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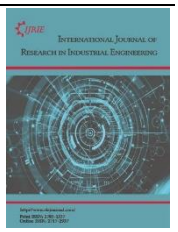

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Designing a Model for Creating an Organization with High Reliability, Case Study: Iran Space Research Institute

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Abstract

Given the challenges and global uncertainties in the business's, the use of futurism to improve management in space research center in Iran has become very important. Hence, space sector needs continuous futurology improvement in its systems and processes to obtain higher levels of reliability. Therefore, this study is aiming to design a model to create an organization with high reliability. So, this research is among developing research. In terms of the nature and approach of research, it is a causal-effect research, while it should also be noted that the present study is mixed by Grounded theory. This research has done based on qualitative part of the research and semi-structured interviews with 20 experts and knowledgeable experts in Iran Space Research Institute and active academic experts at universities. Firstly, categories and subcategories have been selected through individual interviews with experts in the field of reliability based on snowball sampling method. The statistical population of this research in a small part consists of active employees of the organization in the Iranian Space Research Institute of 1000 people. The statistical sample in this research is 277 people and the sampling method is also available. The results showed that, security activities, learning and experience survival, high interaction ability activities, job rotation and trust, high learning ability and difficulties at work activities, managers' special attention to supply line forces, high transfer rate, knowledge management, teamwork, loyalty and dignity, teamwork and collaboration, organizational knowledge management, commitment to flexibility, talent management and organized turmoil are essential to create a highly reliable organization.

Keywords: Organization, High reliability, Space research.

1 | Introduction

Reliability is in fact the probability of success or the probability that a system or set will fail to perform predetermined tasks with design constraints (such as time and space) and under certain operating conditions (such as temperature, humidity, vibration, etc.) without failure. The definition of reliability is based on the definition of failure [1].

Nowadays, making a product that has quality and meets all the characteristics required by the employer has become an obvious issue. Reliability is the probability that a system will achieve a certain result. Therefore, high-reliability organizations are organizations that operate in a high-risk environment that gains more security and the ability to deal with more risk every day [2].

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High-reliability organization is an important approach to risk prevention and mitigation that began in the mid-1980s with the study of culture, decision-making, complexity, and technology in three organizations. These organizations were selected based on their long history of accurate and reliable performance in the field of internal and external pressure and often under severe time constraints [3].

Due to the emergence of new and high-risk technologies and the complexity of the environment, it is necessary to have complete and comprehensive information about theories related to this field and to do the necessary research in this field. Highly trustworthy organizations have characteristics such as learning organization, safety culture and redundancy [4]. Weick and Sutcliffe [25] wrote a book called "Unexpected Management", which showed how reliable international organizations such as US aircraft carriers can successfully accomplish their mission despite high risk, and why seemingly good organizations like the Ocean Union, suffer catastrophically after natural disasters because they are unable to understand their situation. Therefore, in response to their questions, they divided the characteristics of highly reliable organizations into 5 categories:

I. **Failure Concern.** Means a highly reliable organization. Unlike other organizations that usually seek success and want to know the reasons for their own success and the success of others, in these organizations, the main concern is failure and knowing the reasons for failure and finding ways to prevent it.
II. **Unwillingness to simplify interpretations.** That is, to be deep in analysis and not skimp on the issues that happen to the organization; so that the weak signals received by different units of the organization are examined and not only one person or one unit of the organization is responsible for the problems but the whole organization is responsible.
III. **Sensitivity to operations.** Means having complete and simultaneous information with details of the entire operation of the organization, full attention to operational personnel and providing the equipment they need.
IV. **Commitment to return to a baseline.** It means that the organization returns the situation to its original state immediately after the accident. This ability requires full preparation and capabilities of the organization's units to deal with the crisis.
V. **Obedience to expertise and specialty.** That is, in the organization, the criterion for decision-making in all cases is expertise and expertise. In the event of an accident, organizational hierarchy is the second priority over the experience and expertise of the organization [5].

The combination of these five characteristics leads to a state of awareness and preparedness to deal with the unexpected events, which according to the theory of American psychologist "Alan Langer", is called mindfulness or awareness.

In general, the study shows that the discussion of highly reliable organizations in areas that have high risk of executive operations as well as high costs of production and services is relevant. One of the most important such organizations is the organization with a focus on space projects, which seeks to exploit the atmosphere's extraterrestrial space and use it in the industrial and economic cycle by allocating huge costs, and its most important mission is to design, build and send measurement and telecommunication satellites. In our country, the Iranian Space Research Institute is responsible for this mission. In this research, an attempt has been made to enter into the discussion of reliability in these organizations and to present a model and to answer the question, what model is suitable for creating an organization with high reliability in the Iranian Space Research Institute?

Although the Iranian Space Research Institute is not very old and has been criticized a lot in terms of structure and performance, but this wide and long research institute can be considered the largest space institution in the country in terms of number of staff and budget allocated. Some experts believe that the institute is more like an industrial group than a research institute because it deals with industrial and commercial activities, some of which are not compatible with the space industry, and must follow the rules of commercial institutions so that the private sector can compete with this governmental institution.

Therefore, creating an organization with high reliability and organizational trust requires conditions and factors that must be considered. Identifying these factors is the first step in creating such an organization. Despite the fact that despite the great importance of the subject, no research has been done in this field in the country's space complex, and there are theoretical and practical gaps in the field of space in this regard, and on the other hand to prevent wastage of human and financial resources Is to provide a model to create high reliability in such organizations. This research is an attempt to achieve this goal to help create an organization with high reliability in the country's space. In this article, after the introduction, the theoretical foundations of the research and the background of the research are discussed. Finally, discussions, conclusions and suggestions are discussed.

2 | Theoretical Foundations and Research Background

High Reliability Organizations (HROs) are organizational forms designed to overcome complex environments. The processes found in HROs provide both reliable performance and adaptive learning. These organizations operate in a social and political environment without neglect, an environment rich in the potential for mistake and error, where a scale of consequences (implications) prevents learning through experience and to prevent failure in processes, they use complex technology in their sophisticated procedures [6]. The basic features of HROs emphasize the complete elimination of errors and mistakes and the absence of trial and error in learning [7]. These organizations tend to be safe from environmental inflammation and actively work to maintain and develop these buffers [8], that is, to create a distance between themselves and the complex environment, but now interact with the complex and changing environment is a necessity for HROs. Social theorists have listed the following characteristics for HROs [9]:

- *Failure concern.*
- *Unwillingness to simplify interpretations.*
- *Sensitivity to operations.*
- *Commitment to flexible (resilience).*
- *Obedience to expertise.*

These five characteristics make the organization a kind of constant awareness and constant care to deal with accidents. This awareness is called Consciousness. Awareness is the process of actively paying attention to new things. Doing so puts people in the present and more sensitive to the environment and perspective [9]. Consciousness is the work of interpreting weak signs in the organization. This means that the conscious organization senses even weak signs of malfunctions in parts of the organization and reacts to it. It is believed that in organizations that use sophisticated technology, the units of the organization are highly interdependent, or in other words, are paired with each other. Defects in one part of the organization are quickly transferred to other units, and a small error becomes a cascade of larger errors and causes an accident; this is the characteristic of organizations with sophisticated technology [10]. Finally, it can be said that the five features mentioned in the HRO cause the organization to become aware and by this awareness, the organization is able to detect and predict unexpected events and finally deal with them. This series of activities increases performance reliability and creates an organization with high reliability. It is clear that the ability of highly reliable organizations is not to be error-free, but the organization will be able to ensure that errors can not cause the organization to fail [11].

