

## Measuring and analysis of productivity indexes and identifying preventing and driving factors of growth of productivity and presenting solutions to promoting that in technical and vocational training centers

(Case Study: the Eram center of education of advanced technical and vocational skills)

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### Abstract

In order to enabling organizations to survive in modern economical and social environment and having growth and eminency. They have obtain necessary informations about their performance indexes of own organization, competitor's strategy, technology changing and changing in process. In order to this, the degree of countries from economical perspective is depending on extend of appropriate using of existing resources that lead them toward their goals. Thus this issue showing the special place of productivity in development strategy of countries and also making necessary building a special system for measuring of productivity in organizations in order to giving necessary informations of organizations performance to managers and enabling them to make appropriate decisions in order to achieving their goals. Although triggering a system of measuring productivity in organizations is costly but if managing this system appropriately the organization will gain many benefits more than its costs. This survey interns of goal is applicable and interns of methodology is descriptive –analysing. Statistical society including courses that presented in eram center during years of 1388 to 1390 that according to elits of this center, 6 educational courses was selected as popular courses and our sample. Analysing of results of this survey show that this center has dynamic curriculum in the year of 1390 and managers of organizations had good monitoring on improving quality of courses and measuring participants through rigid exams.

**Keywords:** productivity indexes, preventing factors, driving factors, Productivity, solutions, technical and vocational training centers.

### 1. INTRODUCTION

Today, productivity, more than being a measure is introduced as a culture and attitude to life and work and improving productivity is main source of economic development. Improving the productivity has vast effects on main social, economic and political phenomena, such as inflation, higher levels of welfare, employment levels, increase competitiveness and so the economic and political implications.

All experts agree that the main factor productivity growth and economic development and provide improving the living standards of the population. Productivity growth is the increase of per capita income, which itself is the product of productivity growth. Improving productivity, it is possible to achieve a high standard of living . (AbulAlayi, 1995) The aim of this study was to examine the factors inhibiting and promoting productivity and productivity growth, and presenting incentive strategies and provide technical and professional logo in the center of Mashhad using available data from 1388 till 1390. So the main question in this research, namely is the lack of adequate training and productivity analysis in the center.

Department of Technical and Vocational Training Centers in KhorasanRazaviand its branches including Eram advanced vocational training center in Mashhad, are responsible for technical training and reference applications and scientific and practical training and vocational training and present and provide state-level regulations and standards which are based on international and national special education law and regulations, job training, upgrading technology and professional expertise to individuals and business clients in order to obtain the desired job and are responsible for the various professions programs under the Education Act.

## 2. Theoretical Foundations

### 2.1 Productivity

Productivity in the modern meaning is the efficient use of resources in order to achieve efficient and effective result. The modern and efficient production of economy and management issues that are addressed in organizations. Efficient use of resources is in fact the art that is superior then the principles and equations proven in the economy. Increasing productivity leads to improving the living standards of the population and increased income per capita. (Prokopenko, 1993)

Several definitions of productivity are presented and some examples are provided here:

$$\text{Output} = \text{Productivity} \times \text{Input}$$

Input

International Labor Organization (ILO (AbulAlayi, 1995)): Productivity is the relationship between the output of a production system (goods or services) with used input (resources) to produce the output. Asian Productivity Organization (APO (Prokopenko, 1993)): Productivity is a comparison between the value of goods and services produced and the amount of resources used to produce these goods (Taheri, 2003) Japan Productivity Center ((Taheri, 2003) JPC): Productivity is defined as maximizing the use of resources, manpower, facilities and scientific manner. Reduce production costs, expand markets, increase its efforts to increase employment and real wages and improved living standards, as they benefit workers, consumers and the general management. (Khaki, 1997) Productivity Agency Europe ((Khaki, 1997) EPA): the degree of use of each of the factors of production is called productivity. Europe · Economic Cooperation Organization ((Kotler, 2004) OECD): dividing the amount or value of the amount or value of production is equal to the productivity. In fact, productivity is equal to the quotient of output (output) on one of the (total) factor. American Productivity Center (APC [6]): Profit = Price × Adjusted Productivity . (Kotler, 2004) Iranian National Productivity Organization ((Nazem, 2008) NIPO): Productivity is a culture, a rational approach to life and work intelligently to activities that aim to achieve a better and a higher life. (Kotler, 2004)

### 2.2 Productivity Improve management

Productivity improve Management is performance of a cycle consists of the main steps of measurement, Analysis, planning and implementation (improved), its implementation must be continually repeated. This cycle is similar in all systems in both manufacturing and services, both public and private, (Fig. 1).

