

# **Classifying the Effective Factors on Productivity of Human Resources by Using AHP and TOPSIS Methods**

**Ameneh Malmir<sup>1</sup>, Karam Khalili<sup>2</sup>, Qader Vazifeh Damirchi<sup>3</sup>**

<sup>1</sup> *Management Departments of Science and Research, Isfahan Branch, Isfahan, Iran*

<sup>2</sup> *Management Departments of Science and Research, Isfahan Branch, Isfahan, Iran*

<sup>3</sup> *Management Departments of Science and Research, Isfahan Branch, Isfahan, Iran*

## **ABSTRACT**

Labor productivity is the amount of goods and services that a worker produces in a given amount of time. It is one of several types of productivity that economists measure. Workforce productivity can be measured for a firm, a process, an industry, or a country. One of the most problems of the managers is paying attention to work labor as a best and shortest way to quality and quantity development. For this action some factors should be known that lead to increasing workers productivity and ability. This research was done in two steps: first recognizing the effective factors on increasing employers, by use of the EXPERT CHOISE11, TOPSIS2005 software and according to AHP, TOPSIS model these factors were ranked. Finally the similarity and differences between these two types of sorting were determined.

**Key words:** Ranking, Productivity, AHP, TOPSIS.

## **1 INTRODUCTION**

Productivity is a measure of the efficiency of production. Productivity is a ratio of what is produced to what is required to produce it. Usually this ratio is in the form of an average, expressing the total output divided by the total input. Productivity is a measure of output from a production process, per unit of input [1]. At the national level, productivity growth raises living standards because more real income improves people's ability to purchase goods and services, enjoy leisure, improve housing and education and contribute to social and environmental programs. Productivity growth is important to the firm because it means that the firm can meet its (perhaps growing) obligations to workers, shareholders, and governments (taxes and regulation), and still remain competitive or even improve its competitiveness in the market place [2].

In relation to the definition of productivity, several definitions were discussed; defining only two of them will satisfy our purpose. In 1950 "organization for European economic cooperation or OEEC" has offered a complete definition of productivity that productivity is the quotient of one of the production factors, if the efficiency relationship with the capital, investment or with the raw material or etc. will be studied, therefore, we can mention the capital productivity, investment productivity, and raw material productivity [3]. And also international labor organization ILO has defined the productivity such as "the productivity is proportion of the profits to one of the production factors (land, capital, labour force, and management). In this definition "management" is notably considered as one of the production factors. Proportion of production to each of these factors is reckoned as a scale for evaluation of productivity [4].

Labor *productivity* is the amount of goods and services that a worker produces in a given amount of time. It is one of several types of productivity that economists measure. Workforce productivity can be measured for a firm, a process, an industry, or a country. It was originally (and often still is) called labor productivity because it was originally studied only with respect to the work of laborers as opposed to managers or professionals.

The OECD defines it as "the ratio of a volume measure of output to a volume measure of input" [5]. Volume measures of output are normally gross domestic product (GDP) or gross value added (GVA),

expressed at constant prices i.e. adjusted for inflation. The three most commonly used measures of input are:

1. hours worked;
2. workforce jobs; and
3. Number of people in employment.

Measured labor productivity will vary as a function of both other input factors and the efficiency with which the factors of production are used (total factor productivity). So two firms or countries may have equal total factor productivity (productive technologies) but because one has more capital to use, labor productivity will be higher.

Output per worker corresponds to the "average product of labor" and can be contrasted with the marginal product of labor, which refers to the increase in output those results from a corresponding (marginal) increase in labor input [6].