In the aftermath of the Chernobyl accident, humanity's wisdom response to avoid repeating similar events was to propose the theory of "highly credible organizations." It was first reported at the University of California, Berkeley in the United States on air traffic control and nuclear energy, and was later used in all organizations such as fire and crisis centers or hospital emergencies [12]. Although these centers operate in different industries, they have commonalities such as operating in socio-political environments, using high-risk technologies, and lacking unscientific and experimental learning due to potentially catastrophic consequences [13].

Surveys of theories about high reliability in the country indicate the high importance and necessity of paying attention to this issue.

Irandoost et al. [5], conducted a study entitled "Accident Management in Service Organizations with a High Reliability Approach". In this study, first, the characteristics of HROs are presented; then the activities required to implement the characteristics of an organization with high reliability in electricity distribution companies is listed as a service organization. These activities include high power of interaction, high transfer rate, calmness, security, learning, teamwork, talent management, organized turmoil, knowledge management, trust, job rotation, loyalty, hard work, experience, survival, and dignity. The data collection tools were questionnaires and interviews and the statistical population was the senior managers of Iranian electricity distribution companies. The research method is descriptive exploratory and applied in terms of purpose. They conducted a study entitled "Designing a Human Resource Management Model in Highly Reliable Organizations". The model designed for human resource management includes sixteen components, which are high interaction power, high transfer speed, peace, security, learning, carte blanche, talent management, organized turmoil, knowledge management, trust, job rotation, loyalty, hard work, Survival of experience and dignity. This model was tested in Iranian power companies under the auspices of the Ministry of Energy by field method and by distributing a questionnaire. In the test of this model in Iranian electricity companies, it was found that there are twelve components of the model in electricity companies and there are not four components in these companies, the necessity of their existence for these companies was assessed by interviewing experts in the electricity industry. Neglected components or activities are necessary to achieve a highly reliable organization and provide them by the managers of these organizations in Iranian power companies.

Agwu et al. [2], conducted a study entitled "Accident Prevention through a Coordinated Framework for Highly Reliable Organizations". In this study, which has been conducted using HRO principles in 8 organizations, 3 industries and on two continents, the Organizational Reliability Matchability Model (ORM2) has been developed to pursue advanced organizations at 5 levels of maturity. This framework that has developed For Organizational Reliability Maturity (FORM), has been improved measuring the level of maturity of organizations, forecasting the potential for natural disasters and evaluating the organizations.

Dong et al. [14] conducted a study entitled "Creating Reliable Organizations Using Mindset". The results showed that the subjectivity techniques used with systems software methods, provide an effective framework for creating HRO. In doing so, this study also explores the sixth aspect of HRO.

Milosevic et al. [15], conducted a study entitled "the Effectiveness of Maintenance Methods for Highly Reliable Organizations". The main phases of this study are: identifying the main features (HRO for prevention and flexibility), identifying the main maintenance methods to date and finally to evaluating their compliance with HRO features. This article presents a new method for evaluating different maintenance methods: in addition to productivity, the need to ensure the continuity of production in the face of unpredictable events is also considered.

Huang et al. [16], evaluated the reliability of a complex ship welding structure using a possible design approach; provided that the growth of the resulting cracks is simultaneously interconnected and developed from several areas of the ship. Using stress intensity factors at the starting point of the crack, they examined all the existing compositions of the cracks with different lengths and calculated them with the help of finite element analysis. In this study, the Paris-Erdogan law has been used to estimate the propagation of cracks due to fatigue, and finally, the reliability of the network welding structure is evaluated simultaneously with the correlation of both failures due to fatigue.

Salovaara et al. [17], who is one of the main theorists of high-reliability organizations, claimed in these organizations, people interact with each other to create a clear picture of current operations, recognizing each other's knowledge and abilities in the form of teams and also emphasize on knowledge sharing (knowledge management) of high-level training. Bagnara et al. [18], conducted a research entitled "Are

Hospitals Highly Reliable Organizations?". The results showed that compared to traditional HROs, hospitals are undoubtedly high-risk organizations, but they have specific characteristics and systemic social and organizational barriers that make them HROs. Finally, based on the theoretical foundations and research background of infrastructures and principles of creating an organization with high reliability, it is based on the following:

Table 1. High-reliability organization chart and illustrated methods.

Concept	Definition	Operations
Failure Concern	Working with chronic anxiety about the possibility of unexpected events that could jeopardize security by engaging in preventive analysis and discussion after practical investigations.	Before the operation, people spend their time identifying activities that they do not want to do wrong. In conducting transfers or reports of upcoming employees, people discuss what to look for.
Unwillingness to simplify interpretations	We deliberately question the hypotheses and gain wisdom to create a more complete and subtle picture of the current situation.	People are looking for alternative perspectives and are encouraged to express different opinions. People feel comfortable with difficult problems.
Sensitivity to operations	Continuous interaction and sharing of information about current human and organizational factors to create a large and integrated picture of current situations.	People are often interacting enough to get a clear picture of what is happening here and now. They have a good 'map' of each other's talents and skills. People have access to a variety of resources whenever unexpected surprises go away.
Commitment to flexible (resilience)	Develop the ability to deal with, control, and exaggerate the bad things that have already happened before they get worse and cause more serious damage.	People are constantly talking about mistakes, how to prevent them, and what can be learned from them. People are constantly trying to improve their skills and create new responsive repertoires.
Obedience to expertise	At many times (for example, when trying to solve a problem or crisis), decision-making, regardless of authority or rank, migrates to the person or persons who have the most expertise in the problem at hand.	People are aware of each other's unique skills and knowledge, and take advantage of their colleagues' unique skills when problems arise. When a patient crisis occurs, individuals quickly develop their collective skills to try to resolve it.

3 | Research Methodology

Various classifications of various research methods have been done from the perspective of experts. One of these classifications is categorization based on purpose and classification based on method. The present study is a type of developmental research in terms of purpose. In terms of the nature and approach of research, it is one of the causal-effect researches because it seeks the effect of variables. In this regard, the present study is a descriptive-analytical research in terms of data collection method. It should also be noted that the present study is one of the mixed research of the data-based type, because the data used in the present study is qualitative and quantitative data.

Among the techniques of data collection in qualitative research, interviewing is the most common form of data collection, which is often the main source needed to understand the phenomenon under study. The interview can be structurally completely structured, and that is when the questions and their order are predetermined; or completely unstructured, and that is when nothing is clear in advance. Nevertheless, the most common form of interview is a semi-structured type formed by a set of questions and topics, but not quite precisely with regular pre-determined questions, but as a checklist of what needs to be asked. The interview can be recorded simultaneously or immediately after the interview, or using a tape recorder or video camera [19].

In this research, interviews have been used to collect information and identify the categories and subcategories of creating a highly reliable organization.

The qualitative part of the research is accompanied by theoretical sampling. Theoretical sampling is a type of purposeful sampling that focuses on the development of theory. In other words, the researcher selects knowledgeable individuals who can enrich the required data in the collection process to enable the theory to be made [19]. Therefore, in the qualitative part, the research was conducted using semi-structured interviews with 20 experts who are literate on the subject, in the Iranian Space Research Institute and active academic experts in universities.

It should be noted that the criteria for expertise in this study includes managerial experience of at least 10 years in space research and also having a degree in public administration.

The appropriate sample size varies qualitatively and quantitatively in research and depends on the research method used. The sample size for the theory derived from the data is 40-30 people [20]. Therefore, in this study, first, through individual interviews with experts in the field of reliability, which were selected using the snowball sampling method, the categories and subcategories of the organization were identified with high reliability. Although there are different approaches to targeted sampling, one of the methods of targeted sampling that is commonly used in qualitative research is theoretical sampling. This sampling method is adapted from the research method "data theory" or "fundamental theory".

