

CASE STUDY

Effective indicators in human capital productivity of urban management organization

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ABSTRACT: Human capital is considered as a strategic resource among the main resources of any organization and an important factor in producing and presenting services to the society. Improving the productivity of human capital is the main cause of the improvement of productivity in organizations. Management of human capital development, focuses on the quantitative models and technics to test the productivity of the entire system. The central goal is to determine common and distinguishable indicators of human capital productivity in two levels of staff (individual) and organization (management). According to the previous researches and available managerial theories, 29 variables were selected for two main indicators in two levels of staff and organization. Due to the complexity of testing the productivity in the urban management organizations and the need to determine the variables, exploratory factor analysis test was randomly distributed and conducted among 350 people from the target society of human capital urban management (Tehran Municipality) during four phases with setting out a questionnaire consisted of 22 items in Likert scale which distributed randomly. Output of first phase supported 19 variables out of 29 first variables. In the next phase, matrix of variables (partial indicators), was formed due to the correlation coefficients and classified and defined according to two main research indicators by variance analysis in which weight of organization index and staff index were calculated 0.623 and 0.597, respectively. Therefore, programing for the improvement according to process cycle for both main indicators and other exploratory indicators was offered.

KEYWORDS: *Factor analysis; Human capital; Improvement programming; Matrix of variables; Productivity; Strategic resources; Urban management organization.*

INTRODUCTION

Organizations provide and preserve their own stable value using intangible assets such as human capitals, database and organizational resource (high-quality

service and production processes, accountability to the requirements and trademarks of organization, relationships with consumer and finally innovative abilities and organizational culture (Vakili, 2003). To increase or decrease human capital productivity is equal

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to increase or decrease the organizational productivity (Noe *et al.*, 2006). Since human capital is considered among the main assets of the organization which is the main factor in producing and presenting the services of organization to society. Investment on the staff through the empowerment of human resources and improving management processes is one of the main measures to improve efficiency and accelerating the growth and development of organizations which in this regard, human resource planning based on labor productivity index is considered one of the modern management principles (Birdi *et al.*, 2008). In other words, the interest to human capital in the styles of sophisticated managements has promoted from performance of staff towards understanding and development of human capital. It, of course, provides the ground of dynamism and further development of human capital and it requires using the attitude of knowledge-oriented in the models and the quantitative technics in the management and creative methodology (Chalmeta and Grangel, 2008; Vakili, 2003).

Productivity is necessary for the growth and development of the organization and it will lead to institutionalization of improvement in the different organizational systems. Productivity is the best tool, measuring the performance of every organization (Hubbard, 2009), so that it evaluates the organization in all dimensions of their activities, its covered units, and different aspects. The increase and the improvement of the productivity is dependent on the intelligent and knowledgeable workforce, but not in further use of factors of production (Taheri, 2008). This process consists of several phases. First is to determine the indicators of productivity. One of the most important goals in every organization is to promote the level of its productivity and due to the central role of the human capital in providing the productivity, its role leaves a vital effect in the organization (Syverson, 2004). Effort for the improvement and effective use of various resources such as labor, capital, materials, energy and information is a serious goal of all the managers of economic organizations and industrial production units and service institutions (Syverson, 2004; Székely and Knirsch, 2005). Productivity of human capital is to scientifically maximize the use of manpower resources and the processes, in order to decrease the costs and to increase the staff, managers and the consumer satisfaction (Friedman, 2007). For managers and consumers, the productivity of manpower is to

maximize the use of workforce in order to move towards the organizational goals with minimum time and cost (Prokopenko, 1987). The ultimate goal of human capital development is to empower and develop the individual skills along with the intellectual promotion and financial growth of the staff. One of the indicators of organizational human development, is their efficient performance, which means that development isn't in their specialized performance, but it means how an individual uses his specialty effectively in the organization (Soltani, 2003). Effective performance is adventitious; it means that staff of an organization should learn how to perform to be effective. Staff will be familiar with the organization's philosophy and mission and quantifying of work; they learn the ways to solve the problems and they also learn the use of efficiency technics and, finally, they improve the productivity by using information technology (Umble *et al.*, 2003). Improvement of productivity in the organizations depends on its staff. By offering proper education and awareness and providing them the opportunities for cooperation in the decision-making process, organizational productivity will increase (Wiig and Jooste, 2003).

