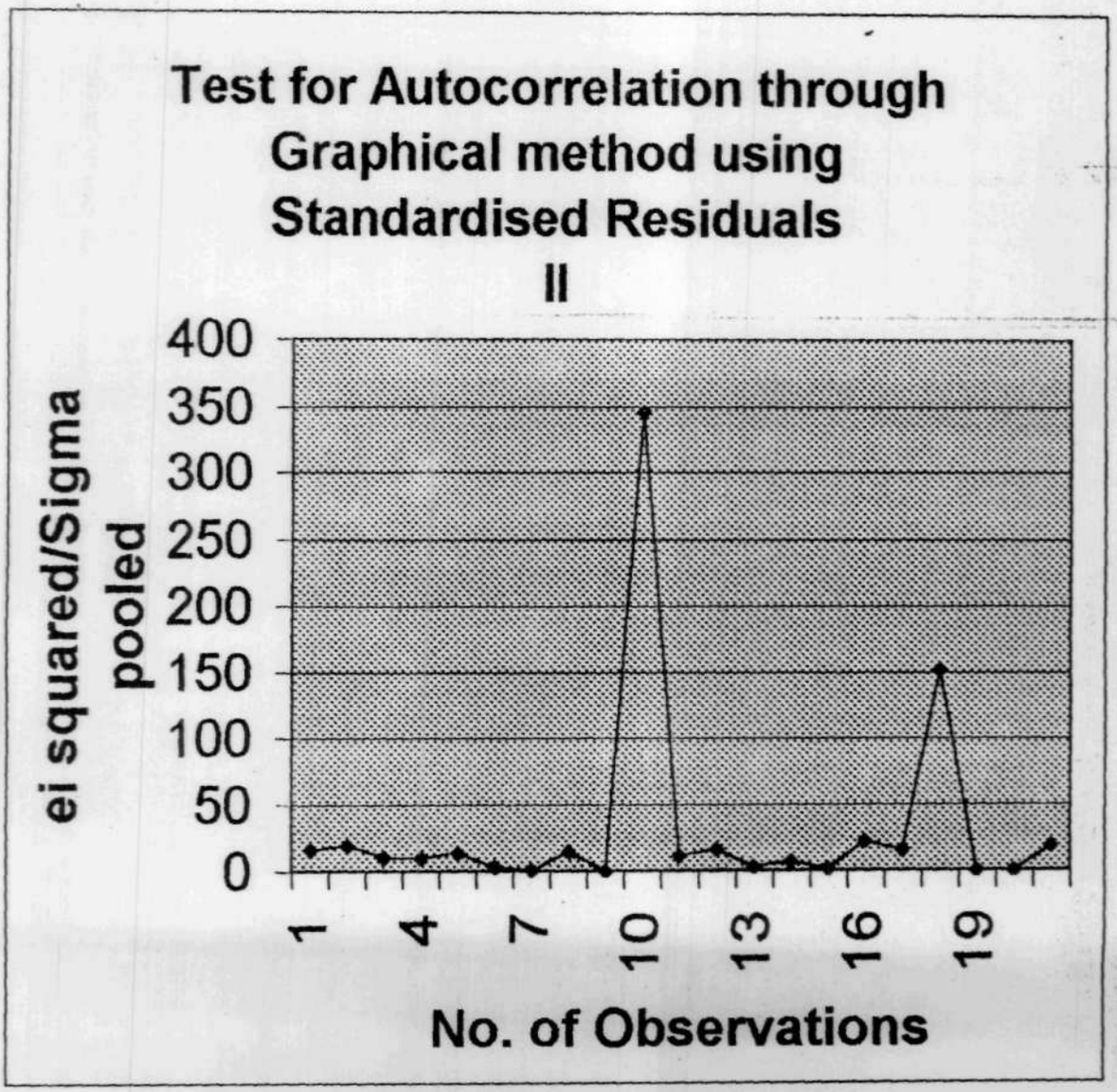
Equations	Computed D.W. Statistic	Tabulated d Values		Remarks
		0.05	0.01	
1	2.01	dL = 1.125 du = 1.538	dL = 0.890 du = 1.277	The hypothesis of no autocorrelation is accepted.
2	2.18	dL = 1.125 du = 1.538	dL = 0.890 du = 1.277	- do -
3	2.06	dL = 1.125 du = 1.538	dL = 0.890 du = 1.277	- do -