After the initial collection of the questionnaires, we coded the collected raw data and also conceptualized the common codes and finally the theory was identified. Then, using confirmatory factor analysis, the introduced factors or categories were confirmed or rejected.

The statistical population of this research in a small part consists of the active staff of the organization in the Iranian Space Research Institute with 1000 people. Also, the statistical sample in this study is 277 people and the sampling method is considered available.

4 | Research Findings

In this study, interviews were conducted with experts in the field of reliability. The focus of the interviews was on people's perceptions of the conceptual model of creating a highly reliable organization. Initial interviews were conducted to identify the main themes and categories. Simultaneously with the interviews, the researcher identified individuals who, during the data analysis process, could provide specific insights into undeveloped or underdeveloped topics and categories. With the identification of topics and the formation of primary categories, the second round of interviews began with the aim of developing this group of categories. The process of analyzing and coding interviews is discussed below. In this study, three types of sampling proposed by Strauss and Corbin [21], open sampling, communication and diversity sampling and discriminant sampling were used to collect and assist in data analysis. Based on this, the researcher conducted 19 interviews and analyzed their text in three rounds. In the first round, after analyzing the text of nine interviews, the researcher was able to identify key categories. After analyzing these interviews and reviewing a wide range of studies conducted by previous researchers, questions arose about the main phenomenon of the research. Therefore, the researcher conducted the second round of interviews. In this round, in order to ensure the theoretical saturation of the categories, the researcher, considering the main phenomenon and its related sub-categories, put 5 more interviews on the agenda. In these five interviews, the researcher focused on questions that helped him to understand the main nature of the research phenomenon and its relationship with the corresponding categories. Finally, after identifying the categories and ensuring their theoretical saturation, it was the turn of the third round of interviews. At this stage, the researcher conducted five more interviews to find theoretical examples of categories and the relationships identified between them to provide a basis for refining the theory and presenting its conceptual model.

4.1| Start Data Encoding

The main coding procedures in this chapter are:

- *Open coding.*
- *Axial coding.*
- *Selective coding (Theorizing stage).*

According to the mentioned procedures, to answer the research question, information data were collected and analyzed. As mentioned before, in the current research, the researcher has taken advantage of MAXQDA software (2018 edition) to analyze all the trends of open, axial and selective coding theory, as well as recording notes and drawing diagrams. After determining the categories, the stage of constructing the general classes of theory will be started which is presented in the table on the next page.

Table 2. Forming general classes of categories.

Categories (Subcategories)	The Main Classes
Develop a reliability strategy.	Commitment to return to basic conditions
Evaluate knowledge during the process of organizational activities.	
Planning based on the strengths and weaknesses of the organization.	
Establish an integrated reliability procedure based on the needs of the organization.	
Determining the procedures for recording individual and organizational knowledge.	
Develop infrastructure and reliability tools.	
Transparency of processes in the organization's service supply chain.	Sensitivity to operation
Review the processes of providing and rendering services to the organization.	
Designing the service supply chain processes of the organization.	
Review of how to perform reliability activities.	
Designing organizational processes based on government priorities.	
Use the opinions of all employees and experts of the organization.	Talent management
Special attention and importance to the head of different departments.	
Paying attention to the importance of the achievements of the services provided to the relevant working group.	
Attention to group relations and partisanship in the organization.	
Practical training in specialized workshops.	Learning
On-the-job learning in different parts of the supply chain.	
Institutionalize what you have learned through continuous practice.	
Employees are encouraged to continue their education.	
Formation of specialized and general associations along the supply chain.	
The role of managers in reliability planning.	
Providing appropriate time to employees by managers.	Support and support of managers
Managers support the provision of open and intimate space in the organization.	
Managers pay special attention to employees participating in reliability procedure.	
Direct supervision of managers over the activities of the organization.	
Documenting staff knowledge.	
Documenting employees' personal knowledge.	Experimental remnants
Documenting critical cases.	
Documenting problems and ways to deal with them.	
Fair distribution of material and intangible benefits.	Motivation and reward system in the organization
Creating a financial and non-financial reward system for skilled employees.	
Motivational system of spiritual reward with employees.	
Monitoring of active processes in the organization.	
Evaluate employee skills courses in the organization.	Job rotation
Staff ability retraining workshops.	
Control systems in the learning of the organization's employees.	
Transparent organizational chart.	
Explain the duties and responsibilities of each employee in the organization.	Organizational agility
Ease of staff interaction with the managers of each department.	
Creating organizational flexibility in order to adapt to the conditions.	

Table 2. (Continued).

Categories (Subcategories)	The Main Classes
Transparency of the organization's training program. Transparency of knowledge dissemination and transfer program. Transparency of the program for the creation and development of organizational and individual knowledge. Transparency of knowledge acquisition program and registration in the organization. Transparency of learning and teaching conditions.	Teamwork
Explain the culture of teaching and learning in accordance with the reliability program. Review and formulate organizational culture in accordance with the structure of the organization. Pay special attention to employees with skills and experience. Special attention to the experience provider staff. Valuing knowledge disseminated in the organization.	knowledge management
Motivate employees to create and disseminate knowledge. Maintaining intellectual capital. Retaining employees with practical skills in the organization. Proper selection of intellectual force.	Human resources managemen

4.2 | Axial Coding

Since in designing the model, first the components must be determined and then the relationship between them must be explained, and then the logic of choosing components and the relationship between them should be described; so in the second step, based on the obtained data, we have considered the components of the model of creating a highly reliable organization. The 6 components of which can be seen in *Fig. 1* as follows. The six components are based on data obtained from in-depth interviews and their processing and categorization. The obtained results were provided to some professors and were validated.

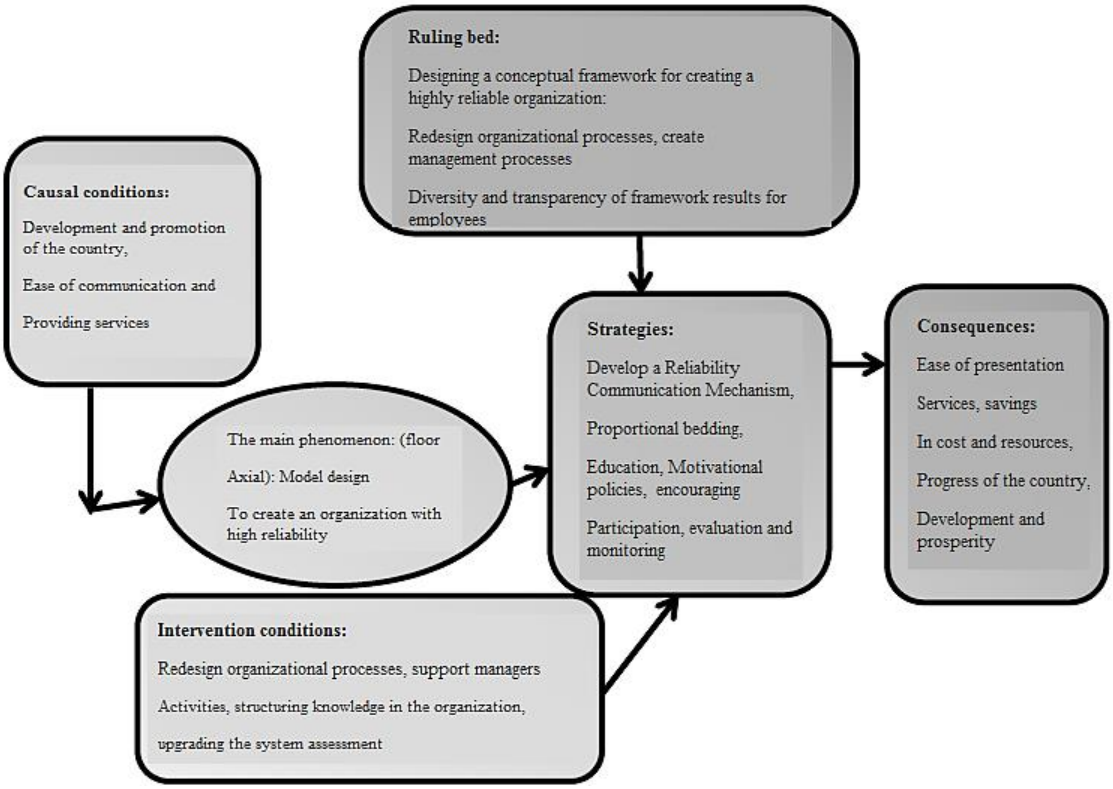

Fig. 1. Axial coding based on the paradigm model.