Human capital management along with the Total Quality Management (TQM), Just In Time (JIT) production and value engineering intends to identify the causes and factors such as job satisfaction (Karimi, 2007), work life style, organizational structure, culture and communications, that finally, led to the productivity of the entire organization. (Eker and Pala, 2008; Yousefi, 2009). Human is a producer and consumer of technology at the same time. It is not difficult to understand why human capital is considered the most important factor of economic-industrial development and basically, why human capital is given a pivotal role in promoting the productivity? The reason for this is that only human can enhance the quantity and quality of his performance, offer new projects and overcome the problems with his creativity, extend his work power and find the solution to decrease the costs and in fact he is the only agent who can create the changes in himself and his surrounding environment (Jones and Hendry, 1994; Allen, 2009). On the other hand, since human is not only the agent, but also the target of productivity, therefore, the importance of interest in human capital is also increased (Luthans, *et al.*, 2004). Foundation of promoting the productivity is dependent on the human capital and paying attention

to this huge potential resource will lead to their prosperity. Productivity improvement is achieved by evaluation of performance, management of knowledge and effective processes, not by hard work for intensifying the work (Newell *et al.*, 2009), will involve limited results due to the limitation of manpower. To justify the importance of manpower role compared to the capital and technology which all three are the main factors to increase the productivity, relatively all experts consider the human capital as the most essential factor (Stewart and Ruckdeschel, 1998) and they believe that capital can be borrowed, as a loan, from other countries or technology can be purchased if needed, but, one cannot face with the manpower like the capital and technology, human capital should be brought up and trained as the main capital of society and with the use of appropriate policies, reinforce their motivations and efforts (Shokri, 2006).

Improvement of productivity and quality is not randomly achieved, but all is the result of a conscious process, it means that the bottlenecks and fields of probability for the improvement in the management of productivity and quality should always be identified (Soltani, 2003). It is necessary that the role of human capital, as a serious strategic resource in developing the urban management organization be evaluated and the factors leading to the increase of productivity is identified.

The urban management organization is involved with a series of factors, including: human factors, technology, technical and constructional, structural, cultural and other environmental elements that they interact along with the realization of pre-determined and common goals. Undoubtedly, due to the lack of compliances of these goals with the individual's goals and resources, it is important, how the managers are encountered with providing the balances, decrease the conflicts and use the optimal potential abilities of individuals and the elements. In this regard, staff of an organization is considered as the most important component of organization that attention to their intended needs and providing them with their requirements is unavoidable (Drucker, 1985).

Productivity process at the employee's level is allocated to analyze, measure and improve the productivity of human capital. The Main issue is to promote and to improve of human capital productivity, including direct or indirect labor work force (Becker, 1994). In the organizational productivity studies, the productivity

of an organizational system is studied and in terms of national productivity, the efficiency of a country's economy as a system is analyzed and evaluated (Drucker, 1985).

Experience has shown that, if all the policies and objectives are correct, one cannot expect that an organization attains to its pre-determined goals if its manpower who has to make the effort to reach the goal would not be in the suitable situation. Similarly, labor productivity index in terms of service organization regarding delivery of service and the establishment of performance management and employee's behavior in organizations is of importance (Vakili, 2003; Ghelichli, 2010).

Manpower is considered as one of the most valuable strategic resources in every organization (April Chang and Chun Huang, 2005). Therefore, it is important to identify the effective indicators of productivity. This research intends to identify the effective factors of manpower productivity in Tehran municipality. Also, the other purpose of this research is to evaluate the effective factors in the pathology of the productivity situation for service organization that resulted to design and perform the effective organizational activities and operations related to the environmental and internal conditions of organization in the future. This research also tries to achieve the common and differential indicators between the manpower productivity in two levels of staff (individual) and organization in order to identify and reinforce the synergy points in the productivity of the whole organization by identifying these factors.

Tehran Municipality has approximately 63,000 workforce, including, permanent and contracting. It is a public entity and a non-governmental organization with long-term five year development plan, and annual action plans.

