# Designing and validating a dynamic, responsive and competitive structure model for the railways of the Islamic Republic of Iran

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## Abstract

The success and growth of organizations are due to their timely actions against challenges and problems and having dynamic capabilities, responsiveness and competitiveness. The purpose of this research is to design and validate a dynamic, responsive and competitive structure model for the Railways of the Islamic Republic of Iran. The research method was qualitative and the statistical population in the qualitative department included senior and middle managers of the Railways of the Islamic Republic of Iran, professors of railway engineering, transportation engineering and public administration in higher education centers and specialists related to the subject and written documents related to the research. In the validation section, the statistical population included faculty members of public administration in higher education centers and senior intermediate managers of the Railways of the Islamic Republic of Iran. In the qualitative section, 15 experts and 6 documents (texts) were selected using the snowball and purposive sampling methods for experts and documents, respectively. 20 experts were selected in the validation section using the purposive sampling method. For data analysis, in the qualitative section, the grounded method with open, axial and selective coding in One Note software was used while in the validation section, the Delphi method in SPSS software was used. In order to determine the validity and reliability of the resulting data, necessary reviews including acceptability (expert review) and verifiability (expert review) were used. According to the results of the qualitative section, the paradigmatic model has 10 dimensions (categories) and 23 components (concepts) as follows: the causal conditions (upstream policies, control and supervision, laws and regulations, commercialization of the company and changes in the organizational structure), contextual conditions (organizational agility, intelligent marketing, human capital, upstream support and non-human resources), intervening conditions (private sector investment, top and middle managers, organizational values, supply chain and re-engineering and new technologies), strategies (motivation and innovation, being knowledge-oriented, optimality, discarding old strategies and national and international interactions) and consequences (company profitability, improving non-financial performance and service quality). The results of the validation section indicated the confirmation of the components identified in the qualitative section.

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# 1 Introduction

Nowadays, the government or senior officials should strengthen the positive role of government effectiveness, rule of law, supervisory quality and corruption control [20]. Accountability and transparency has a long history as a basic principle for public management and governance, and in social sciences it is usually considered as a powerful tool to achieve desirable social goals such as strengthening accountability and reducing corruption [12]. The general public's awareness and knowledge of what happens in the public sector, by monitoring and controlling the activities of public servants, has prevented the occurrence of conflict of interest and corruption, which is possible in the conditions of lack of secrecy [10]. The intensification of changes in the industrial and commercial environments in recent decades has led to the fact that many traditional approaches to strategy formulation (even the resource-oriented approach) are not responsive to strategic managers in creating lasting competitive advantages. Due to this intense market dynamics, some researchers have doubted the efficiency of this approach in meeting the needs of companies in creating and maintaining competitive advantages [26]. Responsiveness, as the basic body and structure of the organization theory, refers to the flexibility of the organization and means the dynamic adaptation and response of the organization to its internal and environmental requirements in order to create, maintain and meaningfully continue itself in the complex environment and the current outcome [27]. The responsive organizations promise a high competitive performance in the field of global competition. They successfully improve production capabilities to support the entire organization to achieve a continuous competitive advantage [1]. Accountability promotes and encourages transparency and mutual commitment and makes the executives take responsibility for what they do and the services they provide guarantee the quality of their work and always seek improvement. be their functions and missions [23]. Responsiveness to customers and competitive advantage means identifying and meeting customer needs in a better way than other competitors [18]. In general, it must be said; In recent years, the global business arena has become highly competitive and the nature of customer demands has changed and become very complicated [21]. Customers are demanding better quality, more variety and increasing accountability to their needs at a lower cost. The revolution in technology, telecommunications and technology strengthens this process and intensifies the competition. In this regard, organizations that have flexibility in producing and providing services strengthen the possibility of accountability to different segments of the market and customers [14].

Also, in today's advanced world, the process of globalization, the expansion of consumer markets, as well as the increase in the number of competitors and the intensity of competition, has given importance to concepts such as competitiveness. This has caused companies, industries and different countries to try to identify factors affecting competitiveness and strengthen them in order to improve their competitiveness. Competitiveness can be seen as the abilities and capabilities that a business, industry, region or country has and can maintain them in order to create a high rate of return in the field of international competition in production factors. Put his human power in a relatively high position. Competitiveness results from a combination of assets and processes [4].Today, in the global business environment where the main indicator is the high speed of changes, companies compete with each other hard [26]. Surviving in the era of free trade undoubtedly depends on the creation of sustainable competitive capabilities, which can include a variety of key competencies, including speed, reliability, responsiveness, product quality, and the appropriateness of marketing and management strategies. be In order to remain and succeed in the market, companies should focus on creating their strengths and competitive advantage [2]. In addition, creating a competitive advantage also requires determining the factors that put the company in a better condition compared to what the competitors are in and the amount of market share they have. A company has a competitive advantage when it has specific resources and capabilities that are unique and difficult to imitate and can provide products to the market that provide a lot of value to the customer compared to competitors. Therefore, it can be said that gaining a competitive advantage is the basis of the activities of strategic managers [26]. Meanwhile, dynamic capability plays an influential role in achieving this goal. The most important authors who investigated this issue were Thies and his colleagues, who actually proposed it as a new theory in various management branches [8]. The possibility of gaining a competitive advantage with the help of dynamic capabilities seems clear considering their role in changing the operational capabilities of the organization. But the more important question is whether this effect is direct or indirect? Although in the framework provided by TES, dynamic capabilities directly lead to competitive advantage. Zahra states that dynamic capabilities lead to learning and its effects can be seen in the short term on ongoing processes, and it is with the continuation of this process that competitive advantage is gained [16]. As a result, the effect of dynamic capabilities on the effectiveness of the changes should be measured and observed whether these new operational capabilities create a competitive advantage in addition to the established knowledge base or not. Helfat and Martin also explicitly state that in order to prevent the creation of confusion, the effect of dynamic capabilities on an intermediate variable such as the effectiveness of the new arrangement of resources should be measured, then the effect of this intermediate variable on the performance of the organization should be evaluated. Dynamic capabilities create a new arrangement of resources within the organization that, if these resource packages have VRIN conditions,

the organization can achieve a competitive advantage. Therefore, the effect of this framework on competitive advantage is indirect and the quality of this effect depends on the quality of decisions taken by managers [17].

