A STUDY ON PRODUCTIVITY IN THE SERVICES SECTOR

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ABSTRACT

Within services research, productivity has been one of the most important issues from an economic point of view. But despite the importance of productivity management in service organizations it is surprising that there is relatively little research on this topic. The aim of this paper is to perform the conceptual analysis of service sector productivity determination, its comparison with manufacturing sector and discussion on various measurement methods. It has been argued in the literature that services are less productive than goods leading to concerns that, as the size of the service sector increases, total economy-wide productivity growth will be reduced. Productivity measurement presents several issues and problems. There is underestimation of service productivity growth and different measurement errors. Thus, this paper is intended as a theoretical framework for a study on services sector productivity issues and is expected to lay the groundwork for further analysis and measurement of services sector productivity.

Keywords: Productivity; Service Sector; Manufacturing Sector; Measurement Errors

INTRODUCTION

Defining Services

In attempting a definition of a service, one needs to recognize the heterogeneous nature of the activities which comprise the services sector. This diversity creates difficulties in formulating a definition which can be applied universally. Perhaps the most common characteristic of services is their intangibility. Apart from this feature, it is difficult to find elements which are common to all services. T.P. Hill (1977) defines a service as a change in the condition of a person or good belonging to some economic unit as a result of the activity of some other economic unit. He argues that services are not capable of being transferred from one unit to another and are characterized by simultaneity of production and consumption.

Service organizations are recognized as the largest and fastest-growing segment of the economy in the world (Sahay, 2005). During the last decade, the service sector has been the fastest growing segment and represents a major and increasing part in the global economy (Russell, 2009). The significance of services for the prosperity of the world economy has been widely recognized. Service sector has played an important role in the growth and development process of developed economies and is currently playing in the developing economies of the world. The greater presence of the service sector in these economies is indeed in line with the growth transformation that has taken place in which the service sector forms a major structural component of the economy compared to that of the manufacturing or primary sector.

Within services research, productivity has been one of the most important issues from an economic point of view. The reasons for why services productivity is important are easy to understand. Developed as well as developing economies have shown a progressive intensification of the service sector. For this reason in the long term the overall productivity should converge with growth rate similar to productivity rates in service industries. Johnston and Jones (2004) states, that despite the
importance of productivity management in service organizations it is surprising that there is relatively little empirical research on this topic. So , this paper is intended to fill this gap in literature.

The Concept of Productivity in the Service Sector

The concept of productivity in the present time , as economists have defined it as the relationship between output and inputs necessary to produce it. Current economic realities (liberalized and dynamic markets, constantly changing customer preferences etc. ) are leading to rethinking of the notion of productivity. Whereas , traditionally productivity was viewed as an efficiency concept , it is now viewed increasingly as an efficiency and effectiveness concept , effectiveness being how the enterprise meets the dynamic needs and expectations of customers.

The concept and issues of productivity have been considerably researched in the manufacturing sector for a long time, compared with those researches for the service sector. The current idea of productivity stems from and is a construct of the “manufacturing paradigm” developed during the Fordist period (Jones and Hall, 1996). Adam and Gravesen (1996) argue that the concept of productivity is deeply rooted in the context of manufacturing, which could be the reason for continuing to overlook the issues and concept of productivity in the service sector.

Productivity of manufacturing organizations is measured in quantitative units of input and output with relatively the same quality. There were several attempts to measure service sector productivity in the same way, i.e. using only quantitative dimensions of input and output (McLaughlin, 1990). At least there are two reasons for inadequacy of this type of service sector productivity measures. The first reason is the fact that input and output of service sector productivity consist not only of quantitative elements but also qualitative (Reid, 2005). The second reason is the fact that quality and productivity in all the sectors of service are strongly correlative (Gummesson, 1992). Customer involvement to the organizational activity in the service sector generates many output quality variations. Therefore, output of service sector in many cases could be measured only by measuring its quantity variations.