1. Measurement: Identify the existing status, identifying indices, measuring indices;
2. Analysis: Identify the strengths and weakness and factors that reduce or increase productivity and the distance to the ideal situation.
3. Planning: Choosing a suitable method to achieve the desired status with appropriate timing.

4. Run (improved) performing and implementing the chosen deadline approaches.(Nazem,2008)  
Figure 1: productivity improvecycle.(Nazem,2008)

### 2.3 Productivity measurement

Necessity of developing a successful strategy for improving productivity, is setting up a systematic approach to measure productivity - both at the macro level and the micro level.Productivity measurement, is the starting point of the scientific process of productivity management and scientific process of productivity management is the continuous cycle consists of four steps of measuring, analyzing, planning, and improvement.Measuring the productivity cycle,role remains the same as boards show the distance to the next city in kilometers in the road to productivity. (Rastogi, 2008)

The first step in measuring productivity is measured by output.The next step is to identify the types of data and measurement. (Nowrziou,2010)

#### A) the output measurement

The output can be in the form of goods and services as well.Output measures examined in this study include:

- 1) The courses were held in the Eram center in person time in the years 88, 89 and 90.
- 2) Number of passed participants in courses held in the Eram center in the years 88, 89 and 90.
- 3) theGPA of all participants in the courses held in the Eram center in the years 88, 89 and 90.

#### B) input measurement

The input is the result of factors of production such as labor and capital services.

### Work force

Input scale factors can be divided into two categories: scales state the labor force input in terms of time and measures that are based on the number of staff involved in the delivery of services. Common unit for input used in industrialized countries is working time.

### Capital

Capital assets include buildings, machinery and other equipment.Sometimes they are also part of the capital stock account.But in public funding agencies, funds and expenditures are measured instead of input for measuring productivity.

Scales were examined in this study include:

- 1) Total number of staff in Eram in years 88, 89 and 90.
- 2) Total Cost realized in Eram center at the end of years 88, 89 and 90.
- 3) The total cost of education for years 88, 89 and 90.

### 2.4 The necessity of productivity measurement

Measuring productivity and construed as an integral part of the scientific process is the starting point for the management effectiveness.If productivity is manifested in our culture, it will lead to true, measurable objectives and performance management.In other words, productivity measures, provide information that makes it possible to judge on how to move towards the target (the Messiah) from the point of departure of the previous situation (current status), creating measuring productivity, the productivity of the organization in order to establish good relationship with its strategic goals.For example, the primary means of achieving improved productivity may increase in the share market.Measuring the efficiency of a system that enables organizations to give new life and fulfill their strategic plans in obtaining desired levels of productivity gains (which is linked to a specific strategic objective).

Apart from its strategic interests, productivity measurement has otherutilities for organizations,. Some useful functions are:

- ✓ Awareness role
- ✓ assessment (identification of opportunities and deal with threats)

- ✓ Create a mechanism to provide feedback
  - ✓ Creation of information for management decision making
- and. . . (Tyler, 1998)

**2.5 Eram Advanced vocational training center in Mashhad**

Eram Center for Information Technology in Mashhad was founded in 1380 as a center. In those years, the Center for Information Technology with specialization courses, web design courses, Professional programming, computer networking and multimedia production created dramatic changes in education, the pattern of schools and departments of education. In 1387 due to improvements in the fields of education and advanced skills, Information Technology Center changed its name to "Advanced Skills Training Center". The center with the disciplinary inquiry, seeks to provide training and educational programs. In the area of education, the logo of Center staff and experienced faculty specializing in teaching specific scopes. Currently, there are about 180 free schools in 14 disciplines working under the Eram Advanced Skills Training Center.

