Nigeria is confronted with challenges such as lack of infrastructure that facilitate economic and social service delivery, dearth of system capital and human resources, global financial and inflationary trends, high unemployment rate, poor industrial relation, use of obsolete and low production technologies and machinery in dualistic economies, economic mismanagement, high growth of poverty and insecurity. These challenges continue to limit the nation’s economic competitiveness and growth. It is in recognition of these challenges that, this paper is set to look at the issues of measuring productivity. Productivity is considered as a key source of economic growth and competitiveness and, as such, is basic statistical information for many international comparisons and country’s performance assessments. This paper begins with the concept of productivity and factors that determines productivity. Main types of measuring productivity- gross output, value added, capital labour, capital productivity and KLEMPs Multifactor productivity are examined. Finally, the paper discusses the relevance of productivity and measures to promote productivity in Nigeria.

Key words: Productivity, measurement, relevance and strategies.

INTRODUCTION

Concept of productivity

Grayson (1982) defined productivity as “what you get out of an activity for what you put in”. Webster’s dictionary defines it as the physical output per unit of productive effort, the degree of effectiveness of industrial management in utilizing facilities for production, and the effectiveness of utilizing labour and equipment. Kendrick (1988) defines it as the relationship between output of goods and services and the input of resources, human and non human resources used in the production process. “Output” can be in form of goods and services while the inputs vary from capital, energy, materials, time and labour. Furthermore, productivity is the ratio between the combination made by education general development and the cost of education. Students are the raw materials with which institutions are characterized as educational and therefore tagged as inputs of the institution. With the educational institutions, students are exposed to academic programmes for a period of time after which they are believed to have been transformed into educated persons. While in school, a combination of other resources such as teachers of specified levels of education, competence, facilities, curriculum types and materials are utilized for the productive process. The teacher is however the key to the system’s productive process.

The economist defines productivity as the ratio of output of goods and services to the input production ratio. The input factors include labour, land, technology, tangible output, finance, energy and management expertise. Also, the concept of productivity involves the interplay of various elements in the workplace. While the output may be related to miscellaneous resources or input (labour, materials, capital) much of the separate productivity ratios is influenced by an array of relevant factors. These influencing factors include the availability and quality of materials, the rate of capacity utilization and the scale of operations, the nature of the motivation and effectiveness of the management. The way in which these elements interact has an important impact on the resulting productivity as measured by any of several feasible ratios.

Productivity therefore is a measure of how effective resources are combined and used in order to accomplish specific, desirable results. It concerns quality, service and
prolific. Increase in productivity can occur only if people do different things or do things differently. Therefore,

\[
\text{Productivity} = \frac{\text{Total Output}}{\text{Total Input}} = \frac{\text{Total results achieved}}{\text{Total resources consume}} = \frac{\text{Effectiveness}}{\text{Efficiency}}
\]

Siegel (1980) viewed the concept of productivity as a family of ratios of output quantity to input quantity.

Symbolically

\[
P = \frac{\text{Output (Goods, Services in quantity & quantity)}}{\text{Land + Technology + Tangible Capital + Finance + Material + Energy + Labour Efforts + Labour Quality Management Expert + Time}}
\]

Therefore, productivity connotes efficient performance resulting in high level output of goods and services both in quantity and quality with minimal wastes in resources and minimal cost in money, energy and time as well as the users of products.

**FACTORS THAT DETERMINES PRODUCTIVITY**

The concept of productivity recognizes the interplay between various factors in the work place. Each of the separate production returns is influenced by a combination of many relevant factors. These influencing factors include the quality and the availability of materials, the scale of operations and the rate of capacity utilization, the availability of capital equipment, and the attitude and skill level of the work force, the motivation and effectiveness of the management.

Another factor is technical and mechanical means. As is obvious, machines and electronics have increased the productivity labour generally. But in a dependent economy like Nigeria Neo-colonial economy like Nigeria, this advancement had tended to be curis. Since the Nation depends on foreign sources for its mechanical equipment expertise, spare parts, raw materials and even markets, a situation has developed whereby the country cannot operate its industries at full capacity. Most factories operate below 20% capacity and also with frequent stoppages.

A modern serious environmental factor which affects productivity has to do with cultural beliefs, norms and values. Take religion for example: several days are lost in the year due to public holidays in observance of either Muslim or Christian events. Our attitude to work also leaves much to be desired; the typical Nigerian is concerned about how to get rich quickly without exerting much efforts.

