

Design and Validation of Blockchain-based Human Resource Management Practices Model

Ali Khodadadnejad*, Ghadir Taymori Arekhloo²

1. Dept. of Gachsaran Branch, Islamic Azad University, Gachsaran, Iran

2. M.A. Student in Business Management, Islamic Azad University, Gachsaran Branch, Gachsaran, Iran

Abstract

The present study aims to design and validate a blockchain-based human resource management practices model and to investigate how the model factors affect each other and practical solutions for the development of human resource management in the education organization. The present study was conducted with a combined approach. In the qualitative part, using the data theory method of the foundation and in-depth interviews with 12 experts, the model of blockchain-based human resource management practices was designed and validated. Then, in the second step, using the technique of confirmatory factor analysis and modeling of structural equations among 300 managers, deputies and experts of education departments of Kohgiluyeh and Boyer-Ahmad provinces, the resulting model was fitted, validated and tested. In the qualitative part of the model, consisting of two main themes and six sub-themes for causal conditions, one main theme and two sub-themes for background conditions, one main theme and four sub-themes for the central category, one main theme and four sub-themes for the interventionist conditions, one main theme and 6 sub-themes for strategies and 4 sub-themes for outcomes were obtained. The results of the quantitative section showed the significance of the relationships between the research variables. In this study, the causal conditions (information technology factors and recruitment process) were identified as a central category (strategic development of human resource management with blockchain technology); Affects and in this impact and impression; Background conditions (design of financial mechanisms and design of legal mechanisms); Interfering conditions (barriers to the use of technology); Are involved and strategies such as (area of staffing); It can help achieve outcomes (strategic, organizational, information and technological implications).

Key words

Human resource
 Blockchain
 Technology
 Education

Original article

Corresponding author: khodadad.ali2019@gmail.com

Received:
 12 Sep 2021
 Accepted:
 18 Nov 2021

Introduction

The goal of the Fourth Industrial Revolution is to transform various business sectors such as manufacturing, services, mining, fashion, etc., using digital technology such as blockchain. The use of blockchain in human resource management performance helps the parties to participate in updating the skills and knowledge of employees. The information obtained from the blockchain process can also be used as a resource for policymakers to set competency standards among employees. In addition, the human resources blockchain implements an automated process to reach an agreement between the parties involved (1). New blockchain technology provides a new format for storing in a database, and the transaction processing pattern in this technology allows a high level of decentralization. Therefore, the application of this technology in various fields, due to the distributed and decentralized control of data, makes possible safe, scalable and efficient management of resources. A blockchain can be considered as a sequence of connected data blocks, each of which is dependent on the previous block and forms a continuous chain data structure (2). The Chinese bloc can affect the business environment and have far-reaching implications for human resources and the workforce. In recent years, especially with the rise of cyber threats, there has been a sense that technology has eroded trust, with blockchain offering a way to use technology to regain lost trust. Human resource approaches in developing their digital strategy should consider blockchain alongside other emerging technologies. Assessing the potential of blockchain to increase efficiency and effectiveness should be considered along with wider implications for the future of work (3). Human resources are the main asset of the organization and every organization in order to fulfill its mission and achieve its goals and strategies must take action in the field of human resources. On the other hand, the

optimal performance of the units and the whole organization depends on the actions of human resources in a practical way and the satisfaction of employees and customers, and innovation and creativity lead to greater productivity and ultimately the success of the organization and high reputation in society. Thus, it becomes clear that not only managers and human resources experts are not responsible in this field, but all managers and members of the organization should participate in human resources actions (4). The impact that new technologies have on all aspects of our lives, work and careers is significant and growing over time. Blockchain and artificial intelligence, among other innovative technologies, have a profound effect on all business operations, including many human resource works. The HR department currently faces a number of challenges as HR departments spend many hours verifying programs and authenticating records to reduce the chances of incomplete recruitment. Today, more technology-based processes are used to search for talent, select and manage, as well as to gather, retain and integrate new talent into a company. These human resource practices are much more effective than traditional methods (5).

Since the education organization considers human resources as the most important factor influencing the quality of its services and also in line with its social responsibilities, it largely ensures that human resource policies and programs are in line with competitive strategies and in the direction of interaction. And strengthen the goals of the organization. The importance of human capital in the dynamism and growth of organizations is not hidden from anyone. It is worth mentioning that not enough research has been done on the subject of the present study on human resources recruitment in education and the present study can be a research gap in the subject of effective human resource management methods based on blockchain technology, especially in the education organization. Compensate for breeding

a little. From a scientific point of view, the results of this research, like other research texts, can be exploited by researchers, researchers and managers of government organizations. Also, from a practical point of view, the present study helps to manage and absorb human resources in offices and schools in order to take effective steps to improve staff performance.

