

Original Article

Designing a smart human resources architecture model for medical sciences universities

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Abstract

Background: This study was conducted with the aim of designing the architectural model of human resources of universities of medical sciences in southeastern provinces of Iran with the intelligent approach.

Methods: This study was of a mixed method. The statistical population in the qualitative part was 20 experts of medical sciences managers in the southeastern provinces of Iran, namely Sistan and Baluchistan, Kerman, Hormozgan and South Khorasan. Also, 264 people were selected using G*Power for quantitative part. Sampling of this part was random cluster sampling. The data collection tool was a researcher-made questionnaire containing 77 items that included six dimensions of intelligent human resources architecture and six dimensions of intelligentization. The software used was Smart-PLS and SPSS-16.

Results: The proposed model identified six main dimensions of human resource intelligentization, including intelligent systems and management (0.960), intelligent learning (0.955), intelligent architecture strategy (0.953), core technology (0.945), and knowledge management (0.451). The key components within these dimensions included intelligent performance evaluation, job task specialization, fostering creativity, and organizational efficiency. The model's validity was confirmed in terms of reliability (Cronbach's alpha and CR above 0.7), convergent validity (AVE above 0.5), and appropriate R² and t-values. The findings indicated that the model's dimensions and components align with the needs of medical universities.

Conclusion: University managers should try to draw and compile the horizon of intelligent organizational architecture and in line with the implementation policies of intelligentization and plan to acquire new technologies in the field of artificial intelligence and use it.

Keywords: Intelligence; Organization and Administration; Universities; Workforce.

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Introduction

Like any other scientific subject, human resource management faces new approaches resulting from the business environment requirements. Organizational architecture is a

comprehensive plan that acts as a coordinating force between different dimensions of the organization (1). Technological advances and innovations for humans increasingly bring complex

outcomes. The role of machines is changing from beneficial tools for production or use to playing a vital role in various areas of human organizational and economic life (2). Human resource architecture includes a set of tasks and human resource management systems that create certain behaviors in employees given the differences in their characteristics (3). These digital technologies cause fundamental changes in the work environment of human resource managers. Scientists have focused more on the impacts of certain technologies on organizations and their managers (4). Rapid technological changes, especially in the digital age, and lack of coordination with the level of knowledge and competence may cause a large gap between the actual competitive levels required by human beings. Artificial intelligence is mostly utilized in recruitment, training, employee engagement, and employee retention. It helps to reduce costs, save time, and complete human resource tasks more accurately (5-7). Based on the studies by Rastgar et al., 96% of the surveyed human resource experts believe that artificial intelligence technology can improve talent acquisition (8).

Numerous studies have underscored the benefits of smart HR systems in enhancing operational efficiency and employee engagement. For instance, AI-powered tools can streamline recruitment, automate routine administrative tasks, and support talent management. While these studies offer valuable insights, they are primarily focused on corporate settings, leaving a gap in understanding how these technologies can be tailored to academic institutions, especially in the healthcare education sector. Previous studies have indicated how artificial intelligence affects specific human resource tasks in the organization. Intelligent sensing mechanisms have been useful in evaluating employee productivity and identifying knowledge hiding (9, 10). The

focus of existing studies on the role of artificial intelligence in human resource management has been on its application at the functional level. This study presents a human resources architecture model with the intelligentization approach in the universities of the southeastern provinces of Iran. Human resource architecture is a new field in human resource management literature. The concept of intelligentization, which involves using digital tools to enhance decision-making and optimize HR processes, has gained traction in the corporate world. Research highlights its potential in areas such as performance evaluation, creative problem-solving, and talent development. However, there is limited research on how intelligentization can address the specific needs of medical universities, such as adapting to rapid changes in medical education and technology. It aims to highlight the role of hiring key employees in realizing the organization's missions and strategies. Given the impact of the intelligentization of the organization on the job description of the employees of medical sciences universities in the southeast of Iran and the need for new knowledge-oriented and expertise-oriented employees in these organizations, the researcher of this study aimed to develop a model for the human resource architecture using intelligentization approach in the universities of medical sciences in the southeastern provinces of Iran to identify the architectural model of human resources with the intelligentization approach in the universities in the southeastern provinces of Iran. This study addresses the identified gap by designing a comprehensive smart HR architecture model tailored to the needs of medical sciences universities. By integrating advanced technologies with strategic HR practices, the proposed model aims to enhance efficiency, foster innovation, and align human resource capabilities with institutional goals.

Methods

Research setting and population

The present study was a mixed (qualitative-quantitative) research. It presented a model qualitatively using a content analysis method.

Data collection method

The first (qualitative) stage: In the first stage, this study was interpretive regarding paradigm, inductive regarding its approach, and qualitative regarding its method. It is also single cross-sectional regarding time horizon. It also uses library sources and interviews to collect data. The number of Delphi working groups in this study was 20 people with sufficient knowledge and expertise on the subject of the study. They were selected using purposeful and snowball sampling .

Participants: A panel of 20 experts in HR management, medical education, and smart systems, selected using purposive sampling based on their expertise and experience.

Process:

- **Round 1:** Open-ended questions to identify relevant dimensions and components.
- **Round 2 and 3:** Iterative rounds of feedback to reach consensus on the importance and relevance of the identified dimensions.

Tools: Semi-structured questionnaires distributed electronically.

By reviewing and analyzing the theoretical foundations, the dimensions and components of the human resources architecture model with the intelligentization approach were investigated and identified in the universities of medical sciences in the southeastern provinces of Iran. The dimensions and components were sent to 20 experts. The proposed dimensions included 14 dimensions and 102

components, which were reduced to 12 dimensions and 94 components in the initial surveys of experts. Then, the Delphi panel was formed using two purposeful and snowball sampling methods. After three Delphi rounds, the desired dimensions and components were identified Figure 1.