4.3 | Reminders and Diagrams

Over time, the researcher has used the facilities of MAXQDA software to integrate the research as much as possible. Two of the most important features of this analytical software are reminders and diagrams, which make the researcher define the necessary points, which are to be specified at a certain time and

include sufficient explanations in it, so that at the appropriate time by the software to let him know. In research based on grounded theory, the use of reminders is necessary and unavoidable due to the long duration of the research. If the researcher did not use this possibility during the research process, more gaps would certainly appear than the current results in the current research. Nevertheless, the use of diagrams will make it easier to display the connections between concepts, categories and coding, because after a short time of analysis and engaging the researcher's mind with new research challenges, it will be very difficult to recall and read content without figures and diagrams. In the current research, the researcher has simply used this possibility to associate the connections between categories and content in his mind.

4.4 | Using Textual Data Mining to Check the Accuracy of Coding

In order to check the accuracy of the categories extracted from the interviews, before formulating the theory and presenting the conceptual model in two ways, the researcher examines the accuracy and precision in the coding done by himself as well as the validity and reliability of the texts extracted from the interviews:

- *Application of text data mining technique to classify texts produced from interviews.*
- *Review and revise the resulting coding and texts by participants and confirm or reject them.*

In this section, we will describe the textual data mining technique used by the researcher. In the present study, the researcher has used a new approach in classifying texts known as MKTPKS or sequential expressions of knowledge versus term methods or simple expressions. The researcher has formed the MKTPKS collection to check the accuracy and precision of the texts obtained from each interview, so that first the texts taken from the interviews as well as the coding done by the researcher are divided into different clusters by clustering technique. Identify common features in the texts, and use these features as a representative for each interview as well as the coding done. The output of this step is stored in the form of interface tables to be used in the second step of forming the MKTPKS set. In the second step, the researcher has applied the set of Apriori association rules to the resulting relational tables, in order to form a series of consecutive expressions of knowledge. Prior to the formation of this collection, the researcher will review this collection and, if necessary, the phrases related to the interview will be added to the MKTPKS collection in consultation with the participating experts. Finally, after extracting the codes from the set of interviews conducted from this collection, in order to classify the texts obtained from the coding, the category of acceptable and accepted texts and the category of unacceptable and rejected have been used. The compiled collections were loaded and examined along with the texts resulting from Grounded Theory coding in the form of a text file in Rapid Miner software. If the texts had an acceptable label, the researcher had the necessary accuracy to develop the model, but still have to go through the second stage of reviewing the validity and reliability of the participant, and he also produced the content. Approve by coding so that the researcher can compile and present a model based on the content and codes generated. However, if the coded texts receive an unacceptable label in the very first stage of the review by the text data mining technique, all the texts obtained from the interview, the researcher's notes and reminders will be reviewed and coded again. This process continues until the texts receive acceptable tags. The following MKTPKS sets based on the algorithm presented in the current research are observed for the first 9 interviews.

MKTPKS Interview Collection No. 1. Policy, strategy, diversity management, documentation, experiences, implicit, explicit, knowledge sharing, trust, knowledge absorption, creativity, innovation, selection, knowledge record, course, training course, experience transfer, integration, improvement.

MKTPKS Interview Collection No. 2. Job description, knowledge staff, organizational position, service delivery, evaluation index, productivity, documentation, work procedure, workshop training, knowledge tools, motivation, knowledge network, value added, culture, budget.

MKTPKS Interview Collection No. 3. Training, learning, knowledge sharing, service chain, rationalization, knowledge creation, recording, monitoring, inspection, outsourcing, knowledge gap, sufficient time, information technology, lessons learned, lessons learned.

MKTPKS Interview Collection No. 4. Idea, challenge, weaknesses, findings, process, information repositories, knowledge base, training course, infrastructure, control, monitoring, Classification, explicit expression, persistence, adherence.

MKTPKS Interview Collection No. 5. Knowledge activity, task segregation, support, information system, selection, organizational needs, recruitment committee, assessment, prioritization, plan new, bureaucracy, organizational climate, reward system.

MKTPKS Interview Collection No. 6. Responsibility, Teaching and Learning, Measurement Criteria, Trust, Codified Procedures, Valuation, Written Documentation, Research, Research, Music, Specialized Associations, Retirement, Knowledge Sharing, Organizational Memory.

MKTPKS Interview Collection No. 7. Evaluation, comparison, competitor organization, staff potential, intellectual capital, suggestion system, IT tools, problems and problem solving, empathy, consensus, knowledge dissemination, standardization, modeling, documentation, competitive environment, employee participation, flexibility, formal training, lessons learned.

MKTPKS Interview Collection No. 8. Valuation, intellectual capital, expert, formal mentoring procedures, facilitation, application of knowledge, financial reward, non-financial reward, specialized association, evaluation indicators, specialized committee, delegation, critical conditions, desire, knowledge map, like-minded meetings, support.

MKTPKS Interview Collection No. 9. Explicit expression, trust, value creation, organizational memory, index, cognitive knowledge, gap, recruitment, evaluation, competitive environment, documentation, documentation tools, rewards, interaction, knowledge base, supervision, knowledge acquisition process, skills based on the above collections.

Based on the above collections, the researcher has reviewed the texts obtained from the interviews and has tried to confirm the accuracy of the analysis in addition to the textual data mining model by the direct opinion of the participants. In order to check the accuracy of the second and third rounds of interviews, the researcher formed a general MKTPKS collection, which was formed with the cooperation of several experts from government organizations.

4.5 | Selective Coding

As mentioned, the goal of grounded theory is to produce a theory (model presentation) not a mere description of a phenomenon. In order to convert analytics to theory, classes should be related to each other on a regular basis. Selective coding (based on the results of the previous two stages of coding) is the main stage of theorizing (model presentation). In this way, it systematically relates the central class to other classes and presents those relations within the framework of a narrative and modifies the classes that need further improvement and development. At this stage, the researcher, according to his understanding of the text of the phenomenon under study, or the framework, presents the paradigm model in a narrative form or breaks down the paradigm model and graphically shows the final theory (final model). To turn the analysis into a theory and present the model, the researcher describes each of the relevant factors. In the following, a complete description of each factor is given.

Table 3. Description of the final theory (conceptual framework).