The results of the research of Mirnizami et al. [11] and under the title of compiling the model of competitiveness of Iranian banks with an emphasis on human capital training, showed that the main indicators of competitiveness based on the banking industry are organizational knowledge management, training and development of human capital, management Customer experience, market orientation, brand equity, bank structure, change management, customer satisfaction and loyalty, marketing mix, information and communication technology and financial management. The results of Askari et al.'s research [3] under the title of introducing the model of dynamic capabilities in transforming threats into opportunities and creating competitive advantage in the army of the Islamic Republic of Iran showed that the strongest coefficient of influence related to external threats on sensory capabilities. And the weakest coefficient of influence related to the dimension of exploitation capabilities is on the integration capabilities in the model. The results of Faruhid and Keyvanpour's research [13]and under the title of analyzing the competitiveness of the suburban train as a non-rail and personal public transportation (case study: Tehran-Parand route) showed that the suburban train option is the first choice for users. Tehran - Parand with 37.99% and after that option, personal ride with 34.86% as the second choice of users and taxi with 15.83% as the third choice of users and finally bus with 11.32% as the fourth choice of the mentioned people. There is an opinion. In a research conducted by Wang L.L, Gao Y [28] and entitled Competitive Network as a Source of Competitive Advantage: A Dynamic Capability Perspective and Evidence from China, according to the results, a company's competitors form a competitive network consisting of Through it, they can collect information about innovative ideas, product market and related industries. Such information helps to identify market opportunities, update the resource base and ultimately strengthen its competitive advantage. This positive effect of competition network on competitive advantage will be logically conditional on active information search by the company. In a research conducted by Biesenthal C, Gudergan S, Ambrosini V [6] under the title of the role of typical growing and functional aspects in the dynamics of capability deployment at different organizational levels, this research showed how dynamic capabilities change capabilities Operational capabilities operate at different organizational levels. Findings have indicated that the aspects of push and show routines explain a method for the performance of dynamic capabilities in improving operational capabilities. Also, the aspect model Dispersive or functional routines in the deployment of dynamic capability at a selected organizational level match the pattern associated with operational capabilities at the same level. Research findings by Singh R, Charan P, Chattopadhyay M [25] and under The title of dynamic capabilities and responsiveness: the moderating effect of organizational structures and environmental dynamics showed that the dimensions of dynamic capabilities; the ability to measure, learn, integrate and reconfigure have a significant positive effect on the company's responsiveness. The statistical results also showed that the dynamic relationship Responsiveness is adjusted by organization structures and environment dynamics.

The formation and establishment of the state railway company in August 1936 with the aim of providing all intercity freight and passenger rail transportation services with a focus on providing services and securing national interests is the first step in creating an independent organization with a specific purpose to deal with the issue of program management. Construction, operation, development and maintenance of railway lines were established. According to the law approved in 1987, the railway company was transformed from a state-owned company to a state-owned company based on the management of the company's affairs in the form of business and income - conversion costs and based on the articles of association of all cargo and passenger transportation activities and carrying out matters related to equipment and development. And the establishment, maintenance and operation of lines and institutions have been assigned to it. Looking at the history of the establishment of the railway company, it can be concluded that the railway is a government institution, which is mostly based on the principle of providing national welfare and providing services in the land transportation sector, and national interests are fully involved in its establishment. have been. Therefore, it cannot be expected to be profitable [19]. During the adoption of the outsourcing policies of enterprise affairs and privatization, from the beginning of the first development plan, a part of the transfer of enterprise activities in the railways was started, but due to the lack of influence on the model of the railway structure (organizational and financial), the transportation tariff There were no changes in cargo and passengers. In the third development program of the country, a new chapter in the attitude and fundamental changes from the point of view of outsourcing and privatization of business affairs and how to participate and establish joint rail transport companies in railway companies and services and ancillary activities of transport and Rail transfer was opened. Articles 30 and 128 of the third development plan law clarified the non-governmental sector's entry permit in exploitation, development, studies, investment and ownership and other related matters by observing the continuity of service provision and preventing monopoly. Now it seems that due to the slow process of privatization of the Railways of the Islamic Republic of Iran, paying attention to a dynamic, responsive and competitive structure is a suitable solution for the profitability and economic justification of the performance of this large transportation company. Therefore, in this research, the design and validation of a dynamic, responsive and competitive structure model for the Railways of the Islamic Republic of

Iran has been discussed.

## 2 Materials and methods

The research method was qualitative. In the qualitative section, grounded method was used while in the validation section, Delphi method was used. In the qualitative phase, experts and specialists should be used so that the interviews have proper credibility. The statistical population of the research in the qualitative part of the high and middle managers of the Railways of the Islamic Republic of Iran, professors in the fields of railway engineering, transportation engineering and public administration in higher education centers and experts in the fields of "dynamic structure", "responsiveness" and "competition" at the country level and written documents related to the research title. The desired characteristics for people's expertise include: mastery of the subject of "dynamic structure", mastery of the subject of "responsiveness", mastery of the subject of "competitiveness" and mastery of the organizational conditions of the Railways of the Islamic Republic of Iran. The statistical population in the validation section includes an expert panel as follows: academic experts including faculty members in the field of public administration in higher education centers and organizational experts including top and middle managers of the Railways of the Islamic Republic of Iran. In order to sample in the qualitative part, a range of key informants in the field of "Dynamic, Responsive and Competitive Structure Model for the Railways of the Islamic Republic of Iran" was selected with the "snowball" sampling method. This selection and survey continued until theoretical saturation was reached and then it was stopped. The meaning of theoretical saturation is to reach the saturation of opinions expressed by experts in the last few interviews of experts, so that no new things are obtained from the analysis of the content of the final interviews. Finally, sampling was done by snowball method until theoretical saturation was reached and 15 people were selected. Also, 6 documents related to the research topic and especially the dynamic, responsive and competitive structures for the Railways of the Islamic Republic of Iran were selected with purposive sampling methods. The characteristics of the interviewees and the selected texts are given in Tables 1 and 2.

