

## RESEARCH ARTICLE

## Open Access

## Identifying and Explaining a Model for Improving DNA Genetic Codes (Case Study: Isfahan Tokafulad Holding Companies)

Sara Etemadi<sup>1</sup>, Ali Reza Shirvani<sup>2\*</sup>, Zahra Alipour Darvish<sup>3</sup>**Abstract**

Organizational DNA expresses a method of investigation, thinking, reflection and thought about organizations, which examines the patterns of organizations, management practices, leadership style and other concepts related to the organization. Organizational DNA uses very diverse approaches to understand and recognize the organization, instead of organizational models and forms, by examining issues such as teamwork, decision-making, and development and improvement of human resources as separate or at least independent variables. In this research, by using the theoretical framework and using quantitative and qualitative methods, it has been done to identify the dominant DNA in Tokafulad Holding companies and determine the relationship model of hidden components using covariance analysis. The statistical population includes 435 employees of Isfahan Tokafulad companies and 6 company experts who used a mixed or mixed design to conduct the research. The technique of structural equations has been used to improve the model and evaluate the components and indicators to check and identify the model. In order to answer the research question, the steps are: 1) presentation of the conceptual model of the relationship between the corporate DNA and the investigated components, 2) quantitative evaluation of the components and indicators of the model, 3) determining the mutual influence of the hidden variables and the obvious variables of the model and 4) the relationship between the apparent variables of the components with each other and the verification of the initial conceptual model has been carried out and then the model has been improved and finally the dominant DNA has been determined. The research showed that semantic DNA with a factor load of 0.93 is the dominant DNA in 4 out of 6 companies under investigation. It was also found that planning and payment system are the least important and change processes are the most important in line with the improvement model. In the improved model based on covariance analysis, the mutual effects of payment system and planning with mission, leadership style with teamwork, performance management with decision-making, interpersonal relations with change processes and change processes with work group should be considered.

**Keywords:** *Organizational DNA, Structural Model, Confirmatory Factor Analysis, TukaFoolad***Introduction**

The term DNA is a medical term related to human genes. Despite this, the term DNA is also used in studies related to administrative sciences. The term organizational DNA is a modern administrative term to describe an

organization and reflects the characteristics, identity and indicators that distinguish an organization from other organizations. (Alshawabkeh, 2021) used the term organizational citizenship behavior

1. Ph.D. student of Management, Department of Management, Dehaghan Branch, Islamic Azad University, Dehaghan, Iran

2\*. Associate Professor, Department of Management, Dehaghan Branch, Islamic Azad University, Dehaghan, Iran (Corresponding Author: [dr.alireza.shirvani@gmail.com](mailto:dr.alireza.shirvani@gmail.com))

3. Associate Professor, Department of Management, North Tehran Branch, Islamic Azad University, Tehran, Iran

(BATEMAN & ORGAN, 1983) for the first time and consider it as the actions of some employees to improve productivity and solidarity and cohesion in the work environment, which is beyond organizational requirements.

(Azudin & Mansor, 2018) believe that the main problem for the lack of organizational effectiveness and poor performance of people is the lack of coordination between different organizational DNAs. They believe that if the organizational issues and activities of the organization are in harmony with the DNA, the organizational tension will subside. Researchers at the consulting firm Hamilton Allen Booz distinguish between healthy and unhealthy organizations based on specific genetic codes. They used the term "organizational DNA" as a biological metaphor to describe the strengths and weaknesses of organizations, predict employee behavior and performance, facilitate knowledge dissemination, promote decision-making, and support sustainability (Hamilton, 2002). (Rashidi et al., 2014) by examining the BOULDING model, they found that organizational DNA is divided into four types of objective-oriented, individualistic, context-oriented, and semantic-oriented DNA. (Hanald & Silverman, 2019) believe that organizational DNA expresses a method of investigation, thinking, reflection and thought about organizations in which organizations examine their patterns, management actions and leadership style and other concepts related to the organization. Organizational DNA to understand and recognize the organization instead of organizational models and forms, by examining issues such as teamwork, decision-making and development and improvement of human resources as separate or at least independent variables, they use very diverse approaches. (Pakdelan et al., 2021) Organizational DNA considers an entire organization as a multifaceted prism that requires a thorough examination of all aspects with multiple perspectives to fully understand it. There is usually one type of dominant organizational

DNA in each organization, and each of the other types is placed in the dominant DNA space. Of course, the presence of dominant DNA does not mean that other DNAs are not important. (Abdini et al., 2018) In the last two decades, the question has been raised that how can a successful organization be modeled? To answer this question, the concept of ODNA is proposed. ODNA is a tool for analyzing and recognizing the difference in the behavior and personality of organizations, and many behavioral methods, actions and organizational structures are influenced by it. (Sadiqe and Prafiyani, 2019) Organizational DNA is presented to formulate the philosophy, structure, beliefs and capabilities of an organization. Organizational DNA actually describes an organization that will be used for communication, strategy development and as a management tool. Conceptually, DNA can lead to new analyzes of capabilities.

(Magladem, 2014) The innovative model of organizational DNA is based on the principle that every organization has unique genetic characteristics similar to a living organism, and all actions and reactions, organizational practices and methods are influenced by their DNA type. Since the metaphor of organizational DNA plays an effective role in understanding the organization and its leadership and management, such as decision-making, planning, organizational structure, teamwork, and communication, it can clarify important aspects of the conditions governing the organization. In the first step, the meaning of the organization's DNA, its origin and how important it is for an organization should be understood. Deoxyribonucleic acid or DNA is the "hereditary material in humans and almost all other organisms". Each organism consists of trillions of cells, in each cell, in the nucleus of the cell, each organism forms a set of chromosomes, and humans have 23 pairs of chromosomes. Each chromosome contains many genes and each gene is made up of DNA. DNA, which is presented in the literature as a double helix. See Figure 1.

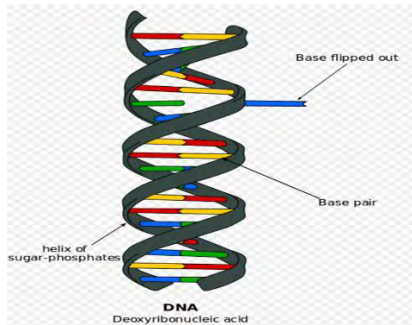


Figure 1. DNA double helix: Source (Magladem, 2014)

Organizational life is based on metaphors that guide us to see and understand organizations in a specific but incomplete way. In analyzing the organization in this way, we are not only looking to find out which metaphor is suitable for the organization or which metaphor is used in which type of organization. Rather, with the help of different metaphors, we want to know the many and diverse aspects of the organization and understand their relationships by integrating and combining

these aspects to gain awareness and surround the entire organization. Different metaphors from the organization not only in understanding the organization but also in the type and practices of management. Effectively, one of the organizational metaphors is the organization as a living organism, so an organization can have all the characteristics of a living organism, including its physical and physiological communication characteristics. Organizational DNA is a metaphor or theory that includes elements that together describe the organization's personality and helps to describe and express the organization's activities. It can be assumed by adapting the four nucleotides that make up organizational DNA.