Agent Title	Effective Parameters in the Agent
The main category	Design a model to create an organization with high reliability.
Causal conditions	Development and promotion of the country.
	Save resources and costs.
	Save time.
	Accelerate service delivery.
Interfering conditions	Designing a mechanism for culture improvement and development.
	Designing an organizational structure reform mechanism.
	Designing a workflow improvement mechanism.
The ruling bed	Designing mechanisms for knowledge discovery and creation.
	Design of knowledge registration mechanisms.
	Design of knowledge sharing and transfer mechanisms.
	Design of knowledge application mechanisms.
	Design of communication mechanisms.
	Design of technological mechanisms.
	Design of legal mechanisms.
	Design of financial mechanisms.
Actions and interactions	Designing a mechanism to modify knowledge processes commensurate with reliability in organization.
Consequences	Improve organizational productivity.
	Provide a conceptual model for creating an organization with high reliability.

After collecting data from the community representative sample, it is time to analyze the data. In data analysis, three goals are pursued: initial statistical description of data (initial knowledge of data), test of data fit and testing of research hypotheses.

4.6 | Sample Adequacy Test

According to the results of *Table 3*, KMO coefficient and Bartlett test were used to determine the suitability of the data for factor analysis. The KMO value was 0.947 and the Bartlett test was 1447.05 and p = 0.000, which indicates that the data of the variables are suitable for factor analysis.

In the next step, for exploratory factor analysis, the main components were determined with special values greater than 1 for each component, and also the accepted factor load considered greater than 0.5. By extracting the components, 8 factors in the same analysis and initial extraction of the case was confirmed. The results of this study are presented in the chart.

Table 4. KMO rate and Bartlett test (source: software output).

	KMO	Bartlett Test	P
Commitment to return to basic conditions.	0.947	1447.05	0.000
Sensitivity to operation.	0.854	118.29	0.000
Talent management.	0.902	117.36	0.000
Learning.	0.746	264.39	0.000
Support and protect of managers.	0.815	113.48	0.000
Experimental remnants.	0.841	115.69	0.000
Motivation and reward system in the organization.	0.793	108.27	0.000
Job rotation.	0.914	99.36	0.000
Organizational Agility.	0.851	84.47	0.000
Teamwork.	0.736	117.15	0.000
Knowledge management.	0.816	98.16	0.000
Human resources management.	0.896	191.25	0.000

According to the findings of *Table 4*, which show the initial subscriptions and the extracted subscriptions, respectively, the subscription of one variable equal to the quadratic power of multiple correlation (R2) for the relevant variables using the factors as predictors. The first column shows the initial subscriptions, which is equal to 1. The second column shows the extracted subscriptions, which should be greater than

0.5, and in this case, because the extracted supported subscriptions, senior managers' protection, incentive and reward system, job rotation and teamwork are less than 0.5, they will be removed from the model.

Table 5. Agent subscriptions (source: software output).

	KMO	Bartlett Test
Commitment to return to basic conditions.	1.000	0.701
Sensitivity to operation.	1.000	0.780
Talent management	1.000	0.729
Learning.	1.000	0.702
Support and protect of managers.	1.000	0.356
Experimental remnants.	1.000	0.692
Motivation and reward system in the organization.	1.000	0.211
Job rotation.	1.000	0.163
Organizational Agility.	1.000	0.736
Teamwork.	1.000	0.255
Knowledge management.	1.000	0.766
Human resources management.	1.000	0.756

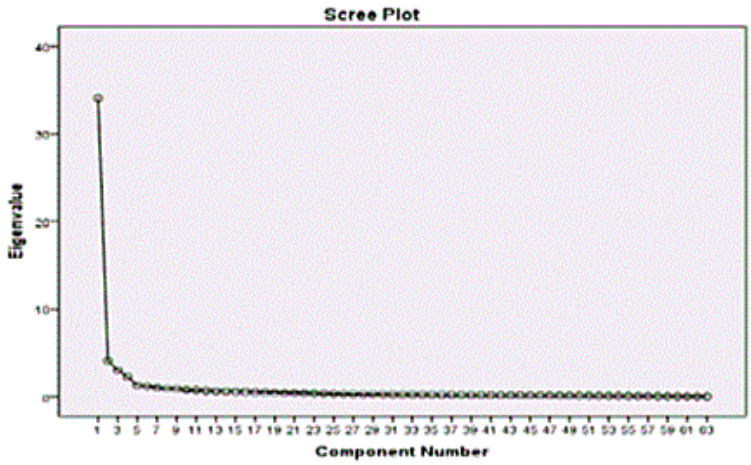

Fig. 2. Scray diagram for factor extraction (source: software output).

According to the findings of *Table 6*, in the rotation of the first stage, it was found that the data are suitable for factor analysis. In this research, 8 factors were extracted with eigenvalues higher than one, which explained 74.64% of the total variance of the factors, and the remaining 25.36% was related to factors that were not identified in the factor analysis. Therefore, two thirds of the factors affecting the creation of high-reliability organization were identified through factor analysis. The remaining value relates to factors that were out of the researcher's control. According to the eigenvalue of *Table 6*, the first factor with eigenvalue 34.08 had the largest share (54.09) in explaining the total variance and the last factor with eigenvalue 1.04 had the smallest share (1.66) in explaining the total variance.

5 | Evaluation of Data Normality Using Kolmogorov-Smirnov Test

To use the statistical technique, it must first be determined whether the collected data has a normal or abnormal distribution? Because if the distribution of the collected data is normal, parametric tests can be used to test the hypotheses, and if it is not normal, non-parametric tests can be used. In this step, we review the results of the above test for each of the dependent and independent variables and based on the results, we select the appropriate test to check the accuracy of the research hypotheses.

Table 6. Symbol of extracted factors and the contribution of each in determining the variance (source: software output).