Table 1: Information of the interviewees

| Number | Related organization | Degree of education | Organizational position or responsibility | Interview method | Code in analysis |
|---|---|---|---|---|---|
| 1 | Iran University of Science and Technology (IUST) | P.H.D | Former CEO of the Railways of the Islamic Republic of Iran and former Deputy Mayor of Tehran | Telephone interview | N1 |
| 2 | The Railways of the Islamic Republic of Iran | Ms.c | Director General of Human Resources of the Railways of the Islamic Republic of Iran | Face-to-face interview | N2 |
| 3 | The Railways of the Islamic Republic of Iran | P.H.D | Director General of North-East Railway Region 2 (Golestan Province) | Telephone interview | N3 |
| 4 | The Railways of the Islamic Republic of Iran | Ms.c | Vice President of Organizations and Methods of the General Department of Human Resources and Organizations of the Railways of the Islamic Republic of Iran | Telephone interview | N4 |
| 5 | The Railways of the Islamic Republic of Iran | Ms.c | Director General of Southern Railway (Khuzestan Province) | Completing the interview text | N5 |
| 6 | Iran University of Science and Technology (IUST) | P.H.D-proffosor | Full Professor of the Faculty of Civil Engineering and CEO of the Railways of the Islamic Republic of Iran in the ninth government | Face-to-face interview | N6 |
| 7 | The Railways of the Islamic Republic of Iran | Ms.c | Chairman of the Board of Directors of Raja Passenger Trains Company - Chairman of the Association of Passenger Rail Transport Companies | Completing the interview text | N7 |
| 8 | The Railways of the Islamic Republic of Iran | Ms.c | Former Director General of the General Directorate of Railways of Tehran Region and a member of the Supreme Accident Commission of the Railways of the Islamic Republic of Iran | Completing the interview text | N8 |
| 9 | The Railways of the Islamic Republic of Iran | Ms.c | Deputy technical infrastructure of the Railways of the Islamic Republic of Iran | Completing the interview text | N9 |
| 10 | The Railways of the Islamic Republic of Iran | P.H.D | Former Deputy CEO of the Railways of the Islamic Republic of Iran - Former CEO of Mapna Locomotive Company | Face-to-face interview | N10 |
| 11 | The Railways of the Islamic Republic of Iran | P.H.D | Advisor to the Managing Director of the Railways of the Islamic Republic of Iran in planning and investment matters | Face-to-face interview | N11 |
| 12 | Faculty of Railway Engineering, Iran University of Science and Technology (IUST) | P.H.D | Abadi, the former director general of the information technology office of the Railways of the Islamic Republic of Iran, the current vice president of the railway engineering faculty | Face-to-face interview | N12 |
| 13 | The Railways of the Islamic Republic of Iran | Ms.c | Honorable General Director of Traffic (Operation) of the Railways of the Islamic Republic of Iran | Completing the interview text | N13 |
| 14 | Islamic Azad university | P.H.D | Former financial vice president of Islamic Azad Qaimshahr University and current professor | Completing the interview text | N14 |
| 15 | Mazandaran University of Medical Sciences | P.H.D | Head of the Administrative Transformation Program of Mazandaran University of Medical Sciences | Completing the interview text | N15 |

Table 2: Information of the interviewees among writers

| Number | Writer | The subject of the text | Year of publication | Code in analysis |
|---|---|---|---|---|
| 16 | Said Kalai | Comparison of organizational dynamics in Iran and other countries | 2020 | N16 |
| 17 | Jalili | Comparison of accountability system in Iran and selected countries | 2009 | N17 |
| 18 | Jalili | Comparison of accountability system in Iran and selected countries | 2009 | N18 |
| 19 | Resistance Economy Think Tank | Successful countries in the field of railways | 2019 | N19 |
| 20 | Resistance Economy Think Tank | Successful countries in the field of railways | 2019 | N20 |
| 21 | Hajarzadeh | Successful countries in the field of railways | 2009 | N21 |

The sampling method in the validation section was purposive sampling methods, and 20 experts were selected using this sampling technique.

In the qualitative part of the research, semi-structured interviews and texts were used as data collection tools, and in the validation part, semi-structured and structured questionnaires were used in three rounds. In order to determine the validity and reliability in the qualitative stage, necessary checks including acceptability (expert review) and confirmability (expert review) were used. The research method of this study was combined:

**A- Qualitative section**, determining the components of the dynamic, responsive and competitive structure model in the Railways of the Islamic Republic of Iran, by grounded theory (GT) technique in One Note software.

Glaser and Strauss introduced the grounded theory strategy to the scientific community for the first time [15]. According to Strauss and Corbin, the basic theory is what is obtained inductively from the study of a phenomenon and is the representative of that phenomenon. The grounded theory method is a qualitative research method that uses a series of systematic procedures to create an induction-based theory about a phenomenon (Strauss and Corbin, 2012). Grounded theory, by starting the creation of the theory in an inductive way and trying to understand the correct and proper feeling of everyday events, tries to understand the world of the participants, as they themselves have made, to connect between concepts and from events and affairs material, to create abstract concepts that may be difficult to do with little research. Grounded theory requires a person to extract structures and laws directly from the direct data he has collected; not from previous researches and theories that exist (Gall et al., 2015). Therefore, the researcher does not start the project with a previous theory in mind, but the researcher allows the theory to emerge from the information and data, the theory derived from the data is more likely to be similar to reality than a theory obtained by putting together a series of concepts based on experience or simply by speculation. Based on the systematic approach and in order to obtain the data needed to explain the paradigm model and achieve the final theory, the interviews were conducted using the content analysis technique during three stages of coding (Open coding, axial coding and selective coding). [7]; done and then the basic codes and axes are identified.

Based on the systematic approach of grounded theory, in order to analyze the collected qualitative data, in order to formulate the theory, one must go through three stages of coding and provide a logical paradigm or an idea of a developing theory [5]. In the grounded theory, the method of analysis is such that each part of the data is analyzed immediately after the collection of that part (in parallel). Then the researcher receives guidelines from the analysis of the primary data to access the subsequent data. These guidelines can come from undeveloped categories, information gaps, or people who have enough insight into the phenomenon. After obtaining these guidelines, the researcher enters the research environment to collect other data. The zigzag process in data collection and analysis continues until the researcher reaches the saturation of classes [9]. In the basic theory, the analysis consists of three types of coding, which are: 1. Open coding 2. Axial coding 3. Selective coding, Theoretical theorems express generalized relationships between a class and its concepts with specific classes. Propositions involve conceptual relationships, while hypotheses require measurable relationships. Because the grounded theory approach produces the basis of conceptual relationships, not quantifiable, therefore, it is preferable to use the term "issues". In the issues section, the relationship between the main classes is examined. In order to convert qualitative research into quantitative research, researchers convert research issues (which are the structure, their constituent elements) into hypotheses (which are the variables, their constituent elements) in order to provide a quantitative basis for their testing. In the hypothesis section, the relationship between the subclasses should be examined [9].

