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Analysis of human resources productivity indicators with structural equations approach. Case study. Kerman executive agencies

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Abstract

This study aims to explain the indicators of human resource productivity management in Kerman executive agencies. It is a descriptive, correlational as well as a developmental study purposefully conducted as a survey in the field of human resources. The sample includes 30 experts in the field of management and administration. It was obtained by purposeful sampling method and included 524 employees of the Kerman executive agencies that were gathered by stratified sampling method. Two questionnaires were used by the experts to confirm the validity and reliability of the model and one questionnaire was used to answer the questions. The validity and reliability of all questionnaires were confirmed. AMOS and SPSS statistical software were used for data analysis. The 42 subscales of human resource productivity management are summarized in 5 factors (individual, organizational, complementary organizational, occupational, and extra-organizational). It is an applied-developmental study considering the simultaneous identification of factors related to human resource productivity in line with the development indicators and can be used by all executive agencies throughout Iran.

Keywords: *human resources, productivity, individual, organizational, complementary, occupational, external, organizational factors*

1. Introduction

Organizations, even large corporations, consist of humans and human skills, characteristics, and motivations [21]. Human endeavors have always been focused on achieving the greatest results with the least effort and facilities. This tendency can be called the desire to achieve more productivity [23]. Low productivity represents a waste of resources used by an organization, which ultimately leads to a lack of international competition and thereby reduction of organizational business activities. One of the major organizational resources is human resources. Organizational management for creating effective and powerful human resources has no way except considering the staff's education, strengthening their power of

creativity and initiative, raising their spirit and motivation, and considering the growth of their personality. Increasing productivity, especially the productivity of human resources, can play an essential role in solving the social and economic problems of countries, especially in developing countries. A logical approach to the progress and profitability of the country's organizations leads us to the conclusion that one of the most important strategies for the progress of organizations is to increase the productivity of their human resources. Most researchers in this field believe that improving the productivity of disabled human resources is a combination of various factors, which can be different in each organization and according to its specific conditions [19]. Since human resources, unlike other organizational resources, are known as the subjective resource and coordinator of other factors and the main levers for increasing or decreasing the productivity of the organization, they have a special priority and should be considered in particular. In other words, the organizations with significant achievements and the advanced countries emphasize their human resources. Therefore, if the staff is motivated, capable, and efficient, they can use other resources efficiently and the objective of organizational productivity can be achieved. Otherwise, the stagnation and backwardness of the staff results are passive and unexpected [11].

Comparing the labor productivity growth in Iran with the countries of the Asian Productivity Organization shows that Iran has low labor productivity growth among these countries and the highest productivity has been realized from 2002 to 2005 at 3.5% Afzonia and Tavakoli [3]. Human resources are the biggest assets of organizations [18]. Modern management systems consider honoring the values and needs of the employees as the most effective step in achieving the goals of the organization [7]. In fact, the most important infrastructure of any complex organization is human resources, because it is the basis of moving towards development. Man is the main element of structure and management, which can both bring development and can act as a great obstacle to development. Therefore, a developed man leads to a developed society [14]. Then, increasing productivity, especially human resource productivity, can play a vital role in solving the economic and social problems of the countries, especially developing countries. A rational attitude to the progress and profitability of Iranian organizations leads us to conclude that one of the most important strategies for the advancement of organizations is to increase their human resource productivity. Most scholars in this field believe that promoting the productivity of disabled people is a combination of a variety of factors, which can vary from one organization to another depending on their specific circumstances [19]. It is not difficult to understand why human capital is considered to be the most important factor in economic and industrial development, and why human capital fundamentally plays a central role in promoting productivity. Since it is just the human being that can increase the quantity and quality of his performance, launch new projects, cope with his problems through creativity, expand his work power, and find cost-cutting solutions. He is the only agent who can make a difference in himself and his environment. Applying motivated, empowered, and productive human resources in addition to providing high-quality services can utilize other intra-organizational resources efficiently, realize various aspects of productivity, and ultimately benefit the organization.