The second (quantitative analysis) stage: In this stage, the research method was a descriptive survey, correlational type. The statistical population in the qualitative section included 20 experts in related fields. The statistical population in the quantitative section included all managers and employees in the universities of medical sciences in the southeastern provinces of Iran including Sistan and Baluchistan, Kerman, Hormozgan, and South Khorasan. Their total number was 840 people. Among them, 264 people were selected as a statistical sample. The researcher-made questionnaire was used to collect data. It included 12 key dimensions and 77 components of the two variables of human resource architecture and intelligentization. It was scored on a five-point Likert scale.

Statistical analysis

Confirmatory factor analysis, structural equation model, Smart PLS-3, and SPSS-22 software were used to confirm the measurement model and structural model validity. The analysis was done using t-statistics, factor loading, path coefficient, and coefficient of determination. In the general model of the study, as shown in Figure 1, the measurement model and path model were calculated. The t-statistic was calculated using the bootstrapping method to measure the significance of the relationships. The model was tested quantitatively with the confirmatory factor analysis method in Smart PLS software.

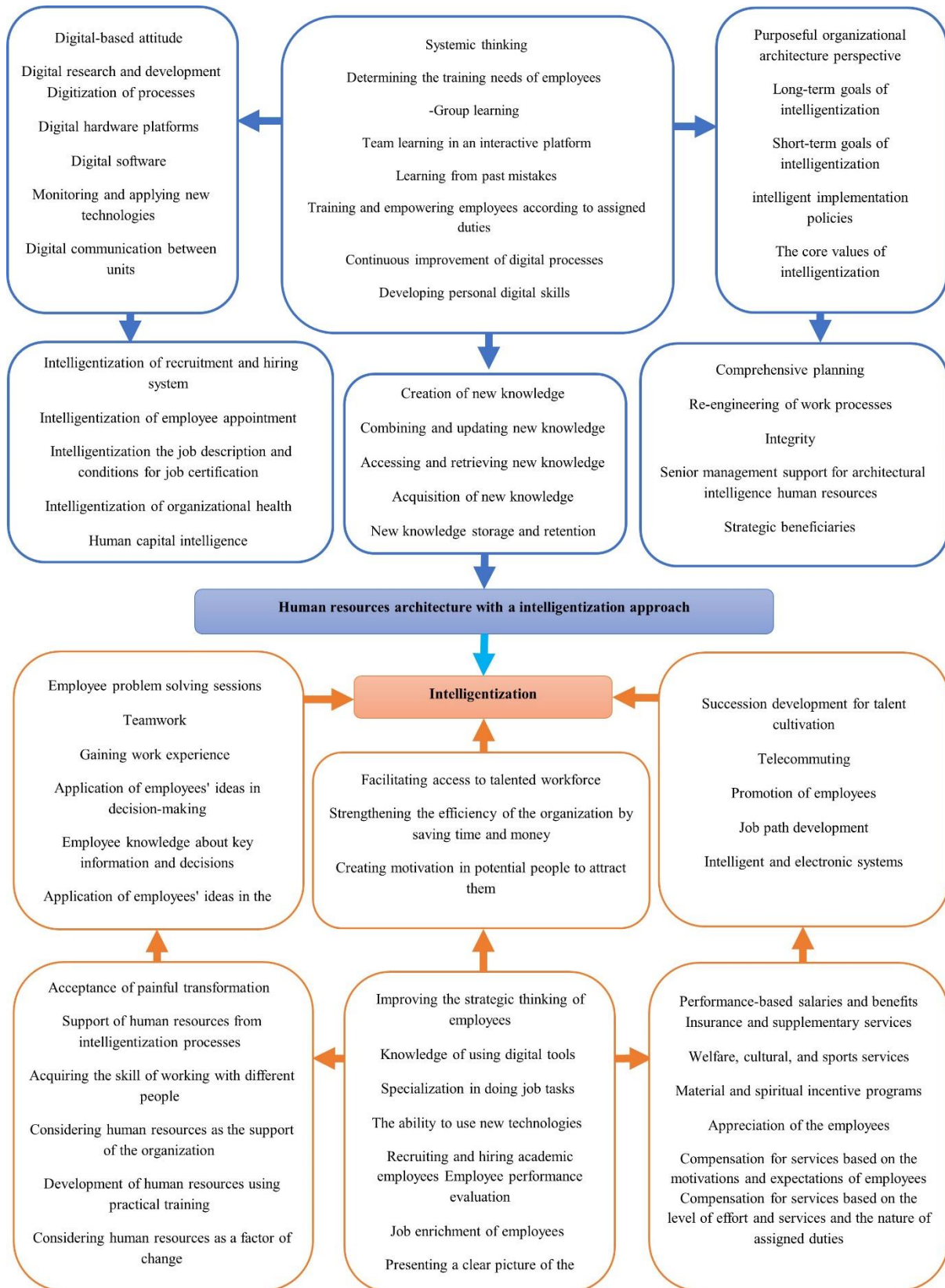


Figure 1. Research conceptual model

Results

Investigating the demographic information of Delphi panel members showed that 85% of the experts were male, 90% had doctorate degrees, 70% were university professors, and 55% had an employment history of 15 years and more. In addition, 60% were in the age group of below 40 years. In the quantitative stage, 67% of the respondents were male and 14.8% of them had a doctorate. Additionally, 23.5% had an employment history of 15 years and above and 66.3% were in the age group of above 35 years Table 1.

The measurement model fit: To examine the measurement model fit, the data from the questionnaires were entered into the Smart PLS software.

Reliability: The reliability of the criteria is confirmed when its Cronbach's alpha is higher than 0.7. As seen in Table 2, Cronbach's alpha is higher than the

recommended value for all 12 criteria, so the reliability of the criteria is confirmed.

Composite reliability: Composite reliability of each criterion is confirmed when its value is higher than 0.7. As seen in Table 2, its value is higher than the recommended value for all 12 criteria, so the composite reliability of the measurement model is confirmed.