(Hamilton, 2002). According to Figure 2, the DNA of a living organization has four bases that determine the unique characteristics of an organization in countless ways. These bases are:

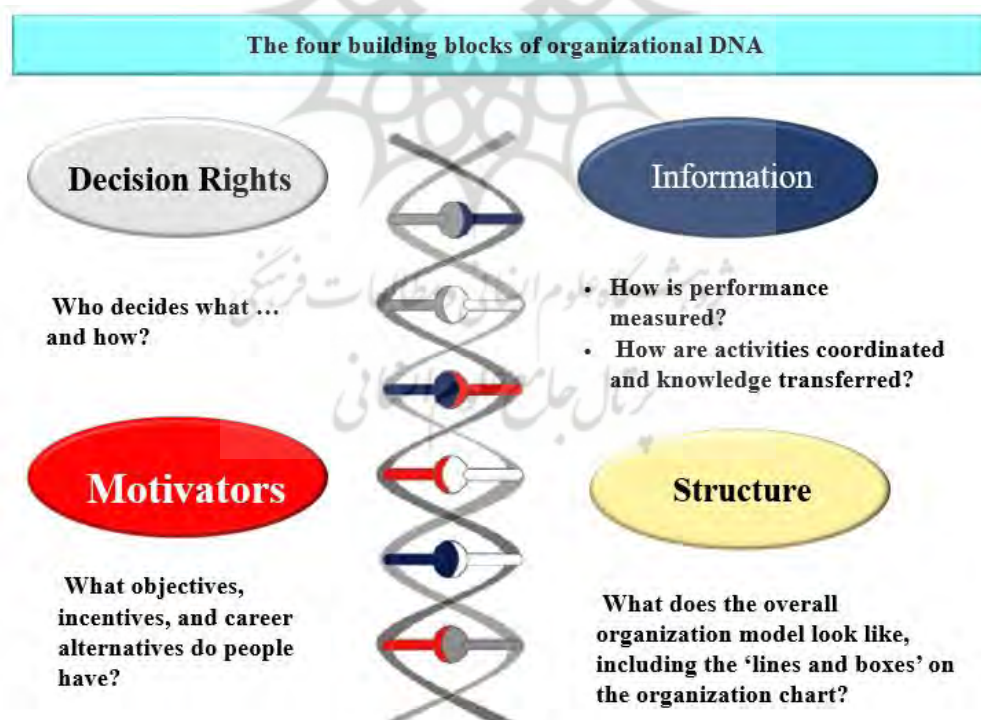


Figure 2. The four components of organizational DNA-source (Hamilton, 2002)

Decision-making rights are a fundamental duty that must be respected by organizations with functional imbalances because they are the cornerstones of efficient development.

Decision-making rights mean the basic mechanism of how decisions are made. Specifically, this means that firstly, decision-making authorities and responsibilities are as



clear as possible, and secondly, "process owners" are assigned to business units or user managers. that lead to the revival of business processes that are necessary and necessary for their success and empowerment (Hamilton, 2002)

Motivations are more than financial, they also include non-financial aspects such as goals, priority and fulfillment. The balance between positive (financial and non-financial) and negative (punishment) motivational considerations is one of the main issues that managers must undertake. (Thompson & Strickland, 2003)

Does information flow from the people who have it to the people who need it? This is the main means of transferring and disseminating knowledge within the organization from the owners of the information to the people who request it. This activity is very common in the organization and may be used to measure employee performance; because bad information has a great impact on DNA components, especially decision-making and motivational rights. (Nafei, 2015)

(Nafei, 2015), structure is a set of methods that the organization divides its work into distinct tasks to ensure effective communication, coordination and integration of efforts among departments. Structure, different organizational layers and spans of control often lead to increased buy-in and decision-making in specific situations. Performances should pay attention to two ways. First; Root out and eliminate or re-hire "shadow employees" who perform duplicative tasks.

In the following, after introducing the types of organizational DNA and creating a conceptual model using the subject literature and theoretical foundations, and then using analysis techniques to determine the dominant DNA and present the final model.

The characteristic of the current research is that in addition to the proposal of the DNA model of Tokafulad companies, a quantitative evaluation of the components (13 hidden variables) and measures (four determined DNAs) was carried out, and in the

proposed model, each component and its importance with values It has been determined quantitatively and at the same time the mutual influence of the components' measures has been shown with small covariance values. The presented figure 7 can be considered as a basis for starting applied research in this field. In other words, in order to improve productivity, it should be a guide for managers in the field of the importance of factors and determining their risk in order to benefit the company.

### Types of Organizational DNA

(Membini, 2016) defined the types of organizational DNA as follows, which include

**Objective DNA:** It is based on linear models and quantitative calculations and predictions and is related to that group of organizations that use data based on internal and external realities to recognize and evaluate themselves. This information provides continuous and continuous evaluation of performance. They will be, although it is very difficult to develop all the policies and processes.

**Semantic DNA:** It is based on theories, paradigms and theoretical concepts and it is related to those organizations that, through a set of stimulating and exciting ideas, provide the basis for the formation of inclusive statements, visions and other meaningful and valuable elements. they prepare.

**Context-oriented DNA:** It directs our attention to the issues and topics that we are facing and the strategies that are used to shape organizations and the contexts that those strategies are related to each other. Context-oriented DNA is based on the communication of the environment inside and outside the organization and it is related to that group of organizations that put their emphasis on the background and context in which the work is done.

**Individualist DNA:** In human subjects, we seek to develop positive and appreciation-based communication in our organization. Interests, opinions, goals and dreams are unique. Organizations with individualistic

DNA help to satisfy such deep and inner needs. Each type of DNA causes different attitudes and actions:

According to Henald and Silverman, the types of DNA are as follows. (Hanald & Silverman, 2019)

- 1- Objectivist is related to that group of organizations that use data based on internal and external realities to know and evaluate themselves and their environment. They continuously evaluate their performance based on the obtained data and information and use the results to develop and improve all policies, methods and procedures and the growth of the organization.
- 2- The semanticist is based on theories, paradigms and theoretical concepts
- 3- The contextualist is based on the communication of the environment inside and outside the organization.
- 4- Individualism is based on people, either as a single person or as a member of a group.

(Hanald & Silverman, 2009) believe that there is a dominant DNA type in every organization and each of the other DNA types are also somehow present in the dominant DNA space. That other DNAs are not important but all of them are important and organizational problems are caused by the lack of coordination between them. For organizations, the alignment or coordination of the dominant DNA with other organizational dimensions is very important. And organizational activities are aligned with DNA, organizational stress is suppressed. By adapting the dominant and recessive genes in the human genetic structure, which causes the emergence of external and internal characteristics of people, such as skin color, eye color, IQ, etc. In organizations, types of organizational DNA can be dominant or dominant in different organizations. Every organization is found to be in one of these DNAs, but at the same time, there are other types of DNA in the organization, although there are different definitions according to the type of dominant DNA. There are some of them in every organization. For example, the actions that are taken in an organization based on objectivity for improvement and

development are not successful in an organization based on individualism. Also, the structure of administration in a mind-based organization is different from an organization based on individual communication, and the teams in the organization Context-based organizations are formed and operate quite differently from what you see in object-oriented organizations, so each type of organizational DNA represents different definitions of the same practices as well as different ways of thinking and thinking.

### **The role of Organizational DNA in Organizations**

(Estabriano colleagues, 2014) Identifying organizational DNA helps us to lead the improvement, development and transformation programs in our organization in a more efficient way and identify the lack of alignment of organizational sub-systems with organizational DNA and make our organization a coherent whole. Let's turn into a violin that emits a pleasant sound. After identifying and clarifying the sensitive tasks and processes, it becomes easy to adjust and coordinate the other pillars of the organization and they can be coordinated with the correct functioning of the tasks. By paying close attention to daily organizational affairs and their compliance with DNA, we will not only be able to recognize the type of DNA of our organization, but we can also enrich and develop it in the most effective way. From competent consultants, the concept of DNA refers to a kind of solidarity or solidarity that we can act on to achieve solidarity that is related to organizational functions. Organizational balance is the basis of holism, solidarity and effectiveness. The affairs and activities related to each type of DNA present challenges and opportunities for potential solutions or policies that are consistent with the DNA of the organization.