According to the studies in the field of human resource productivity, it seems that the activities carried out are still insufficient. This has caused the productivity of human resources not to be recognized in different organizations. Therefore, the present study focuses on contextualization to identify, describe and explain the indicators of human resource efficiency management in Kerman executive agencies.

Boukany et al. [5] found that the effectiveness of leadership and strategic planning had a positive and significant effect on human resources productivity. Abedini and Khorasgani [1] concluded that there is a direct and significant relationship between favorable behaviors in the optimum use of human resources such as rewards, justice, effective communication, motivation, etc. in employees. Hosseini et al. [16] concluded that organizational factors had the most impact on promoting human resource productivity followed by individual and environmental factors. Shekarchi and Ismaili [28] in a study found that improving service quality is one of the factors influencing human resource productivity.

Considering the results of the study by Sukoco and Prameswari [30], the human capital approach does not have a positive effect on human resource productivity, especially in terms of individual ability and motivation. Bures and Stropkova [6] suggest three paths for integrating knowledge management to increase human resource productivity: focusing on better integration of human capacities (1), development of technological tools (2), and continuous improvement (3). Durdyev et al. [9] conducted a study on productivity and service quality. The results indicated that the most influential factors on productivity and PSQ in Turkey include the lack of skilled and experienced workforce, appropriate jobs, and quality management.

2. Research theoretical framework

Productivity is one of the key measures that describe the competitiveness of the countries. Not only productivity is an important competitiveness indicator, but also a measure of economic growth. Human resources are the core of all human institutions. Even in developed and industrialized countries throughout the world where the use of machinery and technology has progressed, human resources are necessary [32]. Organizations are required to consider their human resources even more important than before. They should consider them as resources of competitive advantage since their efficiency, productivity, and profitability can increase the performance of the organization and the economy. By contrast, ignoring human resource productivity and merely focusing on other factors can undermine individual and organizational efficiency [22].

Due to its multifaceted nature, productivity has always been considered from different dimensions and models. In the present study, productivity was measured as a variable using exploratory and confirmatory factor analysis. It was measured with a validity and reliability instrumentation method via a researcher-made questionnaire using various models. After examining most of the models related to human resource productivity and analysis of their factors and components most models were selected with commonality. In the next step, these components were provided for the experts and university professors in the form of five categories of factors. Then, the most appropriate components for the conditions of Iranian organizations were selected. After deleting some components extracted from the models according to the viewpoint of the experts and university professors, the final components for the conceptual model of research were formed. Principal function indexing such as clarity, comprehensiveness, non-interference, sensitivity, and relativity was performed. The used factors are given in Table 1.

Individual factors are rooted in the characteristics, personalities, and attitudes of individuals to occupations, as well as age, gender, education, history, and experience years [17]. Individual indicators in the present research include commitment, training, ability, skill, motivation, creativity, job satisfaction,

competence, personal value system, competitive spirit, accountability, physical work, and the degree of work difficulty.

Organizational factors include the factors that the organization is responsible for their development and implementation, and they are conveyed by factors such as occupation type, structure, organizational culture, etc., as well as internal factors or internal environment of the organization that influence the maintenance or dismissal of the individual in the organization [12, 17]. In this research, organizational security, organizational support, feedback and scientific assessment of performance, effective leadership, staff scientific selection, technology, resources, organizational structure, equipment, staff participation, the possibility of staff's development, rules and regulations, quantitative and qualitative rewards, and capital are measured.

Table 1. Used factors

Variable	Factors	References
Manpower productivity	individual	Hosseini et al. [16] Salajegheh et al. [25] International Labor Organization
	organizational	Salajegheh et al. [25]
	complementary organizational	Kameli et al. [17]
	occupational	Nazari et al. [20] Fenjanchi and Sadri [10]
	external organizational	Fenjanchi and Sadri [10] Afjeh and Asl [2]

Complementary organizational factors include a set of factors that enable the organization's leadership and management to operate human resources in effectively to achieve the main objective of each organization, which is optimal productivity [24]. The complementary organizational factors measured in this research include providing mental health of the employees, efficient organizational culture, changing and improving attitudes, organizational change, and improvement, formal organization of the groups and their impact on performance, and communication effectiveness.