In the field of human capital, it has the special legal law for staff. Subsequently, it follows numerous circular and guidelines according to the strategies of development, including performance management and human capital empowerment which are performed in both line and staff unites. Tehran municipality, however, is subject to the further governmental regulations, but in terms of funding it has no dependency on the government and it provides the required budget for performing the constructional plans by its annual budget. For this reason, decreasing the productivity in this organization, unlike other affiliated organizations

to budget rows of government, shows faster its impacts in the service to the citizens and inter-organizational dimensions and it has been very obvious in recent years, therefore, due to the importance of the subject this study also tries to answer the following question and hypothesis: what are the effective indicators in manpower productivity? The correlation coefficient of testable factors is led to determining the indicators of manpower productivity.

MATERIALS AND METHODS

According to previous studies, productivity is directly related to the workforce efficiency or right doing of the tasks, quality of work and the end value and personal and professional lifestyle of the staff. Similarly, the contribution of productivity in the European Foundation for Quality Management (EFQM), Total Quality Management (TQM) and resource saving pattern in establishing the performance management system by measurable quantities are clear (Shokri, 2006; Harris and McCaffer, 2013). Productivity can be processed and every organization implements productivity management process due to its own conditions in any phase as it is shown in Fig. 1, and it tries to evaluate the obstacles implementing the productivity management in the intervals in order to decrease its factors according to its plan.

Establishment of the productivity improvement management cycle is causing the productivity to promote as a permanent process and specifies the

direction of productivity and is performing the required infrastructures. Rother believes that the most important challenge that organizations are facing is transforming to staff with the habit of continuous improvement. (Rother, 2009; Peyman, 2005). There are different ideas to determine the effective factors on the productivity including continuous professional training of managers and staff, promotion of motivation between staff for better and more performances, provision of appropriate fields of expressing their creativity and innovation, establishment of appropriate system of payment based on the performance, and punishment and reward system, work ethic and social regulation of evolution in the system and methods which play a key role (Wiskow *et al.*, 2010), strengthening the governance and dominance of the organization’s policies over other affairs and saving as the national duty in effective productivity. Of course, all the scholars in the field of management agree that one cannot present only a specific cause for increasing the level of productivity, but, believe that promotion of productivity should be influenced by the combination of different factors (Rother, 2009).

Certainly, it is very difficult to measure the efficiency. One can easily measure efficiency based on the volume of physic of outputs and inputs used in the production of the outputs. But, measuring the efficiency of an organization or service company like municipality is very difficult. It is because that input used in producing the service (or output) is naturally heterogeneous and also aren’t measurable. However, the efforts are made

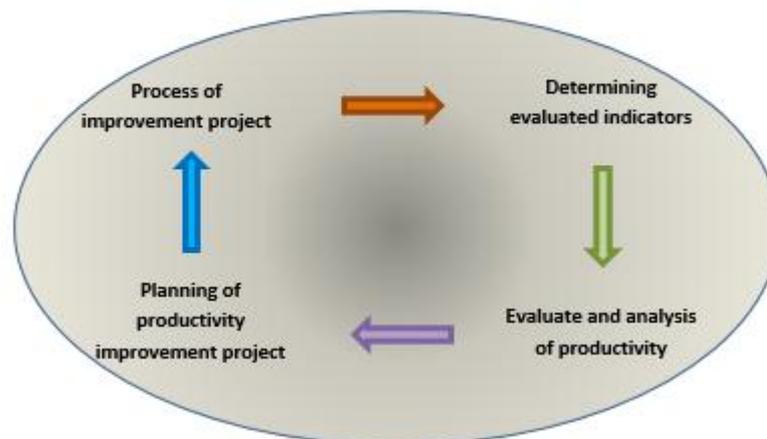


Fig. 1: Productivity management process

for developing techniques to measure the productivity. To date, several techniques such as factor analysis have been developed. Measuring the productivity in the service sector is the prerequisite of productivity improvement. Through this, one can specify level of productivity and effectiveness of efforts for productivity improvement. The areas of productivity improvement must be identified and operational flexibility in terms of using process and manpower should be strengthened. Measuring productivity should be performed at both levels of staff and organization (Taris and Schreurs, 2009). At the level of organization, productivity measurement index involves these phases:

- 1- To identify the main services of the related organization;
- 2- To determine productivity indicators.

Indicators should be based on the main services presented by the organization. It is best to define different indicators for every type of service.