Convergent reliability (AVE): The convergent reliability of each criterion is confirmed when its value is higher than 0.5. As seen in Table 3, the AVE value for all 12 criteria is higher than the recommended value, so the convergent validity of the measurement model is confirmed.

Composite reliability (CR): Composite reliability is confirmed when its value is higher than AVE. As seen in Table 3, the composite reliability of the measurement model is also confirmed.

Table 1. Demographic characteristics of qualitative study experts

Characteristics	Respondents	Frequency	Percentage of frequency
Gender	Female	3	15
	Male	17	85
Education	Master	2	10
	Doctorate	18	90
Job rank	University lecturer	14	70
	Senior manager	6	30
Employment history	10-15 years	9	45
	15 years and older	11	55
Age	Below 40 years	12	60
	40 years and older	8	40
Demographic characteristics of participants of the qualitative stage			
Gender	Female	87	33
	Male	177	67
Age	Less than 30 years	36	13.6
	31 to 35 years	53	20.1
	36 to 40 years	99	37.5
	40 years and older	76	28.8
Education	Bachelor	127	48.1
	Master	98	37.1
	Ph.D.	39	14.8
Employment history	Less than 5 years	46	17.4
	6 to 10 years	68	25.8
	11 to 15 years	88	33.3
	Above 16 years	62	23.5
total		264	100

Table 2. Results related to the measurement model fit

Row	Cronbach's alpha	rho_A index	Composite reliability (CR)	Average variance extracted
organizational architecture intelligent strategy	0.884	0.889	0.908	0.553
Human resources intelligent management	0.868	0.927	0.907	0.586
Human resources intelligent system	0.913	0.916	0.930	0.625
Core technology	0.873	0.881	0.905	0.614
Intelligent organizational learning	0.841	0.886	0.880	0.598
Intelligent knowledge management	0.889	0.897	0.913	0.600
Human resource intellectualization	0.939	0.940	0.948	0.672
Intelligent employee engagement	0.894	0.903	0.918	0.617
Creating new human resources roles	0.838	0.844	0.903	0.756
Talent treasury formation	0.836	0.840	0.891	0.671
Advanced functional activities	0.836	0.852	0.891	0.674
Human resource retention activities	0.888	0.890	0.918	0.691

Divergent validity: In examining the divergent validity (Fronell-Larcker criterion), if it is found that the correlation between an index and another structure other than its own structure is higher than the correlation of that index with its own structure, the divergent validity of the model is doubted. For this purpose, a matrix should be formed, which is the original diameter of the root matrix of the AVE coefficients of each structure and the lower values of the original diameter of the correlation coefficients between each criterion and other criteria. As seen, the correlation of each criterion with its related components is higher than the correlation of each criterion with other criteria, so the model's divergent validity is confirmed.

The structural model fit: To examine the structural model fit, two statistics are used. One is the significance coefficient z. It means the t-value should be higher than 1.96. As seen, this value is much higher than the recommended value for all 12 criteria. Also, the R2 value of all twelve criteria is more than 0.5, so the structural model it is also confirmed Table 4.

Presenting the structural model: In the general model of the study shown in Figure 2, the measurement model (the relationship between each of the observed variables and the latent variable) and the path model of the relationship between the latent variables were calculated.

Table 3. Results related to divergent validity

Divergent validity Fronell-Larcker criterion	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
organizational architecture intelligent strategy	0.912											
Human resources intelligent management	0.900	0.929										
Human resources intelligent system	0.744	0.896	0.923									
Core technology	0.879	0.784	0.873	0.905								
Intelligent organizational learning	0.884	0.895	0.903	0.887	0.953							
Intelligent knowledge management	0.264	0.250	0.243	0.286	0.353	0.775						
Human resource intellectualization	0.871	0.913	0.906	0.895	0.820	0.264	0.923					
Intelligent employee engagement	0.891	0.765	0.907	0.891	0.907	0.255	0.912	0.917				
Creating new human resources roles	0.858	0.869	0.851	0.898	0.851	0.222	0.828	0.785	0.908			
Talent treasury formation	0.819	0.871	0.887	0.844	0.706	0.276	0.903	0.898	0.894	0.970		
Advanced functional activities	0.790	0.877	0.891	0.821	0.860	0.312	0.890	0.888	0.808	0.861	0.910	
Human resource retention activities	0.894	0.878	0.901	0.843	0.912	0.223	0.831	0.862	0.850	0.837	0.859	0.926

Table 4. Results of structural model fit

Row	significance coefficient z	R2 values
organizational architecture intelligent strategy	164.01	0.908
Human resources intelligent management	217.28	0.922
Human resources intelligent system	212.57	0.932
Core technology	176.81	0.893
Intelligent organizational learning	204.83	0.913
Intelligent knowledge management	5.97	0.123
Human resource intellectualization	321.26	0.949
intelligent employee engagement	265.39	0.932
Creating new human resources roles	86.26	0.803
Talent treasury formation	111.73	0.900
Advanced functional activities	105.95	0.859
Human resource retention activities	218.87	0.926

To measure the significance of relationships, the t-statistic was calculated by the bootstrapping method, as shown in Figure 2. This model, which is the output of Smart PLS software, presents a summary of the results related to the standard factor load of the relationships of the research variables.

Figure 3 shows the factor load of the dimensions of human resources architecture and intelligence and their components. It shows the impact of each dimension in human resource architecture and intelligence.

The Figure 3 also shows the t-statistic for all six dimensions of human resources architecture and six dimensions of human resources architecture. According to the results of the factor load, the order of all six dimensions of human resources architecture in terms of importance in universities of medical sciences in southeastern provinces of Iran is intelligent human resources system (0.953), intelligent human resources management (0.960), intelligent organizational learning (0.955), intelligent organizational architecture strategy (0.953), core technology (0.945), and intelligent knowledge management (0.451), respectively.