Occupation factors include channels to modify results timely and accurately based on the objective criteria, work schedules, and job planning that include skills, work identity, work importance, autonomy, feedback, job recognition, and a clear understanding of their role and knowledge about job objectives, description of clear tasks and timely awareness of the results of their performance [25]. This study evaluates job indicators such as job adaptation, job clarity, occupational scientific dimension, freedom of action, flexible hours of work, challenging work, and job redesign.

External organizational factors include external factors that can affect the performance of the organization. The key foreign factors are cultural, political, social, and governmental ones [25]. The present study analyzes and evaluates the external organizational factors such as the country's political situation, community culture, the role of parties in the country, accessibility to scientific information, the use of specialist personnel, the ratio of the workforce to the entire population, and financial and credit policies. This study aims to explain the indicators of human resource productivity management in Kerman executive agencies.

3. Research method

The current research is developmental in terms of purpose, quantitative in terms of approach, explanatory in terms of strategy, descriptive correlational, and case-survey type in terms of research method. The statistical population of this research in the process of building a model of experts who are aware of the subject includes two categories: the first category includes experts in the field of management and administrative affairs, and the second one contains the employees of executive agencies of Kerman city. Regarding the sampling, for the first category, the most expert people in this field should be used, and 30 experts were used based on a random method. For the second category, considering that the structural equation approach and confirmatory factor analysis were used, the sample size was between 5 to 10 times the number of questionnaire questions [31].

Table 2. Population and sample size

Number	Executive agency	Population size	Sample size
1	service group	2618	137
2	cultural – educational	1792	94
3	headquarters – ministerial	1079	56
4	state companies	2180	114
5	banks and insurance	2340	123
Total		10,009	524

Therefore, the statistical population of the research includes 30 experts and 524 employees. In the current research, to collect the required data, both library methods (referring to written documents such as books, magazines, etc.) and field methods (interviewing experts and distributing questionnaires) were used. Two questionnaires (Questionnaire 1 and Questionnaire 2) were used to obtain information from the statistical population of the experts and the statistical population of the employees. The validation questionnaire was also used for the final approval of the proposed research model. The validity of the questionnaire was based on the factorial validity method. To identify the dimensions of manpower productivity management and to answer this hypothesis, exploratory factor analysis using the method of decomposition into main dimensions and varimax rotation has been used. Descriptive and inferential statistics, structural equation approach, confirmatory and exploratory factor analysis, Pearson correlation, and one-sample *t*-test were used to analyze the data.

In the present study, both library (the reference to written documents, such as books, journals, etc.) and field (interview with experts and distribution of questionnaires) methods were used to collect the required data. Questionnaires 1 and 2 were used to collect data from the statistical population of the experts and employees, respectively. The validation questionnaire was also used to confirm the final proposed model of the research. The validity of the questionnaire was carried out based on the factor validity method. Accordingly, exploratory factor analysis has been used by analysis of the main dimensions and the varimax rotation to identify the dimensions of human resource productivity management and to respond to this hypothesis.

Table 3. Eigenvalues of the factors and cumulative frequency of variance percentage (after rotation)

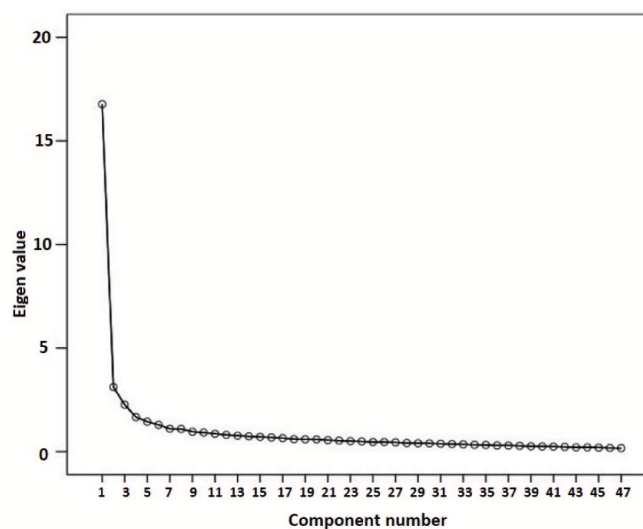
Factor	Eigenvalue	Variance percentage	Cumulative frequency of variance percentage
1	12.838	27.315	27.315
2	4	8.523	35.839
3	3.376	7.183	43.022
4	3.148	6.698	49.72
5	1.909	4.061	53.781