**B- Validation section**, validation of the components identified in the qualitative section by determining their importance in explaining the model, by surveying experts and applying the Delphi technique and performing descriptive calculations in SPSS software.

The Delphi method is one of the qualitative research methods that are used to reach consensus in group decisions. In practice, the Delphi method is a series of questionnaires or consecutive rounds with controlled feedback that tries to reach a consensus among an Expert Panel on a specific issue. Usually, the Delphi method includes the following basic steps. In the first stage, the research problem is defined and, based on this, the necessary characteristics for the participants in the Delphi Panel are determined. Then the candidates for participation in this Panel are identified and invited. This stage ends with determining the members of the Panel. The second stage of the Delphi method is dedicated to the generation of ideas in the field of the research problem. At this stage, the Panel members present their ideas about the factors related to the research issue. By analyzing and refining these ideas, removing duplicates and using the same words, the researcher extracts the final list of factors related to the research problem. At this stage, the opinion of the members may be asked about the factors that have been determined in advance. In the third stage, the Panel members determine the importance of the factors or select a number of the most important ones. Based on this, the number of factors is reduced to the extent that work with them can be done. In fact, this step is done to reduce the number of factors to an acceptable number for continuing the work. In this research, the Delphi method was completed in three rounds.

To implement the fuzzy Delphi method, the following steps have been taken:

First step: After preparing the evaluation factors, a questionnaire was prepared to prepare the opinions of the experts and the experts were asked to give 1 to 5 points according to their agreement with the evaluation factors in the form of a fuzzy spectrum and, if necessary, add items to the list and in case of disagreement with the evaluation criteria, provide explanations.

Second step: After collecting and reviewing the questionnaire data, a number of experts announced the factors to be removed from the proposed list. Third step: Another questionnaire with a complete list including the initial list and new experts' opinions was prepared and sent to the experts to give their opinion so that they could rate the factors again.

Fourth step: Each expert in each stage must consider a level for each of the considered criteria and dimensions, and these levels are provided to the experts in the form of linguistic variables (very low, low, medium, high, very high). Is. whose numerical values in the form of fuzzy numbers are defined as triangular fuzzy numbers as follows:

Table 3: Fuzzy numbers equivalent to verbal expressions

| Very high | High | Moderte | Low | Very low |
|---|---|---|---|---|
| (7,5,10,10) | (5,7,5,10) | (2,5,5,7,5) | (0,2,5,5) | (0,0,2,5) |

At the end of each stage, the fuzzy average of each question has been calculated according to the following formulas.

- Answers received from each of the experts:

$$A^i = (a_1^{(i)}, a_2^{(i)}, a_3^{(i)}, a_4^{(i)}) \; i = 1, 2, \ldots, n$$
$$A_m = (a_m^1, a_m^2, a_m^3, a_m^4) = (1/n \sum a_1^{(i)}, 1/n \sum a_2^{(i)}, 1/n \sum a_3^{(i)}, 1/n \sum a_4^{(i)}).$$

- Calculation of average opinions of experts in each stage as fuzzy numbers: Fifth step: At the end of each step, a threshold value is selected in order to screen inappropriate factors. Basically, the threshold value is determined by the subjective judgment of the decision maker and will directly affect the number of factors that are screened. There is no simple way or rule of thumb to determine the threshold value. Often, the number 3 is considered as the threshold. This research also considered the number 3 and eliminated the factors that had a geometric mean lower than 3.

## 3 Findings

**A- Qualitative section**

In the qualitative part of the research, the main axis of the research is related to the exploration and discovery of the influencing factors regarding the dimension (factor), component (criterion) and indicators (indices) related to the dynamic, responsive and competitive structure model for the Railways of the Islamic Republic of Iran was the main concept. To achieve this, the component (criterion) and indicators (indices) are presented based on the open and central coding of the data obtained from the content analysis of in-depth and exploratory interviews with key experts and refinement of conceptual codes. Based on this, to perform open and axial coding in the first stage, the data were examined at the sentence and phrase level for each of the interviews, and conceptual codes were extracted from the transcripts of the interviews. In the next stage, by refining and reducing, this component (criterion) and indicators (indices) were organized in the form of dimensions (factors) and named with continuous review. In order to ensure the proper organization of each dimension (factor) and components (criteria), the transcript of the interviews was checked again and by reviewing the indicators (indices) in order to reach a logical saturation for the dimension (factor) and components (criteria) took place. Open and axial coding was stopped when a meaningful classification was achieved after several reviews of the interview transcripts. Totally, 288 primary conceptual codes were obtained from the qualitative data analysis of the research in the coding stage. After checking, matching and removing duplicated codes (176 codes), 112 codes were finally counted.

**Open coding:** the findings of the qualitative section are in the form of findings from the results of coding with the approach of analyzing the themes and concepts of the data. The most basic task at this stage is open coding. Based on this, the common concepts of the recording units were counted and the common codes were counted.

**Axial coding:** Table [26] shows the results of axial coding. In the phase of axial coding, from the initial 288 codes, after reviewing these codes and removing duplicate codes, 176 codes were removed and finally, axial coding was done with common codes (112 codes).