Question	Rotation						
	1	2	3	4	5	6	7
EE17	0.851	-0.107	-0.029	-0.129	0.015	0.042	-0.011
EE9	0.831	-0.147	-0.134	-0.286	0.077	0.072	-0.014
EE18	0.821	-0.249	-0.015	-0.128	V001	-0.035	-0.046
EE19	0.815	-0.101	0.188	-0.028	-0.059	-0.147	-0.030
EE4	0.806	-0.127	0.110	-0.269	0.018	0.214	-0.003
ST21	0.803	0.244	-0.099	-0.120	0.157	-0.137	-0.204
ST23	0.802	0.062	-0.059	-0.124	-0.041	-0.049	-0.219
ST22	0.797	0.054	-0.080	-0.193	-0.019	-0.074	-0.292
SE3	0.791	-0.229	-0.226	-0.202	0.095	0.086	-0.026
SE2	0.798	-0.193	-0.266	-0.128	0.182	-0.044	-0.014
EE15	0.785	-0.084	0.233	-0.124	-0.158	-0.207	-0.060
SE5	0.783	-0.195	-0.083	0.116	0.000	0.033	-0.228
ST10	0.780	0.362	-0.039	0.036	-0.105	-0.002	-0.024
SE8	0.780	-0.196	-0.244	0.108	0.005	-0.036	-0.123
SE9	0.778	-0.093	-0.368	-0.024	0.017	-0.205	-0.037
ST12	0.778	0.357	-0.127	-0.062	-0.047	0.031	0.021
SE4	0.778	-0.184	-0.278	-0.105	0.154	0.028	0.113
EE1	0.777	-0.072	0.229	-0.197	0.084	0.189	0.044
ST5	0.773	-0.297	0.132	0.005	-0.137	-0.114	0.147
SE10	0.771	-0.166	-0.407	-0.033	0.081	-0.068	0.047
EE8	0.771	-0.119	0.310	-0.200	0.159	0.010	0.037
EE7	0.770	-0.169	0.228	-0.274	0.134	0.165	-0.094
SE1	0.768	-0.168	-0.162	0.032	0.143	0.028	0.137
ST20	0.763	-0.295	-0.091	-0.017	0.225	-0.152	-0.192
EE3	0.761	-0.136	0.217	-0.286	0.028	0.202	-0.004
SE16	0.765	-0.172	-0.298	0.051	-0.158	-0.160	-0.012
SE14	0.756	-0.323	0.029	0.188	-0.144	-0.037	0.170
EE13	0.753	-0.225	0.342	-0.105	0.036	-0.195	0.042
EE2	0.752	-0.165	0.134	-0.344	-0.019	0.193	-0.056
SE11	0.749	-0.187	-0.372	0.006	0.116	-0.069	0.022
EE14	0.748	-0.128	0.247	-0.167	-0.184	-0.101	-0.021
ST4	0.746	0.321	-0.059	-0.039	-0.149	0.048	0.112
ST7	0.740	0.390	-0.085	-0.146	-0.039	0.184	0.170
EE16	0.740	-0.139	0.166	-0.009	-0.050	-0.018	0.064
ST9	0.740	0.400	-0.015	0.035	-0.148	0.071	0.029
SE7	0.739	-0.161	-0.261	0.098	-0.004	0.094	0.300
EE6	0.732	-0.102	0.266	-0.100	-0.008	0.237	-0.001
ST13	0.728	0.354	-0.051	0.166	0.111	0.005	-0.127
SE20	0.726	-0.275	-0.024	0268.	-0.095	0.005	-0.137
SE21	0.725	-0.240	0.258	-0.143	-0.029	0.055	-0.168
ST18	0.723	0.328	-0.024	0.249	0.178	0.052	-0.103
SE13	0.719	-0.209	-0.339	0.089	0.037	0.007	0.106
ST11	0.712	0.428	0.107	0.073	-0.167	0.174	-0.034
ST19	0.710	0.160	-0.133	0.250	0.088	-0.256	-0.183
ST6	0.708	0.363	-0.039	-0.208	-0.040	0.021	0.111
SE18	0.695	-0.296	-0.060	0.316	-0.180	0.099	-0.204
ST2	0.695	0.438	-0.076	-0.221	-0.223	0.004	-0.008
EE5	0.695	-0.048	0.452	0.131	-0.100	0.104	0.098
ST3	0.693	0.403	-0.158	-0.110	-0.146	-0.135	0.098
EE11	0.687	-.033231	0.436	0.122	0.059	-0.317	0.155
SE19	0.678	-0.301	-0.028	0.275	-0.191	0.211	-0.324
SE6	0.671	-0.220	0.013	0.368	-0.043	0.111	0.185
Se15	0.667	-0.129	0.103	0.387	-0.226	0.002	0.020
EE10	0.665	-0.117	0.534	0.122	0.155	-0.089	-0.085
EE12	0.663	-0.324	0.364	0.117	0.033	-0.305	0.170
SE12	0.646	-0.454	-0.366	0.049	0.149	-0.052	0.064
ST8	0.646	0.301	-0.073	0.116	-0.233	0.176	0.178
ST16	0.638	0.321	-0.100	0.213	0.371	0.070	0.008
ST17	0.635	0.328	-0.002	0.280	0.308	0.-43	-0.199
SE17	0.623	-0.280	-0.077	0.313	-0.288	0.034	-0.205
St14	0.594	0.230	0.128	0.337	0.274	0.227	0.043
ST1	0.592	0.481	-0.004	-0.185	-0.085	-0.278	0.009
ST15	0.568	0.358	0.238	0.404	0.268	0.118	0.086

Table 7. Evaluation of data normality using Kolmogorov-Smirnov test (source: software output).

Factor	Kolmogorov-Smirnov Coefficient	Significance Level	Result
Commitment to return to basic conditions	0.150	0.093	Normal
Sensitivity to operation	0.142	0.088	Normal
Talent management	0.086	0.062	Normal
Learning	0.154	0.321	Normal
Organizational Agility	0.718	0.512	Normal
Experimental remnants	0.441	0.149	Normal
Knowledge management	0.142	0.238	Normal
Human resources management	0.212	0.312	Normal

According to the results of *Table 7*, because the value of the significant level for all factors is higher than 0.05% error, so the frequency distribution of the items of these variables is normal. Due to the fact that the present research model measures the relationships between several hidden variables (main research variables) simultaneously, so structural equation modeling was used to analyze the data and test the hypotheses. In this study, for more accurate results, and for test the conceptual model of the research, the PLS method was used. This method is a variance-based path modeling technique which allows the study of theory and metrics to be done simultaneously [22]. In this method, two models are examined: 1) the Outer Model that is used to examine the relationships between indicators (research questions) with their main variables. This model is in fact equivalent to the same measurement model in covariance-based methods, 2) Internal model that measures the structural part of the model and is used to examine the relationships between hidden variables (main variables). Research hypotheses are formed from the relationships between latent variables.

5.1 | External Model (Measurement) Research Hypotheses

Fig. 3 shows the output of the measurement model for the research model in PLS software.

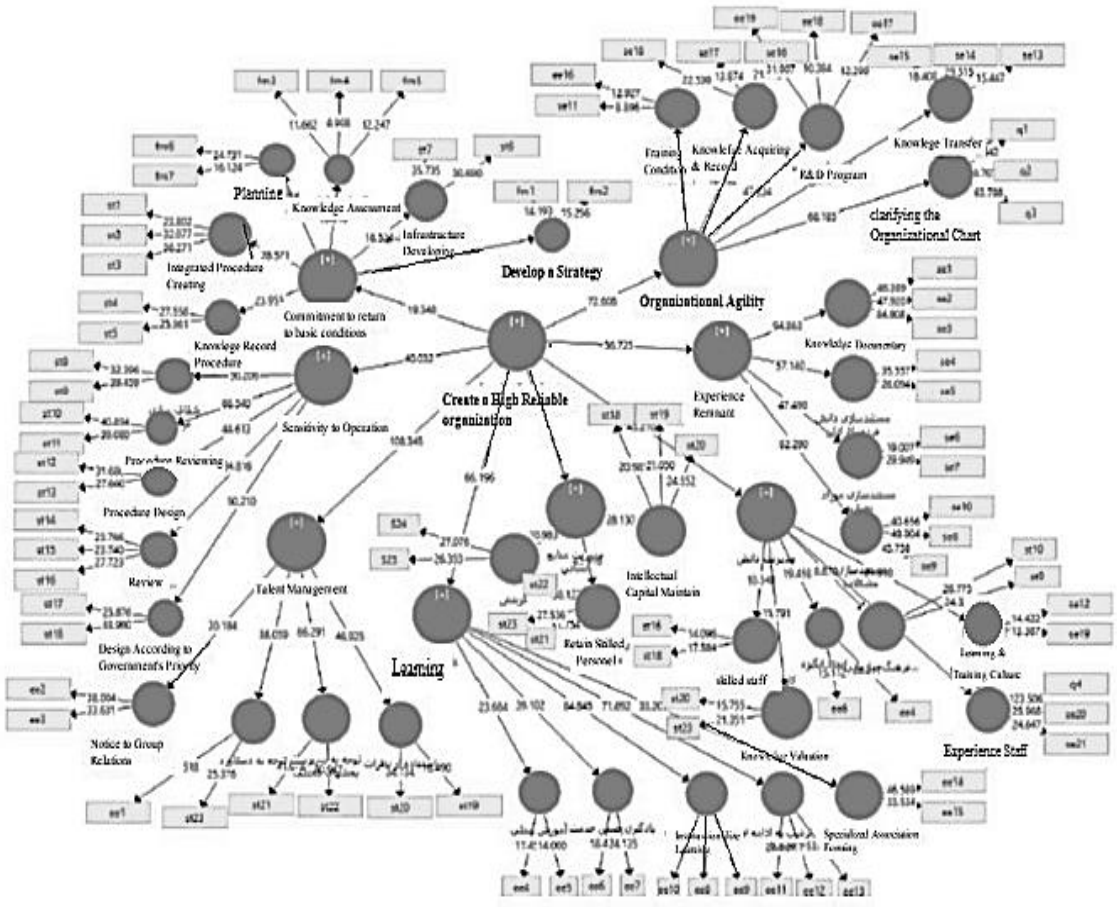

Fig. 3. Measurement model output in Smart PLS software (source: software output).

