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.
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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, Dehghan Nayeri et al, 2006). Implementing culture of productivity will lead organizations to make the best use of human and material resources to approach competencies and optimum potentials of organization. Suitable productivity is not achievable if we just focus on the changes of layouts, adding new technology, documenting work instructions and procedures. Human resources and manpower are the most important factor in individual productivity, social and organizational activities and to improve productivity (Soltani, 2007, Abtahi and kazemi, 1999). Efficient manpower is the main factor to obtain organizational goals 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

not suitable for medical and health sectors (Jordan, 1994). Furthermore, due to some differences in cultural, social and economic circumstances, studies conducted in other countries are not feasible and proper to achieve suitable models for Iranian organizations either. (Dehghan Nayeri et al, 2006). Reports specify that manpower productivity indexes in Iran are lower than the other countries of Middle East along with the eastern Asian countries. (Taheri, 2007).

In comparison with other members of Asian productivity organization countries, average productivity manpower growth index of Iran was % 2.03 at the period of 2000 to 2006 means locating at ninth level amongst the 14 members of Asian productivity organization (kameli, 2009). Universities as the most important center to produce knowledge in order to perform important tasks and improve the levels of productivity require determining the factors affecting human resources productivity (khodayari, 2008). Hence, in this study researcher used path analysis to identify factors influencing manpower productivity in Guilan University of Medical Sciences to increase.

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 questionnaire 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)