Table 4: Axial coding results

| Number | Component or criterion or concept (axial coding) | Index or indicator or criterion (open coding) |
|---|---|---|
| 1 | Upstream policies | [N1-1] Transfer of regulatory powers from railways to the Ministry of Roads<br>[N4-6] Approving and approving the submitted structures of the company in the administrative and employment organization of the country<br>[N6-13] Less government ownership in railway company for more agility<br>[N7-4] Looking at the government's sovereignty over the interests of private companies by liberalizing some service areas<br>[N9-1] Reducing the impact of political decisions and political-economic developments<br>[N11-4] Changing the attitude of the government in the field of transportation from the incoherent management of different sections of transportation to the formation of an integrated transportation and logistics chain (changing the country's transportation management structure) |
| 2 | Control and supervision | [N10-3] Appropriate and active and transparent incentive and punishment systems for the structure components<br>[N12-1] Transfer of regulatory roles outside the company including technical and safety issues<br>[N12-3] Clear and clear reporting to the public without censorship, deletion and editing<br>[N17-3] Existence of public complaints office<br>[N17-8] Evaluating employees' moral issues<br>[N18-4] Inspections of the legislative and judicial authorities and the inspection office |
| 3 | Laws and regulations | [N7-7] Voting and policy making for stakeholders and implementers<br>[N11-3]Establishing appropriate laws and regulations and policies for outsourcing privatization and digitization in the railway sector<br>[N13-3] Paying attention to the laws, macro policies of the country and organizational values in the company's service commitments<br>[N16-14] Social capital and the efficiency of the legal and judicial system |
| 4 | Commercialization of the company | [N3-8] Prioritizing rail transportation as one of the important economic infrastructures<br>[N7-5] Discussing the tariff system with the aim of greater productivity and the attention of cargo and passenger customers<br>[N8-10] Issuance of single bill of lading for export-import-domestic sections<br>[N11-9] Commercialization of the Railways of the Islamic Republic of Iran and the governance of customer-oriented attitude |
| 5 | Changes in the organizational structure | [N2-7] Improving the structure in accordance with the company's new mission and proportionate and balanced according to the current state of the country<br>[N2-12] Examining the existing structural situation and matching it with the company's future plans for a balanced explanation of the structure<br>[N2-14] Drawing and approval process of how to change the structure of the company according to sustainability capabilities<br>[N4-10] The existence of the phenomenon of bargaining and organizational power in determining the desired organizational structure<br>[N10-4] Lack of identical tasks in separate parts of the structure<br>[N10-11] Removing and merging some headquarters and downsizing the headquarters |
| 6 | Organizational agility | [N2-2] Ability to move quickly and easily<br>[N2-3] Being active and thinking quickly and intelligently<br>[N6-12] Agile of different sections of the Railways of the Islamic Republic of Iran<br>[N2-1] Increase flexibility and responsiveness based on structural nature |
| 7 | Intelligent marketing | [N2-4] Alignment of the organization with the changing needs of work and move towards gaining a competitive advantage<br>[N2-5] Quick and effective response to market needs<br>[N8-16] Formation and establishment of tourist and pilgrimage routes and international and tourist passenger trains<br>[N13-8] Promotion of green, cheap and safe rail industry |
| 8 | Human capital | [N2-10] Proportionate distribution and effective allocation of forces in the wide area of the country's railways<br>[N6-5] Using talent management and valuing new ideas of committed and expert forces<br>[N6-19] Providing suitable financial conditions for employees and financial and job security of employees<br>[N8-4] Suitability of specialized and operational manpower with functional changes and fluctuations<br>[N14-20] aligning the goals of employees with the goals of the organization |
| 9 | Upstream support | [N6-15] Government assistance to private companies entering this field with ease of administrative and financial conditions<br>[N6-20] Spiritual support of middle managers to employees of different units<br>[N6-8] Depreciation compensation of railway parts and equipment for private investors to encourage them<br>[N13-12] The support of the government and related government institutions of railway expert decisions |
| 10 | Non-human resources | [N2-16] The correct allocation of valuable resources of the company in a continuous and sustainable manner according to the economic and political conditions of the country<br>[N2-13] Creating new resources in order to renew or change the composition of the company's resources<br>[N2-20] renewal and reconstruction of resources and dynamic capabilities of the company<br>[N9-3] The formation of public companies with the approach of developing and maintaining the infrastructure of private operating companies |
| 11 | The axial phenomenon is a dynamic, responsive and competitive structure | [N2-21] Updating the capabilities in response to the changing environment to achieve a sustainable competitive advantage in line with the company's macro goals.<br><br>[N4-2] Statistics of organizational processes and workload determination<br>[N5-2] Analysis of internal factors including strengths and weaknesses of the organization<br>[N14-6] Creating infrastructure to eliminate negative bureaucracies in the organization to become agile and dynamic<br>[N10-20] Correct and timely notification of network behavior to railway business partners (owners of locomotives-wagons-forwarders) |
| 12 | Private sector investment | [N6-7] Investing in the railway sector by inviting private investors<br>[N6-16] Taking privatization seriously by the government and the ease of entry of companies into the Railways of the Islamic Republic of Iran<br>[N7-10] Removal of enterprise structure units that have conflicting interests with the private sector and have at least friction<br>[N9-2] Existence of government infrastructure structure and actual private exploitation structure<br>[N19-2] Financial aid to the private sector for railway expansion |
| 13 | Top and middle managers | [N2-11] Management of basic capabilities at different levels by the company's top management<br>[N4-4] Timely decision-making regarding the approval of the proposed structures in the structure and management technologies committee<br>[N6-21] The expertise of the top managers of the railway company and their nobles on the technical and specialized issues of this industry<br>[N6-22] Long-term planning with the stability of the top and senior managers of the railway company<br>[N12-8] Involvement of the whole body of the company with the strategies of the organization and removing the separation between top managers and middle managers to make the organization more dynamic. |
| 14 | Organizational values | [N2-15] Acquiring and improving the value of company processes<br>[N2-18] Promotion and improvement of company values<br>[N3-6] Using new business models in order to create value |
| 15 | Supply chain and re-engineering | [N2-9] Reengineering Description of daily activities and involved in company goals<br>[N8-13] Integration of different modes of transportation<br>[N8-14] Supply chain integration<br>[N15-13] Structural and operational re-engineering of the company due to rapid environmental and operational changes<br>[N19-12] Systematic management of the entire project with the approach of reorganization and creation of accounting systems |

