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ORIGINAL RESEARCH PAPER

# Analysis of factors influencing human resource development for state-owned enterprises

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**ABSTRACT**

**BACKGROUND AND OBJECTIVES:** This study was performed to analyze the factors influencing human resource development for state-owned enterprises.

**METHODS:** This research was an applied study concerning its objective with a descriptive-exploratory type. The study was conducted by two quantitative and qualitative approaches. The research statistical population included two groups for both approaches. In the qualitative approach, 22 experts were selected to design the model using fuzzy Delphi methods, structural-interpretive modeling. In the quantitative approach of 360 employees of state-owned enterprises companies were selected from the statistical population of 2738 people by the stratified random sampling method. Content analysis was used to analyze qualitative data and in the quantitative method used interpretive structural method, analytic network process and MICMAC.

**FINDINGS:** The result of determining the relationships revealed that organizational factors, job factors, behavioral factors, and empowerment factors affect human resource development, respectively. The findings of weighting the factors by fuzzy network analysis process indicated that empowerment factors with a weight of 0.361 among the dimensions and the knowledge management factor with a weight of 0.132 among the components have the highest importance in the development of Human Resource.

**CONCLUSION:** The variable "human resource empowerment" leads to success in human resource development, which needs to be improved quickly to bring success to the organization and improve its performance. The managers should pay attention to the high levels of the model and improve the relationships set between the factors to improve this factor. Considering the high significance of the "knowledge management" component, the managers' most important measure should be focused on improving this factor followed by continuous efforts in this context since paying attention to knowledge management has the greatest impact on the success of human resource development and requires special attention.

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## INTRODUCTION

The core of any organization's success relies on organizational assets, or indeed, Human resources (HR). HR have an important responsibility for the success or failure of the organization. Human Resource Development (HRD) involves a set of activities that support the employees' behavior change and learning opportunities. HRD activities aim to develop the employees' skills and flexibility to the current and future demands of the organization. The ultimate goal of HRD activities is to achieve high performance (Richman, 2015). HRD includes the process of developing and employing human skills through developing the organization and training and developing personnel aimed at improving the performance (Najafi *et al.,* 2012). An organization's HR include all the people who work in the organization (Bernardin, 2010). Hence, as a part of an organization, human resource management needs to be prepared to deal with dynamic environmental change (Decenzo and Robbins, 2010; Sabokro *et al*., 2018; Ardakani *et al*., 2020). The human sector plays a key role in strategic HRD with a great impact on the strategic decisions of the organization (Ancaloana, 2013). This concept implies understanding the effects of globalization, workforce diversity, changing skills needs, conditional workforce, employees' participation as well as technological changes (Decenzo and Robbins, 2010). HRD consists of four basic components: Knowledge, attitude, skills, and behavior. No organization can survive without paying attention to HR, human aspects, and their constructive role in the development. HRD includes the process of developing and employing human skills through developing the organization and training and developing personnel aimed at improving the performance (Najafi *et al*., 2012). Consecutive changes in the economic, cultural, and technological environment of organizations have led them to face challenges on how to properly manage HR and improve their performance (Alvani *et al*., 2016). Acquiring knowledge and skills is a time-consuming process, in which, companies invest significant capital to help their employees acquire necessary competencies. Inability to determine the competence of employees to implement a strategy and failure to ensure its achievement or development at the proper level and time can dramatically weaken the company's ability to realize its goals (Kazakovs, 2014). By creating a useful work environment, HRD significantly increases the employees' awareness, honesty, trust, and interaction at work to improve performance (Mahmood *et al*., 2018). Competition cannot be realized without performance management and developing the skills and competencies of employees at the same time. Therefore, there is a need to create a culture and opportunity for continuous learning of employees and the organization, to improve performance at the organizational level (Raj Adhikari, 2010). HRD as well as necessary knowledge and skills are required to overcome the highly turbulent competitive environment in industries and to succeed in such an intensely competitive environment. In fact, in such a competitive environment in the economy, smart and capable people are needed to maintain values. Therefore, there seems to be an urgent need to invest in HR. State-owned enterprises (SOE) in the area of HR face a number of development issues. These problems should be addressed first so that these SOE companies can expand their presence and activity domestically and internationally. To this end, first, SOE should have an accurate understanding of the quality of HR as organizational intelligence to provide products with appropriate quality. Second, State-Owned Enterprises, necessarily because they are SOE, have to succeed in the social and economic environment of the country, which will not happen unless through the development of HR. For example, if the training, skills, and capabilities of HR are not understood, the SOE may not succeed in providing high-quality products. Also, failure to pay attention to the beliefs of human values can lead to unsuccessful implementation in the organizational performance improvement. According to the settlement of budget report by the Supreme Audit Court (SAC) of Iran (2017), of a total of 385 SOE and production and industrial institutes, 176 SOE and institutions were profitable, 47 companies were break even, and 162 SOE and institutions were unprofitable that 375 million $ have been dedicated from the public budget to compensate their losses. Also, according to the report of the Plan and Budget Organization of Iran (2017), low productivity and inefficiency of production factors are important factors of loss of SOE and institutions. Thus, this is the main issue that was focused on in this research. Considering the position of HR, which is the most important factor of production, so, this research was conducted to design an HRD model for SOE. Economic development in countries and providing appropriate and localized

development models have always been one of the commonly discussed topics in the area of development management in recent studies. The system of SOE is one of the foundations of Iran's economic development. The problem to be considered in SOE is the lack of sufficient attention to intangible resources such as the development of employees' thoughts to gain competitive advantages. It seems that overseeing HRD is not done seriously and senior executives do not support HR management practices in many cases. This research was performed to design and present a HRD model for SOE aimed at training thoughtful and highly skilled manpower to compete and gain competitive advantages. The current research has been carried out in Mashhad city in 2020.