Using blockchain technology, in addition to increasing security in information storage, processes can be better organized, so that, as a result, human error is minimized. Blockchain is so reliable both in terms of performance and security that a number of financial institutions and banks have shown interest in using it, and this technology can be used in human resource processes such as smart contracts, the identity of individuals without the need for a third party. He used attendance registration, recruitment process, etc. (6). Due to the ownership of data for each field of work in the blockchain network, each employee can be informed of the performance results of others. And all employees can share the work experience gained in the company, exchange ideas with human resources staff, and through this the company can determine which of the human development measures is an effort to improve the quality of performance. Blockchain can also be used to modify a company's system by considering the performance outcomes listed in the blockchain network. In it, we automatically repair to develop the potential of employees. Essentially, blockchain is here as a tool to provide employees with opportunities to share information so that employees in the company have equal knowledge and skills. In addition, it can increase the profitability and credibility of the company. With blockchain, data is stored securely, cannot be changed, and companies waste less time. Using this blockchain technology, in case of fraud in one of the supply chain processes, it will be easier to detect it (1). Although the issue of human resource management practices has been the focus of many researchers in recent years, in the country, little research has been done on this issue, all of which are theoretical and only to define, enumerate the characteristics and reasons for using management. Human resources are sufficient. So far, no field research has been conducted in the country on human resource management methods based on blockchain technology, through which the operation of such work

systems in the education organization can be examined. Due to the importance that researchers have given to this type of technology in their research and also the lack of field research conducted in this field in the country, in this research, blockchain-based human resource management methods have been tried in the education organization. This can be useful for the country's education departments to find appropriate strategies and methods of leadership, recruitment and management of human resources to increase performance.

In the present study, an attempt has been made to classify the identified categories and propositions as a process, so each category was assigned to the three processes of absorption and supply, improvement, empowerment and retention. Also, many studies conducted on the subject of human resource management practices have used quantitative methods and in a few cases the combined method, but the present study has used a qualitative method in identifying categories affecting human resource management practices. From this perspective, the present study is a new research. Also, the blockchain technology-based approach is a new approach that has been used on human resource management practices in the education organization. Therefore, the questions of the present study are as follows:

1. What are the causal categories of blockchain-based human resource management practices in the education organization?
2. What are the environmental (contextual) categories of blockchain-based human resource management practices in the education organization?
- 3- What are the intervening categories in blockchain-based human resource management practices in the education organization?
- 4 - What are the strategic issues in the field of blockchain-based human resource management practices in the education organization?
5. What are the consequences of using blockchain-based human resource management practices in the education organization?
6. What are the key issues of blockchain-based human resource management practices in the education organization?

7. What are the effects of effective categories on block-chain-based human resource management practices?

Research Methodology

The design of the present study is a combination-sequential-exploratory method. In other words, first the qualitative approach and then the quantitative approach have been used. Accordingly, in the present study, the researcher has first moved towards creating a theory by using inductive approach and then has evaluated the explained theory with a deductive approach.

In the qualitative section, in order to identify the study population in the interview, the researcher will identify people who are aware of the actions and processes of human resource management in addition to the initial studies and acquisition of human resource management in the education organization. The characteristic of the participants in conducting the interview or "knowledgeable experts" will be having a minimum bachelor's degree and long-term executive and managerial background (at least 10 years), which includes the director general of education, deputy director and primary education experts. Deputy and experts of secondary education, deputy and experts of planning and development, deputy of education and culture, deputy of physical education, deputy and recruitment experts and support experts of the general administration and regions who are involved in attracting and employing human resources. The selected sample includes 12 experts familiar with human management topics.

Targeted sampling is one of the common sampling methods in which the participating groups are selected based on pre-defined criteria related to the research question. Usually, the choice of sample size depends on the researcher's saturation. It suffices because this number of repetitive cases is raised by addressing the next issue.

In the quantitative part, the statistical population includes executive or experimental experts and these experts mean all managers, deputies and experts (primary education, secondary education, planning and

development, education and culture, physical education, recruitment, support) of the education departments of the province. Kohkiluyeh and Boyer-Ahmad. Depending on the size of the population, the sample size will be determined through the Cochran's formula at an error rate of 5%. For sampling in the present study, cluster sampling method will be used.

In the present study, in the qualitative part of the tool, semi-structured and in-depth interviews were used face to face. In a small part, a researcher-made questionnaire was used to collect data. The final questionnaire was prepared in two sections of descriptive information of the respondents and the main questions with the option of five answers of the Likert scale and the statistical sample was given.