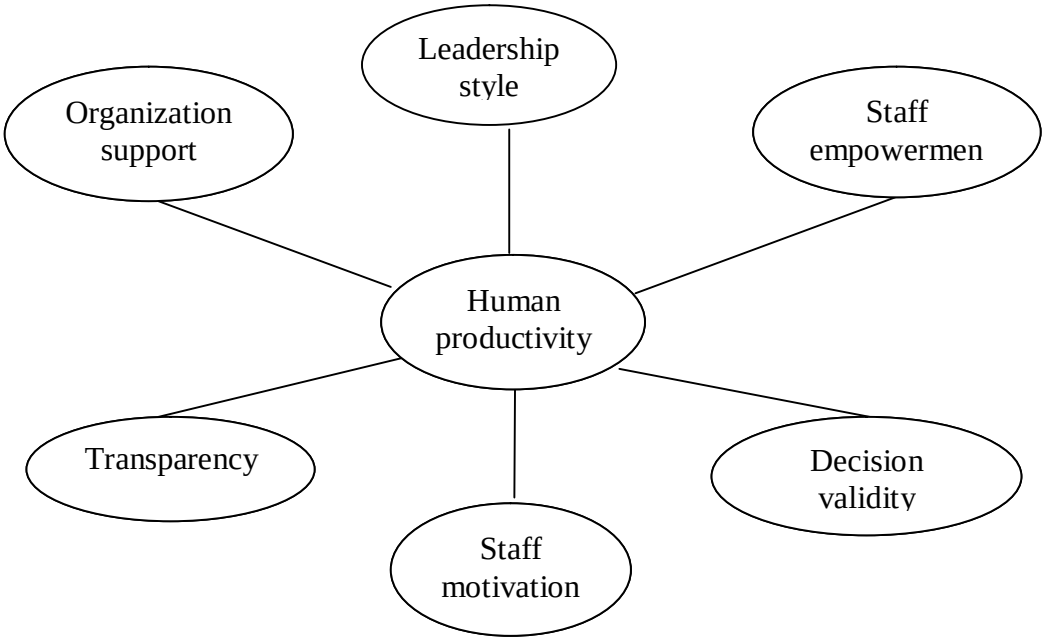

Figure1. Initial conceptual model of manpower productivity

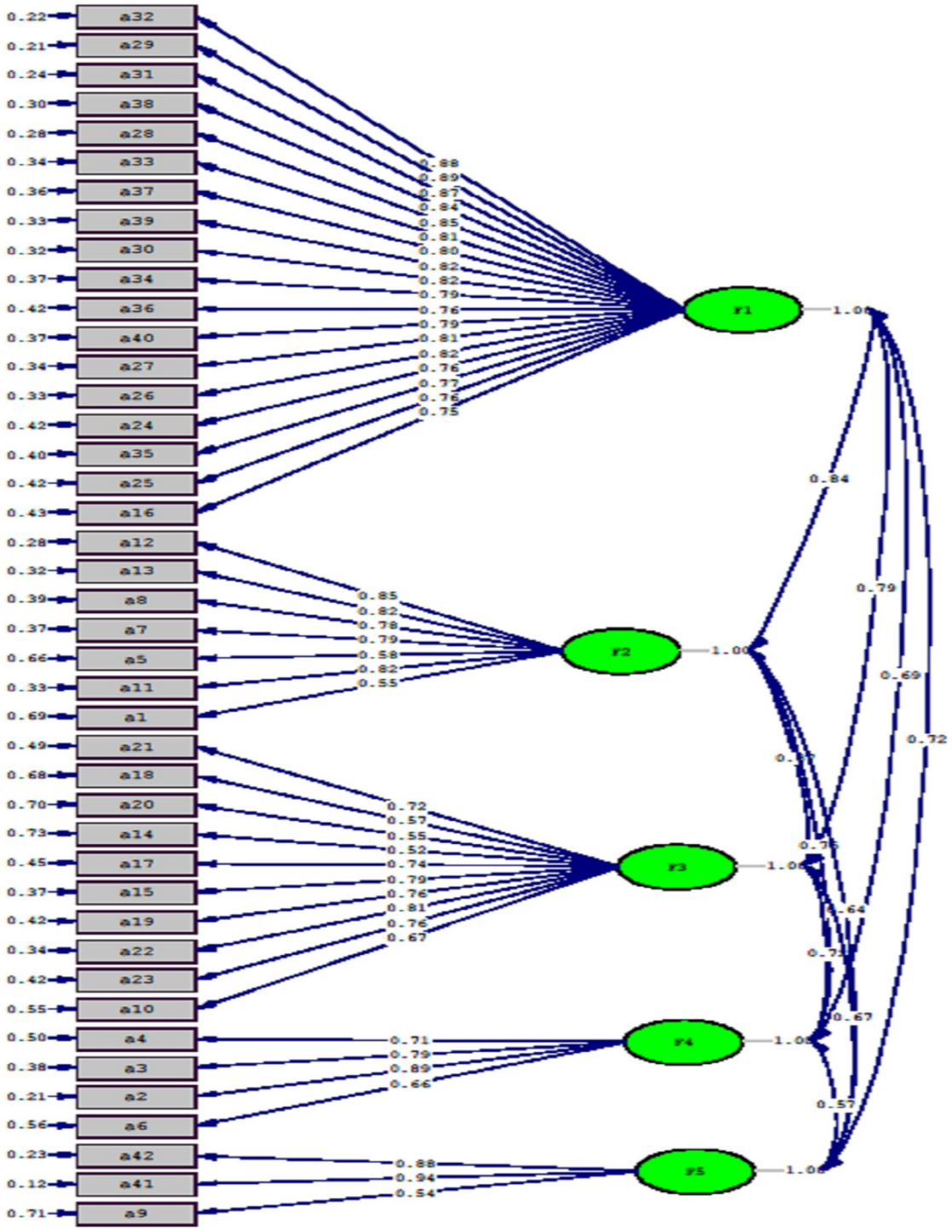

Figure2. Index model in confirmatory factor analysis and loaded variable

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):

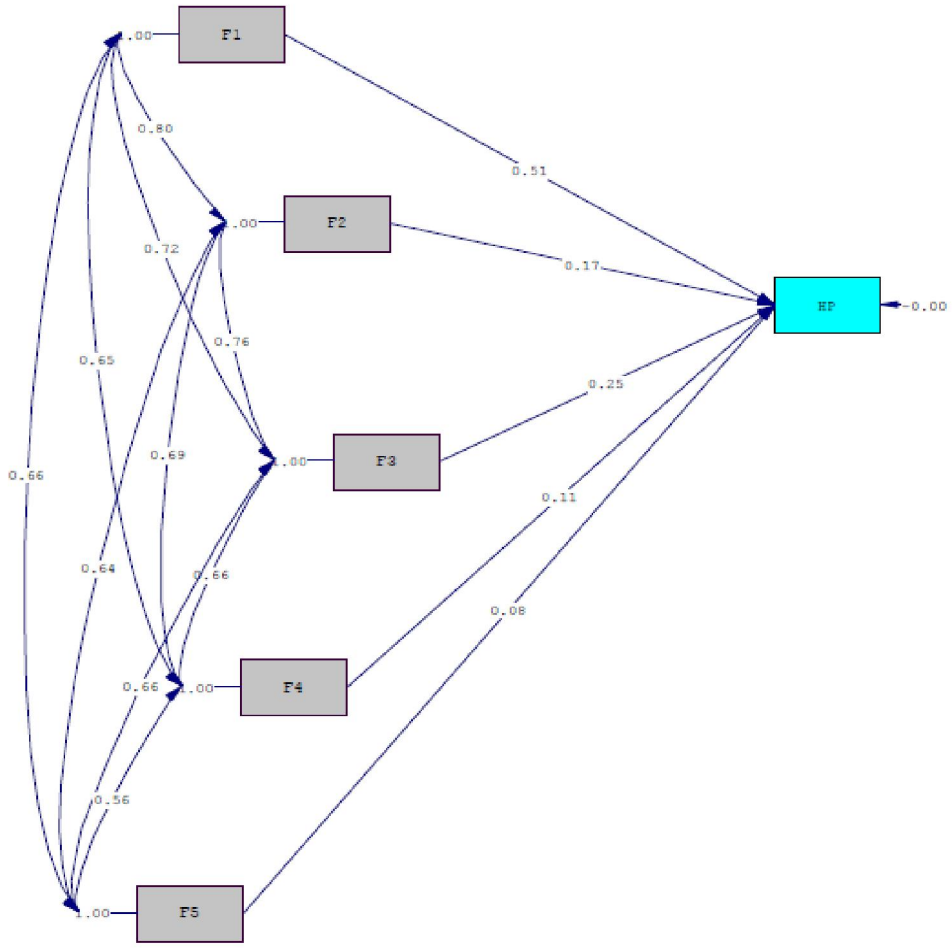

Figure3. Human resources productivity fit model of the Guilan University of Medical Sciences (GUMS)

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.