*Theatrical background*

*Human Resource Development*

According to Schlebusch and Kgati (2016), learning is the main focus of HRD and its main goal is to achieve the goals of the organization and the individual. In this context, development takes place over time and by emphasizing the learning opportunities, development, and training to improve the individual, team, and organizational performance. According to Mathis and Jackson (2000), HRD is gradually turning into a tool for survival in a dynamic, competitive, and constantly changing environment. Malone (2004) also suggested that HRD has now turned into a significant factor, which continues to be widely used by many organizations as one of the most promising approaches for organizational success in the age of information. The goal of HRD can be seen from the perspective of activities or functions in Human resource management (HRM), which mainly involve personal development, organizational development, occupational achievement, and performance improvement that can be described as HRD-related functions. It is suggested that HRD goals are aligned with organizational strategies and goals aimed at meeting the changing and evolving social and economic needs (Schlebusch and Kgati, 2016). In an HRD review article, Hamlin and Stewart (2011) describe HRD performance as improvement in the individual and group performance, improvement in the organizational effectiveness and performance, the development of knowledge, skills, and competencies, and strengthening of human potential and personal growth. In line with the above definitions, the basic elements of HRD include Organizational Development (OD), Training and Development, and Career Development (CD). While CD is almost an external organizational structure, OD and Training and Development, are HRD interventions, which are focused within the organizational framework and seek to provide and develop key skills to enhance the company's performance (Galperin and Lituchy, 2014). Some of the functions of this activity include identifying the training and development needs and selecting appropriate methods and programs for these needs, planning how to implement them, establishing communications and information management, the company's performance, productivity, organizational culture, employees' turnover, and ultimately the evaluation of their results (Al-Mustapha and Olugbenga, 2016).

*Human resource development theory*

In general, studies have adopted two broad theoretical models. The first models, micro-theories, are related to organism behavior and individual motivation, influence, or cognition. The second theories models include strategic choice perspectives that use human capital theories, which are resource-based contingency views derived from the company theory. Most of the available HRD studies originate from limited theories such as learning and development theory, social psychology, or mainstream economics (Ahmed *et al*., 2017). Murphy and Garavan (2016) suggest that several theoretical perspectives on HRD have been discussed in the literature, indicating that the HRD theoretical foundations have been largely focused on the nature of models, principles, and theories. Researchers such as Gilley and England, 1989; McLagan, 1989; Swanson *et al*., 2009 focus on the theory of human resource psychology and state that HRD refers to a process, which enables personnel to experience and learn over a period of time aimed at changing the individual's behaviors. In system theory, HRD has been discussed as organizing activities or learning in the organization to improve the performance and growth of workers to improve the work, personnel, and the organization (McLagan, 1989). Similarly, some researchers have relied on the economic theory and suggest that HRD refers to the process of developing and disseminating expertise to personnel aimed at improving the performance and process of

Table 1. A summary of the literature review

| References | Title | Results |
|---|---|---|
| Hajilou *et al*. (2018) | Designing an ethical-based model of HRD in government organizations | Human capital development has been studied in three dimensions of empowerment, talent management, and knowledge management to achieve the optimal combination. |
| Fallah (2018) | Identifying and explaining the coming results of human resource empowerment with the knowledge management approach | Based on the results, the mediating variable of knowledge management plays a crucial role in the organization to empower employees by creating synergy between two categories of cultural factors and capacity building. |
| Pakdel *et al.* (2018) | Designing a national HRD model with a system dynamics approach | The results of this study indicate that the national HRD system has the main subsystems of training and providing manpower and labor market. These two subsystems are subject to the policies made by the human resource management subsystem and economic growth and development. |
| Askari Masouleh (2017) | The integrated model of HRD in government organizations of the Islamic Republic of Iran based on the Islamic-Iranian model of progress | Managerial factors; national and extra-organizational factors; individual factors; factors of service compensation and performance appraisal system; employees' commitment and career path progress factors; planning and employee's guidance factors; factors of employees' independence in performing tasks; factors of hardware and software conditions of the work environment; training and knowledge management in the organization factors; employees' empowerment factors; factors of organizational culture, values, and behavior; religion-oriented factors, organizational justice, and perfectionism factors, and content and indigenous factors of the development model |
| Jalali *et al.* (2017) | Identifying and modeling the factors affecting the empowerment of managers | The research results indicate 7 variables in the form of a structural model as follows: 1. Management effectiveness, 2. Knowledge and skills, 3. Risk acceptance, 4. Access to information, 5. Participation in decision-making, 6. Organizational culture, and 7. Faith. |
| Rad *et al*. (2017) | Identifying the effective factors on human resource empowerment of the headquarters of Ardabil University of Medical Sciences | Analysis of findings demonstrated that all three studied variables (individual factors, group factors, and organizational factors) play a decisive role in explaining the dependent variable (psychological empowerment). |
| Taghvaie and Daneshfard (2015) | The infrastructure model of human resource management tailored to telecommuting in Iranian government organizations | According to the results, all hypotheses were confirmed and a positive and significant relationship was found between culture, technology, and strategy. |
| Aghdasi and Nowrouzzadeh (2013) | Analysis of effective factors on human resource empowerment | The research findings demonstrated that participatory management, clear goals, providing information, access to resources, reward system, group formation, delegation authority, performance appraisal, modeling, supporting, motivating, independence, and organizational structure are respectively the most effective factors on the empowerment of HR of the headquarters of the Ministry of Science, Research and Technology. |
| Ahmadvand and Yavari Bafghi (2008) | HRD model in the Law Enforcement Force of the Islamic Republic of Iran | According to the results, the following factors are respectively important for the development of HR in the Law Enforcement Force of the Iran: Evaluation and leveling of HR, commissioning of training, the continuation of education and training, job rotation, and the individual's opinion |

Continued Table 1. A summary of the literature review

| References | Title | Results |
|---|---|---|
| Mahmood *et al.* (2018) | The relationship between spiritual intelligence and human resource development | The results revealed that IQ affects EQ in HRD and EQ also affects SQ, and in total, three dimensions lead to the development of HR. |
| Nguyen and Hadikusumo (2017) | The effects of HRD on the success of engineering projects | They considered the components of HRD as individual development, education and development, career development, team development, and the development of the organization. |
| Ensour *et al.* (2016) | The impact of factors affecting the strategic position of HRD in Jordanian Universities | Revealed by the results, all the proposed variables (functional, organizational, and personal factors) had a significant contribution in predicting the dependent variable (HRD strategic position). |
| Sparkman (2015) | Factors and conditions of national HRD in Brazil | Political, economic, social, and educational conditions lead to the development of HR. |
| Uchechukwu and Uche (2015) | HRD analysis as a critical factor effective on organizational productivity | The attitudes of senior managers and other employees as components of HRD affect productivity. |
| Kazakovs (2014) | Analysis of factors affecting the choice of solutions for human resource development | Twelve influential factors were identified in this study, including the need for development, efficiency of development solutions, time, development methods, cognitive style, and place of residence, price, travel cost, indirect costs, position development priorities, and skills development priorities. |
| Hunko (2013) | Factors effective in the formation of HR | External factors, including the average wage in the industry and the average wage in the region, and micro-factors, including staff policy, life cycle stage, level of engineering and technology, and characteristics of the production process play a role in human resource development. |
| Burdbar Khan and Nisar Sheikh (2012) | HRD model based on motivation and Islam | Organizations need to place further emphasize the values of ethical and normative goals that may affect the reduction of satisfaction. |
| Kumpikaite and Sakalas (2011) | Evaluation model of HRD systems | The variables of the model were the organization's approach to human resource development, job organization, training, professional development, and their adaptation and evaluation, determining development needs, and rewarding. |
| Bae and Rowle (2004) | Macro and micro approaches to HRD in South Korean industry | The dimensions were as follows: 1. Political practices, 2. Government structure, 3. Education and development system, 4. Industrial/company structure (the type of industry, employment, job/domain design, authority structure, professional structure/change, and management), 5. Financial markets and institutions, 6. Industrial relations (employers' organizations, labor unions). |