In qualitative research, narrative answers the question of whether the methods and techniques used in the research are related to each other and evaluate well what is designed for it. In the present study, in order to increase the level of validity, an attempt was made to send a written interview to the interviewee after the implementation of the interviews and, if possible, to obtain their approval in this regard. In addition, the final conceptual model extracted from the interview analysis was sent to the interviewees so that they could confirm the model in terms of conformity with reality.

In the quantitative part and to assess the validity of the questionnaires, the content validity and construct validity methods have been used. To assess the content validity, the research questionnaire was given to five experts and university professors and they confirmed the validity of the research. Confirmatory factor analysis was used to assess the construct validity. Also, regarding the reliability of the research tool, Cronbach's alpha test was used to assess the reliability and internal consistency of the questionnaires. In this study, in the form of a pre-test, a questionnaire was distributed among 30 samples and their Cronbach's alpha coefficient was calculated as follows. Cronbach's alpha coefficients equal to or greater than 0.7 indicate the appropriate reliability of the measuring instrument. Accordingly, the results of Cronbach's alpha indicate the high reliability of the research questionnaire.

Findings

The design of the present study is a combination-sequential-exploratory method. In other words, first the qualitative approach and then the quantitative approach have been used. Accordingly, in the present study, the researcher has first moved towards creating a theory by using inductive approach and then has evaluated the explained theory with a deductive approach.

In the qualitative section, in order to identify the study population in the interview, the researcher will identify people who are aware of the actions and processes of human resource management in addition to the initial studies and acquisition of human resource management in the education organization. The characteristic of the participants in conducting the interview or "knowledgeable experts" will be having a minimum bachelor's degree and long-term executive and managerial background (at least 10 years), which includes the director general of education, deputy director and primary education experts. Deputy and experts of secondary education, deputy and experts of planning and development, deputy of education and culture, deputy of physical education, deputy and recruitment experts and support experts of the general administration and regions who are involved in attracting and employing human resources. The selected sample includes 12 experts familiar with human management topics.

Targeted sampling is one of the common sampling methods in which the participating groups are selected based on pre-defined criteria related to the research question. Usually, the choice of sample size depends on the researcher's saturation. It suffices because this number of repetitive cases is raised by addressing the next issue.

In the quantitative part, the statistical population includes executive or experimental experts and these experts mean all managers, deputies and experts (primary education, secondary education, planning and

development, education and culture, physical education, recruitment, support) of the education departments of the province. Kohkiluyeh and Boyer-Ahmad. Depending on the size of the population, the sample size will be determined through the Cochran's formula at an error rate of 5%. For sampling in the present study, cluster sampling method will be used.

In the present study, in the qualitative part of the tool, semi-structured and in-depth interviews were used face to face. In a small part, a researcher-made questionnaire was used to collect data. The final questionnaire was prepared in two sections of descriptive information of the respondents and the main questions with the option of five answers of the Likert scale and the statistical sample was given.

In qualitative research, narrative answers the question of whether the methods and techniques used in the research are related to each other and evaluate well what is designed for it. In the present study, in order to increase the level of validity, an attempt was made to send a written interview to the interviewee after the implementation of the interviews and, if possible, to obtain their approval in this regard. In addition, the final conceptual model extracted from the interview analysis was sent to the interviewees so that they could confirm the model in terms of conformity with reality.

In the quantitative part and to assess the validity of the questionnaires, the content validity and construct validity methods have been used. To assess the content validity, the research questionnaire was given to five experts and university professors and they confirmed the validity of the research. Confirmatory factor analysis was used to assess the construct validity. Also, regarding the reliability of the research tool, Cronbach's alpha test was used to assess the reliability and internal consistency of the questionnaires. In this study, in the form of a pre-test, a questionnaire was distributed among 30 samples and their Cronbach's alpha coefficient was calculated as follows. Cronbach's alpha coefficients

equal to or greater than 0.7 indicate the appropriate reliability of the measuring instrument. Accordingly, the

results of Cronbach's alpha indicate the high reliability of the research questionnaire.