The priority of the components of each dimension of human resources architecture

The results revealed that all the components of the presented model dimensions were in line with the human resource architecture in the universities of medical sciences in the southeastern provinces of Iran. The "short-term goals of the intelligentization" component was ranked first in the dimension of the intelligent strategy of organizational architecture. The intelligentization of the performance evaluation component was ranked first in the dimension of the intelligent human resources management component. The component of job activities based on digital requirements was ranked first in the intelligent human resource system" dimension. The component of encouraging creative thinking was ranked first in the dimension of intelligent organizational learning. The component of the creation of new knowledge was ranked first in the dimension of intelligent management of knowledge Table 5. Based on the results, the order of intelligentization dimensions in terms of importance is the intelligentization of human resources, intelligent participation of employees, activities to human resource retention, formation of talent treasury, advanced functional activities, and the creation of new roles of human resources.

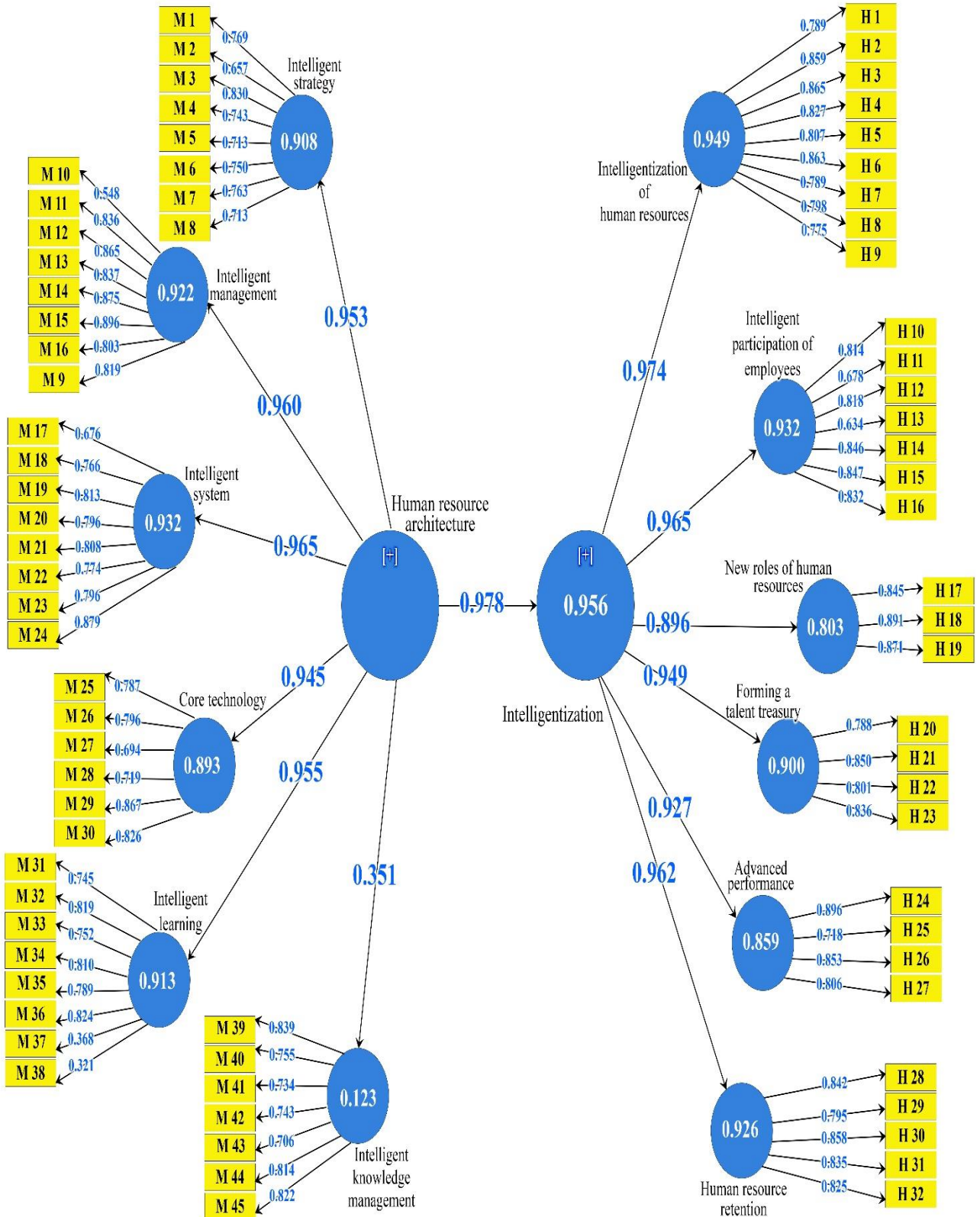


Figure 2. The path coefficient of the primary research model for the dimensions of human resources architecture with the intelligitization approach