teamwork and performance at the individual level. HRD seeks to improve these issues through training and development, organizational development, performance improvement, organizational learning, professional management, leadership, and development, etc. (Swanson *et al*., 2009).

*State-owned Enterprises*

SOE refer to institutions that more than 50% of their shares are owned and held by the government, government agencies, or institutions. SOE are subject to Iranian accounting standards, commercial law, Iran's public accounts law, and the provisions of the law of the five-year plan and the laws of the annual budget in terms of laws and regulations governing them. Pursuant to Article 44 of Iran's public accounts law (Islamic Parliament Research Center, 2005), SOE are required to deposit the government dividends in the treasury account by the end of the legal deadline stated in the mentioned article.

Table 2. The dimensions and factors effective on HRD

| | | |
|---|---|---|
| Strategic Planning | | Mankin, 2001; Gosney and Hughes 2016; Šiugždinienė, 2009; Sablok *et al*., 2017; Kieopairee, 2008, |
| Management Development | | Sablok *et al.,* 2017, |
| Job Planning | | Sablok *et al.,* 2017; Otoo and Mishra, 2018; Galperin and Lituchy 2014 |
| Technology | | Wedchayanon, 2016 ; Kieopairee, 2008 |
| Budget | | Kieopairee, 2008 |
| Management Support | | Wedchayanon, 2016 |
| Organization structure | | Mankin, 2001; Wedchayanon, 2016 |
| Organizational Culture | | Mankin, 2001 ; Galperin and Lituchy 2014; Gosney and Hughes 2016 |
| Human Resource Management | | Mankin, 2001 |
| Government policies | | Bondarouk *et al.,* 2010; Hatcher, 2009; Mankin, 2001. |
| Knowledge Management | | Hajilou *et a*l. 2018 |
| Performance evaluation | | Otoo and Mishra, 2018 |
| Information Technology | | Banton, 2019; Wang, 2018 |
| Leadership | | Nguyen and Hadikusumo, 2017 |
| Human Resource Development | Individual Development | Nguyen and Hadikusumo, 2017 |
| | Organizational Development | Sablok *et al*., 2017; Hughes, 2019 ; Nguyen and Hadikusumo, 2017 ; Otoo and Mishra, 2018; Galperin and Lituchy, 2014 ; Mankin, 2001 |
| | Team Development | Sablok *et al.,* 2017;Hughes, 2019; )Nguyen and Hadikusumo, 2017;Otoo and Mishra, 2018; Galperin and Lituchy 2014; Gosney and Hughes 2016; Mankin, 2001 Nguyen and Hadikusumo, 2017 ;Mankin, 2001 |

*Literature review*

The dimensions of HRD were identified due to the theoretical literature and given in Table 2, which form the basic conceptual model of the research.

According to Table 2, the conceptual and basic model of HRD is as illustrated in Fig. 1

## MATERIALS AND METHODS

This study is considered an applied research from the perspective of goal since it evaluates the development of applied knowledge in the area of HRD in SOE. The research data consists of qualitative and quantitative data. Give that a questionnaire was provided to the experts besides interviewing with them, this research can be seen as a quantitative-qualitative concerning the data type. Since the study was focused on designing a HRD model for SOE, thus, it can be considered an exploratory research of content analysis type. The study population consisted of experts, including managers and employees with at least 10 years of experience, with higher related education and experience as a human resource manager in SOE. Since the present study was conducted quantitatively and qualitatively, therefore, the statistical sample was selected in two parts. In the qualitative part of the research, the research statistical sample consisted of experts in the area of HR and managers and experts in the field of HR planning and management of SOE in the city of Mashhad. The purposive sampling by the snowball method was used in this research due to the type of employed method. The proper number of samples for the grounded data method is between 10 and 25 subjects based on the suggestion by Strauss and Corbin. The increase in this number depends on the theoretical saturation phase. In this study, 15 experts were used for semi-structured interviews who were accountable. The characteristics of these experts were as follows: Higher and related education fields, work experience of at least 10 years or more, history of human resource management in industry, knowledge and full mastery of the subject, sufficient motivation, cooperation with the researcher, and availability. The content analysis approach was utilized to analyze the qualitative method. There are seven steps in qualitative content analysis approaches as follows (Bagh Mirani *et al.,* 2017):

1. Designing the questions that should be answered;
2. Selecting the desired sample (theoretical background) that should be analyzed;
3. Specifying the content analysis approach;
4. Designing the coding process (deductive and inductive);
5. Implementing the coding process;
6. Determining the validity and reliability;
7. Analyzing the results obtaining from the coding process.