5.2 | Internal model (Structural Part) Research Hypotheses

According to the data analysis algorithm in PLS, after examining the fit of the measurement model, it is the turn of the structural model to fit the structural model. Unlike the measurement model, the structural model section does not deal with explicit variables, but only with hidden variables and the relationships between them. The structural model examines the relationships between structures. The Bootstrapping function is used for this purpose (*Fig. 4*).

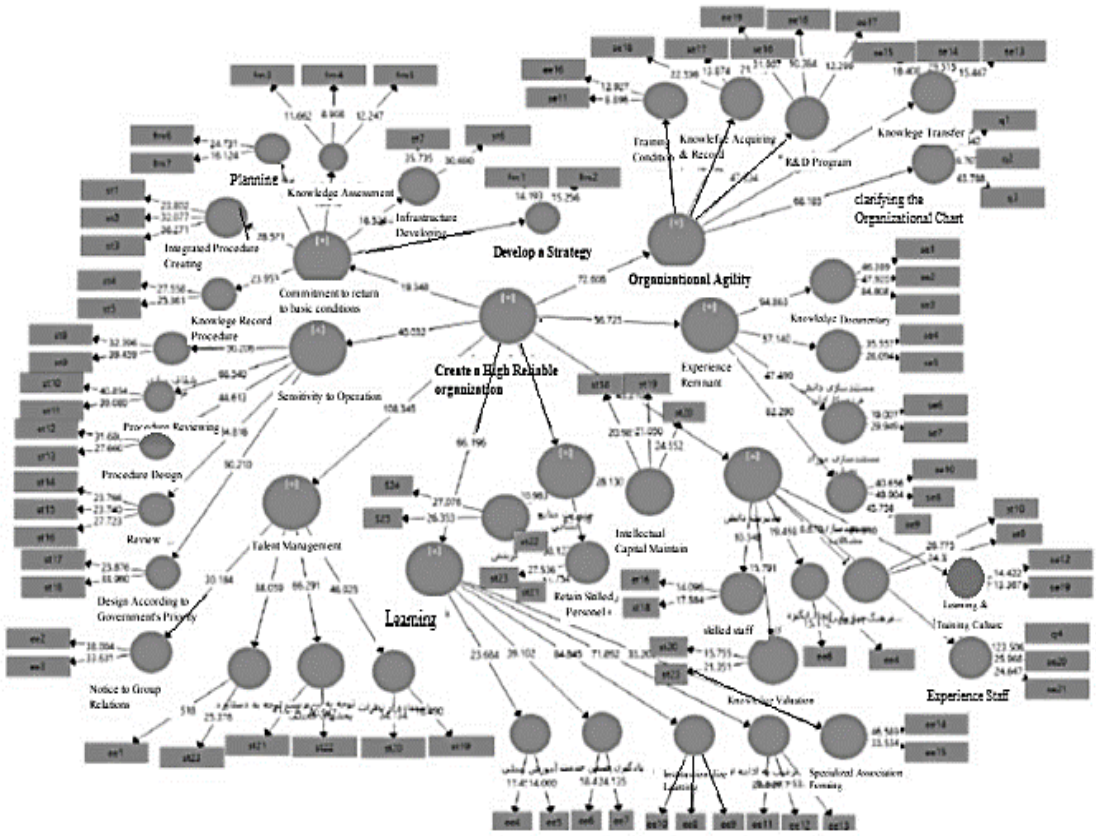

Fig. 4. Structural model output in Smart PLS software (source: software output).

The numerical value in the relations represents the t-value statistic, which is in fact the main criterion for confirming or rejecting the hypotheses. Acceptable values for the significance of path coefficients at the confidence level of 0.90, 0.95 and 0.99 should be greater than 1.64, 1.96 and 2.57, respectively.

5.3 | Overall Fit of the Model

Standardized Root Mean Squared Residual (SRMR) is used to fit the whole model. The SRMR index determines the extent to which the conceptual model is consistent with the experimental data. SRMR also helps to see if the available data confirm the set of hypotheses mentioned, i.e. the effect of hidden variables on each other. The SRMR value varies between zero and one. The weaker the factor loads and the less significant they are, the larger and larger this index will be. The value of 0.08 is the red line of this index. The higher the value of this indicator, means that the model has important failures and it is necessary to revise the model as a whole [23]. In this study, the SRMR index is about 0.13, which is considered a good value, and means that the whole model has a good fit.

Table 8. SRMR criterion (source: software output).

	Saturated Model
SRMR	0.135

6 | Discussion and Conclusion

Security, learning, and experience survival activities are required to characterize the failure concern of a highly reliable organization. Space research staff should be able to report errors and problems to the organization, even if they are responsible for them. People should report these errors to the relevant centers without worrying about the consequences of reporting errors and mistakes. In HROs, employees not only do not blame for their reports, but also encouraged. These reports are used extensively to prevent them from becoming bigger problems. Unexpected accidents are caused by a series of errors that are obscured and suddenly cause a cascade in the power grid. If people report these errors at the same point of production, the said chain will not be formed or can be controlled. In space research, what is important and increases reliability is to prevent accidents. If this is a major concern for the employees of these companies (concern for failure), they are always concerned about the accident and seriously monitor the slightest sign of an accident and try to prevent it. This is the organizational awareness that characterizes an organization with high reliability. Another necessary activity is learning. Learning here is to use the experiences of others to correct current behaviors in order to avoid repeating mistakes. Continuous training and evaluation of the effectiveness of these trainings, face-to-face visits and face-to-face negotiations with similar companies that have experienced failure, and analysis of the causes of these failures and the occurrence of crises increase learning. Simulation of accidents, and creating controlled crises and dealing with crises by performing operational maneuvers as well as maintaining the organizational experiences of people when leaving the organization, for example when retiring with various methods such as holding classes and seminars or writing pamphlets and books so that these experiences to remain in the organization, in other words, to remain an experience in the organization, is one of the conditions to ensure the failure of the organization as the first characteristic of the organization with high reliability.

Activities of high interaction ability, job rotation and trust. To provide the characteristic of unwillingness to simplify interpretations in the organization with high reliability, these features are required. In power distribution companies, the belief that they operate in a complex organization with a more complex environment is important, especially for the managers of these companies, this belief should become a heartfelt belief. In any electricity distribution company, problems and errors occur during operation that cause power outages. If we consider any of these outages as a failure in the current operations of the company, this failure has reasons or reasons. If this failure is superficially passed on or blamed one person or unit (simplification in interpretation), then the probability of recurrence of the incident will be very high; while if to investigate and analyze each incident without them be divided into minor or important; by all units of the company to solve the problem and prevent recurrence, which of course requires the ability to interact between the people of these units. In other words, all data, although not seemingly trivial, is then not simplified. Research staff should learn the art of negotiation. This means negotiating and interacting with each other and using each other's abilities to create synergies. Certainly, in order to achieve this ability, it is necessary to have trust between the employees themselves as well as between the employees and the managers. Trust means being sure that someone else is not doing anything to harm you. Without trust, people do not share their knowledge with others. Job rotation can be effective in building trust and mutual understanding between organizational units; because being in different jobs and getting acquainted with the problems and difficulties of each job makes it possible for employees to understand it. Finally, if there is a belief that failures and problems are not determined only by one person or unit; but a chain of individuals or units involved, and to solve it, the whole organization must be involved and use all its power, then the company has acted reluctantly to simplify interpretations, which is the second characteristic of a reliable organization.

