

# Introducing a Model for Measuring and Analyzing Productivity in the Service Businesses

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**Abstract**— Service is an economical and intangible product produced by a person, institution or industry for others' consumption and any institution that produces an intangible product is called service business, so, you can see that the service has different nature from the product, so, the same difference caused its study has become so complicated. As you know, for considering the productivity position in an industry, producing or service business, we need to measure the productivity in that particular field, also, for measuring productivity, it is necessary to recognize obtained outputs and imported inputs into the system and with comparing them, recognize the amount of productivity in that special case. Now, due to lack of special study resources in the field of productivity in service businesses, the primary purpose of above proposal is introducing an appropriate model for measuring and analyzing productivity in the service businesses. In fact, the submitted model in this proposal can apply more effectively than other existed models in submitting an effective model for studying productivity in service and duty sectors.

**Keywords:** Productivity, service business, administrative services, measuring, family of productivity criteria

## I. INTRODUCTION

As you are aware, measuring the productivity is the primary step in the productivity cycle, but, about service businesses, it is necessary to mention that they have a significant difference with industrial and producing companies [3] and [9]. Actually, outputs of service businesses are intangible and cannot be converted to digits. Because the outputs of service activities are related to quality, so, we cannot measure the quality of service activities. Meanwhile, we cannot insert the digits of output activity based on its quality measurement [2], [4], [6], and [8].

On the other hand, the inputs of service activities are nearly intangible; especially, the material plays a less role in service activities, but human resources play the main role.

So, the quality of human resource plays the central role in the quality of outputs [5] and [7]. Unfortunately, the scientific research records of above subject are not developed and organized same as productivity studies in industrial institutions.

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Productivity has been surveyed deeply by economists, sociologist, financial experts, and engineers for many years [1]. Each group has tried to consider it in Macro, Micro levels and present some solutions for its development.

The variety of inputs and outputs divided into two quality and quantity groups, which should interact with each other. Productivity is a conception that establishes this relationship, so productivity thinking is to elevate and develop a system. Productivity as a positive perception considers the response method in a system. Finally, productivity aims to obtain the best result from submitting the correct activities. So the aim of productivity is not high production but gets a better result.

## II. THE EFFECTIVE FACTORS ON ORGANIZATION PRODUCTIVITY

If we pay attention to one organization (productive or industrial), we can divide the effective factors on productivity into two groups. The first group is referred to system and organization attributes such as technology, machinery, raw material, energy, planning methods and scientific management tools. The second one is effective for elevating the productivity is referred to human and their behaviors in the system.

Now, it is necessary to mention that effective and proper management leads to productivity improvement, the main responsibility of a manager is increasing the productivity, maintain the growth and elevating the system. In processes of improving the productivity, the human resources should try to establish and apply the new changes. For this reason, the managers who prepared the appropriate planning for improving the organization productivity has paid attention to motivation and technical activities.

## III. INCREASING SIGNIFICANT OF SERVICES IN RECENT YEARS

In the second half of 20th century, we have encountered the rapid changes in global economic structure. This matter is evident in an industrial era more than anywhere.

The developed countries have found the sign of service activities as an incentive power for growth after equipping with industrial, mineral and agricultural powers. Increasing share of services in Gross National Product, occupation, the expense of personal consumption and foreign business certifies this matter. The other aspect of the importance of services is seen in industries and companies; increasing the service occupations in non-service industries, increasing the ratio of service workers in the companies shows the coordination with main economic changes and their exchange from industrial societies to service societies. Finally, the attention to the productivity of service businesses has been increased; in such a manner, that one of authorities believes that productivity in the service

businesses is a determinant of winner or loser in the competition war.

#### IV. NECESSITY OF MEASUREMENT OF PRODUCTIVITY IN SERVICE SECTOR

The first and foremost step in improving the productivity is measuring the productivity. The measurement of productivity will increase manager's power to analyze the problems, and help them to plan for improving the system, and it has advantages like awareness, attention to the weak area, getting feedback, and facilitate the integrating.

For example, measuring of productivity and its analysis, lead to clearing many problems, and through this, manager pays more attention to the sectors needing more assistance. Usually, the productivity's traditional attributes, focus rather on the effectiveness of the services. The aim of effective service workshop is not servicing many customers, but we consider the quality of services too. About the services, how we can separate the quality from quantity? A suitable method is to recognize the good service and important results and create a group of criteria that focus on quality, on time services and efficient use of resources. When we cannot measure more complicated services through one criterion, we should utilize the family of criteria's. The main secret of success in measuring service business is a method that can measure the effectiveness of supply customers' demands, not merely measure the effectiveness in performing that service.

#### V. A SURVEY ON TRADITIONAL METHODS TO MEASURE PRODUCTIVITY IN SERVICE SECTOR

##### A. Analysis of Mandel unit work:

This method is based on applying the industry engineering technique regarding service business. In this method, the outputs of organization or service units are separated into a single unit hierarchy. So, one structure of work unit is established, and the quantity objectives are assigned for measuring the effectiveness of that work unit. Then, related productivity criterions, like output for any worker, registered working hours or useful and real working hours are controlled for these work units.