**3. Research Methodology**

This research, in terms of purpose is applied, because of the use of context and issues dealing with organizational requirements, and in terms of method is survey and uses of documents and information. Data Matrix tool efficiency and productivity index charts are used. In this study, using data analysis and data related to Eram training and advanced vocational training center held in Mashhad during 1388 to 1390, including number person time, the number admitted each period, the cost of education ..., is trying to understand the factors affecting the productivity growth, and offers practical solutions to improve the quality and performance.

**population**

The study sample included all training courses held during the years 1388 until 1390 in the Eram center.

**sample**

Due to the extensive population of this study, a sample of the most popular courses held in the Eram center during the years 1388 till 1390 have been selected.

Topics in this course include:

1. Carver Auto Cad,
2. Carver Corel Draw,
3. Basic Web Design and Development,
4. ICDL (grades 1 and 2),
5. Carver SQL Server,
6. Application Programming with Visual Basic.

**Matrix method for determining the productivity index**

Productivity Matrix is framework for displaying and comparing productivity in a particular subject area. In the top row output titles and in left column of the matrix, input titles are placed. As shown in Table 1, number inserted in each cell of matrix is result of output of that cell divided by input related to the cell.

Table 1: productivity matrix. (Fabricant, 1998)

outputs inputs	-1	-2	-3
-1	$\frac{\text{Output 1}}{\text{Input 1}}$	$\frac{\text{Output 2}}{\text{Input 1}}$	$\frac{\text{Output 3}}{\text{Input 1}}$
-2	$\frac{\text{Output}}{\text{Input}}$	$\frac{\text{Output}}{\text{Input}}$	$\frac{\text{Output}}{\text{Input}}$

	$\frac{1}{\text{Input 2}}$	$\frac{2}{\text{Input 2}}$	$\frac{3}{\text{Input 2}}$
-3	$\frac{\text{Output}}{1}$	$\frac{\text{Output}}{2}$	$\frac{\text{Output}}{3}$
	$\frac{1}{\text{Input 3}}$	$\frac{2}{\text{Input 3}}$	$\frac{3}{\text{Input 3}}$

**Indicators of productivity of courses in Eram training center**

The ratio between the volume or value of output to the volume or value of one, several, or all of the factors that have been used to generate output; or in other words, each type of association between the output and input is defined as the ratio is called the productivity Index (Shams, 1999)

Using experts in the field of productivity in Eram training center, Productivity indicators of the training center for years 88, 89 and 90 were defined as:

Index 7.1

The time courses were held in the year

The total number of staff in Eram center in year

Index 7.2

The time courses were held in year

Total Cost Centre achieved in Eram center in year

Index 7.3

The time courses were held in year

The total cost of education in Eram center in year

Index 7.4

the number of people accepted in courses were held in year

The total number of staff in Eram center in year

Index 7.5

the number of people accepted in courses were held in year

Total Cost realized in Eram center at the end of year

Index 7.6

the number of people accepted in courses were held in year

The total cost of education in Eram center in year

Index 7.7

Overall GPA of participants in courses held in year

The total number of staff in Eram center in year

Index 7.8

Overall GPA of participants in courses held in year

Total Cost realized in Eram center at the end of year

Index 7.9

Overall GPA of participants in courses held in year

The total cost of training in year.

**Measurement of productivity index**

Based on measurements taken on Impact Factors on the productivity of training courses organized by the Eram Centre for Advanced Technical and Vocational Skills Training, three following matrix are displayed, respectively, for the years 88, 89 and 90 from which the following.