The average variance extracted (AVE) is 0.755 and, the composite reliability (CR) value is 0.938. Because (CR) is greater than 0.7 and greater than AVE and AVE is greater than 0.5, therefore convergent validity is also confirmed. Cronbach's alpha coefficient was used to estimate the reliability of the questionnaire. Cronbach's alpha was 0.953 in the human resource productivity management questionnaire. Predictive validity: the model estimated that the second-order factor human resource productivity accounted for 75.7, 94.1, 92.2, 65.2, and 59.3% of the variance in individual, organizational, complementary organizational, Occupation, and external organizational factors, respectively. Model indices demonstrate adequate fit. Common sample bias is $(0.17)^2 = 0.0289$.

Discriminant validity: MSV and ASV less than AVE; $MSV = 0.973 \times 0.973 = 0.947$;
 $ASV = (0.869 + 0.973 + 0.959 + 0.748 + 0.772)/5 = 0.864$; $MSV < AVE$; $ASV < AVE$;
 convergent validity: $AVE < 0.5$.

Table 4. Discriminant validity

No.	Factors	1	2	3	4	5
1	individual	0.755				[t]
2	organizational	0.69	0.755			
3	complementary organizational	0.659	0.612	0.755		
4	occupational	0.602	0.601	0.614	0.755	
5	external organizational	0.419	0.523	0.522	0.575	0.755

**Figure 1.** Scree plot to determine the number of proper extractable factors

4. Results and discussion

In this section, the proposed research model in Kerman executive organizations has been studied using the modeling approach for structural equations based on path analysis. Library studies (a reference to written documents such as books, journals, etc.) have been investigated to design the variables of human resource productivity. Demographic information of the employees includes gender, age, education, and service history.

Table 5. Distribution table and percentage frequency of respondents' demographic information

Demographic information		Frequency	Percentage of frequency
Gender	female	254	48/5
	male	270	51/5
Total		524	100
Age	20–30 years old	50	5-Sep
	31–40 years old	216	41/2
	41–50 years old	220	42/0
	above 50 years old	38	3-Jul
Total		524	100
Education	under diploma	6	1-Jan
	diploma	67	8-Dec
	bachelor	256	48/9
	master's degree	182	24/7
	doctorate	13	5-Feb
Total		524	
Service history	1–10 years	139	26/5
	11–20 years	222	42/4
	above 20 years	163	31/1
Total		524	100

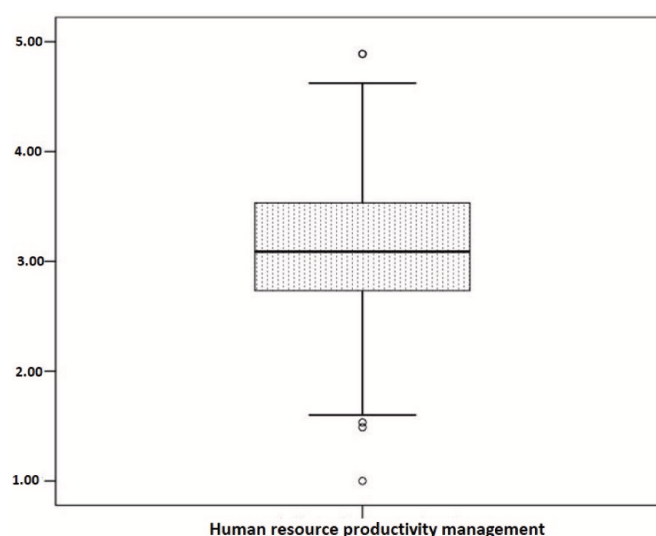


Figure 2. Box plot of the variable of human resource productivity management among subjects

An expert interview is conducted with the relevant experts in addition to identifying the dimensions and the indicators of each of the variables. The expert interviews were mostly semi-structured. In such interviews, the interviewer receives different facts from the interviewed individuals during the interview. Then, the survey methodology of the experts (including university professors and specialists in the field of human resource management) was used by the Delphi method to finalize the list of dimensions and indicators. A specific type of open and closed questionnaire was used to survey the experts.

