PRODUCTIVITY MEASUREMENT AND ITS CHALLENGES TO THE MANAGEMENT ACCOUNTANT IN NIGERIA

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Abstract

Productivity measurement is the quantification of both the input and output resources of a productive system as a level of relativity between them.

Productivity measurement has been a challenge to the management Accountant over the years. Indeed, the problem of conceptualization of the term productivity is the fact that productivity is not only to be managed but it is also to be measured. In measuring productivity, the management accountant is faced with the problem of how to aggregate the different types of inputs and outputs of the firm in order to minimize waste. This paper explains the concept, types, and choice of productivity measurements. The approaches lo total factor productivity, the relevance of Balanced Scorecard in productivity measurement, and the factors that influence productivity measurement are discussed. The problems associated with productivity measurement, and its challenges to the management accountant are equally highlighted. The paper concludes that, for productivity measurement, whether imaginary or real, (he main indicator of improved productivity is a decreasing ratio of input to output at constant or improved quality. It is likely that the magnitude of aggregation problem will be reduced if (lie right kind of choice in productivity measurement is implemented.

Key Terms: Productivity, Efficiency, Effectiveness, Employees, Input and Output.

Introduction

The issue of productivity measurement has been a major challenge to the management Accountant over the years. Horngren, Sundem and Stratton (2000:345), opined that, more than half the companies in the United States manage productivity as part of the effort to improve their competitiveness. Blocher, Chen and Lin (1999:680), stated that, productivity in making and moving things has increased in the last 125 years in industrialized countries. Ability to achieve more output with less input resources is often a strategic critical success factor for business firms. Firms that compete as cost leaders, have to be able to perform all tasks with fewer resources than their competitors to be successful. Firms competing on differentiation as a focus of strategies also, can increase their competition. The management accountant is faced with a major challenge of reconciling the output and input of an organization and this tells on the profit and loss account of the organization.

Most third world nations are blessed with mineral resources like gold, bronze, crude oil, etc but still, they suffer from poverty and imbalances in their National Income. Government and nonprofit organizations often require employees to do more with the limited resources at their disposal due to an increase (or more use) in inputs with little (or less) output. For example, Nigeria as a nation, is blessed with crude oil and over the years, has experienced a lot of waste of its resources like crude oil resulting from gas flaring, wrong measurement and mismanagement of these resources. The commitment of the Nigerian democratic government to the nation's ailing economy through such policies as liberalization, privatization, autonomy of institution, resource control, commercialization, private regulation, *inter cilia,* may not be the total solution to the ailing economic situation if the productivity in line with its inputs and outputs, are not carefully measured and controlled.

In the view of Horngren, Sundem and Stratton (2000:345), "Productivity is a measure of output divided by inputs. The lower the inputs needed to produce a given output, the more productive the organization". This simple definition however raises difficult measurement questions like how should outputs and inputs be measured? Specific management control problems usual!) determine the most appropriate measures of inputs and outputs. Manufacturing companies in general, are concerned with the efficient use of materials and so far, the measures of the materials yield (a ratio of material outputs over material inputs) may be useful indicators of productivity.

The issue of productivity measurement poses major challenges to the management accountant with reference to companies' outputs and inputs. And this presents questions like (i) does

the lack of measurement of productivity affect the well being of the company? (ii) Does **the** measurement of an organization's productivity yield more output if limited production resource inputs tire used? (iii) Is it possible for (he management accountant to measure the level of productivity in an organization? (iv) What are the benefits of productivity measurement and how is it a challenge to **the** management Accountant?

This paper shows, (he problems of productivity measurement and the challenges it presents to the management accountants, ascertains the effectiveness, efficiency and proper utilization of productivity measurement strategies as a tool for the management accountants to curtail the problems associated with productivity measurement, and provides a basis for the appropriate performance measures used by organizations in relation to the adequate measures of inputs and outputs.

Concept of Productivity Measurement

Blocher, Chen and Lin (1999:680), slated that, a measure of productivity could be either an operational or a financial productivity. An operational productivity measure is essentially a physical measure with both the input and the output in physical units. While a financial productivity measure uses dollar (or the currency of the nation) amounts for the input. A productivity measure focusing on only the relationship between one of the inputs and the output attained is a partial productivity measure. While a productivity measure that includes all the input resources used in production is called total productivity.