**Selective coding:** Table (5) shows the results of selective coding. In this stage of coding, 112 common codes were grouped into 23 criteria or components or categories (not including the axial phenomenon), in the subset of 10

| 16 | New technologies | [N3-3] Using knowledge and new technologies to respond to the needs and demands of customers<br>[N3-4] Creating innovation and relying on advanced technologies from internal and external ideas<br>[N10-13] More reliance on software systems<br>[N11-7] Attention to changes in the fields of information technology, such as the Internet of Things, artificial intelligence, blockchain, virtual reality, and metaverse.<br>[N11-11] Digitalization and intelligence, especially in providing services to customers |
|----|------------------|---|
| 17 | Motivation and innovation | [N3-7] Innovation in the development of quality services<br>[N3-11] Creating a stimulating, prone and creative atmosphere<br>[N14-19] Creating an environment with work commitment and confidence<br>[N16-13] Appropriate service compensation system in the company |
| 18 | Being knowledge-oriented | [N6-11] The knowledge base of the research and development department of the railway company and investment in this department to reduce dependence on foreign countries<br>[N6-18] Holding in-service training courses to improve the knowledge and expertise of employees<br>[N16-11] Close cooperation and interaction with prestigious universities<br>[N14-2] Providing conditions for employees to participate in training courses (theoretical and scientific), scientific and specialized seminars outside the organization and the Railways of the Islamic Republic of Iran<br>[N14-3] Accelerating the transfer of extra-organizational knowledge (especially the knowledge of advanced countries in the rail industry) to the internal organization<br>[N14-5] Holding meetings to interpret the knowledge created in the organization in order to coordinate the views and approaches of colleagues within the organization |
| 19 | Optimality | [N10-16] Paying attention to the structures of other organizations in order to respond to the entire common issue<br>[N12-7] optimality by comparing with the world's top railway companies to fix the deficiencies and use the right idea for proper planning by comparing with the world's top railway companies<br>[N12-9] Assessing the risk of the company like the successful companies of the world in order to solve the existing problems in order to improve the dynamics of the organization.<br>[N13-5] Use of past rich experiences, views of experts and experts and up-to-date knowledge |
| 20 | Discarding old strategies | [N3-5] Abandonment of traditional and old approaches and changeability<br>[N4-11] Determining smart strategies and long-term organizational goals<br>[N5-4] The use of experts, academics and technical experts in the integrated strategy management document<br>[N12-6] Detailed information of the company's experts on short-term and medium-term strategies |
| 21 | National and international inter-actions | [N10-27] Playing a more effective role in the transit of the country despite the current very suitable arteries<br><br>[N8-7] Interaction with other departments including customs - ports organization - road transport<br>[N13-6] Accurate and principled compilation of interactions between different sectors, especially suppliers and the private sector<br>[N11-10] Improving international cooperation, both technical and commercial, of railways<br>[N8-12] Diplomatic relations and attendance at international conventions |
| 22 | Company profitability | [N3-12] Opportunities for growth and profitability in the direction of cost control<br>[N5-17] Reducing organization costs<br>[N7-11] Increasing the productivity and benefits of using the rail network in terms of environmental aspects and operating costs.<br>[N14-16] Dynamics in the country's economic system and recognition of the railway as green transportation<br>[N19-8] Financing investment sources in infrastructure |
| 23 | Service quality | [N3-2] Providing your services in a different way from other competitors to create a competitive environment<br>[N11-15] Satisfaction of customers, business partners and other stakeholders<br>[N13-16] Improving the quality of service delivery (including increasing shipping speed, increasing safety, etc.)<br>[N14-22] Better service and faster advancement of the organization towards predetermined goals |
| 24 | Improving non-financial perfor-mance | [N4-15] Improving organizational processes<br><br>[N5-18] Flexibility of the organization in case of environmental and internal changes<br>[N11-14] Improving the railway brand, especially in the field of social responsibility<br>[N19-6] Increasing safety in the network<br>[N19-9] Protecting the environment and monitoring weather and noise pollution |

dimensions either the category or the factor was placed.

## B- Validation section

"Causal conditions": In the first round of Delphi, the highest importance is related to "upstream policies" with an average of 4.17 and a deviation from the standard of 0.59, and the lowest importance is related to "commercialization of the company" with an average of 3.71 and a deviation from The criterion was 0.82. In the second round of Delphi, the highest importance is related to "laws and regulations" with an average of 0.4 and a deviation from the standard of 0.69, and the least importance is related to "changes in the organizational structure" with an average of 3.80 and a deviation from the standard of 0.90. It has been 0. In the third round of Delphi, the highest importance was related to "upstream policies" with an average of 4.11 and a standard deviation of 0.54, and the lowest importance was related to "control and supervision" with an average of 3.78 and a standard deviation of 0.65. . Kendall's coordination coefficient for the answers of the third round is 0.833, which has only increased by 2.4% compared to the second round, which was equal to 0.791. Not significant. Therefore, the final explanatory components of "causal conditions" after performing three rounds of qualitative Delphi technique, which includes five components as follows: 1. upstream policies, 2. control and supervision, 3. laws and regulations, 4. commercialization of the company and 5. changes in the organizational structure, from the point of view of experts, they have had favorable and acceptable validity.

"Contextual conditions": In the first round of Delphi, the highest importance is related to "non-human resources" with an average of 3.62 and a deviation from the standard of 0.87, and the lowest importance is related to "intelligent marketing" with an average of 3.28 and a deviation from The criterion was 0.74. In the second round of Delphi, the highest importance was related to "upstream support" with an average of 3.57 and a deviation from the standard of 0.76, and the lowest importance was related to "human capital" with an average of 3.19 and a deviation from the standard of 0.95. In the third round of Delphi, the highest importance was related to "upstream support" with an average of 3.52 and a deviation from the standard of 0.87, and the lowest importance was related to "organizational agility" with an average of 3.22 and a deviation from the standard of 0.77. Kendall's coordination coefficient for the answers of the third round is 0.814, which has only increased by 5.9% compared to the second round, which was equal to 0.755. Not significant. Therefore, the final explanatory components of "contextual conditions" after performing three rounds of the qualitative Delphi technique, which included five components, were 1. organizational agility, 2.