Productivity level in the service organization is divided into two general groups of staff (individual) and organization (management): individual productivity of manpower is including the ratio of performing work by every individual (useful working time) to the consumed time by the same individual (hours of daily work). The productivity of human capital in the organization is the ratio of the performed work of the organization (production of goods or presentation of services) during a certain period of time to the number of human capitals (all the staff) in terms of, hour, week or month of work. Among the useful work of productive staff and idle time of unproductive staff, some factors, such as lost time, ineffectiveness of management, absence, conditions of work environment, inappropriate programming, complex and unnecessary processes, ineffective working methods, inappropriate localization of staff are involved. Therefore, according to international labor organization standards (De La Cruz *et al.*, 1996), variables of manpower productivity after work sampling, work timing and necessity of beneficial activity in measuring manpower productivity of service organization are testable and definable (Armstrong, 1999). In this regard, the main 29 variables of research were defined and categorized at two levels of staff and organization according to theories of scientists such as Herzberg (two-factor theory), Maslow (requirements hierarchy theory), Adams (equality theory), Vroom (expectation

theory), Skinner (promotion theory), in sector of staff and Crosby (requirements of organization theory), Porter (five comparative forces theory), Zydming (total quality management), Robins (organization theory). The 29 under study variables were: Job stability, motivation, job satisfaction, conditions of working environment, training time, work time, client satisfaction, organizational culture and identity, reward, participation of staff, leadership, absence and leave of work, inefficiency, accountability, organization policies, career of organization structure, hours of useful work, number of jobs, communications, work error rate, supervision, ambiguity in function, compensation of service, appointments, job enrichment, precise goals, organizational commitment, access to resources, which each of them influence on the total ratio of manpower productivity.

In order to determine and measure the effective indicators in manpower productivity, exploratory factor analysis was used. The statistical population of this research consists of the managers and the staff of Tehran municipality.

Using method of Krejci and Morgan with the specifications (with confidence of 95%, standard deviation of 0.5 and error margin of $\pm 5\%$) determined the sample size of 350 people. A questionnaire with 22 items in five-optional Likert type was randomly distributed among the target population (Momeni and Ghayoumi, 2001). The validity of the questionnaire was confirmed by the experts (10 people) and for the reliability of items Cronbach's alpha with Cronbach's alpha coefficient of 89% were used. The number of testable variables was 29 items and the result of analytic software involves 5 input and output phases.

First phase – entry of 29 independent variables of test into the software,

Second phase – conducting Bartlett Test (Bartlett, 1954) in order to identify the structure and appropriate factor model,

Third phase – extract the factors and differential and common points in two organizational and individual levels,

Fourth phase – Analysis of variance in order to determine the remaining variables in the research for the next phase,

Fifth phase –Constitute the matrix components (the remaining variables in output research from the previous phase) which involves factor loads (factor scores) of each variable.

RESULTAS AND DISCUSSIONS

To provide the correlation matrix of variables and factor analysis of variance (Bartlett Test), the software setting is updated.

According to Table 1, the first output shows, an amount of index, an amount of Bartlett Test statistics (which is an approximation of chi-squared test), Degrees of freedom and the significance level of the test respectively. Since, the amount of index is 0.894 (approximately 1), the number of samples (number of respondents) is sufficient for the factor analysis. The amount of significance of Bartlett Test is less than 5%, which shows that factor analysis is appropriate to identify structure and model of the research.

Second output shows initial subscription and extraction subscription. The subscription of a variable is R^2 for 29 variables using expected indicators. The much larger amount of extraction subscription, the extracted factors better expose the variables. In this phase, communication variables, the amount of error in work, leadership, ambiguity in the function, compensation of service, appointments, richness of job, obvious goals, organizational commitment, availability to the their low amount extracted subscription (less than 0.5) therefore, the variables are reduced from 29 to 19. In other words, factors which have eigenvalue less than 1 eliminated from the analysis, since their presence isn't caused further explanation of variance in the research.

Final output shows the test matrix components in Table 2 which involves factor loads (two main indicators of research) of each of the remaining variables. The much larger absolute value of these coefficients, the related factor plays a greater role in the total changes (variance) of the given variable.

Table 2 shows 19 factors for two main indicators of staff and organization, which were identified, selected and categorized. The main hypothesis of this research

(correlation coefficient of testable factors led to determine the indicators of human capital productivity) is supported.