### **Research Background**

In the research conducted by (Güloğlu et al., 2021) in 2020 under the title of revealing the relationship between government

employees' perception of organizational DNA and their organizational commitment, the statistical population of the research consisted of employees working in public institutions and organizations located in Mersin province and Tarsus region. Were used and it was concluded that there is a significant relationship between the perception of organizational DNA and organizational commitment.

(Atarasadi et al., 2023) to compare the performance of companies admitted to the Tehran Stock Exchange with the aim of explaining the current situation in relation to the role and importance of three categories of trust factors, audit quality and political connections on the process of influencing fraudulent behavior in financial decisions such as Profit management, risk management, capital structure and ownership structure of companies with the aim of controlling the effective factors in this field were analyzed using SEM structural equations. The result showed that the mediating role of political relations and audit quality in the relationship between fraud and financial decisions in this model using the path coefficient of structural equations is significant.

(Hoseini Rad et al., 2023) presented a model for the role of disclosure quality in the relationship between innovation and financial performance using structural equation modeling. The statistical population includes the number of 140 companies admitted to the Tehran Stock Exchange from 2015 to 2022. The results showed that there is a significant and positive relationship between innovation criteria and disclosure quality indicators, and that the quality of disclosure makes financial performance innovation improve in Tehran Stock Exchange.

(Jeloudarlou et al., 2022) The purpose of this research was to develop a dynamic model for the influence of content and relationship with customer influence, from loyal customers of five-star hotels in northwest Iran. Using the structural equation method, it was determined that the hotels that monitor all the basic services provided, create a

physiological response in the customer, control the behavior and attitude of the hotel managers, use skilled employees and managers trained in the hospitality industry and chefs. Maher is better at attracting customers.

(Ubaid & Dweiri, 2019) In 2019, they conducted research under the title of considering the organization, production unit or products as a living organism and DNA development, and the statistical population of the research was one of the research areas, the result of which is the diagram of virtual DNA applications (V -DNA)

(Abdel-Raheem & Saad, 2019) in 2019, by examining the relationship between innovative performance with the organization's DNA and organizational components (decision rights, information, organizational structure and drivers), the statistical population of which were local organizations, they concluded that whatever the higher the level of total organizational DNA, the higher the level of innovative performance.

(Azudin & Mansor, 2018) in 2018 by determining the relationship of adoption of new accounting management practices with three factors (i.e., organizational DNA, commercial potential and operational technology) with the statistical population of 110 small and medium companies in the east coast of Malaysia, they concluded that two Factors (i.e., organizational DNA and business potential) do not significantly affect management accounting practices (MAPs). The main reason for the lack of organizational effectiveness and poor performance of people is the lack of coordination between different organizational DNAs. They believe that if organizational issues and activities are in harmony with DNA, organizational tension will subside.

According to Henald and Silverman, organizational DNA expresses a method of investigation, thinking, reflection and thought about organizations in which organizations examine their patterns, management actions and leadership style and

other concepts related to the organization. Understanding and knowing the organization instead of organizational models and forms, by examining things such as teamwork, decision-making and development and improvement of human resources as separate

or at least independent variables, takes advantage of very diverse approaches.

The summary of internal and external researches in the field of organizational DNA is given in Table No. 1 and 2

Table 1.

*Foreign research conducted in the field of organizational DNA*

Row	Title	conceptual design	Components	extracting the data	Analysis used	Target
1	The effect of teachers' awareness of organizational DNA on organizational commitment (Güloğlu et al., 2021)	Yes	Organizational DNA, punctual workers, passive and aggressive organizations, regular organizations questionnaire	questionnaire	SEM structural equations	Determining the investigated components with organizational commitment by gender and age group
2	Analysis of the relationship between teachers' awareness of schools' DNA and organizational happiness (Köse & Kahveci, 2021)	does not have	Resilient schools, schools with strict rules, orderly schools, schools with excessive control management, organizational happiness -Decision-making rights, incentives, information, structure, innovative performance (speed of decision-making about new opportunities, transparency and information exchange, responsibility)	questionnaire	Average and correlation coefficient	Determining the DNA relationship of teachers' organizational happiness with school management methods
3	The relationship between organizational DNA and innovative performance using the variable of organizational personality (Abdel-Raheem & Saad, 2019)	does not have	(speed of decision-making about new opportunities, transparency and information exchange, responsibility)	questionnaire	Statistical assumption test and linear regression equation	The effect of component size on innovative performance using regression coefficients
4	A review of the systematic literature of virtual DNA (V-DNA) applications (Ubaid & Dweiri, 2019)	does not have	Analysis of all DNAs that have been examined so far	Theoretical	Theoretical	Building a comprehensive DNA that includes all levels of the organization, from the product to the way to the highest level of the organization, taking into account the necessary correlations.



Row	Title	conceptual design	Components	extracting the data	Analysis used	Target
5	The relationship of adopting new accounting management practices with three factors (organizational DNA, business potential and operational technology) (Azudin & Mansor, 2018)	does not have	Organizational DNA Commercial potential Information technology	questionnaire	regression	The effect of selected components on improving the business sustainability of medium and small companies
6	Organizational DNA (Henald & Silverman, 2009)	does not have	A useful guideA useful guide to the "organizational DNA" of successful companies (management process, system development, management structure, training, growth and evolution of the organization, etc.)	Theoretical	Theoretical	Correct performance against problems and achieving goals and discovering the dominant DNA of the investigated companies

Table 2.

*Internal research conducted in the field of organizational DNA*

Row	Title	conceptual design	Components	extracting the data	Analysis used	Target
1	Comprehensive Systematic Model of Fraud and Decisions in Financial Management: A Structural Equation Modeling Approach (Atarasadi et al., 2023)	does not have	Trust, audit quality, political communication, profit management, risk management, capital structure and ownership structure of companies	questionnaire	Using structural equations and path analysis	Compare Comparing companies using the mediating role of political relations and audit quality in the relationship between fraud and financial decisions
2	Design and validation of organizational DNA questionnaire (Ardalan, Niaz Azari, & Erfanizadeh, 1400)	does not have	Decision-making rights, information, organizational structure, incentives	questionnaire	Exploratory analysis and determination of validity and reliability using SPSS	The prepared questionnaire is a suitable method for measuring organizational DNAr



Row	Title	conceptual design	Components	extracting the data	Analysis used	Target
3	Designing and Validation of Organizational DNA Questionnaire (Ardalan et al., 1400)	does not have	Decision-making rights, information, organizational structure, incentives	questionnaire	Exploratory analysis and determination of validity and reliability using SPSS	The prepared questionnaire is a suitable method for measuring organizational DNA.
4	Designing the genetic model of brand identity: a new approach in higher education brand management (Fatemi Far et al., 2019)	has it	,vision, mission ,top management micro environment factors, macro environment ,factors ,marketing	Qualitative and exploratory interview	average and standard deviation using SPSS	A new approach to design a brand identity model using the concept of organizational DNA
5	Identifying the organizational DNA model in the broadcasting organization (Abedini et al., 2018)	has it	Information and knowledge, the right to make ,decisions structure and communication ,networks selection and application of motivational factors	Qualitative method (systematic foundation data)	_ Test Ranks W Kendall and the use of SPSS software	Identification of organizational DNA in the national media
6	Investigating the impact of organizational DNA on human resource performance based on the Hanald model in the General Administration of Tax Affairs of the Central Province (Delavari & Qajri, 2016)	has it	Human resource ,performance organizational planning	questionnaire	Regression analysis	Examining dominant DNA and its effect on human resources