Traditional Theories on Service Sector Productivity: Baumol disease Costs or Services as Guilty of Overall Low Productivity

Researchers have mainly cited the relative productivity of services to explain the sector ’s growth. With regard to the relationship between the progressive growth of services in the economy and their low productivity, the most important advances are due to the works of William Baumol. The well-known “Baumol disease” brings out a decrease in economic growth due to its influence on productivity, while at the same time prices increase. Thus, this would bring down the decrease in overall total factor productivity.

But, in recent years as other authors have criticized or have been contemplated that Baumol disease has been cured. More recent studies show that only one – third of the services sector can be identified as low productivity growth activities , while the rest includes sectors registering similar growth rates or even higher than the manufacturing sector.

Another important theory, the "stages" theory given by Clarke (1960) and Bell (1973) seems to suggest that the services sector is inherently low in productivity. Thus, the shift to the tertiary/service sector is regarded as contributing to slowing down the rate of growth of the economy. Another implication of the theory is that an economy which has attained a certain level of development and per capita incomes would automatically experience a rapid increase in the contribution of the services sector in terms of additions to national product and employment. A further implication is that there would be no need for a services policy. Thirdly, it implies that developed countries should specialize in the production of services and developing countries in the export of goods.

Some writers have sought to refine the theory and more importantly to conduct empirical investigations into the causes of services sector growth. They explain the latter in terms of the difference in the dynamics of productivity between services and industry. Momigliano and Siniscalco (op. cit.) state: The lower growth of productivity in the tertiary sector is alleged to be caused either by
smaller opportunities of embodying technical progress in that sector or by the smaller exposure of the services sector to competition. Fuchs and Baumol (Inman, 1985), on the basis of data on the U.S. economy, sought to investigate the factors contributory to the emergence of the services sector; and have concluded that differential labour productivity growth was the main cause of low service sector productivity.

The Definition of Service Productivity

Given the huge size of the service sector in GDP it is increasingly important to find a satisfactory and widely accepted definition for the productivity of the service sector. As Mahoney (1988) has emphasized, it is inevitable that aggregate productivity measures will be plagued with difficulties unless service sector productivity is defined satisfactorily. As such there is no universally accepted definition of productivity.

Productivity shows whether the activity of an organization is efficient and effective. Though the terms like productivity, efficiency and effectiveness are used together and precisians sometimes alternate their meanings, however we must not identify productivity with efficiency and/or effectiveness. Productivity requires both efficiency and effectiveness, because a certain activity will not be productive if it is only efficient, but not effective, or effective, but not efficient. Productivity in economic position is defined as the relation between output and input. Input element in an organization consists of resources used in the product creation process, such as labour, materials, energy. Output consists of a given product, service and the amount of both. Mostly productivity is analyzed in manufacturing sphere. Productivity in the service sector was not analyzed before the end of the twentieth century, while productivity in manufacturing has been analyzed for more than two hundred years. Many researchers argued that application of productivity concept in service sector is more complicated task than its application in manufacturing. Productivity concept in manufacturing is analyzed in the scope of organization, but in the service sector this scope is larger and involves an external element from the organizational position – customer. The quality aspect in manufacturing is not gauged, because input and output are measured by quantity units which quality is seemingly the same. The quality in service sector is very important. Customers often evaluate a given service not only by its amount. If only one unit or package of service is purchased, output is mostly gauged only by the quality aspect. Input commonly is gauged both by the quantity and quality aspects. Quantity and quality aspects in the determination of productivity will differ in different spheres of service sector. Service sector input elements such as materials, machines and energy are not as important as in manufacturing. The main element in service sector is labour because service sector is more personnel-intensive comparing to manufacturing. Output in manufacturing is measured by quantity units and boosted by increasing the amounts of production, its realization. Service sector output usually has no high values by the quantity aspect; therefore it is mostly increased by the attempt to provide higher quality services to the customer, seeking for better customer satisfaction.