Table 1: Main and sub-themes and primary codes

Conditions	Main theme	Sub theme	Basic codes
Casual Conditions	IT	Information technology infrastructure	The education organization has the necessary technical requirements to use blockchain-based substrates; The education organization has a suitable internet connection speed; Maturity of the organization in using the Internet and related technologies; The organization needs blockchain technology to meet the needs of its IT-based organization
		IT skills	Possess knowledge of blockchain technology among the managers of the organization at all levels; Possess a high level of skills and technical knowledge related to blockchain in the education organization; Familiarity of the information technology department of the organization with the organizational business processes, in order to identify the actual applications required by the organization; Ability of IT experts in the development of blockchain-based systems; Existence of necessary skills in the body of the organization to use blockchain-based services
		IT policies	Security rules, procedures and privacy laws in blockchain-based platforms; Possibility of loss of control over the data by the organization if it uses blockchain-based platforms to execute transactions; The need for rules for the use of blockchain-based substrates; Insufficient rules and regulations today to support the use of blockchain
	Recruitment process	Application of blockchain in absorption and socialization	Assessing skills gained from education; Save effort and cost and speed up the recruitment process; Availability of all one person's work history at once; Standardization of candidates' job profiles, which in turn improves the quality of resume content; Making it easier to file and track candidates' career advancement; Easy validation of

			the quality and transparency of the candidates' resume content
		Security in the employment contract	Concluding secure employment contracts; Information and data security is guaranteed and the risk of information leakage is minimized.
		Non-discrimination in employment	No ethnic discrimination in related employment opportunities (disregard for ethnicity); Creating employment opportunities for people with disabilities; Pay attention to equal (non-discriminatory) behavior in the recruitment process
Background conditions	Design of financial and legal mechanisms	Design of financial mechanisms	Attention of education management to meet the financial needs of employees; Existence of a suitable environment for expressing the opinions, demands and criticisms of the employees; Financial support for research ideas; Financial weakness of the organization; Organizational support for individual efforts for professional development; The supportive role of top managers in creating change; Providing facilities and equitable distribution of benefits.
		Designing legal mechanisms	Government laws and regulations; Rules within the organization; The current structure of the education system in Iran; How to evaluate employees that is more quality-oriented than problem-oriented; New design of internal processes of the organization; Creating a process of knowledge sharing and education based on the goals of the organization; Transparency of existing bylaws in the organization, management style of the organization, Organizational identity and targeting, allocation of resources in the organization and schools, flexibility in the management system of the organization and structured interaction with the external environment.
Interfering conditions	Barriers	Management reasons	Lack of mechanisms for permanent attraction of elites and creation of symbolic values; Ineffectiveness of laws protecting the scientific elite; Presence of qualified individuals without national commitment and ethnicity; Unmanaged and unknown managements remain the meaning of human capital; Lack of

			meritocracy, elitism and specialization and disregard for the empowerment of scientific and professional staff.
		Economic and social causes	Insufficient financial resources required; Feeling the need of the country at the macro level to solve problems locally due to the existence of oil revenues; Insufficient educational and research equipment; Failure to support the organization's research results; Ignoring the necessary research capacities in the education organization and paying attention to the staff and innovation and giving plans to the government by the organization.
	Causes	Scientific and research causes	Lack of appropriate scientific and research facilities in the country; Neglecting the optimal use of research budgets while being insufficient; Neglect of research and production of science in schools and use of research results; Intellectual poverty, illiteracy and ignorance; Lack of attention to scientific institutions or related institutions; Staying creative thinking in education; Teachers and staff do not need training because of their narcissism.
		Political and culture causes	Political instability in relation to the present and future of the country; Reducing the motivation and commitment of employees to serve the people as a religious and national duty; Creating cultural changes in employees' morale; Foreign mass media propaganda in the absence of employee protection of the system; Cultural and political heterogeneity of some employees with the beliefs and values that govern society and the elimination of political slavery.
Axial category	Strategic development of human resource management with blockchain technology	Cognitive abilities of managers	Ability to process information, pay attention, learn, make decisions, adapt to new situations, embrace change, be creative, take responsibility for failures, be bold, assertive, optimistic, seek opportunity, strive to create opportunity from the heart of the threat, High self-confidence, focus on strengths.

		Skills in selecting talented people	Adequate attention to the fit of employees' personality traits with the job, sufficient skills in attracting qualified people, prioritizing people's resumes and certificates, sufficient attention to the ability to learn new skills, paying attention to people's personality traits, ability and skills in identifying talents , Ability and skill in attracting talents; Existence of a database of qualified and talented people to be upgraded by blockchain technology; Attention to scientific and executive records in the selection of individuals by blockchain technology.
		Talent needs assessment	Recognize talent needs; Targeting talent identification tailored to the needs of the organization
		Talent assessment	Existence of a codified process of measuring talents by blockchain technology; Use blockchain technology to gather information about people's abilities; Existence of a strong and appropriate evaluation system for the evaluation of employees by managers.
		Problem solving skills	Ability to analyze a problem, identify the source of the problem and the relationship between different problem factors and then formulate relevant and practical alternative solutions.
		Planning skills	Ability to prepare work planning in a systematic and planned manner, allocating resources based on planning results, monitoring to ensure that the work plan can be implemented effectively and efficiently.
Strategies	Area of employment of employees	Appropriate way of evaluating employee performance	Designing an independent and systematic evaluation model for evaluating, controlling and monitoring employees; Perform employee evaluation with blockchain technology.
		How to encourage and punish employees	Designing a system of encouraging and punishing employees; Designing a staff rating system with blockchain technology.
		How the education organization interacts with its employees and vice versa	Increase employee belonging to the organization; Increase the formal and informal interaction of managers with employees; The need to trust employees; Support of managers; Creating a safe work environment and