Table 6. Score scale for components of human resources productivity management

Very strong	Strong	Good	Over satisfactory	Satisfactory	Boundary	Unsatisfactory
4.51–4.99	4.01–4.49	2.61–3.99	3.01–3.59	2.51–2.99	2.01–2.49	> 2.00

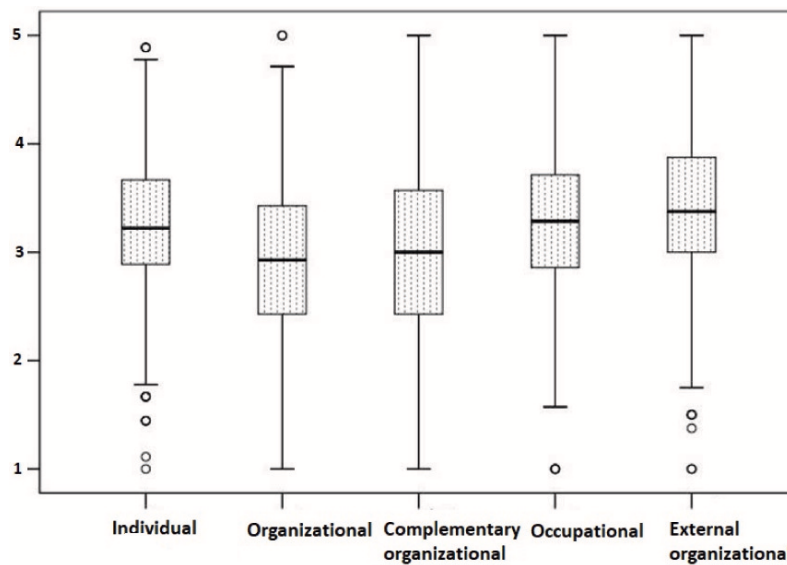


Figure 3. Box plot for components of human resource productivity management among subjects

The Kaiser–Meyer–Olkin criterion (KMO) is used to verify the validity of data and to evaluate the accuracy of sampling before factor analysis. According to the results of factor analysis, 42 sub-dimensions (indicators) related to human resource productivity management are summarized in 5 factors. According to the findings, the KMO value for sampling quality is 0.947, which is an acceptable value.

Table 7. Validation and accuracy test of sampling

Test	Statistic	df	<i>p</i> -value
Kaiser–Meyer–Olkin	0.947	–	–
Bartlett test of sphericity	14,141	1081	0.001

As the Likert scale has been used to measure the relevance of the introduced indicators, the figure of 3.00 was thus used to verify the indicators, which represents the studied average level, and the average views of the experts participating in the Delphi method about effective indicators were compared by *t*-test with the theoretical value of 3.00. Forty-seven indicators out of 102 proposed were approved by the experts (mean experts' views > 3), and 60 indicators were rejected (mean experts' views < 3). Questions 3, 9, 10, 11, 43, and 46 were omitted due to a factor load of < 0.5.

Table 8. Fit indicators of the human resource productivity management model

Index	Acceptable value	Reported value
Root mean square error of approximation (RMSEA)	≤ 0.08	0.064
Normed chi-square (CMIN/DF)	≤ 3	3.16
The goodness of fit index (GFI)	≥ 0.9	0.884
Adjusted goodness of fit index (AGFI)	≥ 0.9	0.857
Comparative fit index (CFI)	≥ 0.9	0.904
Normed fit index (NFI)	≥ 0.9	0.903
Tucker–Lewis index (TLI)	≥ 0.9	0.907
Incremental fit index (IFI)	≥ 0.9	0.904