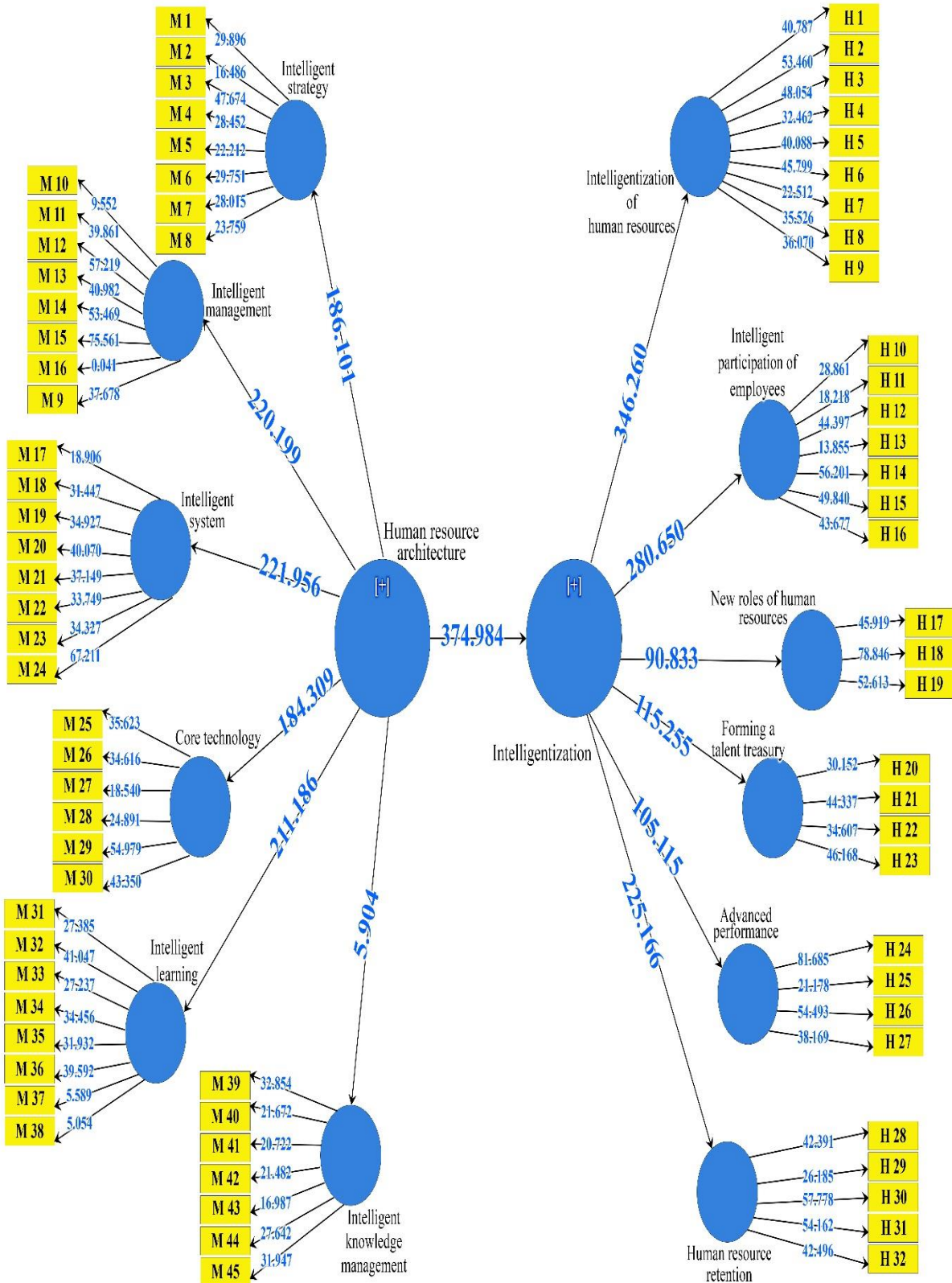


Figure 3. T-statistics of the primary research model for dimensions of human resource architecture and intelligence

Table 5. Factor load and t-statistic for the components of each dimension of the human resources architecture model

Dimensions	Component	Factor load	t-statistic	rank
Intelligent strategy of organizational architecture	Intelligent organizational architecture perspective	0.769	28.74	2
	Long-term goals of intelligence	0.657	16.83	7
	Short-term goals of intelligence	0.830	45.06	1
	intelligent implementation policies	0.743	28.16	5
	The core values of intelligence	0.713	21.74	6
	Intelligentization of rules and regulations	0.750	28.75	4
	Intelligentization of strategy	0.763	24.89	3
Intelligent human resource management	The organization's digital mission	0.713	23.59	6
	Intelligentization of the recruiting and hiring system	0.819	38.64	6
	Intelligentization of the appointment of employees	0.548	10.00	7
	Intelligentization of job description and job qualification conditions	0.836	40.35	5
	Intelligentization of organizational health	0.865	60.93	3
	Intelligentization of human capital	0.837	40.53	4
	New methods of human resource management	0.875	54.68	2
Human resources intelligent system	Intelligentization of performance evaluation	0.896	71.00	1
	Human resource improvement	0.410	4.04	8
	Comprehensive planning	0.676	18.73	7
	Reengineering work processes	0.766	33.21	6
	integrity	0.813	35.30	2
	Senior management support for the intelligentization of human resources architecture	0.796	39.32	4
	Strategic stakeholders	0.808	33.82	3
Core technology	Flexibility	0.774	32.71	5
	Human resource dynamics	0.796	33.48	4
	Job activities based on digital requirements	0.879	62.67	1
	Digital research and development	0.787	31.91	4
	Digitalization of processes	0.796	36.02	3
	Digital hardware platforms	0.694	18.65	6
	Digital software	0.719	24.60	5
Intelligent organizational learning	Monitoring and applying new technologies	0.867	56.81	1
	Digital communication between units	0.826	44.59	2
	Systems thinking	0.745	27.38	6
	Team learning	0.819	39.61	2
	Learning from past mistakes	0.752	28.70	5
	Continuous improvement of digital processes	0.810	35.64	3
	Developing personal digital skills	0.789	30.89	4
Intelligent knowledge management	Encouraging creative thinking	0.824	37.74	1
	Encouraging employees to continue higher education	0.368	5.66	7
	In-service training	0.321	4.96	8
	Creation of new knowledge	0.839	32.18	1
	Combining and updating new knowledge	0.755	23.18	4
	Access and retrieval of new knowledge	0.734	20.43	6
	Acquisition of new knowledge	0.743	21.26	5
Intelligent knowledge management	New knowledge storage and retention	0.706	16.54	7
	knowledge application	0.814	26.86	3
	Free flow of knowledge	0.822	31.67	2

The priority of the components of each dimension of intelligence

According to the results, all the components of the presented model dimensions were in line with the intelligentization in the universities of medical sciences in the southeastern provinces of Iran. In the dimension of intelligentization of human resources, the component of specialization in performing job tasks was ranked first. In the dimension of intelligent participation of employees, the component of improving creativity and problem-solving in employees was ranked first. In the dimension of the creation of new roles of

human resources, the component of considering human resources as the organization's driving force was ranked first. In the dimension of the formation of the talent treasury, the component of strengthening the efficiency of the organization by saving time and money was ranked first. In the dimension of advanced functional activities, the component of talent cultivation and succession development was ranked first. In the dimension of human resource retention activities, the component of welfare, cultural, and sports services was ranked first Table 6.