Row	Title	conceptual design	Components	extracting the data	Analysis used	Target
7	Prediction of organizational performance based on organizational DNA and transformational leadership style in the General Department of Health Insurance of Fars province (Kenaat Pisheh & Mostafavi Rad, 2016)	has it	DNA individual), ,development performance of tasks, moral values, dealing ,with clients interpersonal behavior and organizational behavior) and transformational leadership individual) ,consideration ,ideal influence mental persuasion and inspirational ,(motivation performance evaluation	questionnaire	statistical hypothesis test, regression ,equation Spearman's correlation (coefficient	Investigating the relationship between organizational DNA and employee performance evaluation and the relationship between transformational leadership style and organizational performance evaluation

Four main organizational DNAs were identified by using the subject literature and theoretical foundations. Then 13 components were analyzed separately from the detected DNAs to investigate the relationships between these components using the comparative analysis of the four determined DNAs. On the other hand, to determine the DNA model as follows

1- Determining the dominant DNA among the four main organizational DNAs by Toka

Foolad holding companies by using factor loading size

2- Determining the dominant DNA by separating the organizational components using factor load size

Summarizing the above-mentioned cases, including concepts related to organizational DNA, led to the presentation of the following conceptual model.

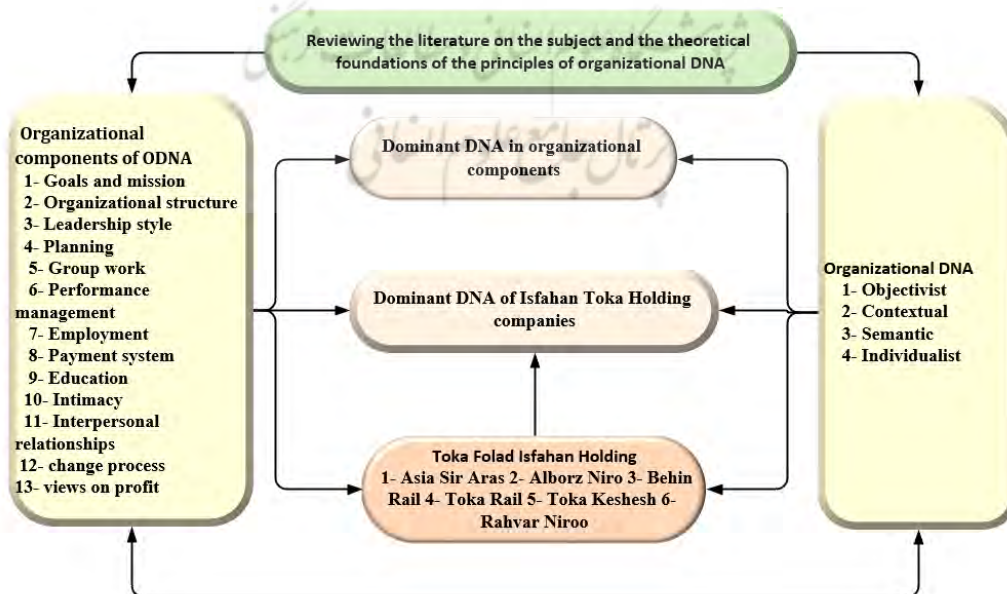


Figure 3. Conceptual model of organizational DNA in Tokafulad companies

### **The Purpose of the Research**

According to the presented conceptual model, the purpose of this research

1. Examining the dominant DNA of Isfahan Toka Holding companies
2. Investigating the dominant DNA hybrid model by separating the main components and the relationship between them

And the answers to the questions are below.

1. How are the mutual effects of organizational components in dominant DNA?
2. Which of the organizational DNA is the dominant DNA in Toka Folad Isfahan companies?
3. Which of the organizational components has the greatest impact on the dominant organizational DNA model?

### **Research Methodology**

The research method used in this research can be described from different dimensions as follows.

The model studied in this research is the use of the improved structural equation method to determine the dominant DNA from four types of DNA: objective, semantic, contextual, and individualistic. After determining the dominant DNA, the relationship between the obvious components was identified using covariance analysis.

In order to carry out the research, a mixed design was used, which was improved in the qualitative research section by using the comparative qualitative analysis method and the initial design of Hanald and Silverman model questions with usability according to experts, and in the quantitative section by distributing improved questionnaires. And the use of statistical analysis and structural equation technique has been used to improve the model and evaluate the components and

indicators to select and check the dominant DNAs.

From the point of view of the time horizon: the current research is cross-sectional research in which the data were collected during the first three months of 1400.

From the point of view of data collection methods: this research was done from the point of view of field data collection tools using interviews and internet questionnaires and through the GOOGLE form in social networks and to compile theoretical bases of information and library and internet studies. Secondary data) has been used

From the point of view of the goal: this research is a research study that has been carried out by the field method.

The statistical population of the research is all the experts, managers and personnel of Tokafulad companies in Isfahan (1- Asia Sir Aras, 2- Alborz Niro, 3- Behin Rail, 4- Toka Rail, 5- Toka Traction and 6- Rahwar Niro). The measurement tools in this research are the quantitative method of questionnaire and the qualitative method of structured interview.

In the methodology of the structural equation model, it is necessary to study the validity of the structure to determine whether the selected indicators are accurate enough to measure the desired structures. For this purpose, confirmatory factor analysis (CFA) is used. In such a way that the factor load of each indicator with its structure has a t value higher than 1.96. In this case, this indicator has the necessary accuracy to measure that existing structure or attribute. In the present research, the obtained t value was used to check to what extent each of the research constructs were aligned with the indicators selected to measure them. The summary of research methodology is shown in Figure 4.