The secular forces comprise knowledge and know-how and their attainment in human and non-human resource. Essential to their attainment is investment. Investment includes expenditures on tangible structures, equipment, inventories, development of natural resources and formation of human capital. Another set of factors that affect efficiency in the use of resources include the scale of production, imperfections in the allocation of resources and human and natural resources.

In a mixed economy like Nigeria, the actions of the government in managing macro-economic policies, fiscal, monetary, exchange rate have potential important efforts on productivity through their impact on after-tax income, after-tax rate of return and value added tax. These affect investment through their effect on incentives and on the funds available to the enterprises.

**MAIN TYPES OF PRODUCTIVITY MEASURES**

There are many different productivity measures. The choice between them depends on the purpose of productivity measurement and, in many instances, on the availability of data. Broadly, productivity measures can be classified as single factor productivity measures (relating a measure of output to a single measure of input) or multifactor productivity measures (relating a measure of output to a bundle of inputs). Another distinction, of particular relevance at the industry or firm level is between productivity measures that relate some measure of gross output to one or several inputs and those which use a value-added concept to capture movements of output.

Table 1 uses these criteria to enumerate the main productivity measures. The list is incomplete in so far as single productivity measures can also be defined over intermediate inputs and labour-capital multifactor productivity can, in principle, be evaluated on the basis of gross output. However, in the interest of simplicity, Table 1 was restricted to the most frequently used productivity measures. These are measures of labour and capital productivity, and multifactor productivity measures (MFP), either in the form of capital of capital-labour MFP, based on a value-added concept of output, or in the form of capital-labour-energy-materials MFP (KLEMS), based on a concept of gross output. Among those measures, value-added based labour productivity is a single most frequent computed productivity statistic, followed by capital-labour MFP and KLEMS MFP.

These measures are not independent of each other. For example, it is possible to identify various driving forces behind labour productivity growth, one of which is the rate of MFP change. This and other links between productivity measures can be established with the help of the economic theory of production.

Once productivity measures are conceptualized on the basis of economic theory, there are several ways to go about their empirical implementation. From a broad
Table 1. Overview of main productivity measures.

<table>
<thead>
<tr>
<th>Type of output measure</th>
<th>Labour</th>
<th>Capital</th>
<th>Capital and Labour</th>
<th>Capital, labour and intermediate inputs (energy, materials, services)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gross output</td>
<td>Labour productivity (based on gross output)</td>
<td>Capital productivity (based on gross output)</td>
<td>Capital-labour MFP (based on gross output)</td>
<td>KLEMS multifactor productivity</td>
</tr>
<tr>
<td>Value added</td>
<td>Labour productivity (based on value added)</td>
<td>Capital productivity (based on value added)</td>
<td>Capital-labour MFP (based on value added)</td>
<td></td>
</tr>
</tbody>
</table>


methodological viewpoint, parametric approaches can be distinguished from non-parametric ones. In the first case, econometric techniques are applied to estimate parameters of a production function and so obtain direct measures of productivity growth. In the second case, properties of a production function and results from the economic theory of production are used to identify empirical measures that provide a satisfactory approximation to the unknown “true” and economically defined index number. The growth accounting approach to productivity measurement is a prominent example for non-parametric techniques.

The following are the five most widely used productivity concepts. They point out major advantages and drawbacks and briefly interpret each measure. These are:

1. Labour productivity based on gross output;
2. Labour productivity based on value added;
3. Capital-labour MFP based on value added;
4. Capital-labour MFP based on value added; and
5. KLEMS multifactor productivity.

Labour productivity, based on gross output

The labour productivity shows the time profile of how productively labour is used to generate gross output. Labour productivity changes reflect the joint influence of changes in capital, intermediate inputs, as well as technical, organizational and efficiency change within and between firms, the influence of economic of scale, varying degrees of capacity utilization and measurement errors. Labour productivity only partially reflects the productivity of labour in terms of the personal capacities of workers or the intensity of their effort. The ratio between output and labour input depends to a large degree on the presence of other inputs. The purpose is to analyse micro-macro links, such as the industry contribution to economy-wide labour productivity and economic growth. From a policy perspective, value-added based labour productivity is important as a reference statistic in wage bargaining. It is expressed mathematically as:

\[
\text{Labour productivity (LP)} = \frac{\text{Quantity index of gross output}}{\text{Quantity index of labour input}}
\]