Oyeranti (2000:12), **stated that, productivity measurement is the quantification of both the output and input resources of a production system. One additional problem to the conceptualization of the term productivity is (lie fact that productivity is not only to be defined and managed; it is also to be measured. Its measurement poses no fewer problems than it's definition. Perhaps, Krugman** (1990:9), **intended to assert that, defining or measuring productivity is a herculean task when he said, "productivity isn't everything, but in the long run, it is almost everything". Samuelson and Nordhaus** (1995), **explained that, the concept of productivity goes to imply that it can indeed be perceived as the output per unit of input or the efficiency with which resources are utilized. Olaoye** (1985), **observed that, productivity measurement as a concept can assume two-dimensions namely, total factor productivity (TFP) and partial productivity. According to Scott (1983), efficiency and effectiveness are actually measures of performance just as productivity is equally a measure of performance Sumath (1984), stated that, being conscious of the trend of input costs particularly by relating output increases to price increase and in Union could combat the misconception between productivity and production. Foley** (1962), **then asserted that, productivity measurement must produce effective controls which in turn, would produce corrective action and which finally result in increased productivity.**

Productivity Measurement

Total Productivity is a productivity measure that includes all the input resources used in production. Partial productivity measure describes the relationship between the output of a period and a required input for production of the output.

$$\text{Partial productivity} = \frac{\text{Units of output manufactured}}{\text{Units or cost of single input resource used}}$$

The denominator is the quantity or cost of a manufacturing factor such as direct materials or direct labour- hour, while the numerator is the unit or value of the goods or services produced.

An operational partial productivity shows the conversion ratio of an input resource into the output. The numerator, the output, is the number of units produced while the denominator is the number of' units of the input resources used in attaining the output. A comparison of partial productivity over time shows changes in productivity of input resource while a financial partial productivity, shows the number of units of output manufactured for each Naira of the input resources the firm spent. An operational productivity measure is simpler because it is unaffected by price changes or other factors which makes it easier to bench mark. By focusing on the physical measure of one input resource at a time, an operational partial productivity measure enables management to know the effect on operations of changes in the productivity of the input resources while a financial partial productivity has the advantage of considering the effect of both cost and quantity of an input resource

on productivity at a management level, (he effect of cost not merely the physical quantity is of concern. It can be used in operations that use more than one production factor (Scott, 1985).

A total productivity measure is a financial productivity measure. The total productivity measures the relationship between the output attained and the total input costs of all required input resources for the production of the output

Total productivity: $\frac{\text{Units or sales value of output manufactured}}{\text{Total cost of all input resource}}$

Total factor productivity measures the comprehensive aggregates of outputs and inputs that are of interest. Oyeranti (2000:13), opines that, the unique advantage of partial factor productivity measure is computational simplicity and feasibility except where the required aggregate labour input data are unavailable. The greatest shortcoming of partial factor productivity measures (particularly labour productivity measures), is its inability to identify the causal factors for observed productivity growth.

Empirical Evidences

Horngren, Sundem and Stratton (2000:345), stated that, the choice depends on the behaviour desired. The challenge in choosing productivity measures is that, management may be able to improve a single measure but hurt performance elsewhere in the organization. For example, long production runs may improve machine production but result in excessive inventories. Alternatively, improved labour productivity in the short run may be accompanied by a high rate of product defects. Oyeranti (2000:13), showed that, three reasons arc sometimes put forward to justify the use of labour input for purposes of partial productivity measurements, these are: (i) labour is regarded as the most important *factor of production, (ii) labour is* the most *easily* quantified factor of production, and (iii) labour is the only factor of production that has conscious control over its contribution to output.

Recent productivity debate has been concerned with total factor productivity (TFP) measures that are based on comprehensive aggregate of outputs and inputs. At the moment, productivity research has focused more on total factor productivity (TFP) measures where comprehensive aggregates of outputs and inputs are of interest. It is helpful to note that production theory remains the basis for analyzing the factors that explain output level changes. Literature indicates that, the rate of output depends on three factors: (a) the State of technology or kind of production process that is in use, (b) the quantities and types of resources put into the production process, and (c) the efficiency *with which those resources* are *utilized. Arising from these* factors behind productivity changes are two possible explanations for differences in total factor productivity: Productive efficiency in terms of the scale of production, and the state of technology subject to the specific assumptions that are made with respect to the production function and the market conditions. Beyond the level of partial factor productivity measurement, the growth of output can be composed into two: the contribution of changes in inputs, and in total factor productivity.

The production function indicates the contribution of additional inputs to increased output and the residual (otherwise called Multi factor) productivity growth or less formally, the Solow residual, is attributed to total factor productivity change. Under the assumptions of constant returns to scale and competitive markets, the rate of output can be written as follows: gy = agb + (I -a) gk +q. Where gy, gb and gk are the growth rate of output, labour and capital respectively, and ‘a’ is the share of labour input while ‘q’ measures that part of growth that cannot be explained by either growth of labour or capital. To this end, recent productivity debate has been concerned with total factor productivity (TFP) measure that is based on comprehensive aggregates of outputs and inputs.