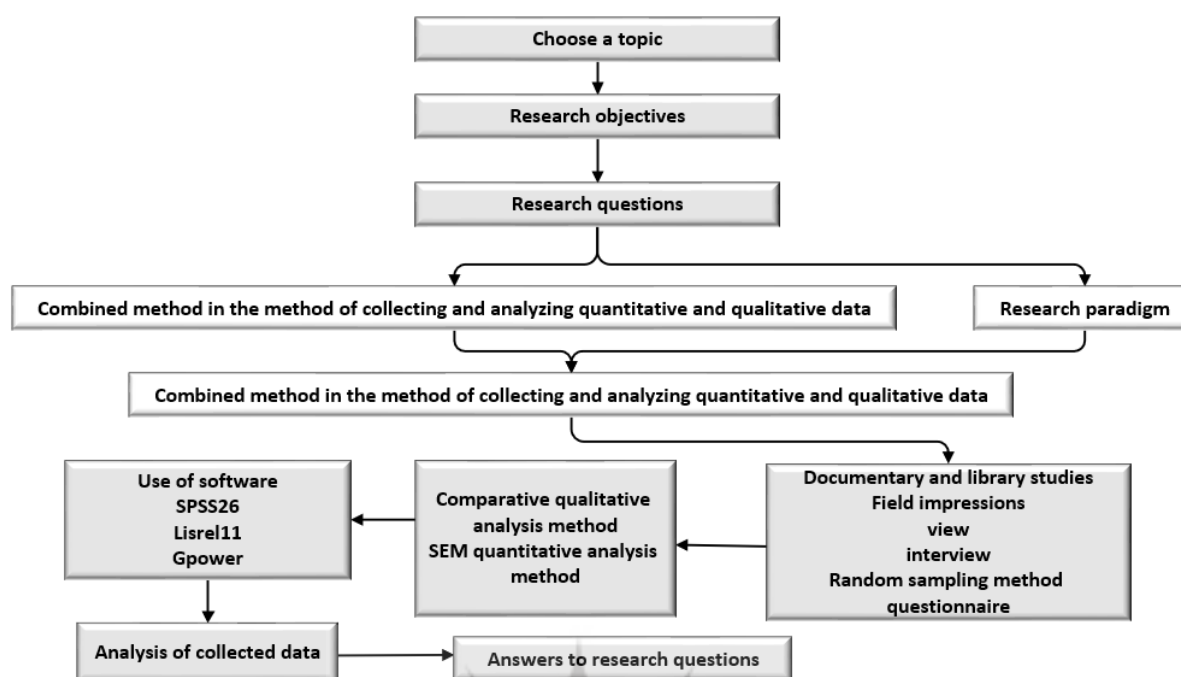


Figure 4. *Research methodology*

### Data Collection Tool

In order to quantify the data by converting qualitative data into quantitative data, a number of 350 questionnaires with 52 questions (four questions for each defined organizational component) based on a 5-point Likert scale (very little (1), little(2), medium (3), high (4), very high (5)) were distributed among managers and personnel according to the logic of structural equations of SEM, of which only 289 questionnaires could be analyzed and the rest of the questionnaires using the facilities SPSS software (use of frequency tables, box plot to identify outlier data) and Mahala Nobis calculation (Ramin Karimi, 2014) were left out. In general, in the structural equation technique, the sample size can be determined between 5 and 15 observations for each measured variable. " $5Q < n < 15Q$ ", where Q is the number of observed variables or the number of items

(questions) of the questionnaire and n is the sample size. Therefore, according to the number of 52 items, the number of samples is in the range of  $260 < n < 480$ . Recently, based on the studies conducted by scholars, it has been announced that the calculation of sample size with Cochran's formula or referring to Morgan's table is not applicable in structural equations. This is a common mistake among researchers. (Wang & Wang, 2012, p. 392)

The adequacy of the samples using the KMO statistic and the obtained number of 0.904 and ( $P=0 < 0.05$ ) to perform confirmatory factor analysis (EFA), for the sample data collected in order to use the SEM technique and provide a suitable model for confirmation. Has been (Xu et al., 2019) data reliability (Cronbach's alpha) of 0.994 was obtained using SPSS software.



Table 3.

*Output values of SPSS software for Cronbach's alpha*

Row		Number	Percentage	Statistics used in reliability	The numbers obtained
1	The number of correctly collected questionnaires	289	100	Cronbach's alpha	0.942
2	The number of deleted questionnaires	0	0	Number of questions	52
	total	100	100		

According to the number obtained for this research, the obtained result shows excellent reliability.

(Eisinga et al., 2013) using the output table of LISREL software and using the obtained parameters and putting these parameters in the Gpower software and the power of the test, the power of the model in the sample size is equal to 0.941 and as a result The sample size is sufficient to estimate the unknown values of hidden and obvious variables in the model. If the number obtained in Gpower software is less than 0.5. The model is not correct and the number of samples taken should be re-examined. (Schumacker & Lomax, 2010)

After the previous steps, the data analysis method using SEM technique is done as follows. (Kline, 2016) 1- specifying the model, 2- evaluating the specified model, 3- performing the necessary actions (choose the operations of the structures) and preparing the model and displaying it. 4- Model estimation including model evaluation, parameters checking and determining models close to the main model. 5- Review and final adjustment. 6- Compilation of the final report.

Also, the reasons for researchers' desire to use SEM in multi-dimensional research can be listed as follows:

a) estimation of multiple relationships, b) ability to measure hidden variables (unobserved concepts), c) calculation of measurement error, d) ability to check co-linearity and e) checking fake and unrealistic relationships

The main application of this model is in multi-variable issues that cannot be done in a two-variable way by considering one independent variable with several dependent variables.

## Research findings

### Findings of the qualitative part of the research

The four DNAs used in this research include 1- Object oriented DNA, 2- Semantic DNA, 3- Context oriented DNA and 4- Individualistic DNA. That in the dominant semantic oriented DNA companies in the Toka Steel Group companies, using comparative analysis and examining the questions raised by Hanald and Silverman's model after the review by the elites of the studied companies, the following 13 questions in the objective oriented DNA section include the following questions along with Coding is finalized.

- 1- People are hired in this company who are fully aligned with the goals and ideals of the company and are committed to it. (Recruitment-MR)
- 2- In this company, planning is done based on the issues that arise (planning is not done regularly). (Planning - MP)
- 3- In this company, the payment system is in such a way that the ideals and visions of the company are strengthened (better payment is given to the performances that are in the direction of the ideals and visions). (Payment system - MS)
- 4- The managers of this company mostly manage on the basis of their personality characteristics in relation to creating change and solving the company's problems (such as ethics, moral attractions, expertise, ability, skill) instead of the company's position. (Leadership style - ML)
- 5- The mission of the company is expressed in the form of a general ideal (without details). (Mission - MM)
- 6- Working groups should be used in processes where it is likely that carrying out

- those processes and solving them will help to realize the corporate ideals. (Working group - MT)
- 7- The performance evaluation of the employees is done based on the compatibility and coordination of the salary and perspective. (Performance management - MF)
- 8- Change occurs only because of the difference between actions, current functions, ideas, and visionary expectations. (Change processes - MC)
- 9- Achieving profit strengthens the value and usefulness of the core idea of the company. (How to look at profit - MH)
- 10- Training programs are adjusted according to the position of the employees. (Employee training and development - MD)
- 11- The emphasis is on placing the employees in the path of the ideals and visions of the company. (Organizational structure - MO)
- 12- Every person is responsible if he comes across an issue that requires a decision to be made with the help of the group or personally, and each employee is responsible for the issues they face. (Decision making - MG)

- 13- People can work together to achieve the goals and ideals of the company. (Interpersonal Relations - MI)

### Findings of the quantitative part of the research

In fact, the results of Table 4 show that what the researcher intended to measure. In fact, the results of Table 4 show that what the researcher intended to measure with the questions of the questionnaire among the hidden components of the study were well measured with their first level indicators and as a result, what the researcher considered as the investigation of the DNA model in the six investigated companies. The intention to measure has been realized. In this research, to evaluate the confirmatory factor analysis model of RMR residual mean square indices, GFI fit index, smoothed fit index (NFI), non-softened fit index (NNFI), incremental fit index (IFI), comparative fit index (CFI) and very important, the second root of the estimation of the variance of the RMSEA approximation error is used.

Table 4.  
*DNA measurement model fit indices*

Indicator	desired limit	Total	Asia Garlic Ars	Alborz Niro
RMR mean squared residuals	Close to zero	0.0017	0.0056	0.0051
Mean squared residuals Standardized SRMR	Close to zero	0.0055	0.017	0.015
Fit index GFI	0.9 and above	0.99	0.96	0.99
Softened Fit Index (NFI)	0.9 and above	1	0.98	0.98
fit index (NNFI)	0.9 and above	1	0.98	0.96
Incremental Fit Index (IFI)	0.9 and above	1	0.99	0.99
Comparative Fit Index (CFI)	0.9 and above	1	0.99	0.99
The second root of the estimated , variance of the error of approximation RMSEA	$0 \leq 0.08$	0.046	0.11	0.169

Continuation of Table 5.  
*DNA measurement model fit indices*

Indicator	desired limit	Best Rail	Toka Rail	Toka pull	Power path
RMR mean squared residuals	Close to zero	0.0015	0.0024	0.0051	0.0014
Mean squared residuals Standardized SRMR	Close to zero	0.0052	0.011	0.014	0.0031
Fit index GFI	0.9 and above	0.99	0.99	0.96	1
Softened Fit Index NFI	0.9 and above	1	0.99	0.98	1
fit index NNFI	0.9 and above	1.01	1	1.02	1.05

Indicator	desired limit	Best Rail	Toka Rail	Toka pull	Power path
Incremental Fit Index IFI	0.9and above	1	1	1.01	1.01
Comparative Fit Index CFI	0.9and above	1	1	1	1
The second root of the estimated variance of the error of , approximationRMSEA	$0 \leq 0.08$	0.71	0	0	0

Table 6.