Labour productivity, based on value added

This shows the time profile of how productivity labour is used to generate value added. Labour productivity changes reflect the joint influence of changes in capital, as well as technical, organizational and efficiency change within and between firms, the influence of economic of scale, varying degrees of capacity utilization and measurement errors. Labour productivity only partially reflects the productivity of labour in terms of the personal capacities of workers or the intensity of their effort. The ratio between output and labour input depends to a large degree on the presence of other inputs. The purpose is to analyse micro-macro links, such as the industry contribution to economy-wide labour productivity and economic growth. From a policy perspective, value-added based labour productivity is important as a reference statistic in wage bargaining. It is expressed mathematically as:

\[
\text{Labour productivity (LP)} = \frac{\text{Quantity index of value added}}{\text{Quantity index of labour input}}
\]

Capital labour MFP based on value added

Capital-labour MFP indices show the time profile of how productively combined labour and capital inputs are used to generate value added. Conceptually, capital-labour productivity is not, in general, an accurate measure of technical change. It is, however, an indicator of an industry’s capacity to contribute to economy-wide growth of income per unit of primary input. In practice, the measure reflects the combined effects of disembodied technical change, economies of scale, efficiency change, variations in capacity utilization and measurement errors.
The purpose is to analyse micro-macro links, such as the industry contribution to economy-wide MFP growth and living standards, analysis of structural change. It is mathematically expressed as:

\[
(\text{CLMFP}) = \frac{\text{Quantity index of value added}}{\text{Quantity index of combined labour and capital input}}
\]

**Capital productivity, based on value added**

The capital productivity index shows the time profile of how productivity capital is used to generate value added. Capital productivity reflects the joint influence of labour, intermediate inputs, technical change, and efficiency change, economies of scale, capacity utilization and measurement errors. Like labour productivity, capital productivity measures can be based on a gross-output or value-added concept. The same reasoning as for labour productivity applies between gross-output and value-added based measures in the case of outsourcing and changing vertical integration. Capital productivity has to be distinguished from the rate of return on capital. The former is a physical, partial productivity measure; the latter is an income measure that relates capital income to the value of the capital stock. The purpose is the changes in capital productivity indicate the extent to which output growth can be achieved with lower welfare costs in the form of foregone consumption. It is expressed mathematically as:

\[
\text{Capital productivity} (CP) = \frac{\text{Quantity index of value added}}{\text{Quantity index of capital input}}
\]

**KLEMS multifactor productivity**

This shows the time profile of how productively combined inputs are used to generate gross output. Conceptually, the KLEMS productivity measure captures disembodied technical change. In practice, it reflects also efficiency change, economies of scale, variations in capacity utilization and measurement errors. When capital and intermediate input measures are aggregators of detailed types of assets and products, each weighted by their respective share in total cost, and based on prices that reflect quality change, the effects of embodied technical change are picked up by the capital change are picked up by the capital and intermediate inputs terms, and only disembodied technical change enters the MFP measures. It is expressed mathematically as:

\[
\text{KLEMS} = \frac{\text{Quantity index of gross output}}{\text{Quality index of combined input}}
\]

**THE RELEVANCE OF PRODUCTIVITY**

Productivity entails that total output is a function of total resource inputs; more output is possible with less labour input, if the latter is more efficient and effective in its contribution to the production process. This is basically the reason why labour productivity is considered a critical factor for the enhancement of both the level and rate of socio-economic development and of manpower development.

Given a sizeable surplus output of goods and services made possible by high level of labour productivity in the production process, savings, autonomous capital formation or investment which are "sine quo non" for economic growth and development are easily made available. These, in turn, give rise to increase in output and standard of living of the people.

Productivity is important in achieving national, business and personal goals. The primary benefits of greater productivity growth are that more can be produced in future, using the same or fewer resources.

From a national perspective, productivity improvement is the only source of increased real national wealth. The more productive use of resources reduces waste and conserves scarce and expensive resources. Steady productivity is the only way a nation can solve pressing problems such as inflation, unemployment, an increased trade deficit and unstable currency. Productivity therefore is the way to increase the standard of living and the available resources to improve quality of life.

In business, productivity can lead to more responsive customer service; increase cash flow, improved return on assets and greater profit. More profits provide investment capital for the expansion of capacity and the creation of new jobs.

Productivity is vital in reducing inflation. Any increase in output per man hour allows salaries and wages to increase without increase in the unit labour costs and prices of goods and services of the nation’s industries. Productivity assists in solving unemployment problem, improving the quality of working life and the competitiveness at the nation’s industries in internal market and thereby increasing the nation’s balance of trade.

Productivity measurement improves managers’ diagnostic capabilities, thereby enhancing their improvement in effectiveness. Adequate measurement of productivity is required for the effective implementation of such productivity. Improvement schemes like IMPROSHARE (Productivity Gain Sharing Scheme). If a job is adequately measured, it can be compared with similar jobs in another organization. Those with low performance will have to emulate the best performance.