			increasing the psychological security of employees
		Employee recruitment system	Have a comprehensive plan on how to attract employees with blockchain technology; Determining the pattern of human needs of the organization in the field of employees; Attracting employees in specialized fields from the very beginning of the recruitment and entry process; Collaborate with other organizations and institutions to identify and attract employees; Establishing a liaison office with the university in the organization's deputy for education and research; Define a logical path for the entry of capable employees with the help of blockchain technology
		Area of training and skills development of employees	Allocation of appropriate and sufficient budget for staff training by managers; Designing training courses for employees according to their real needs; Holding training courses at different levels and in accordance with the ranking of employees; Moving towards specialization of teaching by training and educating specialized staff; The need to take practical courses by newly arrived staff accompanied by experienced staff; Research and scientific support of staff
		Employee management system	Designing a model for training, retaining and managing elite and famous education staff; Disciplined and purposeful use of employees in various fields; Specialized entry of the organization's senior management in some of the employees' affairs; Managing the conflict between popular and organizational popularity of employees; Training knowledgeable and skilled staff to compete with famous staff; Regulate and target the service compensation system based on the employee rating system; Compilation and compilation of implementation and teaching methods in schools; Balancing employee payments; Staff financing; Improve and stabilize the employment status of employees

Consequences	Strategic implications	Transparency and access to information; Prevent fraud and manipulation; Reduce corruption
	Organizational Consequences	Increase trust; Increase tracking capability; Increase predictability; Increase control; Increase productivity (achieve the goals of the organization); Strengthen creativity and innovation
	Informational implications	Integration and enhancement of information quality; Reduction of human error; Increase the speed of access to information; More security
	Technological implications	Resistance to destructive behaviors; Increase security and reduce database hacking; Prevent the change or deletion of data registered in blockchain-based databases; Reduce energy consumption in the network by increasing efficiency and automated mechanism; More speed and reduced costs

Explain the blockchain-based human resource management model

The paradigm model of this research was designed based on the paradigm model of Strauss and Corbin according to Figure (1). In this model, causal conditions, binding factors of blockchain-based human resource management are shown. Despite these factors and conditions, a blockchain-based human resource management model was designed. Underlying conditions are the bedrock of human resource management. Conditions that need to be considered more for the success of this process. Interfering conditions have a positive or negative effect on blockchain-based human resource management and can disrupt or facilitate or accelerate human resource management as well. In this process, the main factor in creating the strategic

development process of human resource management with blockchain technology is considered as a central category. The strategic factor of the model is the strategies of employee performance evaluation strategies, how to encourage and punish employees, how the education organization interacts with its employees and vice versa, staff recruitment system, staff training and skills development system and staff management system. Implications, expected outcomes of strategic implications, organizational implications, information implications and technological implications were considered. Consequences whose manifestation means the emergence of the phenomenon of human resource management based on blockchain technology.