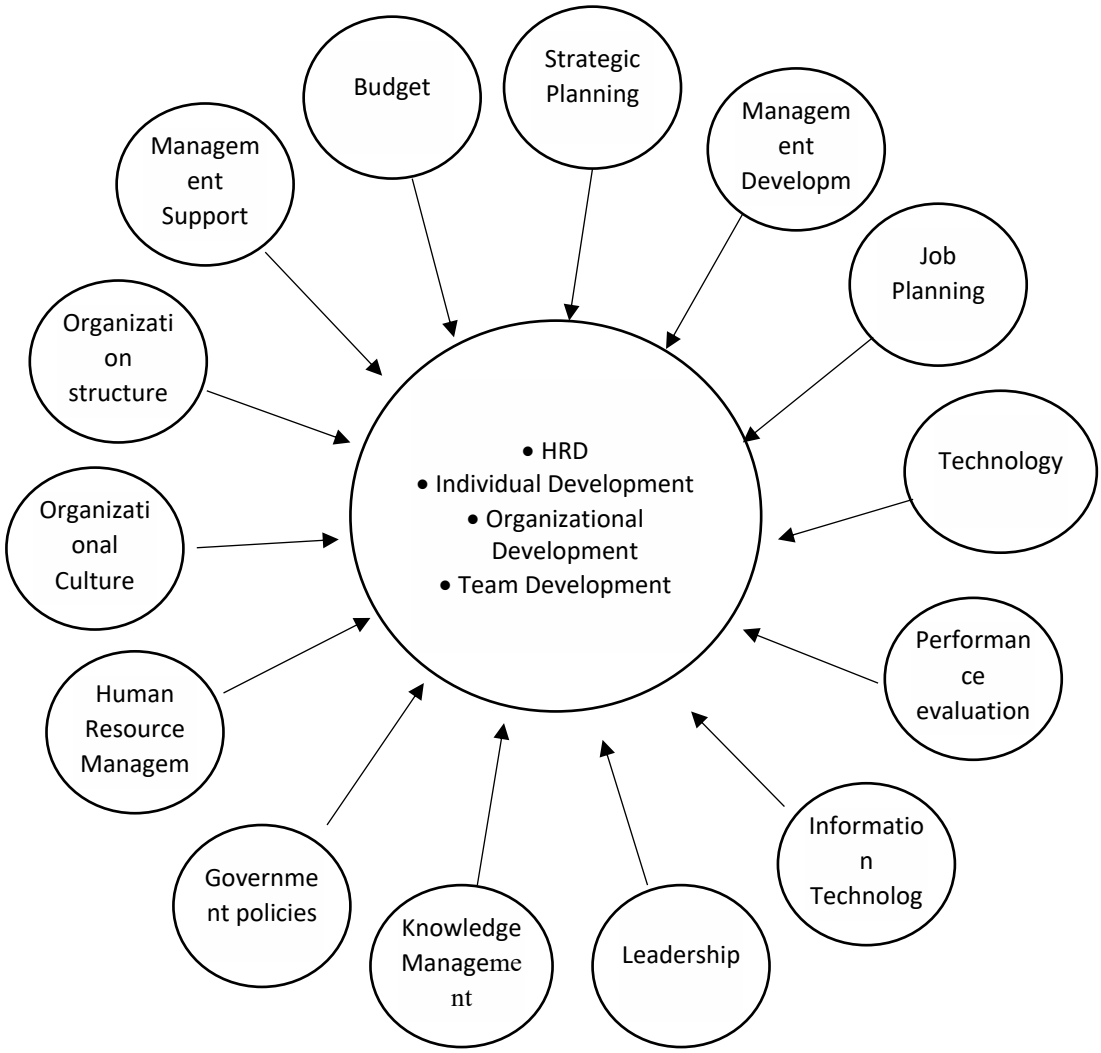


Fig. 1. The conceptual and basic model of HRD

In the quantitative part, the verbal propositions were screened with experts' opinions and fuzzy Delphi method, so, the initial conceptual model was designed. Then, interpretive-structural modeling method has been used to determine the relationships between the identified components and their leveling. Also, analytic network process (ANP) has been used to determine the weight and importance of the dimensions and criteria of human resource development. Finally, the MICMAC technique was used to detect and analyze the conductivity and dependence of the components.

## RESULTS AND DISSCUSION

*Identifying categories by content analysis method*

In this section, each interview was analyzed after completion. Accordingly, the concepts and categories identified and determined during open and axial coding were considered in subsequent interviews. Also, the data of each interview were analyzed based on the three stages of open coding, axial coding, and the main category. The data were separated from each other in the first stage and open codes were extracted from them. Then, similarities and differences in the data were examined, and accordingly, the gaps in

areas that need more questions were specified. In the axial coding stage, the codes separated in the previous stage were connected in a new combination based on their relationships with other codes to form the concepts. The main category was considered in the third stage, in which, the codes of the axial coding stage of the concepts, which had been separated in the previous stage, were connected together in a new combination under the main category based on their relationships with other concepts. Then, the analysis was completed with the new data, followed by the appearance of the initial theoretical framework. Finally, the theory emerged from the heart of the data. In open coding, the main concepts obtained during the process were referred to. These concepts were broken down into small pieces in axial coding and described and explained as much as possible. In selective coding, these concepts were presented at a more general and more abstract level to demonstrate the basic principles of the work. Finally, a model was provided, which is indeed a theorem to describe the development of HR in SOE. This theorem narrates how the HRD system is designed, its components and relationships with other subsystems and internal and external systems. Accordingly, the categories extracted from the research concepts are listed in Table 3.

The research variables are illustrated in Fig. 2 according to the categories extracted from the research concepts.

*Determining the hierarchy by Interpretive Structural Modeling (ISM)*

The problem-solving was made in the present study with the ISM method (Lin *et al.*, 2019) as follows:

Step 1: Determining the variables used in the model

Step 2: Obtaining the Structural Self-Interaction Matrix (SSIM)

Then, the opinions of 22 experts who were fully aware of the research topic were used and the results of their comments were summarized in the Table 4.

Step 3: Obtaining the access control matrix

The access matrix was obtained by determining the relations as zeros and ones from the matrix obtained in the previous stage through 2 steps:

In the first step, initially is considered a single numerical scale and compare the numbers of the previous step table with it. If the corresponding number in the table is larger than the scale, is used the number one in the new table, and otherwise, used zero, as stated in Eq. 1

$$M = \begin{cases} a_{ij} = 1 & if \quad a_{ij} \geq m \\ a_{ij} = 0 & if \quad a_{ij} < m \end{cases} \tag{1}$$

Therefore, the component access matrix will be obtained by summing with the unit matrix as shown in Table 5.