In the field of business economics, comparisons of productivity measures for specific production can help to identify inefficiencies. Typically, the relevant productivity measures are expressed in physical units (e.g. cars per day, passenger-miles per person) and highly specific. This fulfils the purpose of factory-to-factory comparisons,
but has the disadvantage that the resulting productivity measures are difficult to combine or aggregate.

Measurement of productivity is a key element towards assessing standards of living. A simple example is per capita income, probably the most common measure of living standards: income per person in an economy varies directly with one measure of labour productivity, value added per hour worked. In this sense, measuring labour productivity helps to better understand the development of living standards. Another example is a long-term trend in multifactor productivity (MFP). This indicator is useful is assessing an economy’s underlying productive capacity (“potential output”), itself an important measure of the growth possibilities of economies and of inflationary pressures.

MEASURES TO PROMOTE PRODUCTIVITY

Government should intensify efforts in informing all Nigerians and organizations of the need to improve productivity. This is done through productivity awareness. The company should involve all mass media and information ministries. Efforts should be made by the government to devise means of compelling organizations to measure total productivity and present indexes in an easily understandable manner so that organizations with high productivity level could be rewarded. All organizations should set productivity measurement system, people tend to perform better when they know that they are being matched or measured.

Employers in all sectors of the economy should be required to expose their workers at all levels to appropriate attitudinal training programmes. The recently established Research and Technology Development Endowment Fund (RTDEF) should be complemented with the establishment of sectoral research and productivity promotion committees.

As a matter of public policy, permanent machinery should be established to advise government on annual or bi-annual adjustments to be made on workers’ minimum level of wages, salaries and fringe benefits. The productivity Price Income Board should be recognized and strengthened to perform the role more effectively. All trade union officials should be exposed to appropriate trade union education and training and prior to being allowed to play important relationship in trade union organizations in the country. There is need to measure and quantify productivity in the public services; work study measurement must be developed to enhance this measurement and quantification for any meaningful discussion of productivity in the public service. Greater focus and attention must be on the individual worker to eliminate under-utilization of labour and redundancy. The role of management is indispensable. There is need therefore to organize and conduct regular seminars and refresher courses for management. This is because once management is able to play its expected role; the battle for increased productivity is largely won. Resources and studies aimed at highlighting better use of the work force must be embarked upon.

The government of the federation should provide visible and efficient political leadership for the citizenry who are labour of the country. For workers to be effective, they require certain basic infrastructure facilities – shelter, food, health, transportation and politically stable atmosphere.

The principle of federal character, quota system, educationally disadvantaged states and localities should be seriously examined so that qualification, experience and suitability of candidates in appointment promotion should be based on merit. Government should design a system of wage and salary which could be devoid of the noise such exercise has attracted. A system whereby salary increase is tied to annual cost of living index to minimize the inflationary pressure must be evolved as a matter of urgency. A system where salary is pegged whilst the prices of goods and services are galloping out of the reach of the Nigerian workers must be in the interest of productivity.

For a worker to be productive, he should be able to pay for his basic needs from his salary but where this is impossible, as it has been for majority of Nigerian workers for sometime now, such workers become frustrated, irritated, overburdened and therefore they go on borrowing, a worker in such a situation cannot concentrate to achieve the desired level of productivity that is required.

Adequate supervision of staff must be effected. Where the supervision capacity is weak, there will be low productivity. Where the supervision is regular and constant, workers are bound to be on their toes.

Walker (1980) cautioned organizations against installing new technologies to increase productivity without considering the human elements in the productivity equation. Human elements are of crucial importance because they are the ones that make machines work, hence, the improvement of human effectiveness in work is the greatest opportunity for performance. Thus, attention must be focused on improving productivity through the optimum utilization of human resources.

There must be prompt overhauling of security measures at the airports to ensure safety of lives and property. Government should set up a social anti-terrorist squad whose responsibilities would be to identify such clandestine groups and minimize damages to the civil society.

It is important to remember that in the foreseeable future, unskilled labour will continue to abound in this country while the scarcity of managerial and technical skills will largely remain. Therefore, in drawing up the plan, the emphasis must be placed on those categories of employees. A continuous check must be made on the sources recruitment and the general levels of pay in the
CONCLUSION

In this paper, an attempt has been made to look at the facets of measuring productivity. Progress in the social sciences now makes measurement possible. As a consequence, new methods are available to assist employers and employees in their responsibility for successful management. In the light of the concept of productivity, there is no doubt that increasing productivity in Nigeria has become an emergency which requires coordinate national policy and programme orientation.

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