Table 2: Productivity Matrix for Eram Training Center in 88

outputs inputs	Courses' person hou	Number of accepted people	Total GPA of participants
Total number of staff	57554	6710	3/605

Total costs of center	0/00805	0/000095	0/0000005
Total educational costs	0/082	0/000975	0/0000051

Table 2: Productivity Matrix for Eram Training Center in 8

outputs inputs	Courses' person hour	Number of accepted people	Total GPA of participants
Total number of staff	119185	449	2/94
Total costs of center	0/00357	0/0000134	0/00000009
Total educational costs	0/2084	0/000784	0/00000514

Table 2: Productivity Matrix for Eram Training Center in 90

outputs inputs	Courses' person hour	Number of accepted people	Total GPA of participants
Total number of staff	2000739	1145	1/715
Total costs of center	0/4134	0/000236	0/00000035
Total educational costs	5/7237	0/00327	0/00000491

**Analysis of findings**

With cooperation of two managers of Eram Center, a group was formed to improve productivity and with the holding of several meetings, the transfer of knowledge and experience in project management was done on productivity indicators and factors and strategies for improving productivity indices and sizes of the groups were presented and conclusions were made. Based on the opinion of experts of the group, some of the measured parameters for training were considered as significant indicators, and some other were evaluated as insignificant. In Table 5, significant indicators (factors driving) are signed with ✓ and insignificant indicators (barriers) are marked with X.

Table 5: Matrix showing the productivity of the training significant and insignificant indices for Eram educational center

outputs inputs	Courses' person hour	Number of accepted people	Total GPA of participants
Total number of staff	✓	X	X
Total costs of center	✓	✓	X
Total educational costs	✓	✓	✓

According to this matrix, the diagrams for productivity index for significant indices for Eram educational center during years 88, 89, and 90 are:

Diagram 1: diagram for index a

Diagram 2: diagram for index b

Diagram 3: diagram for index c

Diagram 4: diagram for index d

Diagram 5: diagram for index e

Diagram 6: diagram for index f

As can be seen in the charts above, indicators "A" and "D", have a process that is constantly rising. Indices "b", "c" and "e", first had downward trend, then, an upward one. Index "f" first had upward trend, then, an downward one. This shows improvement in productivity of 89 to 90 years, and the fact that the indicators have a significant leap in year 90, is because in the Eram center there is a more dynamic educational program in this year, and "f" drop is because it was in this year that the directors of the quality of courses for participants to measure the stress tests are more accurate and more



powerful. Productivity improvement Group considers this research as a good base for further studies in this regard and has proposed the following recommendations.

### Recommendations

According to the findings, the following items are recommended as ways to improve productivity and vocational centers:

1. Productivity through improved training efforts to enrich the content.
2. Increase investment planning in order to recruit experienced teachers and specialists in the same special field of education.
3. Evaluation of the ability of teachers convey the concepts and subjects to students through comparing productivity indices educational training and graduation rate compares of every course and surveys of students.
4. Vocational training should be prepared with a holistic approach in all areas of learning, cognitive, psychomotor, affective. It includes three aspects of students' competencies and technical competencies, learning competencies and social competencies. The balance and interest is defined in terms of indicators.
5. possibility to measure of total productivity indicators and partial productivity indicators, by covering all the input and the output productivity of main components in each course.
6. Possibility to compare the performance of different courses, with each basic course of training, by examining changes in productivity and productivity in prior courses (base level).
7. Possibility to analyze the performance of personnel in the organization.
8. Comparison of productivity indices with other organizations providing training services and technical and professional organizations periodically and annually.

### 4. DISCUSSION AND CONCLUSION

this research was a theoretical study which, in addition to measuring and analyzing the factors affecting the productivity and recognizing preventing and promoting factors of productivity growth in technical and vocational education centers, the Eram center is one of the most prestigious of them in the holy city of Mashhad, proposed useful solutions to managers and officials. With no detailed description of the strategy (procedure - the solution), managers and employees can not execute the strategy successfully. Undoubtedly with a common understanding of the strategy, management can bring a system around and by creating a stable order, implement their new strategies in the face of global competition, liberalization, domination of customers, high technologies and competitive advantage, which are directed by intangible assets, especially human and information capital.

Applications of this research is on implementing presented measures to improve the current state of the educational system and its administration, to remove the defects and shortcomings in the education system, thereby establishing a systematic and efficient management. Systematic management, particularly in the area of education, needs to supply from the results of current performance evaluation. Managers of all relevant institutions, both educational and technical facility management in general and Eram professional and technical center managements in Mashhad in particular are important users of the results of this study. It is suggested that in future research, in order to examine the generalizability of these findings, their validity in other organizations, both private and public institutions be tested.

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