In the second step, the matrix obtained in the first step is added to the unit matrix, as stated in Eq. 2

$$RM = M + I \tag{2}$$

Step 4: Adjusting the access matrix

Once the initial access matrix was obtained, its internal consistency needs to be established. Various methods have been proposed to make the

Table 3. The categories extracted from the research concepts

| Main category | Concepts | Main category | Concepts |
|---|---|---|---|
| | Strategic planning | | HRD |
| | Budgeting | | Career rotation |
| Organizational factors | Organizational structure | Occupational | Job enrichment |
| | Information Technology | factors | Career path |
| | Communications | | Career progression path management |
| | Education | | Management and leadership |
| Empowerment | Knowledge management | Behavioral factors | Motivation |
| | Talent management | | Organizational culture |
| | Performance appraisal | | Creativity and innovation |
| | Individual development | | |
| HRD | Organizational development | | |
| | Team development | | |

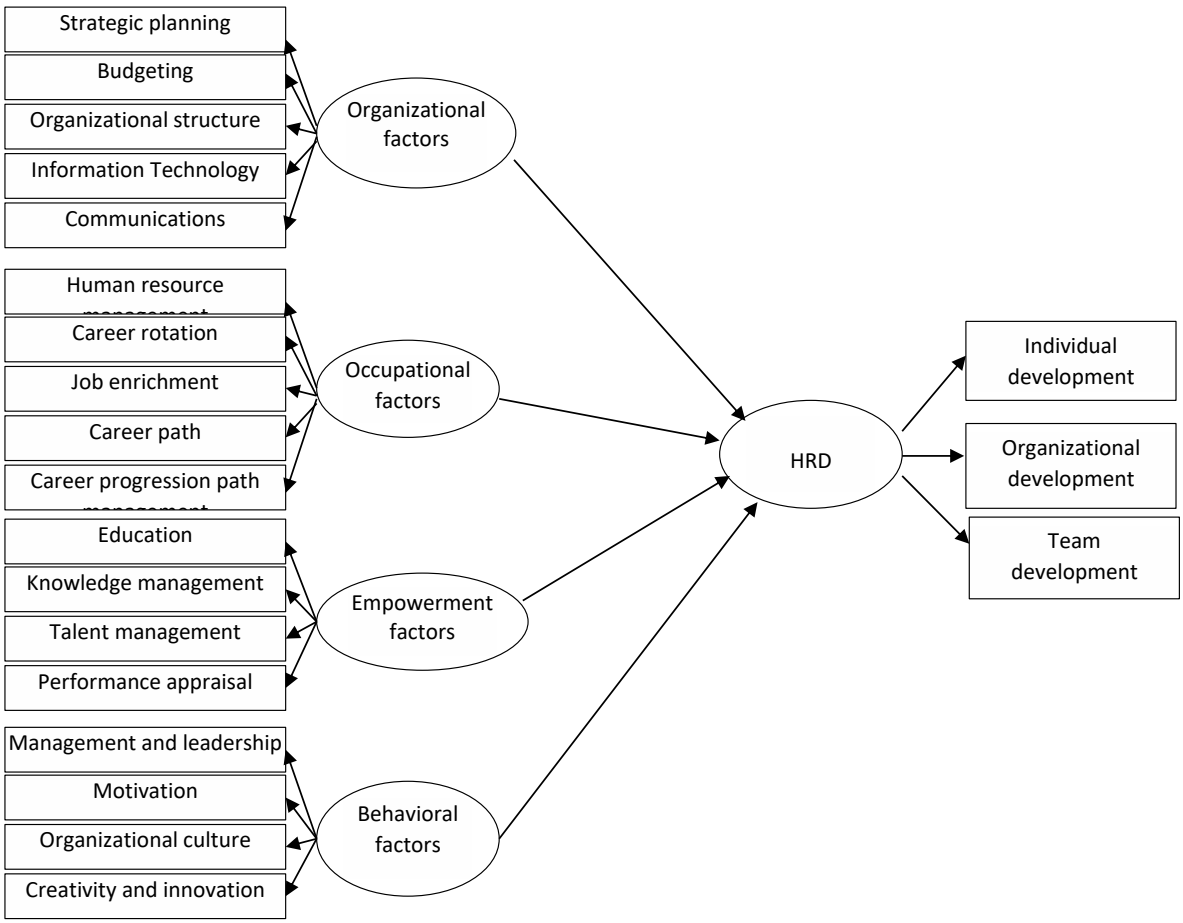


Fig. 2. The variables of the HRD model in SOE

Table 4. The SSIM matrix

| Factors | | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|---|
| Organizational factors | 1 | 0 | 69 | 74 | 85 | 72 |
| Occupational factors | 2 | 45 | 0 | 73 | 69 | 86 |
| Empowerment factors | 3 | 57 | 55 | 0 | 60 | 81 |
| Behavioral factors | 4 | 61 | 82 | 86 | 0 | 79 |
| Human resource development | 5 | 63 | 59 | 49 | 56 | 0 |

Table 5. Access matrix

| Factors | | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|---|
| Organizational factors | 1 | 1 | 1 | 1 | 1 | 1 |
| Occupational factors | 2 | 0 | 1 | 1 | 1 | 1 |
| Empowerment factors | 3 | 0 | 0 | 1 | 0 | 1 |
| Behavioral factors | 4 | 0 | 1 | 1 | 1 | 1 |
| Human resource development | 5 | 0 | 0 | 0 | 0 | 1 |

Table 6. The access matrix after adjustment

| Factors | | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|---|
| Organizational factors | 1 | 1 | 1 | 1 | 1 | 1 |
| Occupational factors | 2 | 0 | 1 | 1 | 1 | 1 |
| Empowerment factors | 3 | 0 | 0 | 1 | 0 | 1 |
| Behavioral factors | 4 | 0 | 1 | 1 | 1 | 1 |
| Human resource development | 5 | 0 | 0 | 0 | 0 | 1 |

Table 7. Determining the levels of HRD components for SOE

| Components | | D (Direction) | R (Dependence) | D-R | Level | Result |
|---|---|---|---|---|---|---|
| Human resource development | 5 | 1 | 5 | -4 | 1 | Dependent |
| Empowerment factors | 3 | 2 | 4 | -2 | 2 | Dependent |
| Occupational factors | 2 | 4 | 3 | 1 | 3 | Connected |
| Behavioral factors | 4 | 4 | 3 | 1 | 3 | Connected |
| Organizational factors | 1 | 5 | 1 | 4 | 4 | Independent |

matrix consistent; however, Boolean rule is used in this study. According to this rule, 1 * 1 = 1. The calculations made and the consistency matrix formed for the components are shown in Table 6. According to the result, the access matrix was consistent.