##### B. Measuring work:

There is another industrial engineering technique, which prepares possibility of criterion determination of productivity for the service sector, such as informal techniques, semiofficial and official techniques. The informal techniques: In this method, supervisors control the staffs, in order to check the effectiveness of them or how much time they spend on performing the task. The value of this method is concealed in measuring of decrease or increase of productivity.

##### C. Semiofficial techniques:

In this method, a list of main tasks are provided by the service sector, and then with circumstantial looking, the abundance of their occurring will be determined.

##### D. The official techniques:

The service job is described based on its details. A qualified worker is chosen. He is aware of the correct performance of his task. He has enough experience for essential decisions in the usual timetable, and he has essential power, talent and strength for doing his task in usual speed and under planned circumstances. Then the analyst considers the worker's speed while doing the task. Some supervision will be done, in order to be sure about the accuracy of data.

#### VI. INTRODUCING TWO NEW METHODS FOR PRODUCTIVITY MEASUREMENT IN SERVICE SECTOR AND SELECTION AN APPROPRIATE METHOD

##### A. Criterion family:

It is a useful method for evaluating staff's effectiveness. This method has been suggested by productivity and quality center of America. We will describe the principal rules of this system and negotiate about its details in the various processes. This method has 4 procedures:

- 1- Determination
- 2- Recognition
- 3- Development
- 4- Modification

One of the weakness of the traditional measuring systems in comparison with a control of productivity in service sectors is the workers who do not perform their task correctly. So, their effectiveness will be controlled by these systems. Staffs, who participate in the establishment, will avidly accept the system. In the criterion family method, first, one working group is formed. This group is combined with various people who supply the studied services such as a seller, supplier or customer.

The first task of the group recognizes main services of products and customers who purchase them. Upon the objectives are set, then the group utilizes the thinking storm technique (nominal group technique) for determination of effective criterion of their outputs and services. The aim of the mentioned above is forming a criterion family to cover various aspects of productivity, the productivity of resources, quality and on time services.

The chosen criterions should have a true effect on principal standards of the company; it means to help reducing expenses, improving the quality and so on.

After specifying the criterion by staffs, the manager will consider them and determine the final list. Finally, the border of the measuring system is that to some extent it shows the objectives of services and to some extent, these objectives are described. The managers should not expect to obtain the perfect criterion. The starting point is obtaining appropriate and reasonable criterions improved by feedbacks during the specified period.

##### B. Multilinear regression:

By another method (statistical technique) known as regression analysis, the productivity of services is measured. First, the service occupations are categorized in order to recognize their attributes. These attributes are as follow:

- Number 1- Thinking activity
- Number 2- Operation with long cycle
- Number 3- Unstable nature of occupations
- Number 4- Deciding independence or performance in first or end of the task
- Number 5- Affiliation about finishing the task in the middle stage
- Number 6- Variable time of accomplishing the work
- Number 7- Group working
- Number 8- Participating with outside staffs
- Number 9- Coordination of activities or secondary tasks
- Number 10- Ability to perform task with several tools
- Number 11- Direct operational time
- Number 12- Unstable and unexpected obtaining to the results

Then these attributes will be converted to the criterion. For instance, attribute No. 3 is converting to job Variability criterion.

$$\text{Job Variability criterion} = \frac{\text{The number of task delivered to an individual or a group}}{\text{The number of all tasks delivered to an individual or a group}}$$

Moreover, the attribute No. 11 is changed to individual productivity criterion.

$$\text{Individual productivity criterion} = \frac{\text{The real working hours of an individual or a group}}{\text{The working hours of an individual or a group which is paid for}}$$

Two models have been prepared for usual service occupations (Pr) and unusual service occupations (Pnr). The productivity significant factor in the first case are attributes No. 4 or 5,10 and 11 and The productivity significant of the second case are attributes No. 5,6,7,8,9,10,11, which are described as follow:

$$\begin{aligned} \text{(Pr)} &= a \text{ (Independence criterion)} + b \text{ (Group interaction criterion)} + c \text{ (Combined facilities criterion)} + d \text{ (Individual productivity criterion)} \\ \text{(Pnr)} &= a' \text{ (Job variable criterion)} + b' \text{ (Independence criterion)} + c' \text{ (Group interaction criterion)} + d' \text{ (Outside of group interaction criterion)} + e' \text{ (Coordination criterion)} + f' \text{ (Variable time)} + g' \text{ (Individual productivity criterion)} \end{aligned}$$

The information of some staffs are gathered. Then; we use this information for obtaining the coefficient of a, b ....d, a', b', c', ... g'.

The technique of family criterion in compare with regression technique is maximally based on staff's perception, but the information for the second method is low. Meanwhile, the same method may be used for any service activity. On the other hand, the suggested model in regression technique is applied just for managers and executive managers. For service staff like computer

department and administrative staff, the factors should have been changed or modified.