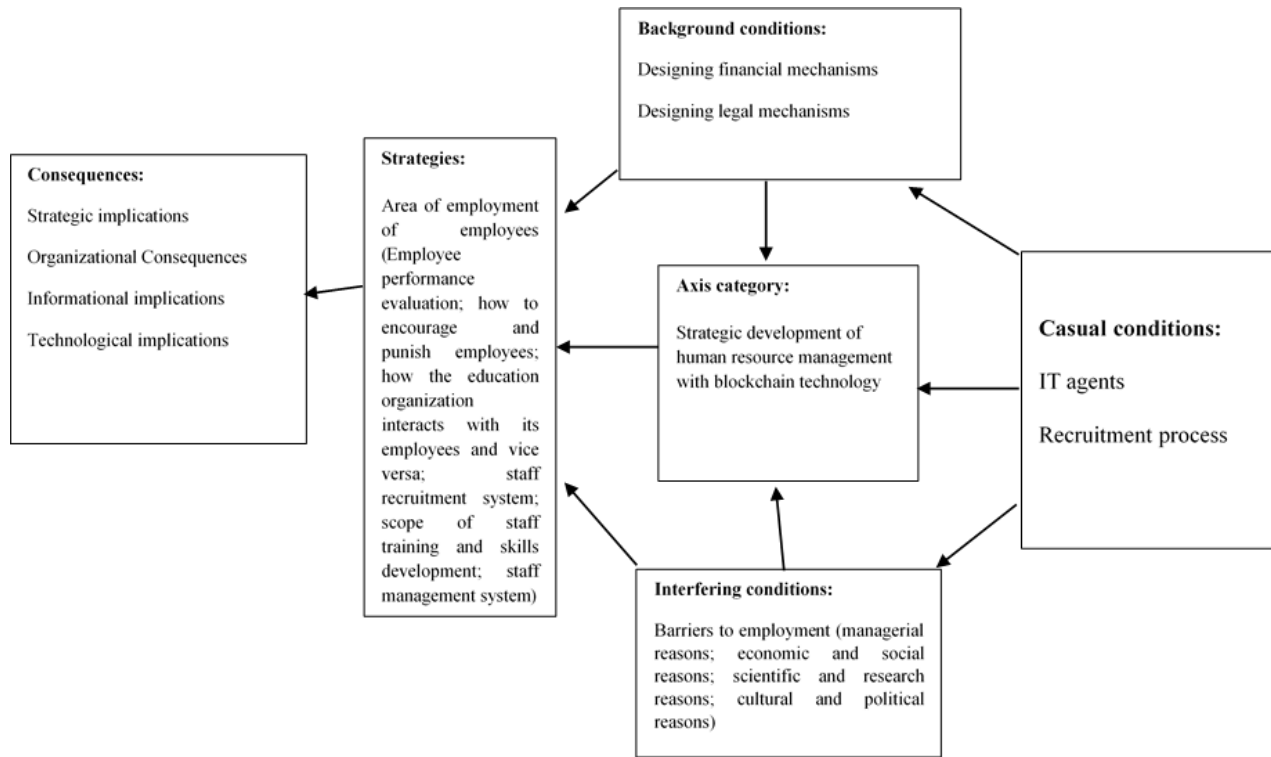


Figure 1: Paradigm model of research

Quantitative analysis

To analyze the collected data, analytical statistics are presented in the form of descriptive and inferential statistics.

The demographic statistics related to this study are summarized in Table 2:

Table 2. Demographic variables

Demographic factors		Frequency	Percentage
Gender	Male	220	73.3
	Female	80	26.7
Education	Diploma	30	10
	Junior	62	20.7
	B.A	126	42
	M.A	78	26
	Ph.D.	4	1.3%

After reviewing the descriptive statistics using inferential statistics and to explain the relationships between the models, confirmatory factor analysis and structural equation testing using Smart PLS software were used.

Before examining the research hypotheses, the reliability and validity indicators of the measurement

model have been reviewed and then the test of each of the research hypotheses has been presented.

Reliability and validity of indicators

To check the validity, considering that the factors have been done based on interviews with experts and also the identified factors have been matched with the background of similar researches, therefore it has the necessary validity and to measure the reliability in the first stage, 25 questionnaires of spectrum 5 The Likert scale was prepared based on the research topic and sent for this number. The result of calculating the reliability of these questionnaires by Cronbach's alpha method is as follows:

Table 3. Cronbach's alpha calculation results

Title	Indexes	Cronbach's alpha
Casual conditions	IT agents	0.885
	Recruitment process	0.858
Background conditions	Designing financial mechanisms	0.737
	Designing legal mechanisms	0.793

Axial conditions	Strategic development of human resource management with blockchain technology	0.889
Interfering conditions	Barriers to employment	0.900
Strategies	Area of employment of employees	0.873
Consequences	Strategic implications	0.818
	Organizational consequences	0.888
	Informational implications	0.828
	Technological implications	0.836

According to Cronbach's alpha value for different indicators, more than 0.7 was obtained. As a result, the reliability of the questionnaires is appropriate.

Investigation of research hypotheses

The significance number of all questions is above 1.96 or less than -1.96, so the questions measure the variables well. To analyze the structural model, if the significant number of relationships is higher than 1.96 or less than -1.96, the hypothesis can be confirmed. The path coefficient also determines the intensity of the relationship. The results of the relationships test in the model are presented in Table 4.