Step 5: Determining the level and priority of variables

This process is done using the access matrix. After determining the access and prerequisite sets for each variable, common elements in the access and prerequisite sets are identified for each variable. In this study, the sum of rows and columns of the compatibility matrix based on the theory of Karimi *et al.* (2017) are used to determine the level instead of doing the achievable set calculations, the predecessor set, and common elements. The calculations are given in Table 7. Thus, the factors are classified into 5 levels based on the results of Table 7.

Step 6: Drawing the model

After determining the relationships and the levels of the components, they can be drawn as a model. To do so, initially, the components were adjusted in descending order according to their levels. In this research, the factors were on 4 levels. Fig. 3 shows the design of the interpretive-structural model for the partitioning of HRD components for SOE.

The component of "organizational factors" is at the highest level of the model (fourth level). These factors act as the foundation stone of the model, which affects the development of HR. The improvement of HRD begins from this component and is directed to other components. The component of "organizational factors" also affects other components of its level. There are two "occupational" and "behavioral" components at the second level. These two components influence their next level besides their internal relationship between themselves. The "human resource empowerment" component is at the second level, which affects the first level component of "human resource development". Therefore, the component of "human resource development" is at the first level, which is the result of other components of human resource development.

*Directing-Dependency Analysis (MICMAC)*

The MICMAC analysis aims to identify and analyze the power of directing and dependence of the components. The components are divided into four categories in this analysis based on their directing power and dependence rate. The information on directing power and dependency is provided in Table 7. The directing power and dependency of HRD components for SOE companies are illustrated in Fig. 4

1. The first category includes self-governing components, which have poor directing power and dependence. These variables are relatively unconnected to the system and have low or weak relations with the system. There are no variables

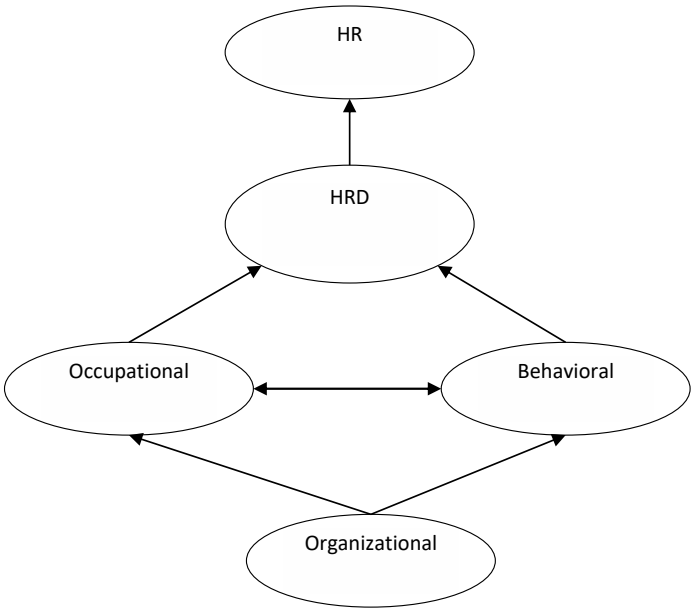


Fig. 3. The interpretive-structural model of HRD components model for SOE

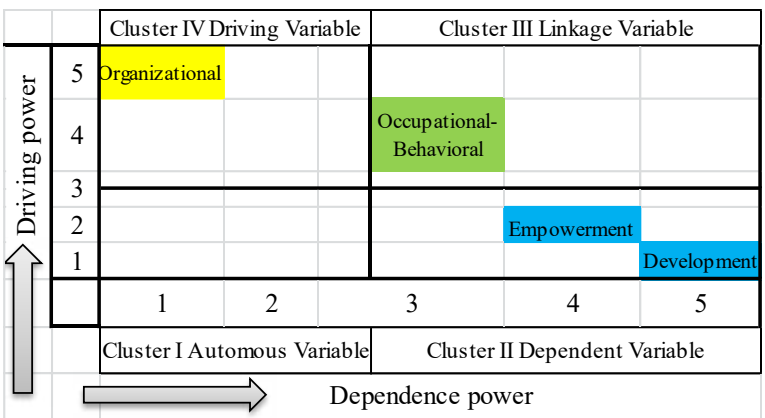


Fig. 4. The analysis of directing– dependence power of HRD components for SOE

in this area, which indicates the correlation and relationship between factors.

2. The dependent components are the second category with low directing power but strong dependence. Two components of "human resource empowerment" and "human resource development" fall in this category. This variable mainly leads to success in HRD that many variables are involved in creating it, while they hardly can provide the context for other components by themselves.

3. The third category includes connected components with high directing power and high dependence. These components are non-static since any changes in them can affect the system. Finally, the system feedback can change these components again. The "occupational" and "behavioral" components fall into this category in this research.

4. The fourth category includes independent components with strong directing power but weak dependence. These components act as the cornerstone of the model and they should be emphasized in the first place to initiate the system