Productivity measures the efficiency and effectiveness with which resources are used in economic activity. Efficiency comprises two components: technical efficiency which reflects the ability of a firm to obtain maximal output from a given set of inputs, and allocative efficiency which is a reflection of how a firm uses the inputs in optimal proportion given their respective prices and the production technology. Productivity is defined as the relation between output and input, in other words, a ratio of output to input. Inputs are the resources used in the production, such as labour, materials and energy. A given product, service or both are the output.

Kendrick (1985) argued that the broadest measure is called total productivity (TP) or the total output (TO) - total input (TI) ratio:

\[ TP = \frac{TO}{TI} = \frac{TO}{L+K+M} \]

The total inputs of the factors of production (F) consist of labour (L) and capital (K) that includes natural resources as well as structures, equipment and inventories, and intermediate products (M) that
include materials, components, supplies, energy, and services purchased from other producers. Total productivity can be written as the weighted average of the partial productivity of L, K and M. Total productivity measurement is particularly useful at the company or plant level because management is concerned about saving on all cost elements and TP enables direct analysis of the savings achieved in the use of purchased goods and services as well as of factor inputs per unit of output.

**Indicators and Methodological Issues for Productivity Measurement in Service Sector**

One major issue in the context of service science is how service productivity can be measured and assessed. Services sector productivity analysis and measurement constitute a complex and intriguing proposition, given the heterogeneous nature and intangibility of services. Some services appear to be amenable to achieving productivity gains, while others appear to be resistant to the same.

Nevertheless, there are two types of productivity measurements that are mostly used to evaluate economic performance. One is called Partial Productivity such as labour productivity (LP) or capital productivity, relating output to a single production factor. As a partial productivity measure, labour productivity is much more often used to measure productivity compared with other partial productivity because it is significant for determining the potential growth in living standards as higher levels of per capita income or output require more output to be produced per labour. Labour productivity is used to capture the efficiency with which the economic system transforms labour into output. Labor productivity is defined as the ratio of a volume measure of output to a volume measure of input and its identity can be written as following:

\[ \frac{Y}{N} = \frac{Y}{H} \times \frac{H}{N} \]

Y is output, N is number of labour and H is number of working hours.

Another is Total or multi-factor productivity measures, relating output to an index of two or more production factors, which is especially useful for measuring the efficiency of the use of resources. Multifactor productivity (MFP) or Total factor productivity (TFP) is a variable which accounts for effects in total output not caused by inputs. For example, in a Cobb-Douglas production function,

\[ Y = AK^{\beta}L^{\alpha} \]

A is the MFP or the TFP. MFP/TFP is a more comprehensive measure of overall productivity, which combines all of the partial measures into an aggregate index. The benefit of using MFP/TFP for industries and sectors is that MFP/TFP for the national economy or the business sector is a weighted average of TFP/MFP in each of the component industries, the weights being the base-period proportions that each industry’s value added GDP is of total gross product. The changes in TFP reflect changes in productive efficiency as a result of net savings in real factor costs per unit of final products.

Järvinen, Lehtinen, and Vuorinen (1996) defined productivity of the service sector as:

Service Productivity = \( \frac{\text{Quantity of output and Quality of output}}{\text{Quantity of input and Quality of input}} \)

In this ratio, the quantity aspect of service productivity is the same as the manufacturing productivity, which consists of material, labour, and capital. Unlike the quantity for manufacturing output, the volume of the service output is not an important issue from the customer’s perspective because the customer normally purchases only one unit of output or one package of service. The output consists of a total service offered in terms of quality and the input includes both tangible and intangible elements. The quality in service sector is very important. Customers often evaluate a given service not only by its amount. If only one unit or package of service is purchased, output is mostly gauged only by the quality aspect. Input commonly is gauged both by the quantity and quality aspects. Quantity and quality aspects in the determination of productivity will differ in different spheres of service sector.