Table 4. Test results of conceptual research model relationships

Hypothesis	Direct effect	P value	CR	Result
Causal conditions on the central category	0.51	0.000	7.212	Accepted
Background conditions on the central category	0.54	0.000	6.324	Accepted
Interfering conditions on the central category	-0.37	0.000	4.431	Accepted
A central category on strategies	0.48	0.000	5.192	Accepted
Underlying conditions on strategies	0.61	0.000	6.417	Accepted
Interfering conditions on strategies	-0.52	0.000	4.431	Accepted
Strategies on consequences	0.44	0.000	5.894	Accepted

Discussion

In this study, the interviewees in the first phase of the research were asked to describe the factors that can help them to block human resource management based on blockchain and to deal in detail with these events. In the open coding stage, where the analysis was based on sentence analysis, including interviews, two main themes and six sub-themes and 24 initial codes were considered for causal conditions. These conditions include technological factors and the recruitment process. IT agents include sub-themes such as IT infrastructure, IT skills, and IT policies. The recruitment process includes sub-themes such as the use of blockchain in recruitment and socialization, security in the employment contract and non-discrimination in employment. In the research, the interviewees were first asked to state the necessary background conditions for the development of blockchain-based human resource management. In the open coding stage and with detailed analysis of the interviews, the

background conditions of a main theme and two sub-themes and 18 initial codes were considered. These conditions include the design of financial mechanisms and the design of legal mechanisms. In this study, the researcher asked the interviewees to name the obstacles or facilitators of the blockchain-based human resource management promotion process in the education organization. The initial code was categorized. These conditions include barriers to employment that include sub-themes such as managerial causes, economic and social causes, scientific and research causes, and cultural and political causes. According to the review of interviews and review of theoretical literature in the second chapter for the central category, the strategic development of human resource management with blockchain technology is considered. Strategic development of human resource management with blockchain technology includes sub-themes such as managers' cognitive abilities, skills in selecting talented people, talent needs assessment,

talent assessment, problem solving skills and planning skills. The results of reviewing and analyzing the ideas extracted from the interviews show that the strategy includes the field of staff employment, which have sub-themes such as how to properly evaluate staff performance, how to encourage and punish staff, how the education organization interacts with staff. Self and vice versa, the staff recruitment system, the scope of staff training and skills development and the staff management system. To extract the consequences, the interviewees were asked to express their views on the consequences. The researcher has considered strategic implications, organizational implications, information implications and technological implications for the human resource management model.

In order to fit the blockchain management model based on blockchain, a researcher-made question-

naire was developed and distributed among the statistical population of the study. The results of the quantitative part of the research showed that underlying conditions with a coefficient of 54%, causal conditions with a coefficient of 51% and intervening conditions with 37%, respectively, affected the central category. The least impact on the central category is related to the interventionist conditions and the most impact is related to the underlying conditions. Also, the impact of the central category on strategies is 48%, the rate of intervening conditions on strategies is 52% and the underlying conditions on strategies are 61%, which has the greatest impact on the underlying conditions. The effect of strategies in the model on the outcomes was 44%.

A comparison of the results with other studies is presented in Table 5

Table (5). Adaptation of research results according to previous patterns

Main theme	Verification resources	Explain pattern innovation
Information Technology	(7, 8)	This category was considered as information technology, but the nature and elements of its direction towards blockchain-based human resource management were not considered in any model.
Recruitment process	(4, 9)	This category has been considered in the same way in other studies
Designing financial and legal mechanisms	--	From this point of view, no report has been quoted on issue B of designing financial and legal mechanisms, and this category is innovative.
Barriers to employment	(10, 11)	Some sub-categories of this main category have been investigated in this study.
Strategic development of human resource management with blockchain technology	(12, 13)	This category has received less attention in other studies
Area of employment of employees	(3, 5)	Sub-categories of staff recruitment as one of the most frequent tools of human resource management have already been considered.
Strategic implications	--	Was first introduced in this study
Organizational Consequences	(6, 8)	This category has been considered in the same way in other studies
Informational implications	--	Was first introduced in this study
Technological implications	--	Was first introduced in this study

In this section, according to the research results, the following practical suggestions are presented.

Senior management support for human resource management based on blockchain technology at all stages of readiness, adaptability and integration;

Development of infrastructure and scientific and technological capacities and special investment in the field of science and research to attract the cooperation and activities of the elite and to provide research facilities

and optimization of the educational system to achieve a suitable scientific position;

In the education organization to reduce and eliminate structural factors, having a coherent plan, having an integrated human resource management system, appropriate and stable structure and organization, proper implementation of performance management process and human resource management processes in general, trying to provide the desired output And tangible in human resource processes and creating the right approach to managing MIT One's integrated talent management helped solve the challenges of human resource management;

Creating a suitable social and cultural environment for the optimal use of the elites and increasing trust between the elites, society and government and promoting social security and creating a democratic intellectual space for the elites within the framework of the constitution, supporting the formation of associations and associations Administrative and managerial capacities and development of structures.