Factor analysis of the variables of useful work hours, accountability, ineffectiveness, and leave off work, participation of staff, time of work, career satisfaction, motivation, and job stability were selected and classified due to the correlation coefficient of variance analysis on the organization index.

By generalizing the other partial indicators (extracted 19 variables), one can define the most useful, measurable indicators for partial measurement of manpower compared to the two main indexes dependent to the factor correlation coefficients that, finally led to the total manpower productivity. For example, variable of work hours covered by the main individual index has this capacity of measurement in the level of partial index, which is defined and measured on the monthly/weekly/daily useful work of an individual in relation to total hours of presence in the workplace. In the level of the main index of organization, training variable also shows the other index which is defined and counted on the training time elapsed by staff in relation to the total time of approved training (inserted in the annual plan) of the organization.

Although, some of these variables are directly and quantitatively measurable in the productivity index such as useful work hours, training and etc., but others, such as leadership, career, organizational structure aren't directly measurable and one should use statistic techniques in two phases in order to access to a quantity with the index, however, all partial and general indicators mentioned in this research are measurable during one or two phases.

In order to determine the degree of effectiveness of each of the indicators in the total manpower productivity index of urban management organization (Tehran municipality), and according to the tests of averages, the weight of the staff index and the organizational index were calculated, as 0.597, 0.623 respectively. Thereupon, it shows the further importance of the organizational index (management) in total productivity.

Based on the obtained results, each of the 19 variables (partial indicators) classified in the main indicators was effective in the management system as a process and was calculated to increase the total manpower productivity index of the organization. In order to increase the total manpower productivity in

Table 1: KMO and Bartlett's Test (Bartlett, 1954)

K.M.O* measure of sampling adequacy	0.894
Bartlett's test (Chi-square)	7641.419
Df**	182
Sig.***	0.000

*Kaiser-Meyer-Olkin

**Degree of freedom

*** Significance

the organization, it is required that all the 19 variables are covered by the cycle of productivity improvement, qualitatively improve and quantitatively promote by the modern method of management of human capitals. Although, these variables play their role in each of four phases of this process, but they perform to evaluate manpower productivity more evidently. Therefore,

before the establishment of the training systems, evaluation of performance, compensation of service and allowances is necessary in the human capital development systems of urban management organization in order to evaluate the contribution of these variables in every system separately and plan for their performance in the executive processes.

Table 2: Matrix of the variables

Variables	Indicators of Staff	Indicators of Organization
Job stability	<u>0.635</u>	0.435
Motivation	<u>0.456</u>	0.421
Job satisfaction	<u>0.675</u>	0.591
Conditions of work environment	0.212	<u>0.675</u>
Training	0.612	<u>0.647</u>
Time of work	<u>0.812</u>	0.156
Client satisfaction	0.587	<u>0.611</u>
Culture	0.566	<u>0.581</u>
Reward	0.675	<u>0.735</u>
Participation of staff	<u>0.766</u>	0.312
Leadership	0.129	<u>0.956</u>
Leave of work	<u>0.950</u>	0.294
Ineffectiveness	<u>0.924</u>	0.367
Accountability	<u>0.952</u>	0.198
Policies of organization	0.167	<u>0.938</u>
Career	0.216	<u>0.894</u>
Structure of organization	0.97	<u>0.976</u>

CONCLUSION

According to the previous researches and available managerial theories, 29 variables were selected for two main indicators in two levels of staff and organization. Due to the complexity of testing the productivity in the urban management organizations and the need to determine the variables, exploratory factor analysis test was randomly distributed and conducted among 350 people from the target society of human capital urban management (Tehran Municipality) during four phases with setting out a questionnaire consisted of 22 items in Likert scale which distributed randomly. Output of first phase supported 19 variables out of 29 first variables. In the next phase, matrix of variables (partial indicators), was formed due to the correlating coefficients and classified and defined according to two main research indicators by variance analysis in which weight of organization index and staff index were calculated 0.623 and 0.597, respectively. Therefore, programing for the improvement according to process cycle for both main indicators and other exploratory indicators was offered.

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CONFLICT OF INTEREST

The authors declare that there are no conflicts of interest regarding the publication of this manuscript.

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