Dominant DNA in the surveyed companies based on factor load

Row	DNA type	Total	Asiasir Company	Aras	Alborz Niro Co	Behin Rail Co	Tokaril company	Tukakesh ehsCo	Ravar NirooCo
1	Objectivist	0.91	0.89		0.91	0.91	0.88	0.98	0.93
2	meaning-oriented	0.93	0.92		0.93	0.95	0.91	0.89	0.96
3	context oriented	0.91	0.96		1.09	0.91	0.86	0.91	0.93
4	individualist	0.91	0.86		0.89	0.92	0.89	0.97	0.92

After recognizing that the meaning-oriented DNA is dominant in the holding companies of Tuka Foulad DNA, the relationships between the meaning-oriented DNA component as a hidden variable and 13 obvious variables are investigated in the qualitative findings section of the research.

In the initial graph of the factorial structure model, the relationship between the semantic latent variable and the components was not accepted, and the factor load was less than 0.3

and the P-value index was 0, which indicated the rejection of the designed model. The value of the factor load in figure number 5 indicates the importance of organizational components in the dominant semanticist DNA. In the initial model, the RMSEA and P-value indicators were not accepted, which was upgraded to the improved model in ten steps using covariance analysis. In Figure 6, the T-value indicates that the improved model is accepted.

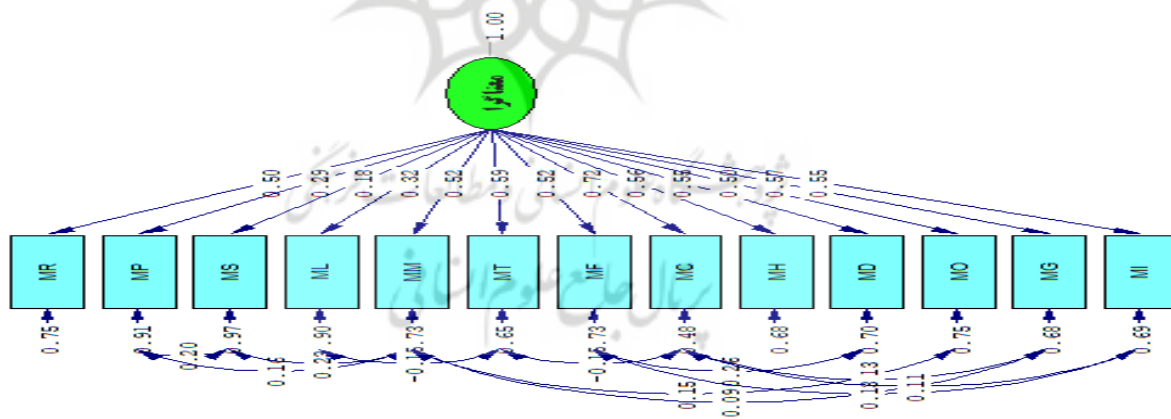


Figure 5. Structural equations based on the semantic DNA conceptual model of Tokafulad companies based on factor load (modified)

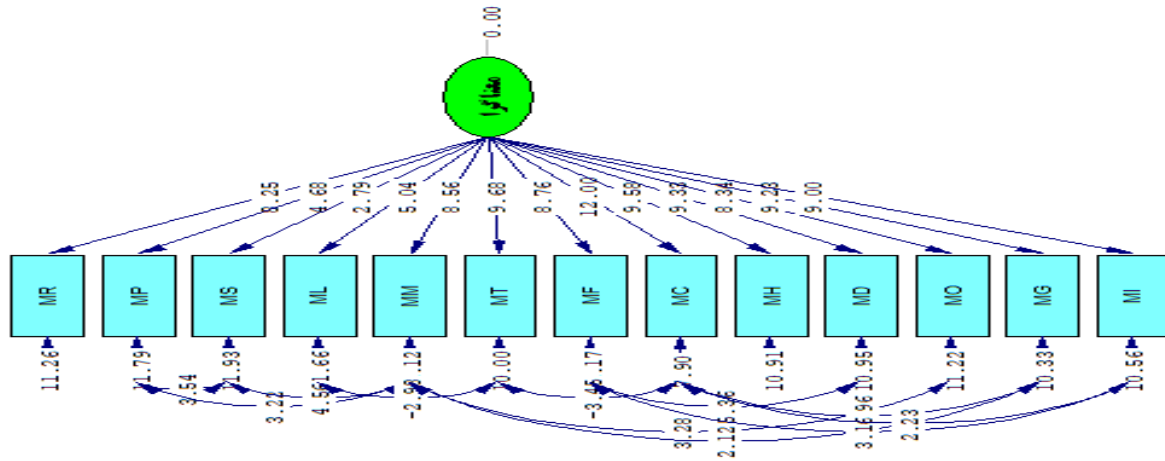


Figure 6. Structural equations based on the semantic DNA conceptual model of Tokafulad companies based on T-Value (modified)

Table 7. Semantic DNA measurement model fit indices

Indicator	desired limit	Reported value
RMR mean squared residuals	Close to zero	0.054
Mean squared residuals Standardized SRMR	Close to zero	0.044
Fit index GFI	0.8 and above	0.96
Softened Fit Index NFI	0.9 and above	0.96
fit index NNFI	0.9 and above	0.98
Incremental Fit Index IFI	0.9 and above	0.99
Comparative Fit Index CFI	0.9 and above	0.99
The second root of variance of the error of approximation RMSEA	< 0.08	0.035

The second root of the approximation error variance estimate,  $RMSEA < 0.08$  0.035

According to the obtained indices and comparing them with the main index of the model, it is accepted.

Factor load is an indicator that shows the strength of the relationship between the factor (hidden variable) and the observable variable. Factor load is a value between zero and one. If the factor loading is less than 0.3, the relationship is considered weak and is ignored. A factor between 0.3 and 0.6 is acceptable, and if it is greater than 0.6, it is very desirable. (Kline, 2016)

In order to verify the proposed conceptual model and improve it with the help of reducing the value of the second root of the estimated variance of the RMSEA approximation error from a value greater than 0.09 to an acceptable level of 0.035 within the acceptance range of the steps, the following was done:

In the conceptual model presented at the beginning, the weight of the components of goals and mission, organizational structure, leadership style, planning, teamwork, performance management, recruitment, payment system, training, decision making, interpersonal relations, change process and perspective towards Profits in dominant DNA were independent of each other and were considered the same, which was modified by using the structural equation technique of the relationship between hidden and obvious variables in the conceptual model by examining Figure 6 and the relationship between covariances and finally in the model modification Quantitative value and weight of components (hidden independent variables) were determined for the dominant DNA in the group of Tokafulad companies.

In the continuation of valuing the metrics (obvious variables) with each of the hidden independent variables (components), it was determined that, for example, the significance



of the obvious variable of meaningful DNA with interpersonal relationships is 0.63 and with mission is 0.64. In the same way, the importance of one-to-one overt dependent variables with independent hidden variables

can be interpreted and analyzed according to the quantitative values inserted in front of them and it shows which metrics with what weight in planning for each of the components. Priority is given.