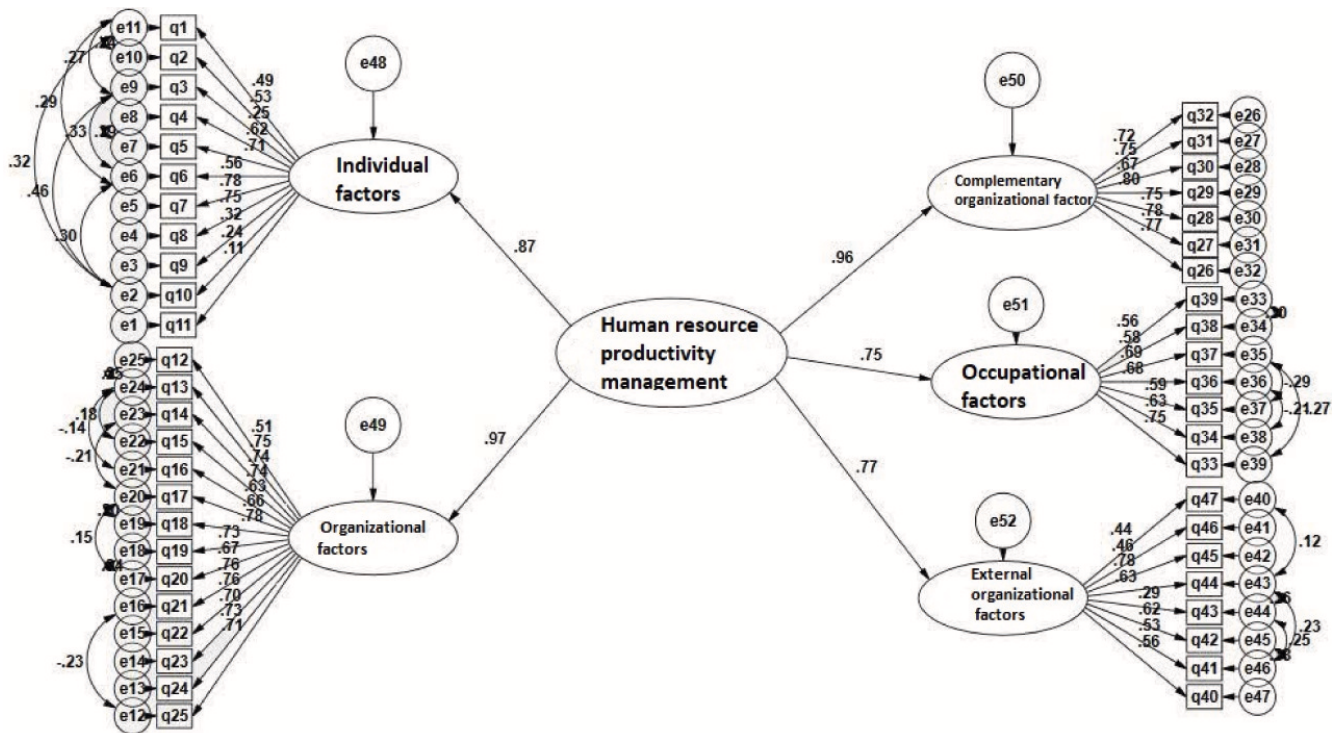


Figure 4. Results of the confirmatory factor analysis of human resource productivity management (standardized factor load)

According to the results of factor analysis, 42 sub-dimensions (indicators) related to human resource productivity management were summarized in 5 factors.

- According to the empirical means, we can conclude that the dimensions of the individual factors (including components of commitment, training, ability, skill, motivation, creativity, job satisfaction, competence, value system governing the individual, competitive spirit, accountability, physical activity and degree of work difficulty), the dimensions of organizational factors (including components of organizational security, organizational support, feedback, scientific evaluation of performance, effective leadership, staff scientific selection, technology, resources, organizational structure, equipment, staff cooperation, possibility of staff development, capital, quantitative and qualitative rewards, rules and guidelines), complementary organizational factors (including components of staffs’ mental health provision, effective organizational culture, change and modification of attitudes, organizational change and improvement, formal organization, groups and their impact on performance, communication efficacy), occupational factors (including components of job matching, job clarity, job scientific dimension, action freedom, flexible hours of work, challenging job and