Conclusion

Human resources are one of the areas that the blockchain can influence and transform; In fact, blockchain can transform the hiring process into a business. Hiring the right staff and choosing the right one is really difficult, time consuming and takes a lot of energy from the human resources department. Sometimes the work becomes so difficult that organizations turn to agencies to attract the right manpower. Of course, these methods usually come at a high cost and sometimes do not work at all.

Blockchain can make it possible for the information of the recruiters to be displayed to you, thus making the recruitment process much easier; because you are fully aware of the volunteer profile. Blockchain can review resumes, check volunteer grades, certifications, and work experience, and notify HR officials. Blockchain has made it possible to eliminate external elements such as agencies in hiring, and with this technology there is no longer a need for hiring intermediaries. When the HR system can verify the identities of individuals, their backgrounds and work experience, the task becomes much easier and HR staff will have the opportunity to think about more strategic goals.

When human resources have access to employee information and records, employee access to human resources is much lower. On the other hand, employees cannot provide fake information and certificates to the human resources unit. This will increase the chances of hiring competent people in the organization. If organizations use blockchain technology in their human resource system, when an employee leaves an organization and wants to start working in a new organization, the new organization can take and review that employee's life cycle from that previous organization. This makes the hiring process much better and more accurate, and as a result, organizations can hire more efficient staff.

In a blockchain system, transactions include the transfer of personal information, work history, financial information records, and digital currencies. Cyber security capabilities change the future of these transactions; because information is stored through cryptography in the blockchain system, it is very difficult to change it. Given that blockchain is one of the best spaces for secure transactions, employees and employees should use it to transfer important information. Blockchain is the solution to one of the biggest human resource problems. Blockchain technology is one of the best spaces for storing biometric information such as fingerprints or iris scans, IDs and records. Organizations can use this technique to store unique employee information, thereby being aware of employee presence and their pay. This eliminates many of the differences, problems and errors in the issue of salary determination.

References

1. Hamidinasr M, Hamidinasr M. (2019). The role of blockchain in productivity and improvement of human resource processes in organizations. *Journal of Tadbir*; 313: 1-29. (In Persian).
2. Rezaei A, Ataei M. (2021). A new blockchain-based solution method for effective employee management. 6th International Conference on Advanced Research in Science, Engineering and Technology, Tehran. 1-8.
3. Zeraatkar S, Rajabifarjad H, Naghashzadeh S. (2020). Identify the challenges of human resource management in the public sector and its impact on productivity. *Human*

- Resource Management Research; 12(42): 197-224. (In Persian).
4. Salamatahvazi M, Hoseinpour M, Shahi S. (2020). Identify the components and present the development model of human resource management based on performance evaluation and organizational learning of Mahshahr Special Economic Zone. Journal of Psychological Sciences; 19(90): 773-786. (In Persian).
5. Sharif Khatibi Z, Izadi SK. (2020). Blockchain and its application in storing information as a secure distributed database. Information and Communication Law Enforcement; 1(2): 85-106. (In Persian).
6. Mohammadi H. (2020). An analysis of human resource management functions with a qualitative research approach; A study in Mazandaran Gas Company. Human Resource Management in the Oil Industry; 12(46): 147-165. (In Persian).
7. Miri Ghamsari F, Babran S, Saeedi A. (2020). Explaining the dimensions and components of strategic development of human resource management (Case study: Broadcasting Organization of the Islamic Republic of Iran). Human Resource Management Research; 12(39): 165-193. (In Persian).
8. Chillakuri B, Prakash A. (2021). Role of blockchain in HR's response to new-normal. International Journal of Organizational Analysis. <https://doi.org/10.1108/IJOA-08-2020-2363>.
9. Fachrunnisa O, Farookh Khadeeer H. (2020). Blockchain-based human resource management practices for mitigating skills and competencies gap in workforce. International Journal of Engineering Business Management; <https://doi.org/10.1177/1847979020966400>.
10. Lai J. (2020). The application prospects of blockchain technology in human resource management. Modern Management Forum; 4(4):167-171. DOI:10.18686/mmf.v4i4.2782
11. Michailidis M. (2021). Blockchain technology: The emerging human resources challenge. Preprints; 2021050035, doi: 10.20944/preprints202105.0035.v1.
12. Nurhasanah Y, Dita P, Fachrunnisa O. (2021). Blockchain-based solution for effective employee management. Proceedings of International Conference on Smart Computing and Cyber Security; 34:147-154.
13. Rhemananda H, Roulina Simbolon D, Fachrunnisa O. (2021). Blockchain technology to support employee recruitment and selection in industrial revolution 4.0. Proceedings of International Conference on Smart Computing and Cyber Security, Lecture Notes in Networks and Systems; 149: https://doi.org/10.1007/978-981-15-7990-5_30.