Table 6. Factor load and t-statistic for the components of each dimension of the intelligentization of the model

Dimensions	Component	Factor load	t-statistic	Rank
Intelligentization of human resources	Improving the strategic thinking of employees	0.789	36.15	8
	Knowledge of applying digital tools	0.859	51.59	3
	Specialization in doing job tasks	0.865	44.55	1
	The skill of using new technologies	0.827	32.48	4
	Recruiting and hiring knowledge workers	0.807	38.29	5
	Job enrichment of employees	0.863	44.63	2
	Employee meritocracy mechanisms	0.789	22.29	7
	Job re-creation	0.798	35.99	6
	Knowledge force retention	0.775	35.27	9
Intelligent participation of employees	Employee problem-solving sessions teamwork	0.814	29.92	5
	Application of employees' ideas in decision making	0.678	17.85	6
	Application of employees' ideas in decision making	0.818	41.09	4
	Employee knowledge about key information and decisions	0.634	13.52	7
	Application of employees' ideas in the service delivery process	0.846	53.34	2
	Improving creativity and problem-solving in employees	0.847	48.31	1
Creating new human resources roles	Brainstorming sessions with employees	0.832	41.75	3
	Human resource support for the intelligentization process	0.845	44.02	3
	Considering human resources as the driving force of the organization	0.891	81.85	1
Forming a talent treasury	Considering human resources as a change agent	0.871	50.25	2
	Facilitating access to talented workforce	0.788	31.97	4
	Strengthening organization efficiency by saving time and money	0.850	46.54	1
	Motivating talented people to hire them	0.801	33.44	3
Advanced functional activities	Formation of a database to discover the talented workforce	0.836	44.81	2
	Succession development of talent cultivation	0.896	80.24	1
	Teleworking	0.718	21.69	4
	Job promotion of employees	0.853	53.62	2
Human resource retention activities	Intelligent and electronic systems	0.806	37.65	3
	Performance-based salaries and benefits	0.842	41.41	2
	Insurance and supplementary services	0.795	25.48	5
	Welfare, cultural, and sports services	0.858	59.72	1
	Material and spiritual incentive programs	0.835	56.26	3
	Compensation for services based on the motivations and expectations of employees	0.825	43.10	4

Discussion

The results showed that among the dimensions of "human resources architecture", the "intelligent human resource system" dimension has the highest impact on "human resources architecture" so one unit of change in the "intelligent human resource system" dimension caused 0.965 changes in the human resource architecture. This result is consistent with the results of studies conducted by Bogičević (11), Deluji (12), Rezaie et al. (13), and Rouhani et al. (14). In explaining this result, it can be stated that human resources can process other resources and provide the services and goods for which the organization was established. The intelligent human resource system can predict and provide the volume and composition of human resources needed for the future or improve the capabilities of existing forces through efficient planning. Thus, human resources planning should have a high priority for the continuation of the organization's life and achieving its goals.

According to the results, among the dimensions of "human resources architecture", the dimension of "intelligent human resources management" was ranked second regarding its effect on human resources architecture, so one unit of change in the "intelligent human resources management" dimension caused 0.960 changes in human resources architecture. This result is consistent with the results of studies by Seyed Javadein (15), Nourafza et al. (16), Yazdanpanah & Afsarian (17), Agarwal et al. (18), Haji Pour Talebi (19), Boon et al. (20) and Lee et al. (21). In explaining these results, it can be stated that the new perspective prevailing in current organizations emphasizes that every organization needs a specific human capital that has high strategic and unique value creation, and the organization's human resource managers should be adapted to these key people. The mechanism of transferring organizations from a traditional

job-oriented perspective to a new knowledge-oriented perspective is called intelligent human resource management. Intelligentization of the management of human resources in the organization is a fundamental and time-consuming process. A clear example of the digital revolution is the acceptance of the expansion of digital human resources systems, which has converted human resources into intelligent platforms.

The results suggest that among the dimensions of "human resource architecture", the dimension of "intelligent organizational learning" dimension was ranked third in affecting human resource architecture, so one unit of change in the intelligent organizational learning dimension caused 0.955 changes in the human resource architecture. This result is consistent with the results of several studies Seyed Javadein (15), Chowdhury et al. (22), Das (23) and Anand et al. (24). In explaining the results, it can be stated that learning significantly contributes to an organization's performance and survival. The intelligent learning process is a continuous cycle of activities of feeling, environment understanding, and the interpretation of the environment based on past experiences and practical action based on the environment interpretation.

Generally, investment in the process of organizational learning and knowledge management in companies and organizations to maintain its position is considered one of the important ways that the organization can continuously use to create and improve knowledge management. According to the results, among the dimensions of human resources architecture, the dimension of the intelligent strategy of organizational architecture was ranked fourth rank in affecting the architecture of human resources, so one unit of change in the dimension of the intelligent strategy of organizational architecture caused 0.953 changes in human resources architecture.

This result is consistent with the results of studies by Anand et al. (24), Arslan et al. (25) and Bawden & Robinson (26). In explaining the results, it can be stated that the goal of intelligent strategy of organizational architecture is beyond the alignment of information technology with business or the modernization of information technology, and the flow of architecture from strategy to implementation is considered. Also, the change in strategic levels and the business transformation is emphasized not only in the technical architecture of information systems. Thus, the important characteristic of the intelligent strategy of organizational architecture is the level of importance of the issues examined and decision-making.