Table 9. Standard factor load and *t*-values
of questions for human resource productivity management structure

Structure	Questionnaire item No. of question	Standard factor load	<i>t</i> -value	<i>p</i> -value
Individual factors	1	0.494		0.020
	2	0.529	2.338	0.019
	3	0.029	2.185	0.029
	4	0.252	2.352	0.019
	5	0.715	2.361	0.018
	6	0.555	2.343	0.019
	7	0.777	2.365	0.019
	8	0.746	2.363	0.018
	9	0.316	2.254	0.024
	10	0.236	0.161	0.031
	11	0.11	–	–
Organizational factors	12	0.512	11.454	0.001
	13	0.749	16.821	0.001
	14	0.744	16.711	0.001
	15	0.745	16.722	0.001
	16	0.634	0.661	0.001
	17	0.661	14.784	0.001
	18	0.777	17.456	0.001
	19	0.73	16.109	0.001
	20	0.673	15.096	0.001
	21	0.757	15.358	0.001
	22	0.757	17.028	0.001
	23	0.703	15.784	0.001
	24	0.728	16.361	0.001
	25	0.715	–	–
Complementary organizational factors	26	0.765	17.058	0.001
	27	0.779	17.375	0.001
	28	0.752	16.763	0.001
	29	0.801	17.868	0.001
	30	0.667	14.838	0.001
	31	0.748	16.664	0.001
	32	0.715	–	–
Occupational factors	33	0.752	12.154	0.001
	34	0.633	11.073	0.001
	35	0.593	10.475	0.001
	36	0.682	11.64	0.001
	37	0.69	11.386	0.001
	38	0.58	12.576	0.001
	39	0.561	–	–
External organizational factors	40	0.563	8.139	0.001
	41	0.527	7.834	0.001
	42	0.619	3.492	0.001
	43	0.288	5.266	0.001
	44	0.627	9.108	0.001
	45	0.775	9.194	0.001
	46	0.458	7.297	0.001
	47	0.44	–	–

redesign of job), and external organizational factors (including components of observance of client demands, the political situation of the country, community culture, the role of parties in the country, access to scientific information, utilization of the experts, the ratio of the workforce to the entire

population and the financial and credit policies) have led to the development of human resource productivity in executive agencies of Kerman city.

- After analyzing the mean human resource productivity indicators by the experts, the studies show that the individual, occupational, and external organizational factors are at the level of over satisfactory, in which individual factors are in priority followed by other components. In the occupational factors, the component of adaptation to occupation is the priority and the rest of the components are the next priority in the external organizational factors; the use of specialist force is the priority. Therefore, the necessary consideration of job satisfaction, job adaptation with the employees, and the use of specialist force in organizations can increase human resources productivity. It is a necessity to pay attention to the individual characteristics, job features, and influential factors outside the organization that can dramatically increase human resource productivity. These results are consistent with the studies of Danyali et al. [8], Sayadi et al. [26], Saatchi [24], and Bahati and Querashi [4].
- The general attitude of a person toward his job can be pointed out for job satisfaction. A person with a high level of job satisfaction has a positive attitude toward work. However, the dissatisfied one has a negative attitude toward his work. Job satisfaction is one of the most important factors in organizational success that increases efficiency, productivity as well as individual satisfaction [15]. Individual adaptation to occupation also relates to the compatibility of knowledge, skills, and abilities of a person and job requirements [29]. The individual's fit with the job focuses on the matching of personality traits and career characteristics. If this fit exists, the individual's capability increases and the person becomes more productive. Also, the presence of specialists from different disciplines in the organizations increases the productivity of the organizations [24].
- The findings obtained from analyzing the average human resource productivity factors from the expert's point of view indicate that the organizational and complementary organizational factors are at a satisfactory level. In the organizational factors, the component of effective leadership is prioritized and in the complementary organizational factors, the component of effective organizational culture is primarily a priority. These results coincide with the findings by Sedghi et al. [5], and Hartnell et al. [13]. The manager is placed at the head of the organization as the official representative of the organization to coordinate and increase productivity. The success of the organization in improving productivity and realizing its goals depends on how to apply the management and leadership styles of the manager. Managers can increase employee satisfaction and productivity in their organization using the right leadership style. In the multivariate theory of productivity, the systematic selection model and effective use of human resources in the organization is the most important factor that can increase human resource productivity, and the existence of effective transformer leaders, and managers in organizations. In general, although several factors increase or decrease the human resource productivity of an organization based on the multi-factor theory of productivity, effective leadership and management and the active presence of qualified and successful managers in the organization are of great importance [27].
- Regarding organizational culture and its importance in increasing human resource productivity, it can be said that organizational culture is an open system approach that has interactive and mutual communications with the organization's performance and, ultimately, the effectiveness of the or-