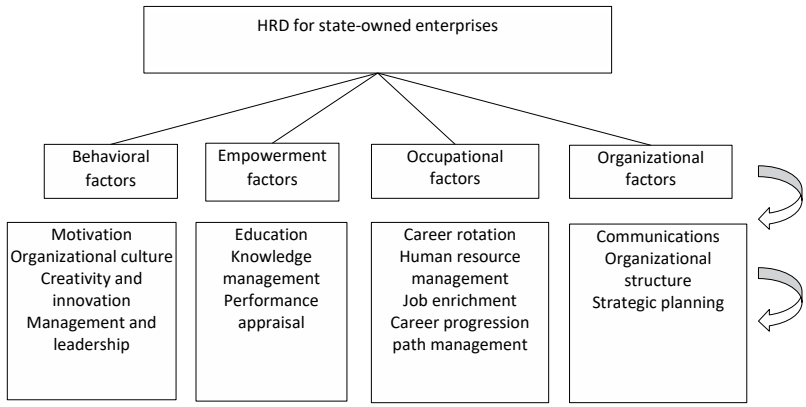


Fig. 5. A model with the research network structure for HRD for SOE

Table 8. The weight and importance of the dimensions and criteria of HRD for SOE

| Weight and rank of dimensions | | Criteria | Code | Weight and relative rank of criteria | Weight and final rank of criteria | |
|---|---|---|---|---|---|---|
| Organizational factors $C_1$ | 0.119 (4) | Communications | $C_{11}$ | 0.3471 | 0.0412 | 11 |
| | | Organizational structure | $C_{12}$ | 0.3255 | 0.0386 | 14 |
| | | Strategic Planning | $C_{13}$ | 0.3274 | 0.0389 | 13 |
| Occupational factors $C_2$ | 0.194 (3) | Career rotation | $C_{21}$ | 0.4451 | 0.0528 | 8 |
| | | HRM | $C_{22}$ | 0.3358 | 0.0399 | 12 |
| | | Job enrichment | $C_{23}$ | 0.2579 | 0.0501 | 10 |
| | | Career progression path management | $C_{24}$ | 0.2646 | 0.0514 | 9 |
| Empowerment factors $C_3$ | 0.361 (1) | Education | $C_{31}$ | 0.6029 | 0.1171 | 2 |
| | | Knowledge management | $C_{32}$ | 0.6808 | 0.1322 | 1 |
| | | Performance appraisal | $C_{33}$ | 0.5772 | 0.1121 | 3 |
| Behavioral factors $C_5$ | 0.326 (2) | Motivation | $C_{51}$ | 0.2034 | 0.0735 | 6 |
| | | Organizational culture | $C_{52}$ | 0.285 | 0.103 | 4 |
| | | Creativity and innovation | $C_{53}$ | 0.2116 | 0.0765 | 5 |
| | | Management and leadership | $C_{54}$ | 0.2017 | 0.0729 | 7 |

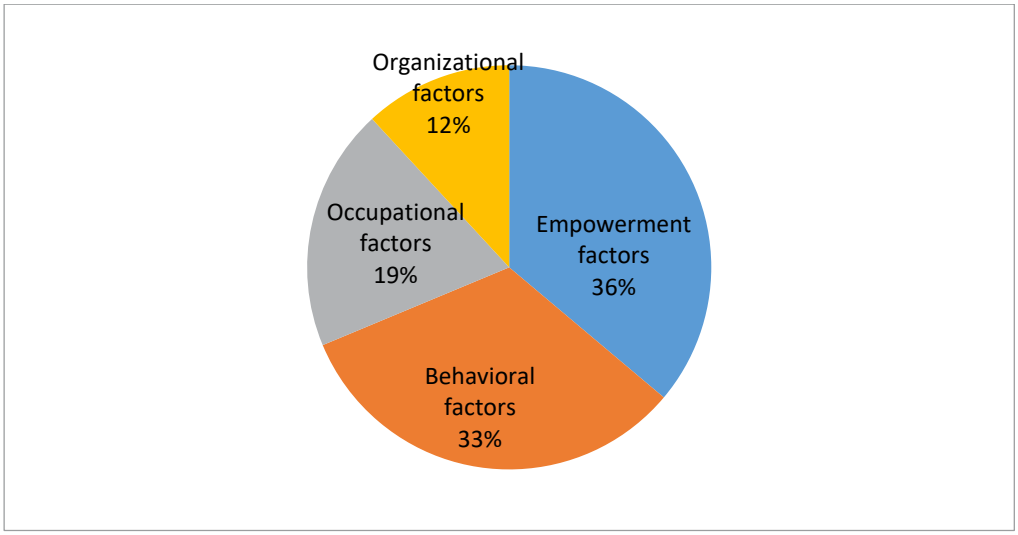


Fig. 6. The relative priority diagram of HRD dimensions for SOE

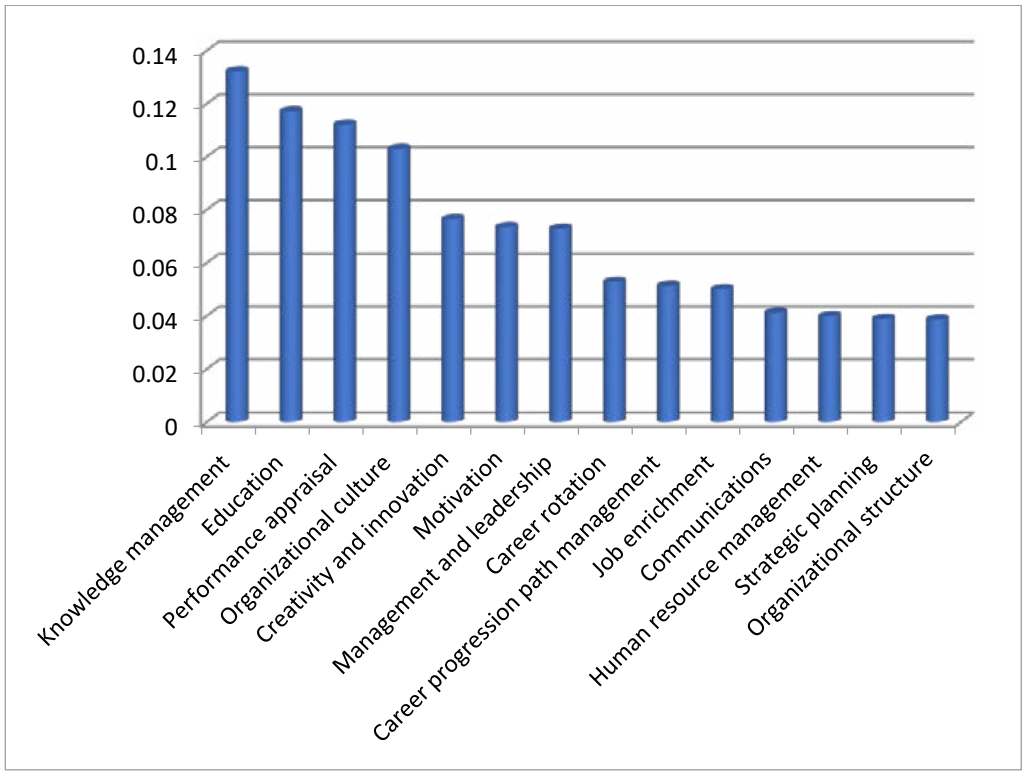


Fig. 7. The final priority chart of HRD criteria for SOE

function. The component of "organizational factors" is in this category in the present study.

*The results from the Analytic Network Process (ANP)*

In this research, based on the general relationship matrix, fuzzy ANP is solved. In this section, first, the general relationship matrix is normalized and the fuzzy unbalanced super matrix is obtained. The balanced (symmetric) super matrix was then resulted from multiplying the general relations of dimensions by the criteria. A balanced super matrix is a super matrix used for the final weight, which is obtained by normalizing the unbalanced super matrix where its sum appears as a row of number 1. The graph with the network structure of the research is shown in Fig. 5

Finally, the weight of the dimensions and criteria were determined and achieved by obtaining the bounded super matrix, which is shown in Table 8.