Table 5: Selective coding results

| Number | Dimension or category (selective coding) | Component or criterion or concept (axial coding) |
|---|---|---|
| 1 | Rules and policies | Upstream policies |
| 2 | | Control and supervision |
| 3 | | Laws and regulations |
| 4 | Business structure | Commercialization of the company |
| 5 | | Changes in the organizational structure |
| 6 | Intelligence and agility | Organizational agility |
| 7 | | Intelligent marketing |
| 8 | Organizational resources | Human capital |
| 9 | | Upstream support |
| 10 | | Non-human resources |
| 11 | The axial phenomenon is a dynamic, responsive and competitive structure | - |
| 12 | | Non-technical factors Private sector investment |
| 13 | | Top and middle managers |
| 14 | | Organizational values |
| 15 | Technical factors | Supply chain and re-engineering |
| 16 | | New technologies |
| 17 | Creativity and knowledge governance | Motivation and innovation |
| 18 | | Being knowledge-oriented |
| 19 | | Optimality |
| 20 | National and international strategies | Discarding old strategies |
| 21 | | National and international interactions |
| 22 | Financial | Company profitability |
| 23 | Non-financial | Service quality |
| 24 | | Improving non-financial performance |

intelligent marketing, 3. human capital, 4. upstream support, and 5. non-human resources. , from the point of view of experts, they have had favorable and acceptable validity.

"Intervening conditions": In the first round of Delphi, the most important is related to "private sector investment" with an average of 4.11 and a deviation from the standard of 0.72, and the least important is related to "supply chain and re-engineering" with an average of 3.87 And the deviation from the standard was 0.63. In the second round of Delphi, the highest importance was related to "private sector investment" with an average of 4.01 and a standard deviation of 0.72, and the lowest importance was related to "organizational value" with an average of 3.79 and a standard deviation of 0.92. . In the third round of Delphi, the highest importance was related to "private sector investment" with an average of 3.91 and a deviation from the standard of 0.71, and the lowest importance was related to "organizational values" with an average of 3.59 and a deviation from the standard of 0.83. . Kendall's coordination coefficient for the answers of the third round is 0.850, which has only increased by 9.5% compared to the second round, which was equal to 0.755. Not significant. Therefore, the final explanatory components of "Intervening conditions" after performing three rounds of Delphi qualitative technique, which includes five components as follows: 1. private sector investment, 2. top and middle managers, 3. organizational values, 4. supply chain and re- engineering and 5. new technologies, from the point of view of experts, they have had favorable and acceptable validity.

"Strategies": In the first round of Delphi, the most important is related to "discarding old strategies" with an average of 3.47 and a standard deviation of 0.64, and the least important is related to "motivation and innovation" with an average of 3.36 and standard deviation. It was 0.60. In the second round of Delphi, the highest importance is related to "being knowledge-oriented" with an average of 3.42 and a standard deviation of 0.85, and the least important is related to "motivation and innovation" with an average of 3.32 and a standard deviation of 0.67. have been. In the third round of Delphi, the highest importance is related to "being knowledge-oriented" with an average of 3.59 and a standard deviation of 0.73, and the least important is related to "optimality" with an average of 3.49 and a standard deviation of 0.56. . Kendall's coordination coefficient for the answers of the third round is 0.844, which has only increased by 7.4% compared to the second round, which was equal to 0.770. Not significant. Therefore, the final explanatory components of "strategies" after performing three rounds of the qualitative Delphi technique, which

include five components: 1. motivation and innovation, 2. being knowledge-oriented, 3. optimality, 4. discarding old strategies and 5. national and international interactions, from the point of view of experts, they have had favorable and acceptable validity.

"Consequences": In the first round of Delphi, the highest importance is related to "company profitability" with an average of 4.23 and a deviation from the standard of 0.64, and the least importance is related to "service quality" with an average of 4.17 and a deviation from the standard of 0.63. It has been 0. In the second round of Delphi, the highest importance is related to "company profitability" with an average of 3.94 and a deviation from the standard of 0.55, and the least importance is related to "improving non-financial performance" with an average of 3.89 and a deviation from the standard of 0.74. have been. In the third round of Delphi, the highest importance is related to "company profitability" with an average of 3.97 and a deviation from the standard of 0.79, and the least importance is related to "improving non-financial performance" with an average of 3.84 and a deviation from the standard of 0.80. have been. Kendall's coordination coefficient for the answers of the third round is 0.859, which has only increased by 9.4% compared to the second round, which was equal to 0.765. Not significant. Therefore, the final explanatory components of "consequences" after performing three rounds of qualitative Delphi technique, which included three components, 1. company profitability, 2. improving non-financial performance and 3. service quality, were valid from the experts' point of view. have been desirable and acceptable.

Table 6 shows the results of the third round of Delphi for the explanatory components of the dynamic, responsive and competitive structure model for the Railways of the Islamic Republic of Iran, from the experts' point of view.

Table 6: Statistical description of the respondents' opinion about the explanatory components of the dynamic, responsive and competitive structure model for the Railways of the Islamic Republic of Iran - the third round of Delphi

| Components | The number of responses | The lowest | The highest | Mean | Standard deviation | Order of importance |
|---|---|---|---|---|---|---|
| **Causal conditions** | | | | | | |
| Upstream policies | 20 | 2.00 | 5.00 | 4.11 | 0.54 | 1 |
| Control and supervision | 20 | 1.00 | 5.00 | 3.78 | 0.65 | 5 |
| Laws and regulations | 20 | 2.00 | 5.00 | 3.93 | 0.72 | 2 |
| Commercialization of the company | 20 | 1.00 | 5.00 | 3.91 | 0.78 | 3 |
| Changes in the organizational structure | 20 | 2.00 | 5.00 | 3.86 | 0.81 | 4 |
| **Contextual conditions** | | | | | | |
| Organizational agility | 20 | 2.00 | 5.00 | 3.22 | 0.77 | 5 |
| Intelligent marketing | 20 | 2.00 | 5.00 | 3.24 | 0.62 | 4 |
| Human capital | 20 | 1.00 | 5.00 | 3.36 | 0.80 | 3 |
| Upstream support | 20 | 2.00 | 5.00 | 3.52 | 0.87 | 1 |
| Non-human resources | 20 | 1.00 | 5.00 | 3.47 | 0.52 | 2 |
| **Intervening conditions** | | | | | | |
| Private sector investment | 20 | 1.00 | 5.00 | 3.91 | 0.71 | 1 |
| Top and middle managers | 20 | 2.00 | 5.00 | 3.62 | 0.56 | 4 |
| Organizational values | 20 | 1.00 | 5.00 | 3.59 | 0.83 | 5 |
| Supply chain and re-engineering | 20 | 1.00 | 5.00 | 3.65 | 0.55 | 3 |
| New technologies | 20 | 1.00 | 5.00 | 3.77 | 0.80 | 2 |
| **Strategies** | | | | | | |
| Motivation and innovation | 20 | 1.00 | 5.00 | 3.56 | 0.55 | 2 |
| Being knowledge-oriented | 20 | 2.00 | 5.00 | 3.59 | 0.73 | 1 |
| Optimality | 20 | 1.00 | 5.00 | 3.49 | 0.56 | 5 |
| Discarding old strategies | 20 | 1.00 | 5.00 | 3.54 | 0.77 | 3 |
| National and international interactions | 20 | 2.00 | 5.00 | 3.52 | 0.98 | 4 |
| **Consequences** | | | | | | |
| Company profitability | 20 | 2.00 | 5.00 | 3.97 | 0.79 | 1 |
| Improving non-financial performance | 20 | 2.00 | 5.00 | 3.84 | 0.80 | 3 |
| Service quality | 20 | 2.00 | 5.00 | 3.88 | 0.93 | 2 |