APPENDIX XIII

st for Autocorrelation through graphical method using Standardised residuals

of Observations	e_i^2	e_i^2 /sigma pooled(37.66)
1	597.31	15.86
2	707.56	18.79
3	385.73	10.24
4	381.42	10.13
5	513.02	13.62
6	110.04	2.92
7	36	0.96
8	547.09	14.53
9	0.24	0.0064
10	13032.51	346.06
11	433.47	11.51
12	608.12	16.15
13	108.37	2.88
14	254.08	6.75
15	50.41	1.34
16	807.13	21.43
17	554.13	14.71
18	5722.92	151.96
19	7.4	0.2
20	0.92	0.024
21	672.36	17.85

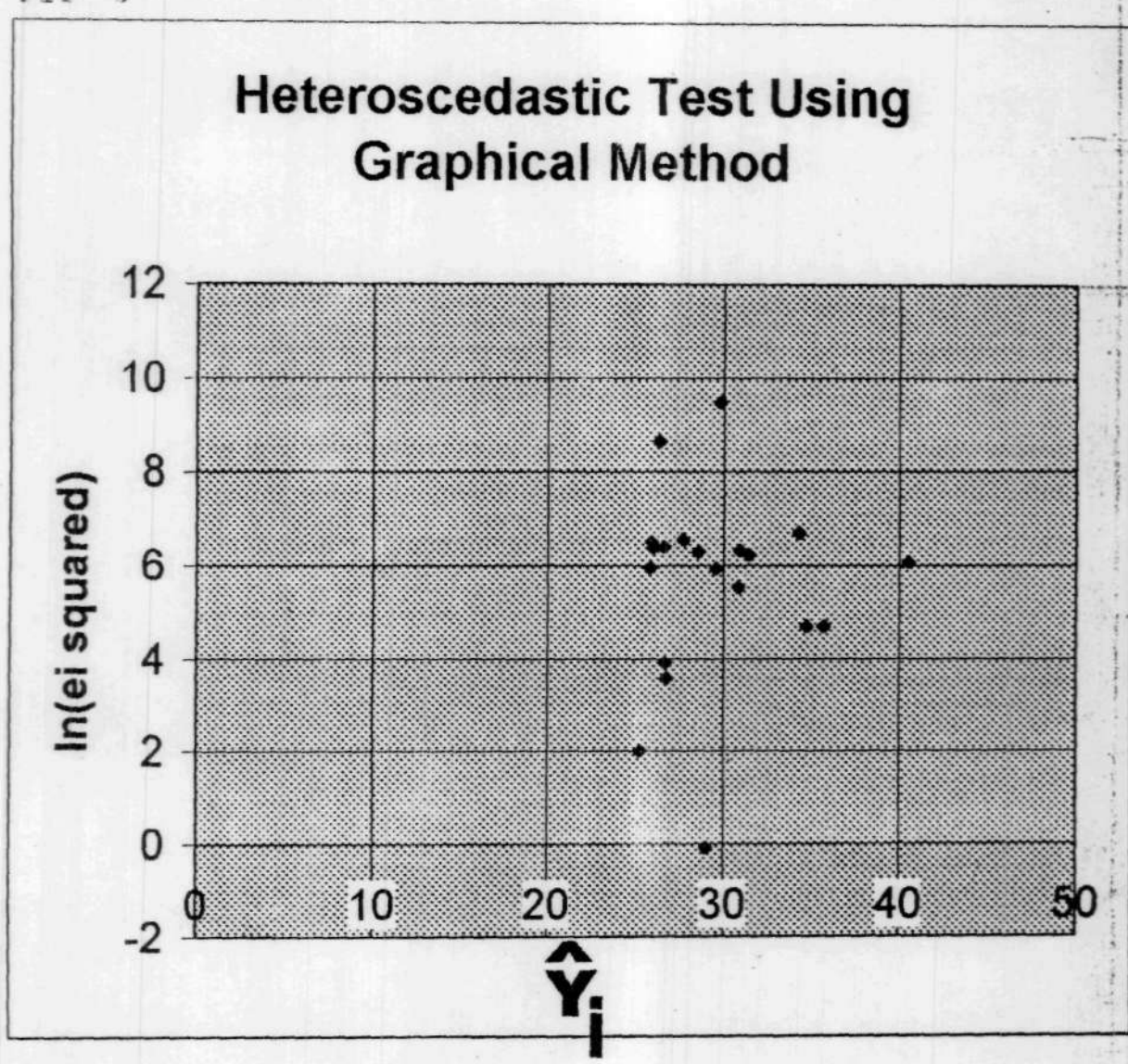
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Test for Autocorrelation through Graphical method using Standardised Residuals
II
ei squared/Sigma pooled
400
350
300
250
200
150
100
50
0
1
4
7
10
13
16
19
No. of Observations