As shown in Table 8, the highest weight is related to the "empowerment factors" of the workforce with the weight of 0.361. "Knowledge management" has gained the first priority among the criteria. The criteria of "education", "performance appraisal", "organizational culture", "creativity and innovation", and finally "motivation" gained the second, third, fourth, fifth, and sixth priorities, respectively, among the 14 criteria, accounting for almost 61% of the total weight of the criteria. This reflects the great importance of these criteria.

Fig. 6 shows the priority diagram of dimensions and Fig. 7 shows the final priority diagram of the criteria by the F.ANP method

## CONCLOUSION

Management and HRD, which are seen as the largest asset of an organization, can help maximize the efficiency of the organization and lead the organization toward success in the community. The core of any organization's success relies on organizational assets or HR. HR bear an important responsibility for the success or failure of the organization. HRD is a set of activities that support behavior change and learning opportunities for employees. The significance of HRD has been widely accepted in the world today. Emphasis on the importance of HRD is indirectly related to the profitability of organizations. Organizations should benefit from core competencies to achieve a sustainable competitive advantage based on their strategy. This study was performed to design and present a HRD model for SOE organizations aimed at training thoughtful and highly skilled manpower to compete and gain competitive advantages. The research findings were obtained in two parts: Qualitative and quantitative. In the qualitative section, the dimensions, components, and indicators of the research were identified and categorized through interviews with experts. The research components were then screened by obtaining the opinions of 22 experts by the Fuzzy-Delphi method. In this regard, the experts commented on the removal, merging, addition, or aggregation of components. Finally, after analyzing the data by the fuzzy Delphi method, they ultimately reached a consensus on a HRD model for SOE organizations with 5 dimensions, including 17 components and 65 indicators. The dimensions included organizational factors, occupational factors, empowerment factors, behavioral factors, and human resource development. Therefore, the following suggestions are presented according to the above results and analyses:

- Managers can use the relationships and hierarchical levels specified in the ISM and SEM models to plan necessary actions aimed at improving human resource development. Accordingly, the variable "human resource empowerment' leads to success in human resource development, which needs to be improved immediately to bring success to the organization and improve its performance. To improve this factor, managers need to pay attention to the high levels of the model and improve the relationship determined between the factors. In general, managers can improve HRD according to the criteria of the factors identified. Some suggestions are given in the following to do so.

- The "knowledge management' component is the most important one in the HRD model according to the results of the importance of the components affecting human resource development. Therefore, the first suggestion and the first step of managers should be focused on improving this factor and they need to make continuous efforts in this area. For, paying attention to knowledge management has the greatest impact on the success of human resource development, and thus, it needs special attention. The following measures are recommended to improve this component:

1. The knowledge management system should be established based on the culture and structure of

companies.

2. Education and knowledge should be promoted through culture-making. For example, knowledge sharing can be supported and encouraged.

3. Information-sharing in the system should be highly focused on through special planning. For example, the knowledge employees should be supported. Also, synergistic social networks, committees, and professional associations of employees need to be established in companies to interact and share knowledge and experiences.

4. The knowledge should be developed in companies. For example, research and development units and areas of knowledge and research need to be created in companies. Also, the risk-taking capacity of the organization should be increased in carrying out innovative projects resulting from knowledge, creativity and innovation, new ideas and solutions.

The "education" component is at the second level of importance. Thus, it is suggested:

1. Educational need assessment should be done carefully and with planning. Environmental changes and the needs of the organization in the future should be considered in educational need assessment.

2. The training of staff should be planned. The hours required for training, training areas, place of training, how to convey training through physical or electronic presence should be considered in planning the training.

3. The training should be practical and specialized. The need of each person for the required expertise should be identified to hold the training tailored to their needs.

4. The training should be done continuously.

5. The coaching in the system should be focused on by trying to institutionalize such type of training since people acquire better skills along with experts.

The "performance appraisal" component is at the third level of importance in human resource development. Thus, it is suggested:

1. The performance appraisal system needs to be designed and implemented based on an appropriate method.

2. The behaviors and practices should be evaluated based on appropriate criteria. To this end, an appropriate performance appraisal system should be first designed to define and identify appropriate criteria.

3. The performance should be continuously monitored and evaluated with appropriate indicators.

4. The performance feedback should be assessed in the system to identify and plan for each person's strengths and weaknesses.

The "organizational culture" component gained a fourth level of importance. The following are recommended to improve this component:

1. The culture of value-orientation should be created in companies so that the individuals come to the understanding that companies value them and consider them as a means to achieve goals, and thus, their development.

2. The participatory culture should be considered by participating individuals in decision-making as well as presenting new ideas and solving problems.

3. Work culture should be created. The work and the people who do the work should matter. A culture should be made that success in doing things better will lead to the success of people in meeting economic and social needs.

*Limitations*

There are limitations to any research, because science basically has a partial approach. The present study, since its audience is human, has been associated with the collection of information and the use of available resources or its own barriers and limitations. In addition, the results of the present study can be generalized to SOEs, and if necessary, generalization to other organizations of such nature should be done with caution and sufficient knowledge. Also, this research has been done cross-sectionally. Because of this, it makes it difficult to draw conclusions about causality.

## AUTHOR CONTRIBUTIONS

A. Zamanimoghadam performed the literature review, experimental design, analyzed and interpreted the data, prepared the manuscript text, and manuscript edition. A. Heravi, A. Hashemi, Y. Vakil Alroaia and S.A. Sajadi performed data collection and correction, writing original draft preparation, writing reviewing and editing references and manuscript preparation.

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## CONFLICT OF INTEREST

The authors declare no potential conflict of interest regarding the publication of this work. In addition, the ethical issues including plagiarism, informed consent, misconduct, data fabrication and, or falsification, double publication and, or submission, and redundancy have been completely witnessed by the authors.

## ABBREVIATIONS

| | |
|---|---|
| $\propto$ | Level of significance |
| *ANP* | Analytical network process |
| *CD* | Career development |
| *HR* | Human resources |
| *HRD* | Human resource development |
| *HRM* | Human resource management |
| *ISM* | Interpretive structural modeling |
| *OD* | Organizational development |
| *SAC* | Supreme audit court |
| *SOE* | State-owned enterprises |
| SSIM | Structural Self-Interaction Matrix |

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