After the completion of the qualitative stage and validation and determination of dimensions, the components and indicators of the dynamic, responsive and competitive structure model for the Railways of the Islamic Republic of Iran, the research paradigm model, are presented as follows.

# 4 Discussion and conclusion

Accountability is a set of social relationships based on which a person makes an obligation to explain and justify his behavior to others. In other words, the person insists on explaining and justifying his relationships with other people. Accountability is one of the ways to create public trust and it is actually a form of reporting. A report that provides information to decision makers at the right time, place and form [23]. Currently, competitiveness is considered a central issue all over the world and it is mentioned as a means to achieve optimal economic growth and
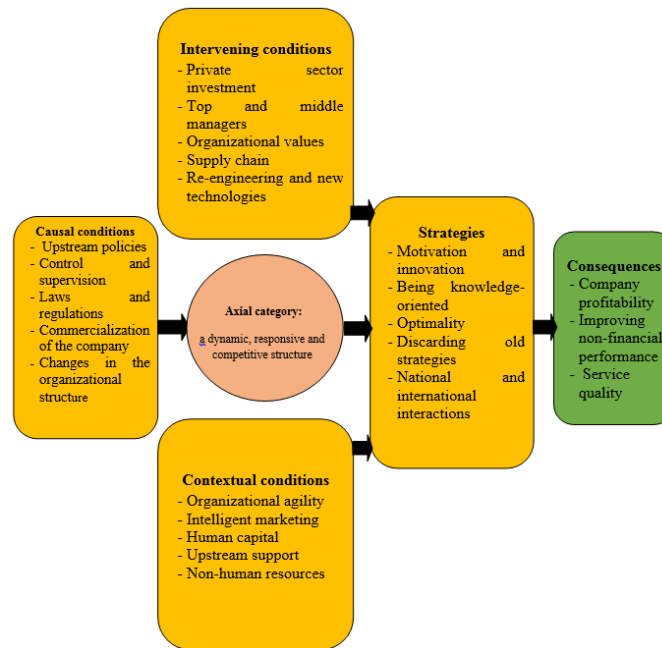
Figure 1: Research paradigm model

sustainable development, therefore, it is an important issue among policy makers at different levels (state, industry and company). ) is considered in different parts of the world [4]. Based on the results of studies conducted in relation to competitiveness; The role of internal factors of organizations and industries, the influence of environmental factors and the four components of the perceived value of competitors, customers and the market of the company, and the internal perceived value of the company and the role of internal organizational factors and its three components, i.e. resource-based attitude , market-based attitude and knowledge-based attitude are said to be effective on competitiveness [24]. Organizations are composed of a set of capabilities that can be divided into two groups: dynamic capabilities and operational capabilities. Dynamic capabilities are capabilities that provide the possibility of change (change of product/service, change of product production process or service delivery, etc.); In other words, operational capabilities have less dynamic capabilities, dynamic capabilities have more dynamic capabilities [16]. Dynamic capability is a necessary and unique feature of the company. Of course, some people believe that dynamic capabilities act like a custom and habit in all companies, which are referred to as best practices and are caused by multipliers. Dynamic capabilities have a direct relationship with company performance. Some have explained the attitude of dynamic capabilities as an upstream and causal mechanism, and in fact, in continuation of the attitude based on resources, which creates profit and economic benefit. When the growth and survival of the company in companies that do not have dynamic capabilities are threatened by environmental changes, there will be a direct relationship between dynamic capabilities and upstream environmental performance and company survival. Some others have considered dynamic capabilities as a necessary and not sufficient condition for competitive advantage. Some also emphasized the impact of dynamic capabilities when modifying the company's resources and processes [22]. Dynamic capabilities are managerial and organizational competencies that can enable organizations to achieve competitive advantage and then change themselves to maintain competitive advantage. It can also be defined as the ability to participate in integrating, creating and rearranging internal and external competencies to face changing environments, and its three general characteristics include the following [26].

The purpose of this research is to design and validate a dynamic, responsive and competitive structure model for the Railways of the Islamic Republic of Iran. The research method was qualitative and the statistical population in the qualitative department included senior and middle managers of the Railways of the Islamic Republic of Iran, professors of railway engineering, transportation engineering and public administration in higher education centers and specialists related to the subject and written documents related to the research. In the validation section, statistical population included faculty members of public administration in higher education centers and senior intermediate managers of the Railways of the Islamic Republic of Iran. In the qualitative section, 15 experts and 6 documents (texts) were selected using the snowball and purposive sampling methods for experts and documents, respectively. 20 experts were selected in the validation section using the purposive sampling method. For data analysis, in the qualitative section, grounded

method with open, axial and selective coding in One Note software was used while in the validation section, Delphi method in SPSS software was used. In order to determine the validity and reliability of the resulting data, necessary reviews including acceptability (expert review) and verifiability (expert review) were used. According to the results of the qualitative section, the paradigmatic model has 10 dimensions (categories) and 23 components (concepts) as follows: the causal conditions (upstream policies, control and supervision, laws and regulations, commercialization of the company and changes in the organizational structure), contextual conditions (organizational agility, intelligent marketing, human capital, upstream support and non-human resources), intervening conditions (private sector investment, top and middle managers, organizational values, supply chain and re-engineering and new technologies), strategies (motivation and innovation, being knowledge-oriented, optimality, discarding old strategies and national and international interactions) and consequences (company profitability, improving non-financial performance and service quality). The results of the validation section indicated the confirmation of the components identified in the qualitative section.

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