Predicting manpower productivity promotion factors in Guilan University of Medical Sciences using Structural Equation Modeling (Iran)

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Abstract: Manpower productivity issues have attracted increasing interest among researchers during the last decade. There are various factors affecting human resources productivity. This study elaborated the human resources productivity promotion factors in Guilan University of Medical Sciences using structural equation modeling. The research was cross-sectional, descriptive and analytical. The study was carried out in two stages during three month of fall season in 2009. In quality stages of research, 45 specialists in management were involved. In the quantity stage, 321 members of the faculty, educational and human resources experts affiliated to Guilan University of Medical Sciences were selected and the data has been collected using the questionnaires. Expert panel has been used for content validity and exploratory factor analysis and confirmatory factor analysis were performed for construct validity. Finally, path analysis carried out in order to identify human productivity promotion factors. Manpower productivity promotion factors identified in path analysis were included organizational culture with 0.51 path coefficient, motivational factors with 0.25 path coefficients, environmental status with 0.17 path coefficient, faculty member’s empowerment with 0.11 path coefficient and leadership style with 0.08 path coefficient. The results indicated that organizational culture, motivational factors, environmental conditions, empowerment and leadership style were the most important human productivity factors for Guilan University of Medical Sciences.


Keywords: manpower productivity, path analysis, structural equations modeling, Guilan University of Medical Sciences

Introduction: Productivity issues have attracted increasing interest attention amongst researchers during the last decade (Vurinen et al. 1998, Parasuraman, 2002, Sahay, 2005). However, the term of productivity was used over two century ago in the Journal of de 1" Agriculture (Tangen, 2005). The concept of productivity is deeply rooted in the context of mass manufacturing and this may be the reason for the prolonged neglect of the productivity issue on service management (Adam and Jonson, 1995, Adam and Gravesen 1996). Productivity defined as the ratio of output to input or as the relationship between inputs and outputs (Singh et al, 2000). Published research shows that productivity and similar terms are not used consistently (Kinnader and Grondahl, 1999). Different factors impact the ratio of growth and productivity of organizations (Ramsey, 1983). Nowadays, productivity and human resource element are one of the main issues that assure stability in organizations and keep succeeding with consistency (Eastaugh, 2002). Human factors may waste or make the most use of resources (Soltani, 2007). It is stated that organizations that locate manpower on top of the list of their agenda as vital factor would succeed to a desirable level (Abdolahi and Navehebrahim, 1999). For that reason identifying significant factors to upgrade manpower productivity is the main objective of many researchers (Alam, 2009). Likewise, almost all researchers believe that promoting manpower productivity may not result from only one special cause (or case), but a combination of factors should be considered (Taheri, 2007).

Present statistics indicates medical schools and organizations as well as medical training centers unlike industrial and commercial organizations have scarcely considered suitable methods to increase productivity among staff in Iran not to mention the models devised in industrial and commercial areas are...
Methods

In this research, descriptive, analytical and cross-sectional studies were carried out during three months of September, October and November of 2009 in two stages (cross-sectional and qualitative). At quality stage, 45 experts in manpower productivity participated in the research sample population to determine manpower productivity dimensions. Data collection instruments at qualitative stage were interview and questionnaires. Issues that appear through research include empowerment of staff, method of leadership, organizational support, clarifying, documenting services and staff intention and motivation, Likert scale (Andaleeb, 2004), completely agree (5), agree (4), no comment (3), disagree (2) and completely disagree (1) was used. After determining the score for each component, the results were fed into SPSS software. Then the agreement extent for each component among experts was calculated. Next, the components on which 70% of experts had identical agreement, chosen to be beneficial for manpower productivity. At last, the rest of the components as well as newly-proposed issues were negotiated again among those experts in order to reach to a total agreement.

At cross-sectional stage, research society were contain of scientific group, training experts and human resource experts from medical faculty, dentists faculty, health care center, nursing center, midwife, medical laboratories and international unit of Guilan university of medical sciences. At this stage, data gathering tool was questionnaires which consist of two sections. Section one consist of 8 questions in relation to personal and demographic information including sex, age, marital status, employment status, work experiences, education level, management experiences and scientific group membership. Section two consists of 42 questions in relation to manpower productivity variables and Likert measurement method has been used for marking of every question with 5 degree, so that 5 indicated very much, 4 indicated a lot, 3 indicated averages, 2 indicated little and 1 indicated very little. Creditability of manpower assessment has been conducted using library studies and item analysis; content creditability using expert panel,. Reliability of this questionnaire calculated by test- retest method was 0.98 and internal consistency was 0.89 using Alpha Cronbach method. Content validity conducted by expert panel. structure creditability using exploratory factor analysis considering main issues with Varimax rotation method and volume sufficiency using Kaiser- Meyer-Olkin (Dixon, 2001). KMO method was employed in order to assess sample population volume, the logical result achieved was 0.96 in which it was found that the result was 0.8 more than the ideal value. The suitability of data was also carried out by using Bartlet test (Bartlett, 1954) which indicated the suitability at the p = 0.000 level. As it can be seen, this suitability disclosed recognizable relations between those variables subjected to factor analysis .questionnaires carried out in Sept and Oct. Necessary explanation in relation to research objective was carried out and 347 persons received questionnaires which out of all, 321 persons completed them accordingly.

Results

Initial conceptual model of human productivity with 6 components designed using previous models and findings of other researchers (Figure 1):

Basic suggested model examined using 45 experts. Staff empowerment with 100% agreement, leadership style with 100% agreement, organizational support with 91.1% agreement, documentation services with 82.2% agreement, staff motivation with 97.7% agreement and decisions validity with 86.7 agreements as an effective component of manpower efficiency were selected.