The results suggest that among the dimensions of human resources architecture, the dimension of core technology was ranked fifth in affecting human resources architecture so one unit of change in the dimension of core technology caused 0.945 changes in human resources architecture. This result is consistent with the results of studies by Seyed Javadein (15), Boon et al. (20), Lee et al. (21), Bawden & Robinson (26), Vrontis et al. (27) and Ghorbani al. (28). In explaining the result, it can be stated that one of the organizational components affecting the human resources management system is the organization's core technology, so organizational and human resource management system officials and managers always consider the core technology of the organization in the design, implementation, and evaluation stages of this vital system of the organization. They are trying to be aware of the status and type of their core technology, design a resource management system, and implement it based on the core technology type.

According to the results, among the dimensions of human resource architecture", the intelligent knowledge management dimension was ranked sixth in affecting human resource architecture so

one unit of change in the intelligent knowledge management dimension caused 0.451 changes in the human resource architecture. This result is consistent with the results of studies by Rezaie et al. (13), Rouhani et al. (14), Seyed Javadein (15), Yazdanpanah & Afsarian (17) and Istudor et al. (29). In explaining this result, it can be stated that organizations will be successful in knowledge management if they can manage their knowledge more intelligently. Artificial intelligence will change executive and operational approaches in many industries. Thus, knowledge management officials must pay attention to it as one of the vital components in the growth and learning of organizations. For this purpose, it is essential to pay attention to artificial intelligence in the implementation of knowledge management. Improving access to knowledge is one of the benefits of using artificial intelligence in knowledge management.

The results indicate that among the dimensions of "intelligentization", the dimension of "intelligentization of human resources" has the highest impact on "intelligence" so one unit of change in the dimension of "human resource intelligence caused 0.974 changes in intelligentization. This result is consistent with the results of several studies Boon et al. (20), Lee et al. (21), Chowdhury et al. (22), Istudor et al. (29) and Choudhury (20). In explaining these results, it can be stated that using sensors, collecting information from big data, and using artificial intelligence and automation of work processes help the development of intelligent human resource management. Intelligent tools directly affect the quality and comprehensiveness of human resources subsystems, including planning the supply of workforce at the required time, real data to evaluate the performance of employees, the development process, and update and online training.

According to the results, among the dimensions of "intelligentization", the

dimension of "intelligent participation of employees" was ranked second in affecting "intelligentization" so one unit of change in the "intelligent participation of employees" dimension caused 0.965 changes in intelligentization. This result is consistent with the results of studies by Seyed Javadein (15), Vrontis et al. (27), Ghorbani al. (28), Fenech et al. (31) and De Angelis (32).

In explaining the results, it can be stated that human and intellectual capital in intelligent human resources is the primary source that helps to achieve organizational goals and the effectiveness of its methods in standardizing human resources. Intelligent human resources are utilized in a management environment with the help of primary resources to understand a situation and implement the necessary solutions and instructions. Thus, it is essential to focus on the capabilities of employees based on the rules set in each organization.

The results indicate that among the dimensions of "intelligentization", the dimension of "human resources retention activities" was ranked third in affecting "intelligentization" so one unit of change in the "human resource retention activities" dimension caused 0.962 changes in intelligentization. This result is consistent with the results of studies by Rouhani et al. (14), Nourafza et al. (16), Lee et al. (21) and Fenech et al. (31).

In explaining the results, it can be stated that human resources can process other resources and provide services and goods for which the organization was established. The intelligent human resources system can predict and provide the volume and composition of human resources needed for the future or improve the capabilities of existing forces through efficient planning. According to the results, among the dimensions of "intelligentization", the dimension of "creating talent treasury" was ranked fourth in affecting "intelligentization" so one unit of a change in the dimension of "creating talent

treasury" caused 0.949 changes in intelligentization. This result is consistent with the results of several studies Rouhani et al. (14), Yazdanpanah & Afsarian (17), Das (23), De Angelis (32).

In explaining this result, it can be stated that a skilled workforce or a suitable job in the new world is mostly found in various collective and specialized events. Forming a talent treasury is one of the best ways to facilitate access to a talented workforce, and large organizations can attract the best specialists in their field by using the talent treasury.

The results indicate that among the dimensions of "intelligentization", the "advanced functional activities" dimension was ranked fifth in affecting "intelligentization" so one unit of change in the "advanced functional activities" dimension caused 0.927 changes in intelligentization. This result is consistent with the results of studies by Seyed Javadein (15), Yazdanpanah & Afsarian (17), Vrontis et al. (27) and Ghorbani al. (28). In explaining this result, it can be stated that to increase performance efficiency, employees should acquire extensive information about advanced workplace design to promote health, purposefulness, and correct interaction with their employees using modern communication tools. Resource management focuses on controlling human resources to achieve the maximum potential of employees.

According to the results, among the dimensions of "intelligentization", the dimension of "creating new roles of human resources" was ranked sixth in affecting "intelligentization" so one unit of change in the dimension of "creating new roles of human resources" caused 0.895 changes in intelligentization. This result is consistent with the results of studies by Lee et al. (21), Rouhani et al. (14) and Fenech et al. (31). In explaining the result, it can be stated that since business managers are facing unprecedented changes in the field of

human resources, to overcome these challenges and adapt to new demands, they should improve their information on intelligent human resources. Thus, it is essential to develop digital human resource training so organizational performance is adapted to these changes.

Nowadays, organizational architecture creates a comprehensive road map at the organizational level for the realization of the organization's missions through the optimal functioning of its primary processes in an effective information technology environment. Thus, organizational architecture is necessary for the evolution of current information systems and the formation of new systems in line with the realization of the organization's missions. Additionally, intelligence is a human characteristic that can be seen in the performance of people, but it has also extended to organizations in the current organization-oriented world (33).