APPENDIX XIV

Heteroscedastic Test Using Graphical Method

No. of Obsevations	yi	y^i	ei=yi-yi	ei^2	LN(ei^2)
1	1.6	26.04	-24.44	597.3136	6.392442
2	1.1	27.7	-26.6	707.56	6.561822
3	6.2	25.84	-19.64	385.7296	5.955137
4	10.1	29.63	-19.53	381.4209	5.943903
5	8.8	31.45	-22.65	513.0225	6.24032
6	46.2	35.71	10.49	110.0401	4.700845
7	20.8	26.8	-6	36	3.583519
8	5.2	28.59	-23.39	547.0921	6.304617
9	30.9	30.41	0.49	0.2401	-1.4267
10	144	29.84	114.16	13032.51	9.475202
11	19.7	40.52	-20.82	433.4724	6.071828
12	2	26.66	24.66	608.1156	6.410365
13	45.2	34.79	10.41	108.3681	4.685534
14	46.8	30.86	15.94	254.0836	5.537663
15	19.6	26.7	-7.1	50.41	3.92019
16	5.9	34.31	-28.41	807.1281	6.693482
17	54.5	30.96	23.54	554.1316	6.317402
18	102	26.35	75.65	5722.923	8.652235
19	22.6	25.32	-2.72	7.3984	2.001264
20	30	29.04	0.96	0.9216	-0.08164
21	0	25.93	-25.93	672.3649	6.510801


Heteroscedastic Test Using Graphical Method
ln(ei squared)
12
10
8
6
4
2
0
-2
0
10
20
30
40
50
Ŷi