References

1. Abdolahi B, Navehebrahim A. Empowerment of staff is the golden key for Human Resources Management, Virayesh Publication, Tehran, 2008, 13
2. Abtahi S, Kazemi B. Productivity, commercial Research and Studies Institute, Tehran, Third copy, 1999: 109
3. Adam K, Gravesen I. "Is service productivity a viable concept? Paper presented in the 2nd international research workshop on service productivity, Madrid, 1996
4. Adam K, Johnson M, Gravesen I. Service productivity: a vision or a search for a new outlook? Paper presented in the 9th world productivity congress. Istanbul.1995
5. Alam, GM. The role of science and technology education at network age population for sustainable development of Bangladesh through human resource advancement, *Scientific Research and Essays* 2009, 4(11*):* 1260- 1270.
6. Alvani M, Ahmadi P. Designing a Model for Human Resources productivity by using management Productivity Approach, Journal of Research and scientific, Tarbiat Modares University, 2001, 5(1): 19-27
7. Anbari Z,Sadaghiani A,Tabibi J. Compare Instruments and work efficiency of support services in Hospitals Arak, The Scientific

Journal of zanjan university of medical sciences, 2005, 13 (52): 49-56
8. Andaleeb S. Determinants of customer satisfaction with hospitals managerial model, International Journal of Health care Quality Assurance, 2004, 11 (6): 181-7
9. Asgri M. Factors affecting efficiency in human resources mobarakeh steel company , Industrial Engineering master's Thesis , yazd university Engineering complex, 2005
10. Bartlett MS. A note on multiplying factors for various chi-squared approximations, Journal of the Royal Statistical Society,Series 1954, B(16): 296-298.
11. Dehghan Nayeri N, Nazari A,Salsali M, Ahmadi F, Adib MIranian Staff nurses views of their productivity and management factors improvement impending it : A Qualitative study, journal of Nursing and Health Sciences (ISI) : 2006, 8 (3): 51-56.
12. Dixon j. k. Factor analysis. In: munro BH. Statistical methods for Health care Research, 4thed New York: Lippincott; 2001: 303-329.
13. Eastaugh SR. Hospital nurse productivity, Journal of Health Care Finance; 2002, 29(1): 14-22.
14. Janalinejad M. Factors affecting human resources productivity. Terabit modares university , Msc thesis Government man agent , Terabit modares university, 2001
15. Jordan SD. Nursing productivity in rural Hospitals, Nurse manages, Mar; 1994, 25(3): 58-62.
16. Kamali Y. the situation of productivity in Iran , Apo productivity data book, 2009
17. Khodayari A. predicting Human Resources productivity in Islamic Azad University science and Research Branch, (PhD) Dissertation , Tehran , Iran,2008
18. Kinnader A, Grondahl P. Productivity development in manufacturing systems, a project proposal within proper, internal report, Stokholm: The royal institute of technology, 1999
19. Nasiri pour AA, Raeisi P, Hedayati SP. the Relationship between organizational cultures and Employees productivity , J journal of Health management , Iran University of medical sciences , 2009,12 (35): 14-20
20. Norris AE. Structural Equation modeling. In B.H. Munroe Statistical methods for Health care Research (5th edition) PA: J.B. Lippincott Company, 2005
21. Parasuraman A. Service quality productivity: a synergistic perfective, managing service Quality. 2002, 12 (1) 6-9.
22. Ramsey, JD. Effect of workplace thermal condition of safe work behavior, safety research, 1983, 14 (3). 105- 114
23. Sadeghi Y. Factors affecting the productivity of Human resources, nursing management [dissertation], university of social welfare,1998
24. Sahay BS. Multi – fac tor productiving measurement model for sevive organisatiom , International journal of productivity and performance management ,2005, 54 (1): 7-22
25. Schermerhorn j, et al. Basic organizational behavior,2nd edition, New York, Wiley,1999
26. Schumacker R E, Lomax R G. A Beginners Guide to structural Equation modeling. Second edition, London: Lawrence Erlbaum associates, 2004: 167 – 230.
27. Singh H, Motwani J, Kumar A. A review and analysis of the state of the art research on productivity measurement, industrial management and data systems, 2000, 100 (15): 234-241.
28. Soltani E. Human resource productivity, Tehran, Arkan publication, 2007:11
29. Taheri S. Productivity and analysis in Organizations, Hastan publication, Tehran1999: 20.
30. Tangen S. Demystifying productivity and performance. International journal of productivity and performance management. 2005, 54 (1): 34-46.
31. Vuorinen I, Jarvinen R, Lehtinen U. Content and measurement of productivity in the service. International journal of service industry management. 1998, 9 (4): 377-396

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