In the digital transformation and knowledge-oriented age, organizations need employees who have enough intelligence to understand and analyze issues. Employees of organizations should be able to receive and analyze rich data and information from various sources. Success in the competitive arena will be guaranteed for organizations that have capable people with sufficient knowledge and insight (34). Intelligent human resource management is a concept that has emerged as a part of digital transformation in the issues related to human resource management or organizational approaches such as learning, sharing knowledge, developing job skills, etc.

Intelligent human resources have many indicators, the most important of which are data-oriented and data analysis capabilities, especially in human resources.

Recommendations

Based on the results, it is recommended that managers should make more efforts in

developing the vision horizon of intelligent organizational architecture and the digital mission of the organization in line with the intelligentization implementation policies. It is also recommended that managers pay more attention to the development, implementation, and evaluation of effective strategies in the intelligentization of recruitment and hiring system, job description, conditions of job qualification, appointment of employees, strengthening intelligent organizational learning by improving systemic thinking, team learning, and learning from past mistakes.

Conclusion

The managers of the universities should develop a vision horizon of intelligent organizational architecture in line with the intelligentization implementation policies and plan to acquire new technologies in the area of artificial intelligence and use them in creating intelligent organizational architecture.

Limitation

One potential issue is the mismatch between the specific needs of medical sciences universities and the available technologies such as AI or data mining, which could make model implementation difficult. Additionally, there may be resistance to change from staff, faculty, or administrators, which could hinder the adoption of the new model. Another challenge is the reliance on accurate and up-to-date data for designing the smart model; any lack of quality data could negatively impact its accuracy and effectiveness.

Potential Barriers:

1. **Resistance to Cultural and Organizational Change:** Changes in the structure of human resources and the introduction of smart models may face resistance from staff and managers. Individuals may be concerned about job security or changes in their work processes.

2. **Technical and Infrastructure Limitations:** Designing and implementing a smart human resources model requires complex technical infrastructure, such as advanced software, extensive databases, and AI-based systems. This can be challenging due to budget constraints or a lack of sufficient technical resources.
3. **Mismatch with the Real Needs of Universities:** Human resources models need to align with the specific needs of medical sciences universities and the unique characteristics of their staff and faculty. If the designed model does not fully address the practical needs of the universities, it may have reduced effectiveness.
4. **Lack of Technical Knowledge in Human Resource Management:** Designing and implementing a smart human resources model requires technical knowledge in areas like data mining, predictive analysis, and modeling HR processes. A lack of such expertise may result in an incomplete or ineffective model.
5. **Legal and Ethical Issues:** The use of personal data of staff and faculty for designing and optimizing HR models may face legal and ethical challenges. Privacy concerns and data security are among these issues.

Potential Solutions:

1. **Training and Awareness Programs to Reduce Resistance:** To reduce resistance to change, educational and awareness programs for staff and managers can be organized. This would help them understand the benefits of a smart human resources model and how it will be implemented.
2. **Enhancing Technical Infrastructure:** Investment in upgrading IT infrastructure and HR management systems, including improving the software used and establishing data-mining capabilities, will significantly help in implementing the smart model.
3. **Designing Models Based on Specific University Needs:** To ensure the model aligns with university needs, a thorough assessment of the real needs of human resources and existing workflows in medical sciences universities should be conducted before designing the model. Additionally, the model should be flexible enough to adapt to future changes.
4. **Hiring and Training HR and IT Specialists:** Designing and implementing smart models requires HR and IT professionals with expertise. Training courses for HR staff to enhance their technical knowledge can also be beneficial.
5. **Addressing Legal and Ethical Aspects:** When designing smart HR models, legal and ethical principles must be followed. This includes ensuring the protection of personal data and compliance with privacy laws. Universities should establish clear policies on the use of staff data and information.

By identifying barriers and offering practical solutions, the successful design and implementation of a smart human resources model in medical sciences universities can be achieved.

Recommendations for Policymakers:

1. **Create Supportive Legislation:** Policymakers should ensure that there is a supportive legal framework for the adoption of smart HR technologies in universities. This includes regulations on data privacy, intellectual property, and the ethical use of AI in human resources management.
2. **Encourage Funding for Technology Integration:** To overcome infrastructure limitations, policymakers should allocate funding or create incentives for universities to invest in the technological infrastructure needed to implement smart HR models, such as upgrading IT systems, databases, and AI tools.
3. **Promote Research and Collaboration:** Governments can support research in the

field of HR management and technology integration in educational institutions. This can be achieved through grants, partnerships between universities, tech companies, and research centers focused on HR innovations.

4. **Facilitate Cross-Institutional Sharing:** Policymakers should encourage universities to share best practices, lessons learned, and insights from their experiences with implementing smart HR models. This can be done through conferences, networks, or online platforms dedicated to HR innovation in education.
5. **Ensure Access to Data and Insights for Decision-Making:** Policymakers should encourage universities to collect and analyze HR-related data effectively to make evidence-based decisions. Promoting the use of AI and data analytics can improve decision-making and resource allocation in universities.
6. **Monitor and Evaluate Outcomes:** After the implementation of smart HR systems, policymakers should establish mechanisms to evaluate the outcomes and effectiveness of these systems. This evaluation should include employee satisfaction, system performance, and alignment with institutional goals.

Authors' contribution

Mohammad Reza Gholami and Abdolali Keshtegar developed the study concept and design. Vahid Pourshahabi and Mohammad Reza Gholami acquired the data. Mohammad Reza Gholami and Abdolali Keshtegar analyzed and interpreted the data, and wrote the first draft of the manuscript. All authors contributed to the intellectual content, manuscript editing and read and approved the final manuscript.

Informed consent

Questionnaires were filled with the participants' satisfaction and written consent was obtained from the participants in this study.

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Conflict of interest

The authors declare that they have no conflict of interests.

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