ganization. Organizational culture is a set of shared values and beliefs that the members of the organization have about their existence in an organization. According to the deep role of human resources as the most important resource affecting organizational productivity, efficient organizational culture can provide an ideal situation for human resource productivity in the organization.

5. Conclusions

Paying attention to human resources is one of the most effective tools for achieving organizational excellence. Human resource productivity as a strategic tool for gaining competitive benefits is one of the major programs in organizations, so having qualified human resources with the characteristics, capabilities, and skills appropriate to the needs of today's organizations can form the competitive advantage of their organization. Controlling the factors affecting the productivity of human resources leads to the promotion of productivity in organizations. The productivity of human resources is not promoted randomly, but the organizational and structural prerequisites needed for it must be provided and constantly taken into account by the organization. Providing the organizational and structural prerequisites and subsequently improving the productivity of human resources in the organization, the role of the organizational improvement and excellence systems should be recognized. Therefore, the individual and psychological indicators of the employees, the need to use working groups and collaborative management should be noticed. An executive system with a regular and flexible structure, tailoring people's jobs based on their physical and mental abilities, paying attention to the effective role of the scientific information of the experts and the role of the turbulent and dynamic environment outside the organization in increasing the knowledge of employees and reducing the impact of uncontrollable environmental factors (political and social factors, etc.) and the internal environment of the organization can help managers to improve the productivity of human resources and the excellence of the organization.

6. Limitations and scope for future research Practical suggestions

Several limitations can be considered in developing the contributions of this study. One of the most important limitations is the failure to cooperate with judicial and law enforcement agencies due to information and security issues. In future studies according to the level of the development of different communities and their relationship to each research variable, it is suggested that a comparative study is conducted between the selected developing and developed communities for each of the research variables. This can improve information and achieve more indicators and provide more strategies and suggestions.

Suggestions based on individual factors. Individual factors have the greatest impact on the productivity of human resources. Among them, job satisfaction has the highest impact. It is suggested that factors such as job enrichment, the correct job promotion system based on merit, fair payments, and creating an environment to be considered for creativity and innovation.

The use of collaborative management methods can be of great help in the productivity of human resources. Considering the potential available in human resources, it is necessary to use working groups and the necessity of participatory management for their participation in decision-making.

Suggestions based on organizational and complementary organizational factors. In organizational factors, the effective leadership component is prioritized. It is suggested that the leaders of the organization pay attention to choosing the appropriate leadership style based on mutual trust and friendly relationships, explaining values and goals, supporting employees to present creative ideas, and creating a healthy competitive environment.

In the complementary organizational factors, the component of efficient organizational culture is the first priority, so modeling and change in organizational culture should be considered in order to change personal interests to organizational interests.

Suggestions based on occupational factors. Adjusting people's jobs based on their physical and mental abilities, as well as job analysis and description of tasks and features required for the occupation can be effective on labor productivity.

Suggestions based on external organizational factors. Regarding the effective role of the scientific information of the experts and the role of the dynamic environment outside the organization in increasing the employee's information, it is recommended that the organizations provide their employees with the most up-to-date scientific information.

It is recommended that the importance of using expert and experienced workforce in various dimensions of organizational life, to solve work problems and increase the productivity of the organization, to identify the experts in the country and in relation to making the devices and tools more effective, the methods of performing job duties and empowering human resources should be considered.

Acknowledgement

The author expresses his sincere appreciation to the reviewers for their insightful comments, which have significantly improved the paper's quality.

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