Productivity Measurement Through (he Balance Scorecard

In 1992, an article by Robert Kaplan and David Norton entitled “the balanced Scorecard-measures that drive performance” in the Harvard business Review caused a lot of attention for their method and led to their business bestseller, “the balance Scorecard Translating Strategy into Actions”, published in 1996. This allows the monitoring of present performance, but the method also tries to capture information about how well the organization is positioned to perform in the future. Kurtzman (1997), found that, 649 of

the companies questioned were measuring performance from a number of perspectives in a similar way to the balanced scorecard.

Kaplan and Norton (1992:71), introduced balanced Scorecard (BSC), a concept for measuring a company's activities in terms of its vision and strategies. It gives managers a comprehensive view of the performance of a business. It is a strategic management system that forces managers to focus on the important performance metric that drives success in internal processes, learning and growth perspectives. The system consists of four processes: (a) translating the vision into operational goals. (b) communicating the vision and linking it to individual performance, (c) business planning, and (d) feedback, learning and adjusting the strategy accordingly.

A comprehensive view of business performance to productivity measurement is assured with the use of BSC. The BSC seeks to measure a business from the following perspectives: (i) financial Perspective, (ii) Customer Perspective, (iii) Business Process Perspective, (iv) learning and growth perspective.

The Financial perspective measures reflect financial performance. For example, number .9 debtors, cash How, return on investment. The financial performance even in nonprofit organizations K fundamental to its success. The financial performances alone suffer from two major drawbacks: (a) they are historical. Whilst they tell what has happened to the organization, they may not tell what -s currently happening neither can they be a good indicator of future performance, (b) Using Tobin's a model to measure the ratio of the value of companies' assets to its market value, it is common for the current market value of an organization to exceed the market v alue of its assets. The excess v alue can be thought of as intangible assets. These figures arc not measured by normal financial reporting.

The Customer perspective measures have a direct impact on customers. For example, time. taken to process a phone call, results of customer surveys, number of complaints, or competitive ranking.

The Business Process Perspective measures reflect the performance of key business- processes. For example, the time spent prospecting, number of units that required network or process cost.

The Learning and growth perspective measures resemble the company's learning curve. I o: example, number of employee, total hours spent on staff training, etc.

The specific measures within each of the perspectives will be chosen to reflect the drives in the particular business. The method can facilitate the separation or strategic policy making from tin implementation so that organization goals can be broken into task oriented objectives that can iv managed by frontline staff. It can also help decrease the correlation between activities. In man. senses, the objectives chosen are leading indicators of future performance. Effort made today is reflected in the future profits of the company. In this way, current expenditure can be viewed a - investment in the future of the company.

Although, BSC was originally introduced as a tool for commercial organizations focusing or financial performance, it has found considerable support and is widely used in the public sector. It is particularly popular as a public sector performance measurement tool in the USA, UK, Australia and Scandinavia. According to Kaplan and Norton (1992), it was found that companies use the BSC n clarify and update strategy, align unit and individual goals with strategy, link strategy objectives to long term targets and annual budgets, identify and align strategy estimates, and conduct periods performance reviews to learn about and improve strategy.

Productivity Measurement and its Challenges to the Management Accountant

While productivity can be given the sort of shorthand definition as "the ratio between output and input", what productivity really is, as well as how it can be measured has always provoked a great deal of controversy among experts. In essence, it can be said that the measurement of productivity is only simple conceptually. In practice however, both measurement of outputs involves aggregation problem and this problem alone has situated productivity measurement in the realm of complexity. For example, the question of how to aggregate different products that do not have constant quality or characteristic constitutes the veil to be removed from output measurement.

In the same vein, the problem of how to aggregate the different types of inputs into well- defined composite unit remains critical on the side of input measurement. Also there seems to be a misconception between productivity and production on the one hand, and productivity and profitability on the other. In order to solve output and input aggregation problems, particularly when heterogeneous inputs and outputs arc combined, some authors have suggested that inputs should be added up in constant price money values. Same thing goes for output (Iyan'wura anil Osoba, 1993; David,

1972). 'Flic loophole in this approach is that the resultant productivity index will be financial productivity and not physical productivity, which obviously, should convey more meanings to most of the users of productivity measures.