Labor Productivity refers to the quantity of output produced by a given quantity of labor input. Let's first consider the microeconomics of Labor Productivity [7]. Suppose that two workers are given the same tools and equipment to perform a task, such as splitting wood. The worker who splits more wood in a given hour is said to be more productive at that task. Since the goods and services produced by labor have value, more productive workers add more value than less productive workers. The implication is that highly productive workers in a market economy command higher wages and salaries than their less productive fellow workers. In fact, under competitive conditions microeconomic theory predicts equilibrium wages will equal the added revenue generated by a marginal unit of labor (marginal revenue product). From a macroeconomic point of view, productivity gains are the key to improvements in material standard of living. If Labor Productivity remained unchanged, then rising wages would increase the cost of producing a given quantity of output. If this occurred across the economy, then prices would rise, even under competitive conditions, undermining any real gain in worker purchasing power. On the other hand, if Labor Productivity is rising, then nominal wage growth is expected to outpace inflation, implying rising real wages and purchasing power. Two key factors that can affect productivity are advances in technology and improvements in education and training. Differences in Labor Productivity are a key determinant of wage differences between industrialized and developing countries. In order for an economy to make further gains in material standard of living, workers must continue to invest in education and training, and firms must continue to invest in new technology [8].

## **2 METHODOLOGY**

In this research the question is determining the precedence of the effective factors on productivity of AZAD universities' personnel of HAMEDAN province by utilizing AHP method and classifying by utilizing TOPSIS method. In which by considering this precedence, the management can make better decision about increasing of productivity in Azad universities of HAMEDAN province. If the human is motivated or powerful or productive, he can use the rest of resources in an effective and desirable manner and can achieve any kind of productivity, and eventually he can make the organization productive. Otherwise, recession and regression would be the result of passive and demotivated human force. But how human force can be productive or their productivity will be increased is a question that it's answer in different institutions and organizations in regard to their purpose and their personnel needs will be different. However, these needs and factors might be similar, but certainly their severity and precedence effect on personnel productivity will not be the same. For example in productive organization maybe consideration of proficiency, wage and salary are more important than other factors whereas in education institution maybe motivation and partnership of personnel in making decision is precedence to others. The main purpose of this study is to answer to this question that: what are the effective factors on personnel productivity of AZAD ISLAMIC universities on HAMEDAN province? And how much is the effect of each of them? (What is the scale of effect for each one?)

This study is conducted on Azad Islamic university's personnel and its results can pave the way to the manager in increasing the productivity of their personnel and decreasing waste of resources and not to achieve the organization goals in this university. What is certainly has a great part in subjective challenge of this university managers and other AZAD ISLAMIC universities is adequate attention to the labour force as the best and shortest way of qualitative and quantitative development and growth

of the university and it is the goal of Islamic republic of Iran. Naturally managers have a tendency to utilize all the management tools to have productive and dynamic personnel's. And to accomplish this they need to recognize the factors that increase the productivity of the personnel's. And this kind of studies will help the managers a lot. Increase of productivity will reduce the costs, time, and cause a quantitative and qualitative increase, efficiency increase and more motivation in in the personnel. One of the most important gaps that exist about the productivity is that the effective factors on productivity in each organization are different. And the effective factors on productivity in different organizations must be classified. Result of Previous studies verifies this issue. Many researches about the effective factors on universities personnel had been conducted in these researches effective factors on personnel productivity were mentioned but they didn't mention the scale of each of these factors. In this research byutilizing AHP and TOPSIS methods we can cover thisweak point and mention the effective factors on personnel productivity and make Precedency for each of them.

Table 1: the effective factors on productivity of human resources

job skills	kind of job	the environment factors
job recognition		
symmetry of the worker and the job		
new and advanced equipment		
job satisfaction	job satisfaction	
wages and salaries		
making desirable condition for creativity exhibition		
workday reduction		
possibility of communication with others	social relationship	
manager informal relation with the personnel		
conducting inquiry cession surveying the personnel problems		
appointing COMPETENT managers		
exhibition of precise information	partnership	
feedback		
partnership in decision		
experience related to the job	the individual factors	
level of education		
age average		

learning as a part of service	
level of income	

### 3 ANALYSIS

Since the growth of productivity on scale of organization has an important effect on costs reductions, desirable services ... it has great importance. Knowledge of the level of productivity in organization can be background for the planning.