Park (1966) Hetroscedastic Test

Model ln ei^2 = alpha + beta1 ln(X1) + beta2 ln(X2) + ui

Y = alpha + beta1 X1 + beta2 X2 + ui

s/n	X1	X2	ei	ei^2	Ln(ei^2)	Ln(X2)
1	1	7.4	-24.44	597.3136	6.39244227	2.00148
2	1	22.1	-26.6	707.56	6.56182243	3.09557609
3	1	5.7	-19.64	385.7296	5.95513661	1.74046617
4	1	39.2	-19.53	381.4209	5.94390349	3.66867674
5	1	55.3	-22.65	513.0225	6.2403197	4.01277290
6	0	13.4	-10.49	110.0401	4.70084484	2.59525470
7	1	14.2	-6	36	3.58351894	2.65324196
8	1	30	-23.39	547.0921	6.30461716	3.40119738
9	1	46.1	0.49	0.2401	-1.4266998	3.83081295
10	1	41.1	114.16	13032.51	9.47520195	3.71600812
11	0	55.9	-20.82	433.4724	6.07182813	4.02356438
12	1	12.9	-24.66	608.1156	6.410365	2.557227311
13	0	5.2	10.41	108.3681	4.68553377	1.648658626
14	1	50	15.94	254.0836	5.53766335	3.912023005
15	1	13.3	-7.1	50.41	3.92018957	2.587764035
16	1	80.6	-28.41	807.1281	6.69348239	4.38949865
17	1	51	23.54	554.1316	6.3174022	3.931825633
18	1	10.2	75.65	5722.923	8.65223488	2.32238772
19	1	1.1	-2.72	7.3984	2.00126376	0.09531018
20	1	34	0.96	0.9216	-0.081644	3.526360525
21	1	6.5	-25.93	672.3649	6.5108012	1.871802177

SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.061272287
R Square	0.003754293
Adjusted R S	-0.106939674
Standard Err	2.694365564
Observations	21

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ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	2	0.49243313	0.246216565	0.033916	0.96671435
Residual	18	130.6729043	7.259605792		
Total	20	131.1653374			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*
Intercept	4.983549504	1.696785048	2.937054113	0.00881	1.41873364	8.548365368
X Variable 1	0.096704043	1.683942816	0.057427154	0.954838	-3.4411313	3.634539358
X Variable 2	0 006812862	0.02728796	0.249665492	0.805673	-0.0505171	0.064142784

Ramsey's (1969) Model Specification ERROR TEST

Model Y1 = alpha + Beta1 X1 + Beta2 X2 + Beta3 X3 + u

No. of Observations	Y1	X1	X2	3 (Y1^ Squared)
1	16	1	7.4	678.08
2	11	1	22.1	767.29
3	6.2	1	5.7	667.71
4	10.1	1	39.2	877.94
5	8.8	1	55.3	989.1
6	46.2	0	13.4	1275.2
7	20.8	1	14.2	718.24
8	5.2	1	30	817.39
9	30.9	1	46.1	924.77
10	144	1	41.1	890.43
11	19.7	0	55.9	1641.87
12	2	1	12.9	710.76
13	45.2	0	5.2	1210.34
14	46.8	1	50	952.34
15	19.6	1	13.3	712.89
16	5.9	1	80.6	1177.18
17	54.5	1	51	958.52
18	102	1	10.2	694.32
19	22.6	1	1.1	641.1
20	30	1	34.1	843.32
21	0	1	6.5	672.36

SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.283799232
R Square	0.080542004
Adjusted R Square	-0.08171529
Standard Error	37.3854271
Observations	21

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	3	2081.345382	693.7817941	0.496384493	0.68962931
Residual	17	23760.39271	1397.67016		
Total	20	25841.7381			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*
Intercept	717.7097317	608.09066	1.180267646	0.254145785	-565.251207	2000.6707
X Variable 1	-342.616647	297.4779823	-1.15173783	0.265369645	-970.241205	285.00791
X Variable 2	4.030594886	3.503791585	1.150352351	0.265924045	-3.36176951	11.422959
X Variable 3	-0.56750081	0.504531463	-1.12480757	0.276301896	-1.63197064	0.496969

Lower 95.0%	*Upper 95.0%*
-565.2512072	2000.670671
-970.2412049	285.0079105
-3.361769506	11.42295928
-1.631970635	0.496969017

APPENDIX XVII

Ramsey's (1969) Formulae for Model Specification Error Test

$$F = \frac{R^2 - R^2_{old} \;/\; \text{Number of new regressors}}{1 - R^2_{new} \;/\; N}$$

Where

N = Number of parameters in the new model.

Substituting $F = \frac{0.081 - 0.12 / 3}{1 - 0.081 / 4} = 0.13 / 0.005 = 2.6$

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APPENDIX viii: SURVEY INTRODUCTORY LETTER

Department of Economics

AHMADU BELLO UNIVERSITY, ZARIA, NIGERIA

OFFICE OF THE HEAD

Our Ref:.....