The determination of coefficients of total productivity criterion is stable for some first periods, whereas we know that it is not possible in reality, also, we cannot measure the productivity of long-term tasks like R&D and research market, so, for facilitating of utilizing, the family group criterion (FOM) is utilized as a prior method for measuring productivity in service activities.

## VII. MODEL OF PRODUCTIVITY CRITERION FAMILY

One of the developing factors of each organization is improving its productivity. The advantage of above in the profit organization is better utilizing of resources, inputs and obtaining more outputs and eventually increasing the margin. Regarding other organizations like educational centers, governmental administrations, and political organizations that perform some non-profit activities, improving the productivity for achieving the preplanned objectives is done by less input, expense, and facilities. After doing improved activities, it is necessary to specify the current productivity position, in order to evaluate the effect of improved activities, so, the organization productivity shall be reconsidered continuously; on the other hand, it should be measured.

With reference to the mentioned introduction, it is obvious that the first step in completing the productivity cycle plan is a model that measures the productivity of the organization, so, this is the most significant step for the beginning of productivity cycle.

Actually, if you could able to measure the quantity of something, you can recognize that thing. Otherwise, your recognition is not satisfactory. It may be your first knowledge, but you have not achieved science, and every subject has evidence in due course.

So, this proposal specifies that family criterion plan is a remarkable model to measure the units and service activities productivity because it has remarkable advantages compared with other models:

- 1) Share all staffs (responsible staffs and supervisors) in planning model and creating feelings of belonging
- 2) Transferring strategies to the staff and clarifying values and organizational objectives.
- 3) Facilitate assigning the responsibilities (valuing staffs' opinions and finally, entrusting responsibilities to them)
- 4) Clarifying the successes for staff
- 5) Thanks staff for their performance and reward them for their services based on chosen criterion
- 6) Allocating the resources efficiently in unit level based on obtained result( based on chosen productivity criterions)
- 7) Recognition of organizational opportunities and threats through the selection of adapted criterion with organizational objectives.
- 8) Due to staffs' participation, the change procedure will be accelerated.

VIII. WRITING THE PRODUCTIVITY OBJECTIVES

When we determine the criterion for measuring the service productivity, the best way is coordinating with performance objectives, so, we can be sure that what we measure, is a correct one. Improving the performance based on criteria means that staffs work hard for achieving the objectives. It is necessary to write the objectives so that that staff would be aware of mission and vision of service sector. Also, each member of the working group should concept service goals and how these objectives connect to each of them. The objectives of performance productivity are not just about effectiveness, but it relates to effective affairs in supplying customers demand too. The coordinator should be assured of members awareness. Also, the group should know that the position of competitive strategies is subject to obtaining progress in wide aspects and try to focus on the performance which can be measured easily, so, the determinant objectives should have following attributes:

- Quantitative
- Creative
- Accessible
- Exact and clear method
- Measurable
- Provocation
- Timetable
- Subject to calculation, control, and evaluation
- Have near relationship with effective factors on current competitive success and long survival.

In the following table, we have brought some samples of output and input criteria about objectives:

Table I: Criterion and Objective

Criterion	Objective
Output: number of delivered products Input: automobile expenses	Increasing effectiveness of delivering product or service expenses
Output: number of new members Input: number of telephones to occasional members	Increasing members through acceptance of telephone inquiry
Output: collection of support expenses Input: working hours	Increasing numbers of orders in postal order
Output: number of customers' complains Input: number of sale forces	Maintaining competitive ability of support expenses
Output: number of customers complains Input: number of considered complains	Decreasing number of customers complains in the marketing department.

As we mentioned before, service activities are so complicated that we cannot recognize it by one or two aspects, but we do not suggest determining ten criteria for each service department. When there are several criteria, staff mixed up about organization's priorities.

A list of nominated criteria should cover the below responses:

- Do the nominated criteria cover all departments' objectives?
- Does obtained information from criteria clarify the effectiveness of services?
- Do the criteria clarify the critical points in the evaluated department?
- Is there a reasonable proportion of criteria and related performances? Alternatively, on the other hand, more criteria should not determine for each department.
- Are criteria's data accessible easily?
- Are chosen criteria measurable easily?

IX. CONCLUSION

The evaluating systems are occasionally created eagerly. However, it is not durable, because, large amount of data is gathered. It is not useful. When staffs find out their efforts for designing criteria and supervision of effectiveness are useless and do not lead to organization's changes, they lost their eagerness. Therefore, managers should find a solution to combine these criteria with daily department's operations or related duty services, and use obtained data in an improved general plan. The data is just converted to information when they will be considered in a real circumstance.

Generally, family criteria are utilized for three objectives: (1) Training the staffs, (2) Creating the motivated systems for department and organization (redesign of service), (3) Determination of new strategies for the organization, and (4) Advantages of utilizing of productivity criteria:

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