Table 2: Classifying the effective factors on productivity of human resources province

percent	The effective factors on productivity of human resources
6.8	exhibition of precise information
6.7	job skills
5.7	wages and salaries
5.6	learning as a part of service
5.6	experience related to the job
5.3	new and advanced equipment
5.2	level of income
5.1	age average
5.1	feedback
5.1	level of education
4.8	job recognition
4.7	conducting inquiry session surveying the personnel problems
4.7	appointing COMPETENT managers
4.5	symmetry of the worker and the job
4.4	partnership in decision
4.4	job satisfaction
4.1	manager informal relation with the personnel
3.7	workday reduction

2.8	making desirable condition for creativity
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Based on the obtained results, 5 factors which are in great importance than other factors are listed here:

1- Exhibition of precise information about the organization functioning 2- job skills 3- wages and salaries 4- level of education 5- experience in this duty and factor of making desirable condition for creativity exhibition has gained the lessproportion.

By utilizing TOPSIS 2005 software we classified the effective factor on productivity.

By considering the obtained results, we can deduce that making precedence for the individual effective factors such as: 1- experience related to the job 2- level of educating 3- learning as a part of service 4- level of income and 5- age average.

By considering the obtained results, we can deduce that making precedence for the environment (kind of job) effective factors such as: 1- new and advanced equipment 2- skills 3- job recognition 4- symmetry of the worker and the job.

By considering the obtained results, we can deduce that making precedence for the environment (partnership) effective factors such as: 1- exhibition of precise information 2- feedback 3- partnership in decision

By considering the obtained results, we can deduce that making precedence for the environment (social relationship) effective factors such as: 1- possibility of communication with others 2- appointing COMPETENT managers 3- conducting inquiry session surveying the personnel problems. And 4- manager informal relation with the personnel

By considering the obtained results, we can deduce that making precedence for the environment (job satisfaction) effective factors such as: 1- motivation 2- wage and salary 3- making desirable condition for creativity exhibition and 4- workday reduction

#### **4 CONCLUSION AND RESULTS**

What is certainly has a great part in subjective challenge of AZAD university managers and other AZAD ISLAMIC universities is adequate attention to the labour force as the best and shortest way of qualitative and quantitative development and growth of the university. Naturally managers have a tendency to utilize all the management tools to have productive and dynamic personnel's. And to accomplish this they need to recognize the factors that increase the productivity of the personnel's. And this kind of studies will help the managers a lot. By considering the determined purposes in this research and conducting them in two processes, the obtained results will be offered briefly in two parts part one: recognizing the effective factors on personnel productivity, as it mentioned in methods and procedures questionnaires number 1 with 20 factors is introduced, this questionnaires is given to individual samples, considering that the given average scores from the participants to these questions was more than 7, all the factors were utilized for conducting in the second level ( factors classifying).

Second part: classifying the effective factors on the personnel productivity. Second questionnaires are designed for couple evaluation that is formed like 5 matrixes. This questionnaire also was distributed between the reports and individual samples experts that include individuals with PhD (9 persons), higher education (24 persons) and bachelors with more than 10 years of job background (17 persons) and in total it was distributed between 50 people, then by utilizing EXPERT CHOICE 11 software we classified the effective factors on productivity by using AHP model and also by utilizing TOPSIS 2005 software we classified the effective factors on productivity. And finally we determine the similar and different point in both of the classification.

By considering the finding of this research and based on the obtained results 5 factors which have greater effect than other factors are listed here: 1- exhibition of precise information about the organization performance 2- job skills 3- wages and salaries 4- level of education 5- background and

experience in this job and factor of making desirable condition for creativity exhibition has gained the less proportion.

In other words whatever these factors are considered and supported by the managers of AZAD ISLAMIC universities, the productivity of personnel human resource will be increased, and vice versa the less these factors are considered of course the less this personnel will be motivated and effective.

Finally it is important that the central organization of AZAD ISLAMIC universities and in lower level the managers of universities, amend the organizational structure of universities more to the flexibility and to make current managers capable and to educate future managers must do the necessary actions and planning. To managing university, these managers need to choose a desirable method that is proportionate to the university statuses. And by utilizing management informative systems, they must have necessary planning and adequate and continuous surveillance on the affairs.

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