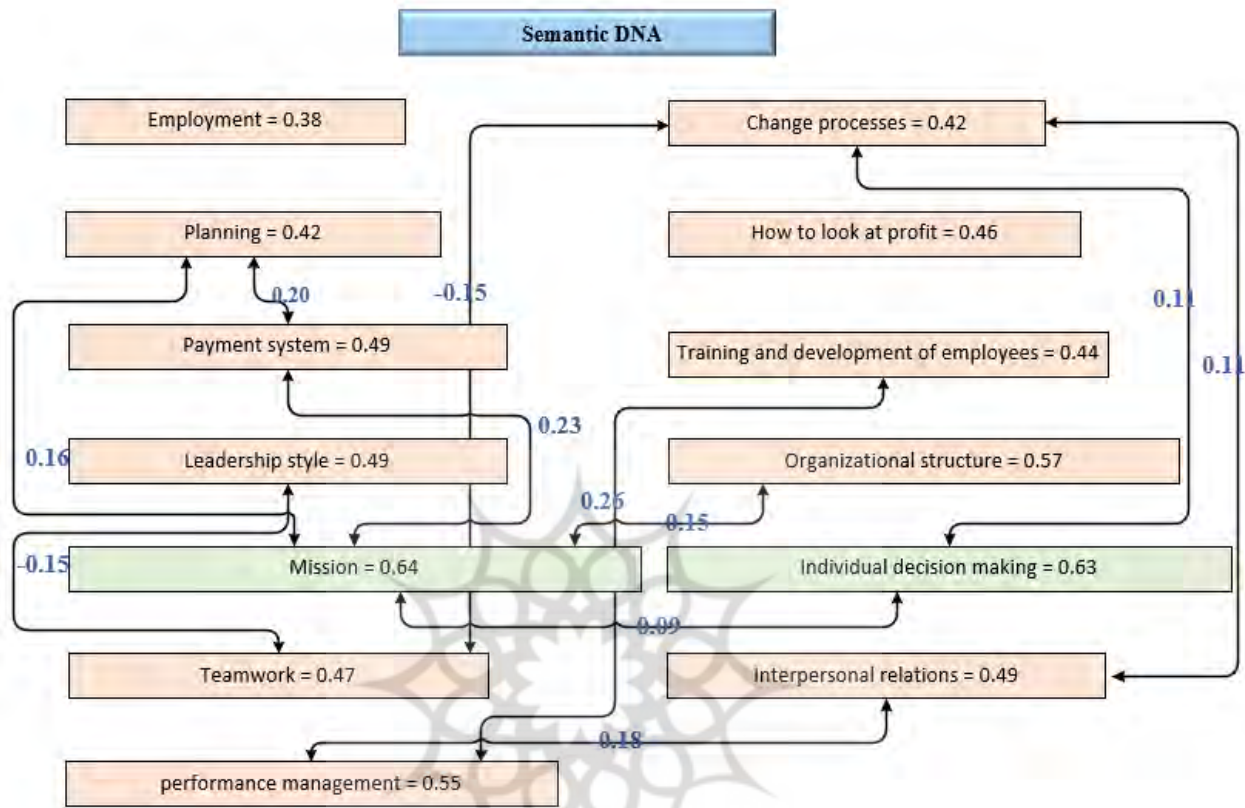


Figure 7. Relationship between the apparent variables of the semantic DNA model along with the covariance coefficients

## Discussion and Conclusion

Each company has unique genetic characteristics similar to a living organism, and these characteristics are represented by the basic and natural building blocks of DNA. The purpose of examining the DNA of the companies of the Toka Folad Isfahan Group is to examine the methods of improving productivity, to examine the overview of the companies from an internal and external point of view, to examine the vision, mission, etc., in order to establish a connection between the original DNA and the 13 hidden components that have been concluded. Explained as follow.

1. In objective ODNA, according to the importance of components 1- mission with a coefficient of 0.64, 2- individual decision-

making with a coefficient of 0.63, 3- organizational structure with a coefficient of 0.57, 4- performance management with a coefficient of 0.55 5- interpersonal relations with a coefficient of 0.49, 6- leadership style with a coefficient of 0.49, 7- payment system with a coefficient of 0.49, 8- leadership style with a coefficient of 0.49, 9- teamwork with a coefficient of 0.46 0, 10- How to look at profit with a coefficient of 0.44, 11- Planning with a coefficient of 0.42, 12- Processes of change with a coefficient of 0.42, 13- Employment with a coefficient of 0.38 were determined and these quantitative values indicate priority The actions and weight of each component are examined.

2. The components of individual decision making and mission have the highest factor

load factor and the highest desirability in the improved model.

3. The recruitment component has the least impact in the improved model.

4. The two components of how to look at profit and employment have an accepted factor load, but they are independent and have no relationship with other components. In other words, they should be considered independently.

5. The mission component that has the highest operating load. At the same time, three components of planning (covariance 0.16), individual decision-making (covariance 0.09) and payment system (covariance 0.23) have a direct relationship and an inverse relationship with teamwork (covariance -0.15), individual decision-making (0.09) and the payment system (0.23) are related and the relationship between these components should be considered to improve the mission of the organization.

6. The component of individual decision-making that has the highest factor load after the mission component. At the same time, it is related to the two mission components (covariance 0.09) and the change processes component (covariance 0.11) and it is necessary to pay attention to the change processes and the mission of the organization to improve individual decision making.

7. The management of the organization's performance is related to interpersonal relationships, in other words, each person is responsible if he comes across a problem that requires a decision, to make it with the help of the group or personally, and each employee is responsible for the problems they face. are.

8. In order to improve the initial model of the relationship between the obvious variables of the components, it was determined with a single, for example, the mutual influence of the obvious variable "the mission of the company is expressed in the form of a general ideal (lacking details)" with the obvious variable "each person is responsible if there is a problem" He faced that he needs to make a decision with the help of the group or personally and each of the

employees is responsible for the issues they face. It is 0.09, which indicates the necessity of considering each of the components according to the measures of other components or the internal relationship of the measures of each component.

### The Final Conclusion

In the investigated researches, no attention was paid to the modification of the model, in other words, the presented model was the initial model that was accepted. But in this research, using the new features of LISRE11 software, the improved model was determined through covariance analysis and as a result, Figure 7 was obtained. In other words, in this research, in order to improve the productivity of the studied companies, the guide of the group managers in order to determine the model, the importance of the components and their relationship has been examined and presented. Therefore, managers should make decisions

1. Consider the importance of the components. (Operating load)
2. The components that have not been examined separately and their relationship should be taken into consideration and a decision should be made for the components that have an inverse mutual effect.
3. The importance of the relationship between the components should be taken into consideration using the obtained covariance size.

### Suggestions

According to the findings of this research, it is suggested to identify the DNA model in Tokafulad holding companies in line with organizational productivity.

1. The relationship between the measures of each of the organizational DNAs related to the 13 examined components and the measures that have a high factor load. Considered as an index and should be included in the direction of the productivity of the studied companies.
2. Mathematical equations separated by hidden variables (organizational DNAs and

13 considered components) with four obvious variables separated by each 13 components were examined and using covariance analysis and calculated error, in the case of metrics that have The higher errors are analyzed and by examining the relationship between the obvious variables to reduce these errors and increase the axial load in order to improve the organizational DNA model of the studied companies.