Activities of high learning ability, job rotation and hard work are required to characterize the sensitivity to operations in the organization with high reliability. Each employee of the research institute should have a relative knowledge of the whole purchase, distribution and sale operations, i.e. be able to create a mental image of the complete operations of the research institute for themselves, because if there is a problem or error in a part of the current operation research institute observed; be able to understand the impact of this problem or error on the entire operation of the research institute. To achieve this knowledge, the

research institute must have a job rotation. The transfer and employment of the organization's personnel in different jobs creates the cognitive ability in them to be able to be informed of the entire operation of the organization. For example, the staff of the design and engineering department should also work in the exploitation departments, and vice versa, even the personnel of the administrative units and services of the research institute should work in the exploitation departments for some time and receive the required training. This understanding of the entire operation of the organization will be effective in increasing the motivation to try to correct or resolve the problem. On the other hand, company managers must believe that the main activity of the research institute is done by the queuing or operational forces and they are directly faced with the problems and difficulties of the work and the most important resources of the research institute and their opinions should be taken into account. If these forces feel tired or have problems due to work pressure, their relocation request will be approved due to the difficulty of work, and in case of retirement, they will retire early if requested. The special attention of managers to the forces of the queue to meet their needs requires sensitivity to operations, which is the third characteristic of an organization with high reliability. High transfer speed, knowledge management, teamwork, loyalty and dignity are required to ensure the commitment to return to the basics of an organization with high organizational reliability. To meet the expectations of the government, they must do two things; first, to anticipate accidents and to prepare for the accident in their research center before the accident occurs. This readiness requires continuous and accurate visits to the network and identification of its weaknesses. Second, when an accident occurs, the research complex can restore the situation to its pre-accident state. Achieving this ability is possible by employing people who have speed in making decisions. Teamwork and cooperation of individuals to solve the problem is another necessity to return the network to the state before the accident. In large-scale incidents, the experience of experienced people, even those who have left the organization, is required. There should be no permanent separation of individuals from the organization, which, of course, is conditional on honoring and respecting these individuals. If people who leave the company are not satisfied with their situation, they will certainly not cooperate with their organization again. Consolidating the experiences of people working in the organization and retirees to use in crisis and accident situations is a kind of organizational knowledge management that can be effective in returning to pre-accident conditions. The fourth characteristic of an organization with high reliability, the commitment to flexibility, will be provided in this way. Organized talent management and confusion as well as calm and trust in decision making to ensure the characteristic of obedience to expertise in a highly reliable organization. When accidents occur in the research institute, the people who really have the ability to manage the accident and deal with its destructive consequences and, most importantly, return the situation to normal, are the experienced experts and specialists of these companies. Solving the problem usually requires more important decision-making consistency, such as moving people, buying some items, moving equipment from one place to another, or even connecting with companies and other organizations. At the time of the accident, experts should be able to make such decisions, and all members of the organization should obey these decisions. While normally, decisions are made according to the organizational structure, that is, managers and people at the top of the organization make decisions and the rest of the people are responsible for implementing it. In order for the research institute to be able to leave the management of accidents in the event of their occurrence, especially in critical situations, to their experienced experts, they must have already thought of measures. One of these measures is talent management in the research institute. Talent management is the identification, attention, and reinforcement of people who have the ability to manage events. Management is a set of arts and sciences, that is, it requires both innate talent and training and learning, and so people who have the essence of management and are usually known over time and in the face of difficult situations should be identified and trained. Be scientific and practical so that they can manage accidents in critical situations. Crisis simulation and operational maneuvers are also necessary in normal situations to maintain and increase the crisis management capacity of the required experts. On the other hand, senior managers of the organization should have the courage to delegate the responsibility of decision-making to experienced experts and experts, and although the responsibility for decision-making in the event of accidents and crises lies with the same experts and experts, but the ultimate responsibility and

accountability lies with senior managers. By combining these conditions, another characteristic of the organization with high reliability in electricity companies will be achieved.

If an organization wants to have high reliability in its performance, that is, not to fail in the mission entrusted to it, or its failures are very rare, and to successfully overcome the incidents that have occurred in its activities, and in a word, the incidents properly manage, can take advantage of the characteristics of highly reliable organizations. To achieve the characteristics of high-reliability organizations that were introduced in this article, employee security for reporting errors, building trust between the organization's personnel, maintaining the experience gained by the personnel in the organization, high interaction of personnel with each other, trusting each other for exchange. High speed transfer for decision making in case of accidents, knowledge management for organizational knowledge distribution, job rotation to acquire multiple skills, teamwork, organizational learning, identification and promotion of managerial talents in the organization and finally creating loyalty and maintaining dignity Those who leave the organization are required to use their experiences in the event of a crisis. The framework presented in this paper will help managers through strategic planning to increase the reliability of the organization as part of the new product development process; improve the performance of your product by using various techniques and strategies to create reliability and thus create a sustainable competitive advantage for your organization. In this way, managers and engineers will be able.

Identify the factors involved in the reliability of the organization in order to improve and develop them, and by formulating effective reliability strategies and optimizing and implementing them at the managerial and technical levels, to achieve the task goals and ultimately the overall goals of their organization. Applying the method of continuous training for employees, in order to raise the quality level of professional skills to increase the reliability of the organization. Leads to improved performance and strategic alignment. Create an environment where people can be more involved in organizational activities and communication is based on mutual trust.

Due to the fact that several Latin articles have been done in connection with the establishment of a high-reliability organization and only a handful have been done in this regard in Iran, so this research will be conducted in the Iranian Space Research Institute and the innovative aspect of this research in the new Being and being the basis of research in Iran Space Research Institute. Also, due to the lack of research on high reliability in space organizations, we can emphasize its innovative aspects.

However, the space research institute is currently in charge of huge projects, including the Nahid 1 and 2 satellites, space balloons, the Saha satellite, etc., and according to officials, it is implementing a large number of projects with the help of the private sector. Thus, with all the facts stated, this research institute is considered as a main actor in the space sector of the country. Therefore, the results of this research can be provided to this research institute and reduce views and criticisms by creating high reliability in the organization.

The current research had some limitations that need to be considered by researchers in future research and the necessary solutions should be found to overcome them. The unfamiliarity of some people in the sample with the reliability of the organization was one of the limitations of the current research, which caused the researcher to provide the participant with basic points before the interview and familiarize his mind with the subject of the research, which of course, this would make the results of the interview more reliable. Another limitation of the current research was the appointment of an appropriate time and interval to conduct interviews with managers and experts of the research institute, which due to the high workload of managers, deputies and experts of the organization, the researcher had to wait a long time for interview time. At one time, it was very effective in the process of research steps. "In data collection, the use of interviews is preferred to direct observation and the study of documents, rather than what is proposed in the grounded theory strategy," quotes Rahim Foukordi. In this study, it was not possible to study all the documents of the organization and observe the behavior of employees for a long period of time, and the current study was no exception. In addition, the results of the current research, like other qualitative studies

of grounded theory, have been obtained by relying on the views and opinions of a small number of experts in the organization, and this limitation can challenge the generalizability of the theory.

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