Your Ref:.....

Direct: 069-50744
Tel. Fax: 069-50891
Telegrams: UNIBELL

Date: Dec 4, 19..

Dear/Sir/Madam,

LETTER OF INTRODUCTION:

We are involved in academic research that tries to examine the effect of technical progress and turnover (Sales) on the level of employment using Nigerian Textile firms as a reference.

2. We are happy to say that your enterprise is among the few selected for this purpose.

3. We would therefore highly appreciate if you could give audience and cooperation to the bearer of this letter - a research assistant employed to administer the questionnaires.

4. We equally want to asure you that all information given will be treated with strictness confidentiality and will not be used for any other purpose(s) other than purely academic interest.

5. We are counting on your usual cooperation and assistance.

6. Thanks.

Dr. (Mrs) P.S. Aku
(ECONOMIST)
LEAD RESEARCHER

Mr. BADAYI M. SANI
(Development Economist)
Co-Researcher

APPENDIX XIX

SAMPLE QUESTIONNAIRE

SURVEY OF TEXTILE FIRMS IN KANO AND KADUNA STATES OF NIGERIA

INTRODUCTION:

This questionnaire is designed to solicit for information that will be used in completing an academic research. It would be highly appreciated if you could please respond appropriately and adequately to the questions asked in the questionnaire.

For the purpose of filling this questionnaire, skilled labour is interpreted to mean those who have a formal qualification exceeding secondary school certificate. Semi-skilled are those that have school certificate or its equivalent and/or those that have received vocational training. Unskilled labour are those that have primary education or no formal education at all. You are also free to use additional sheet where the space provided for an answer is inadequate. You can also enclose the company booklet, report or leaflet that may contain almost all the answers to the questions asked in the questionnaire.

Be assured that all the information given will not be treated for any other thing other than for purely academic purposes. It will also be strictly treated as confidential.

Thanks for the anticipated cooperation.

SECTIN A: COMPANY BIODATA

1. Name of Enterprise _____

2. Year Established _____

3. Year in which production started if different from above _____

_____

4. Locational Address _____

_____

5. Ownership structure

	%
Nigeria	
Foreign	

6. Nationality of Foreign partners _____

_____

_____

7. Manufactured product(s) _____

_____

_____

_____

SECTION B: PRODUCTION ASPECTS

8. Sources of inputs (raw materials):

	%
Local	
Imports	

9. Destination of outputs (Markets) _____

_____

_____

10. Plant installed capacity _____

_____

_____

11. Current level of production and % of utilised capacity _____

_____

_____

12. Current level of workforce, excluding temporary workers (Casual):

a) Skilled _____

b) Semi-skilled _____

c) Unskilled _____

Total: _____

13. Total workforce at the initial year of operation:

d) Skilled _____

e) Semi-skilled _____

f) Unskilled _____

Total: _____

14. Type of production process used by the firm: _____

_____

_____

_____

15. Type of management structure used by the firm: _____

_____

_____

_____

SECTION C: TECHNOLOGICAL ASPECTS

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(I) **PROCESS INNOVATION**

16. Have you ever changed your machinery/plant or production process generally since inception. Specify the year(s) _____

_____

_____

_____

a) If yes, was the change accompanied with new production technique that is more efficient. _____

_____

_____

b) Was the new technique cheaper or costlier?_____

_____

_____

c) Was the new technique more labour or capital using than the previous:_____

_____

_____

17. What motivate the firm to change its production process or replace the old plants: Was it due to

i) Obsolescence of plants

ii) Frequent break downs

iii) Just to take advantage of new improved machines for enhanced output, efficiency and profitability.

iv) Others (specify) _____

_____

_____

18. Has your company ever acquired a patent right for a certain process: (specify the year(s) _____

_____

_____

19. Did your company re-train or employ new specialised labour after changing its plant or production process_____

_____

_____

20. What category of labour did you employ and how many of each:

_____

_____

No.