Thus, determining productivity of service sector, we must evaluate output and input elements in the aspects of quantity and quality. Analysis of productivity concept in service sector helps to reconcile conflicts between improving service quality and boosting productivity. Determination of service
output could be a difficult task because of its intangible nature. One of the most effective ways of boosting productivity is investing to new technologies, which helps to reduce labour element of input and to reach higher values of productivity.

Productivity measurement can be approached in different ways. Determination of which one to use should be based on the particular aim of the research and availability of data. A summary of techniques available is shown in the figure.

**Source:** Own Elaboration

**Figure 1.** Methodological Approaches to Productivity Measurement

The two main approaches to measure total factor productivity are Frontier analysis (where efficiency is measured as distance from best practice frontier) and non – frontier approaches. Further the frontier analysis involves two main methods – Parametric and non – parametric. The parametric approach is based on econometric estimation of a given predefined function with given set of assumptions whereas non – parametric approaches do not assume any functional form. Data envelopment analysis is one of the most popular linear programming non parametric method to measure productivity originally developed by Charnes, Cooper and Rhodes (1978).The non – frontier analysis involves Index numbers which can be evaluated from observable price and quantity data. Out of different index numbers, Tornqvist (1936) indexes are most widely used and are weighted geometric averages of growth rates for the micro-economic data.

**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. These are measures of labour and capital productivity, and multifactor productivity measures (MFP), either in the form 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 the single most frequently 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.

Table 1. Overview of Main Productivity Measures

<table>
<thead>
<tr>
<th>Type of Output Measure</th>
<th>Labour Productivity (based on gross output)</th>
<th>Capital Productivity (based on gross output)</th>
<th>Capital-Labour MFP (based on gross output)</th>
<th>KLEMS multifactor productivity</th>
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<td>Capital Productivity</td>
<td>Capital Productivity (based on value added)</td>
<td>Capital-Labour MFP (based on value added)</td>
<td>KLEMS multifactor productivity</td>
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<td>Value Added</td>
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<td>Multifactor Productivity (MFP) Measures</td>
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Source: Own elaboration

Goods and Services Sector Productivity

It has been argued in the literature that services are less productive than goods. In response to Kaldor (1966), who emphasized that labor in the non-manufacturing sector is less productive; many studies have attempted to examine the lagging service sector productivity. Baumol (1967) points out that productivity improvements in services are harder to achieve than in goods producing industries. The unbalanced growth models by Baumol and Fuchs (1968) helped in popularizing the notion that because of their labor-intensive nature, service-sector activities cannot be made more efficient through capital accumulation, innovation, or economies of scale. Thus, leading to concerns that, as the size of the service sector increases, total economy-wide productivity growth will be reduced. Certainly, lower overall productivity growth would result in lower growth in potential output or, in other words, would lead to slower increases in the level of output that the economy can sustain without raising inflation. It would also limit rates of sustainable, aggregate real wage increases.

Reasons for Lagging Service Sector Productivity

Measurement Errors

Many researchers have suggested that an important source of the differential in productivity growth between goods and services is measurement error. They argue that problems in defining service-sector outputs and identifying price versus quality changes, as well as the paucity of data on services, have resulted in underestimation of service-sector output growth. At a general intuitive level, it is not hard to make a convincing argument in favour of measurement errors leading to underestimation.

General problems that are frequently discussed include:

- The greater difficulty involved in defining output and assessing quality change for the service sector compared with the goods sector. While there are major problems with measuring productivity for both the goods and service sectors, defining a unit of service output is often thought to be harder because of problem such as its greater intangibility and the fact that quality depends on the inputs provided by the user of the service. These conceptual problems translate into practical difficulties, such as less standardization of data reporting.
The poorer quality of data on services than on goods. This is due in part to poorer survey coverage.

The high proportion of certain service outputs that are intermediate inputs elsewhere. This further complicates measurement, since data on intermediate inputs are generally harder to obtain than data on final outputs.