Therefore, the management accountant, apart from the problems mentioned above, which have been given suggested clarification, is also faced with the actual, proper, and appropriate measures to be used in each input and output analyses, but this could be explained using Iyanwura and Osoba (1983), proposal.

Factors That Can Influence Productivity Measurement

Nigeria Employment Consultative Association (NECA) (1991:78), categorized factors that can influence productivity into three namely: General factors, Organization and technical factors, and Human factors.

The general factors include climate, geographical distribution of raw materials, fiscal and credit policies, adequacy of public utilities and infrastructural facilities, general organization of the labour market, proportion of the labour force to the total population, degree of unemployment, extent of labour shortage and of labour turnover. Other factors include technical centers and information concerning new techniques, general scientific and technical research, variations in the composition of the output, influence of low efficiency plants and their varying proportion in total output.

Organization and technical factors include degree of integration, percentage of capacity utilization, size and stability of production, adequate and even flow of materials, sub-division of operations, balancing of equipment, etc.

Human factors include labour - management relations, social and psychological conditions of work, wage incentive, adaptability to and liking for the job, physical fatigue, composition (ace, sex, skill and training) of the labour force, organization of the spirit of emulation in production, trade union practices, etc.

These factors raise a number of interesting issues relating to productivity. Notable ones include population growth and technological development, the role of government in productivity growth, productivity growth and wages and the Linkages between financial reward and productivity, which Klifgard (1989) observed to have become so weak particularly in the developing countries that they have actually eliminated economic incentives. In the case of government productivity nexus, government is to provide the necessary infrastructure and to increase opportunities for growth where infrastructure covers education and training, health, housing, power, water transport, research and development, communications and the availability of technology.

Relevance and Growth of Productivity Measurement to National Well-Being

Wen (1993:3), opines that, productivity is discussed at all levels because of its direct relationship with the standard of living of a people. At the level of an individual, it is rational to argue that the standard of living of any man is the extent to which he is able to provide himself and his family with the things that are necessary for sustaining and enjoying life. Uche (1991), identified four important channels by which higher productivity impacts on standard of living. These are larger supplier, both of consumer goods and of capital goods at lower cost and lower prices, higher real earnings, improvements in working and living conditions inducing shorter hours of work and in general, a strengthening of the economic functions of human well being.

At the national level, steady growth in productivity guarantees non-inflationary increases in wages as well as solves pressing problems of unemployment, increased trade deficit, and an unstable currency (exchange rate) in business. Productivity improvements can lead to more responsive customer service, increased cash How, improved return on assets, and greater profits.

Ahuwalia (1991:191), opines that, productivity as a source of growth has moved to the center stage in the analyses of growth of developing economies in recent years. Hitherto, the focus was mainly on the growth of capital through greater mobilization of resources. As investment level have increased substantially in most developing countries and the scope for further increase becomes more limited, attention has naturally turned to productivity improvements which offers a complementary route to growth by getting more out of limited resources.

Recommendations

1. The management accountant should adopt the appropriate type and choice of productivity measurement in line with each input used in oil Companies.
2. Effective and efficient use of limited production inputs should be used in order to avoid wastage and improve profitability.

3. An effective mechanism like credit policy should be put in place in order to have an efficient credit control system for companies in Nigeria
4. In order for oil industry to align with growth in the economy of Nigeria, the government should see it as their primary duty to repair and maintain the refineries in Nigeria. If it can lie repaired there will be a high level of growth in the oil sector of Nigeria.
5. The good communication system in the company should be encouraged. Communication between management and employees in the firm should be continuously encouraged in order to make for growth to greater heights.
6. Indigenous skilled personnel should be employed and employees in companies in Nigeria should be adequately remunerated, encouraged and motivated to work better so that the company's productivity in terms of higher outputs will be improved.

Conclusion

In any firm or organization, productivity measurement whether imaginary or real, the mam indicator of improved productivity becomes a decreasing ratio of input to output at constant or improved quality. Hitherto, existing approaches for measuring productivity were confronted in aggregation problems yet, productivity growth must be measured if only to look for opportunities to improve and show how well cl forts are fairing. It is likely that the magnitude of aggregation problem will be reduced if the right kind of choice is made between applying parametric and non- parametric productivity measurements. Other conclusions from this report include: (i) the partial deregulation of the Oil and Gas Industry is due to the fluctuations of prices of its products and the bad or inadequate refineries in the Nigerian economy, (ii) The management accountants have a major challenge of measuring productivity in line with the level of input, (iii) The choice and types of productivity measurement is a challenge to the companies in Nigeria, (iv) The poor or inadequate measurement o! productivity in companies in Nigeria affects the well being of the firms.

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