Since at previous stage some experts believed that other components such as environmental conditions, organizational culture, and innovation and creativity can be effective in manpower productivity in addition to the previous components, new components including organizational culture with 91.1% agreement, organizational structure with 86.7% agreement, innovation and creativity with 73.3% agreement and environmental condition with 71.1% agreement were
selected as components which might affect manpower efficiency.

Finally at this stage a model with ten components as a logical model of manpower productivity was designed. The components of this model included leadership style, staff empowerment, staff motivation, organization support, organizational culture, decision validity, organizational structure, transparency, innovation and environmental condition.

Then to identify the most effective components which influence the efficiency of human resources and also to identify the amount of variables loading on each component, exploratory factor analysis has been used. Bartlett test showed the fitness of the data significantly.

In exploratory analysis the main issue with 42 variables identified as follow:

1. Organizational culture with 18 variables, 29.26% variance and Eagan value of 21.62
2. Environmental conditions with 7 variables, 12.96 variance and 2.63 Eagan values.
3. Motivation factors with 10 variables, 12.84% variance and Eagan value of 1.58
4) Empowerment with 4 variables, 7.47% variance and Eagan value of 1.34.
5) Leadership style with 3 variables, 5.50% variance and Eagan value of 1.21.

These 5 issues with 67.60% variance defined changes of manpower productivity.

In order to confirm and fit obtained issues in exploratory factor analysis and the loaded variables, described under each issue(fig2), LISREL 8.80 has been used (Schomacker, 2004)

![Figure1. Initial conceptual model of manpower productivity](image-url)
Figure 2. Index model in confirmatory factor analysis and loaded variable
Fit-index

1. Root mean square error of approximation is equal to 0.090 and because this figure is less than 0.1, then we can consider this is an acceptable result for model used in factor analysis. In other words, degree of variables loaded under every issue is higher than 0.5, accordingly the model is approved (Norris, 2005).

2. Comparative fitting index was equal to %0.97 and because this is higher than 0.9, therefore, this indicates suitable index factor analysis model in comparison with similar models (Norris, 2005).

3. Standardized root mean residuals (SRMR) was equal to 0.039

4. Adjust goodness fit index (AGFI) was equal 0.075

5. Goodness of fit index (GFI) was equal to 0.90

6. Normed fit index (NFI) was equal to 0.96

7. Relative fit index (RFI) was equal to 0.96

Correlation and productivity power of five factors including organizational culture, motivational factors, environmental conditions, empowerment and leadership style with human productivity have been assessed using path analysis. Model was perfectly fit the saturated model. In this model organizational culture with path coefficient of 0.51 was the most important predictor of human productivity. The next predictor was staff motivation with path coefficient of 0.25. Environmental conditions with path coefficient of 0.17 were third factor. Empowerment with path coefficient of 0.11 was the fourth factor that changes the representation of manpower productivity. Leadership with path coefficient of 0.08 was the last predictor of the manpower productivity (Figure 3):

![Figure3. Human resources productivity fit model of the Guilan University of Medical Sciences (GUMS)](image-url)
Discussion and Conclusion

The results of this study indicated that structural model which fit with the data of Guilan University of Medical Sciences had five factors. The comparison of fit model with a logical model (qualitative phase) indicated that organization culture as an effective factor was the most important predictor of the manpower productivity in GUMS. While in logical model, this factor located at fourth level affecting manpower productivity. Shermerhorn, (1999) also reported that organizational culture affect on all aspects of an organization. Nassiripour (2009) also found that there is a significant relationship between organizational culture and manpower productivity in the hospitals of Iran University of Medical Sciences.

The second important factor in this model was motivational factors with 7 variables and 0.25 path coefficient. The comparison of this model with logic model confirms the fact that in the logical model motivational factor was also as an effective component of human resources utilization. Sadeghi (1998) also examined the factors affecting the productivity of human resources, amongst 1,300 employees of the headquarters of welfare organization and found motivational factor as third important component affecting the efficiency of manpower productivity. Meanwhile, Alvani and Ahmadi (2001) designed the productivity of management pattern using 8 components and introduced motivational factor as one of the main effective factors affecting manpower productivity.

The third factor that identified in the structural model of manpower productivity was environmental condition with 7 variables and 0.17 path coefficient. Analysis of findings in this study indicates that environmental condition is an effective component of manpower productivity in the logical model as well. However, in the logical model this component was less important than other components. In the Achiu model, environment has been considered as an effective component in manpower productivity in addition to other components such as capability, transparency, organizational support, motivation, evaluation and validation. Janalinejad (2001) conducted research regarding factors affecting manpower productivity in Tarbiat Modarres University among 108 employees and he also concluded that environmental conditions were significant components in productivity manpower. In the present model with 4 variables, staff empowerment with the path coefficient of 0.11 was the fourth predictor of manpower productivity. However, in the logical model, staff empowerment had been introduced as the most important component of manpower productivity. While this component was at the fourth priority in the structural model. Findings of research conducted by Asgari (2005) regarding effective factors in manpower productivity in Steel Company indicated that human resources training i.e. empowerment operate as an effective component in manpower productivity.

The fifth and last component effecting manpower productivity in structural model was leadership style with 3 predictor variables and the path coefficient of 0.08. This component has been introduced as important factor in both structural and logical models. However, in the logical model, leadership style was the second important component of manpower productivity, while in the structural model this component had fifth priority affecting manpower productivity. Meanwhile, Anbari, Sadaghiani and Tabibi (2003) introduced leadership style as effective component in Arak hospitals. Therefore, the current study indicated that 5 components including organizational culture, motivational factors, environmental conditions, empowerment and leadership style, are the most effective factors to increase human resources productivity in Guilan University of Medical Sciences, respectively.

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