Inappropriate deflators that cannot account for many quality improvements. Price increases resulting from quality increases, for example, may be treated as pure price increases, thus creating a downward bias in real output.

Mismanagement of New Technology?

Stephen Roach has suggested that lagging productivity in services in the 1980s was in part a result of overinvestment in information technology. He claims that not only did service firms invest too much in new computer technology, but that the long learning period associated with the new technology also reduced the visible benefits from these investments. Often, for example, new systems operated side-by-side with the old systems, so that tasks were done twice. Investment in computers has been relatively high in the service sector. So, overinvestment in computer technology offers an explanation for the slower productivity growth in services.

There are a number of factors that can delay the visible benefits of new technology. For instance:

- The adoption of new technology usually involves learning periods that show up as decreased productivity, because improvements in human capital are not captured in the data. Moreover, many of the skills will likely be acquired through “learning by doing” and such a learning process may well include making errors that register as “mismanagement.”
- Initially, technology is used largely to improve the way in which traditional tasks are performed. It takes greater familiarity with the potential of new technology before more fundamental changes in organization and the production process can be implemented to better exploit the technology.
- Significant productivity gains will not be seen until the effective use of new technologies is widespread. Measured productivity growth reflects the average practice rather than the best practice.
- Diffusion of technology may be slow because of the substantial fixed costs of changeover and because of uncertainty about the benefits and vintage effects—it takes time to adapt the structure of capital and it does not make economic sense to scrap old equipment immediately.

In conclusion, it is evident that the service sector has invested heavily in new computer technology and that there has not been visible productivity gains from this investment. It is not clear that the failure to realize productivity growth is the result of poor investment decisions or of mismanagement of the new technology. Unfortunately there is no clear empirical evidence to resolve the issue. At best, however, the hypothesis of overinvestment in computing provides only a very short-term explanation of the disparity in productivity growth between goods and services. Moreover, it only explains the disparity to the extent that the service sector has invested more heavily than the goods sector in new technology.

Lack of Competition?

Another explanation for lower productivity growth in services is that the service sector is subject to less competition than the goods sector. Roach (1991), for example, comments that the failure of the service sector to implement the same kind of productivity-increasing restructuring as the manufacturing sector in the 1980s was a direct consequence of its lack of exposure to competition. There are two main reasons why the service sector may be subject to less competition than the goods sector: a higher level of regulation, including foreign investment controls; and less exposure to foreign
trade. The latter stems not only from trade restrictions, but also from the very nature of services, which often cannot be provided at a distance.

**An Innate Feature of the Service Sector?**

In the 1960s, the development of unbalanced growth models by Baumol (1967) and Fuchs (1968) helped to popularize the notion that because of their labour-intensive nature, service-sector activities cannot be made more efficient through capital accumulation, innovation or economies of scale. They believed that low productivity growth is an innate feature of the service sector. Such ideas remain pervasive today. But while they are valid for some service industries, they should not be applied to the whole service sector.

Thus, various explanations have been given for the lagging service sector productivity in comparison to the goods sector.

**Problems and Measurement Issues**

The concept and definition problems within productivity create measurement problems for the productivity of the service sector and its growth. Productivity measurement presents several issues and problems. There is underestimation of service productivity growth and different measurement biases. There are three areas in which measurement issues may arise. These relate firstly to the choice of inputs, secondly to the choice of outputs at current and constant prices, and finally to the approach of aggregation across industries.

One of the measurement problems concerns prices. Standard price data fails to capture the improvement in the quality of many outputs and thus leads to an understatement of real output. While the index numbers are used to deflate the GDP, they are facing weighting schemes problems. Using a single base year or fixed weighting scheme leads to measurement error of the true productivity and economic performance, so the weights of index numbers should be changed frequently (Diewert, 1987; Gordon, 1996). If the consumer price index (CPI) has an upward bias, the growth rate of output and productivity must be downward biased. The causation of the CPI’s upward bias can be identified as traditional substitution bias, quality change, outlet substitution bias and logarithm bias. Due to the traditional substitution bias and outlet substitution bias, the officially recorded productivity growth in manufacturing and trade has been much lower than the actual productivity growth. Many consumer purchase sectors, such as services like banking, insurance, and health care have quality change bias. Due to this CPI upward bias problem, Gordon (1996) argued that the US productivity growth might have been substantially understated both before and after 1972.