3. By ranking the investigated companies using MADM multi-indicator decision making techniques, the companies that are ranked higher in terms of financial indicators are identified and then the relationship between the components of these companies is set as a criterion for improving the DNA of other companies.
4. Qualitative analysis of the experts was carried out on the questions raised and necessary action should be taken to improve the standard questions resulting from the theoretical foundations, then the revised questions were given to the personnel of the studied companies and the results obtained about Dominant DNA is examined and analyzed.
5. Examine the dominant DNA of other companies related to steel industries and compare the findings with the findings of this research. Because if the findings are repeated, it can be more confidently compared to the conditions of other steel industries. Otherwise, the cause should be investigated in other factors.

### Innovative Aspect of Research

An important point is that, in line with the development of previous researches, the transition from 5 stages of modeling, with valued data, includes 1) presentation of the conceptual model of DNA in Tokafulad companies, 2) quantitative evaluation of the components and indicators of the model 3 ) Determining the mutual influence of the hidden variables and the obvious variables of the model 4) The relationship between the obvious variables of the components with each other, 5) The verification of the initial conceptual model, its improvement and the

presentation of the final model were followed and localized results were developed according to the field data. Has set. Therefore, it can be clearly acknowledged that the characteristic of the current research is that in addition to the proposal of the DNA model of Tokafulad companies, quantitative evaluation of the components and measures has been carried out, and in the proposed model, each component and its importance are specified with quantitative values. Has been done and at the same time the mutual influence of the component measures with small covariance values has been shown, which can be considered as a basis for starting applied research in this field.

### References

- Abdel-Raheem, A. E., & Saad, M. (2019). Organizational Personality as a Moderating Variable of the Relationship between Organizational DNA and Innovative Performance. *Journal of Business*, 7(3), 131-139. doi:10.12691/jbms-7-3-4
- Alshawabkeh, Z. A. (2021). The role of organizational DNA in enhancing the strategic balance in commercial banks in Madaba. *Management Science Letters*, 11(5), 1639–1650.
- Ardalan, M., Niaz Azari, M., & Erfanizadeh, F. (1400). Design and validation of the DNA questionnaire of the organization. *Research Journal of Executive Management*, 13(26), 7-30. doi:10.22080/JEM.2021.18916.3219
- Atarasadi, M., Serkani, S. A., & Khouzani, M. A. (2023). Comprehensive Systematic Model of Fraud and Decisions in Financial Management: A Structural Equation Modeling Approach. *Journal of System Management (JSM)*, 9(1), 119-132. doi:10.30495/JSM.2022.1968673.1693
- Azudin, A., & Mansor, N. (2018). Management accounting practices of SMEs: The impact of organizational DNA, business potential and operational technology. *Asia Pacific Management Review*, 23(3), 222-226. doi: 10.1016/j.apmr.2017.07.014
- BATEMAN, T., & ORGAN, D. (1983). Job Satisfaction and the Good Soldier: The Relationship between Affect and Employee "Citizenship". *Academy of Management Journal*, 26(4), 587-595. doi:10.2307/255908
- Delavari, B., & Qajri, S. (2016). Investigating the



- impact of organizational DNA on human resource performance based on the Hanald model in the General Administration of Tax Affairs of Central Province. Markazi, Naraq, Iran.
- Eisinga, R., Grotenhuis, M. t., & Pelzer, B. (2013). The reliability of a two-item scale: Pearson, Cronbach or Spearman-Brown? *International journal of public health*, 58, 637-642. doi:10.1007/s00038-012-0416-3
- Güloğlu, E., Bekmezci, M., Rehman, u. W., Jalil, F., & Sheikh, L. (2021). The Impact of Teachers' Perceptions on Organizational DNA to Organizational Commitment. *Multicultural Education*, 7(9), 561-574. doi:10.5281/zenodo.5550655
- Hamilton, B. A. (2002). When Everyone Agrees but Nothing Changes: Aligning People, Incentives and Knowledge to Overcome Organizational Inertia. *Business + Strategy Review*. Retrieved from <http://www.strategy-business.com>. doi:10.1186/gb-2002-3-10-reviews1029
- Hoseini Rad, S., Ghasemi, M., & Mohseni, A. (2023). Presenting a Model for the Role of Disclosure Quality in the Relationship between Innovation and Financial Performance. *Journal of System Management (JSM)*, 9(1), 67-78. doi:10.30495/JSM.2023.1967814.1688
- Jeloudarlou, S. N., Aali, S., Faryabi, M., & Zende, A. B. (2022). Developing a Dynamic Model for the Impact of Servicescape on Customer Experience in the Hotel Industry. *Journal of System Management (JSM)*, 8(1), 1-18. doi:10.30495/JSM.2021.1940878.1525
- Kline, R. B. (2016). *PRINCIPLES AND PRACTICE OF STRUCTURAL EQUATION MODELING*, Third Edition. New York. Retrieved from <https://www.guilford.com/>
- Köse, Ö., & Kahveci, G. (2021). An Analysis of Relationship between Schools' DNA Profiles and Organizational Happiness According to the Perception of Teachers. *Journal of Education*, 201(2), 1-10. doi:10.1177/0022057421996256
- Magladem. (2014, March 12). File: Dna-base-flipping.svg. Retrieved from [commons.wikimedia.org: https://commons.wikimedia.org/wiki/File:Dna-base-flipping.svg](https://commons.wikimedia.org/wiki/File:Dna-base-flipping.svg)
- Nafei, W. (2015). The Role of Organizational DNA in Improving Organizational Performance: A Study on the Industrial Companies in Egypt. *International Business Research*, 8(1), 117-131. doi:10.5539/ibr.v8n1p117
- Pakdelan, S., Azarberahman, A., Saremi, H., & Ghaderi, M. (2021). The Effect of Organizational DNA on the Use of Management Accounting Practices: Using the Structural Equation Model. *Journal of Management & Research*, 10(1), 1-12. doi:10.17697/ibmrd/2021/v10i1/159757
- Pradayan, A., Khojaste, G., & Bahrami, M. (2014). A comparative study of the organizational DNA of private companies from the perspective of tax evasion based on Hanald and Silverman's model (case study: private companies of Isfahan city). The fourth conference of modern management sciences, 1-19. Retrieved from <https://civilica.com/doc/403870>
- Rashidi, Z., Ebrahimzadeh Dastjardi, R., Rashidi, A., & Hosseini, R. (2014). Examining the organizational DNA in terms of human resource functions and daily activities based on Hanald's model (Stad Steel, Ghaem Sepahan, Atlas Machine Aria, Guidance Department, Toka Steel, Municipality, Zamzam Isfahan, Naqsh Jahan Sugar and Isfahan Sugar.
- Schumacker, R. E., & Lomax, R. G. (2010). *A Beginner's Guide to Structural Equation Modeling Third Edition*. New York: Taylor & Francis Group. Retrieved from [www.taylorandfrancis.com](http://www.taylorandfrancis.com)
- Thompson, A., & Strickland, A. (2003). *Strategic management: concepts and cases (version 13)*. Boston: McGraw-Hill/Irwin.
- Ubaid, A. M., & Dweiri, F. T. (2019). *Virtual DNA (V-DNA) Applications: A Systematic Literature*. *Industrial Engineering and Operations Management* (pp. 213-224). Bangkok: IEOM Society International.
- Wang, J., & Wang, X. (2012). *Structural Equation Modeling Applications Using Mplus*. Chichester: John Wiley & Sons. doi:10.1002/9781118356258
- Xu, K., Shen, Q. G., Liu, G., & Martek, I. (2019). Demolition of Existing Buildings in Urban Renewal Projects: A Decision Support System in the China Context. *Sustainability*, 11(2), 1-22.