i) Skilled _____

ii) Semi-skilled _____

iii) Unskilled _____

22. If the firm has never changed its plant or production process, what are the likely reasons _____

_____

_____

_____

(II) **MANAGEMENT INNOVATION**

23. Has the firm ever changed its management style since inception

_____

_____

24. What category of labour accompanied the change or got employed

No.

i) Skilled _____

ii) Semi-skilled _____

iii) Unskilled _____

25. What category of labour were laid-off as a result of the change

No.

i) Skilled _____

ii) Semi-skilled _____

iii) Unskilled _____

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26. What factors motivate the firm to change its management style: Was it due to

i) Inefficiency in production/management

ii) Low sales

iii) Others (specify)_____

_____

27. How does the new organizational structure of the firm look like

_____

_____

28. Has the firm ever computerized some of its operations i.e. accounting system. (specify) _____

_____

_____

29. How many and what category of labour were employed or trained due to such change

No.

i) Skilled_____

ii) Semi-skilled_____

iii) Unskilled_____

30. How many and what category of labour force were laid-off as a result of the change:

No.

i) Skilled_____

ii) Semi-skilled_____

iii) Unskilled_____

31. If the firm has never changed its management style or computerized any of its operation or activity, specify the likely reasons:

_____

_____

_____

(III) **PRODUCT INNOVATION**

32. How many new products were introduced by the firm since inception (Specify the years)

_____

_____

33. How many existing products were improved since inception (Specify the years)

_____

_____

34. What motivate the firm to introduce new products or improve existing ones. _____

_____

_____

35. Did the introduction of new products spur an increase or decrease in the workforce. Specify accordingly

	No.	% Increase	% Decrease
i) Skilled			
ii) Semi-skilled			
iii) Unskilled			

36. If firm has never introduced new product(s), what do you think are the likely reasons: _____

_____

_____

SECTION D: GENERAL ASPECTS

37. Specify The years of low production, low capacity utilization or closures since you started production, as well as the % of capacity utilization and level of output in those years:

Year	Level of output (Tons/Metres/Units)	% of capacity utilization

38. List or indicate likely causes of such low capacity utilization and low production or total closure:

i) Inadequacy of capital
ii) Workers strike
iii) High cost of raw materials/utilities
iv) High cost of labour inputs
v) Breakdown of plants (Machinery)
vi) High cost of imports
vii) Shortage of essential inputs
viii) Others (specify) _____

_____

_____

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39. How often do you send your staff for training and re-training.

a) Once every year
b) Twice every year
c) Once every 2 or 3 years
d) Others (specify) _____

_____

_____

40. How often do you conduct in-house training _____

_____

_____

_____

41. Do you have R & D (Research & Development) Department

Yes	No
☐	☐

42. What is your total expenditure on Research and Development to date

_____

_____

43. Please fill in the following tables (A & B) below:

Table A - Employment Size

Table B - Turnover (Sales)

44. State on the average the % annual change in your total wage bill.

45. State on the average the % annual change in your total tax receipts.

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TABLE A: EMPLOYMENT SIZE

Years	Unskilled Workers	Semi-skilled Workers	Skilled Workers	Total
19				
19				
19				
19				
19				
19				
19				
19				
19				
19				
19				
19				
19				
19				
19				
19				
19				
19				
19				
19				
19				
19				
19				
19				
19				
19				
1995				
1996				
1997				
1998				

TABLE B: TURNOVER (SALES)

Years	Estimated quantity (Tons/Metres or units)	Estimated Sales N (Gross)	Yearly Percentage Change in Sales
19			
19			
19			
19			
19			
19			
19			
19			
19			
19			
19			
19			
19			
19			
19			
19			
19			
19			
19			
19			
19			
19			
19			
19			
19			
19			
19			
19			
19			
1995			
1996			
1997			
1998			

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