To measure the productivity of an industry or a sector, we have to have the information on the outputs produced by the production unit for every time period in the sample along with the average price received by the production unit in every time period for each of the outputs. Many of the outputs in service sector industries, however, are difficult to measure theoretically, such as the output in insurance, gambling, banking, options trading, etc. (Diewert, 2008). The problems in defining service-sector outputs have caused underestimation of service-sector output growth. It is hard to find equivalent output unit in physical terms for most of the service sector outputs (Sink, 1989). Defining a unit of service output is considered to be difficult because of the facts such as its greater intangibility and that quality depends on the inputs provided by the user of the service (MacLean, 1997). The quality of service output has more variation than the non-service sector outputs but the average quality should not vary much over time (Kendrick, 1985). Normally, output information is presented as revenues received by the industry with either an output index or a price index for each output. The output of the service sector consists of a total service offering in terms of quality, which is what the customer in fact pays for and which is mostly intangible and difficult to quantify (Adam, 1995). Adam (1995) suggested that the service sector output should be treated as the value for the customer and from the perspective of the customer and defined by its quality level.
Measurement of inputs in the service sector production also poses a problem for service sector productivity measurement. The inputs include both intangible and tangible elements (Rutkauskas and Paulavičienė, 2005). For example, service culture is considered as one important intangible element for service sector production, but it is extremely difficult to put a value on it. Labour input is generally measured in terms of hours worked by all persons engaged in production (Kendrick, 1985). Such a measurement, however, is not accurate. Highly skilled workers contribute more to production than unskilled workers if both of them work for the same number of hours (Diewert, 2008). To solve this problem, some analysts weight labour hours by the average hourly compensation by industry, occupation, and other significant classifications, including levels of education and experience.

Moreover, in the service sector, a high proportion of certain service outputs are used as intermediate inputs elsewhere, which makes the measurement even more difficult because the data on intermediate inputs are harder to obtain compared with the data on final outputs (MacLean, 1997). Many industries in the service sector have more than half of their outputs used as intermediate inputs.

Measurement errors cannot explain all the slowdown and low productivity growth in the service sector, but correcting these errors indeed helps to significantly improve the productivity growth picture in the service sector. Gordon (1996) states that the corrections of the measurement errors could easily double the officially recorded rate of private non-farm non-manufacturing sector productivity growth in the US. Thus, a potential under-estimation of services productivity growth may lead eventually to an under-estimation of aggregate productivity growth. This effect would depend on the type and extent of the measurement bias, and on the role of the under-estimated services for other industries and the whole economy.

More work needs to be done with regard to the role of measurement problems in estimating productivity growth in services industries. Progress on basic services sector measurement problems will improve productivity growth measures and enhance our understanding of the cross-country differences in productivity growth performance.

CONCLUSION

Various relevant conclusions can be drawn from the analysis carried out in the productivity review. It seems clear that the analysis regarding productivity in the services sector is the core of the increasing debate, principally regarding its definition and measurement. A major concern is produced when stagnant or slow productivity in services may slow the entire economic growth due to major participation of services in total economy. Services sector productivity analysis and measurement constitute a complex and intriguing proposition. Though, there is an extensive and still rapidly evolving literature on productivity issues and on the available methodologies for productivity estimation. However, this is just the starting point. The effect of errors in the measurement of productivity and heterogeneity of services needs a far greater analysis. It is intended that this conceptual framework will form the basis for empirical work on service sector productivity for selected developed as well as developing countries of the world.

REFERENCES


