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# Development of a comprehensive model for re-designing the organizational structure based on business intelligence (case study: Esfahan Steel Company)

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**Abstract**
*This research was carried out with the aim of providing a comprehensive model for redesigning the organizational structure that fulfills the requirements of activity in the era of the fourth industrial revolution with the approach of developing smart business. The research was of a sequential mixed type of quantitative and qualitative type. In the quantitative part, which was conducted using a descriptive survey method, in the first stage, organization pathology and organizational design models were examined and identified through a systematic review of the research literature, and Burton's multi-contingency model, which simultaneously includes pathology and organization design, was selected. In the second stage, the researcher developed a questionnaire based on different editions of Burton's multi-contingency model, and the validity and reliability of the questionnaire (content validity using the Laushe method, face validity and construct validity using the confirmatory factor analysis method with Smart PLS software and reliability It was evaluated by the methods of Cronbach's alpha, composite reliability and divergent and convergent reliability of Fornell and Lockerre), the results of which indicate the high internal validity of the research and the validity of the tool designed in the society. Finally, a 90-item questionnaire was developed to measure 14 dimensions and 28 components, which was arranged in the form of a Likert scale and distributed among 263 managers and experts of Esfahan Steel Company, who were selected by stratified random method. After data collection and analysis, it was found that the different dimensions of the organizational structure of Esfahan Steel Company based on Burton's multi-contingency model are not located in one area and are scattered in four different areas of the diagram, and the dimensions of the structure are not proportional and aligned. In the future, in order to redesign the appropriate structure, the research was continued using the qualitative method. In this section, with the purposeful sampling technique dependent on the criterion among 30 academic and steel industry experts related to the subject, the most important dimensions of the organizational structure (using the fuzzy Delphi method and in two rounds) and the components of business intelligence (using the fuzzy Delphi method) and during three rounds) were determined. Then, by using the fuzzy Delphi technique during four rounds, which stopped at the Schmidt agreement criterion, a comprehensive model of organizational structure redesign with the approach of developing smart business was obtained. The findings showed that the most effective components of business intelligence include commercial intelligence, artificial intelligence, strategic intelligence, and competitive intelligence, which can provide suitable platforms and facilitators to achieve a suitable and intelligent organizational structure. The results show that the use of business intelligence factors consisting of strategic, competitive, commercial and artificial intelligence models are effective platforms for making appropriate decisions in order to make changes and redesign the organizational structure (organization plan) and create appropriateness and alignment. It is between dimensions with the aim of developing smart business.*

***keywords**: Structure design, smart business, Burton's multi-contingent model, Delphi fuzzy, Esfahan Steel Company*

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## 1- Introduction

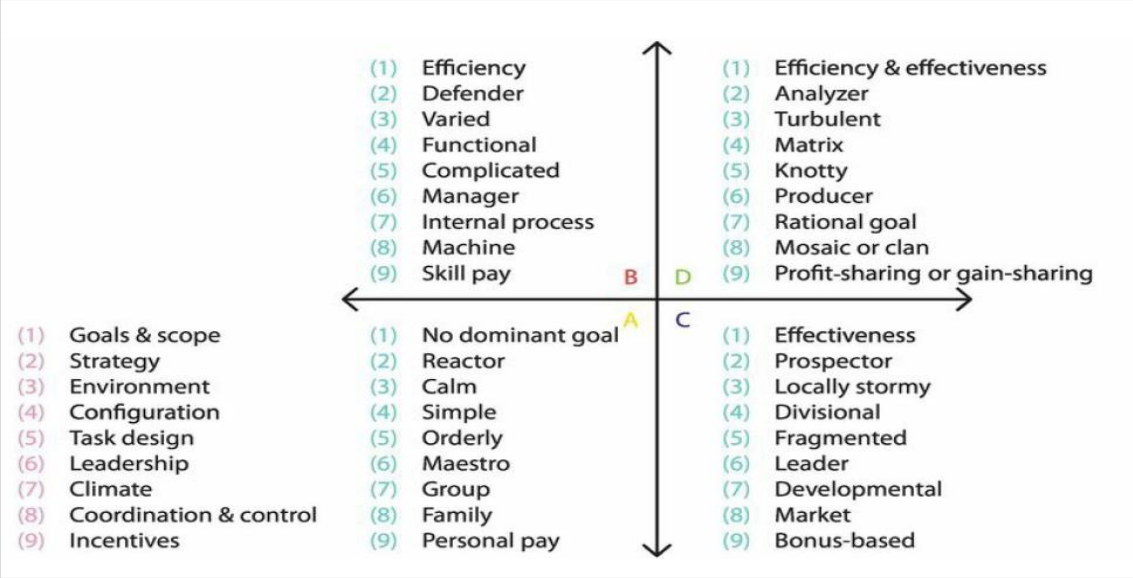
Faced with environmental changes or inefficiencies in the functions or outputs of an organization, usually after a managerial change in organizations, one of the first actions is to modify the structure as the key to solving problems for managers. Structures change only from the aspect of the organizational chart, regardless of the overall dimensions of the organization and factors of poor performance. But we see that many of these actions did not lead to the desired results to remove the weaknesses and this cycle is repeated periodically. A look at the successive changes in the country's major organizations, including the ministries of commerce and industries and mines and the formation of the ministry of industry, mining and trade (2001, 2011) and the insistence on separation after a few years in terms of the ineffectiveness of the structure (government bill of the year 2021 and the plan of the parliament of 1401); or the repeated integration and separation of program and budget organizations and administrative and employment affairs (years 2001, 2007, 2014 and 2016), shows that structural changes without awareness and recognition of the causes of the existing situation and functional problems and obstacles alone are not a solution and for Reforming the structure should have a scientific model and think about concepts beyond the reformation of the organizational chart.

In today's world, where everything is changing at a great speed, organization design is a daily, continuous and challenging activity for executives, whether in managing a global company or a small work team (Burton, Obel and Håkonsson 2020, 3). Organization design is a conscious process of designing the structure, processes, reward system and human resources procedures in order to create an organization that is able to realize the business strategy (Galbraith, 2014). Organizational structure is one of the important components that determine the efficiency of any organization. The use of the correct organizational structure causes fundamental improvements in the performance of the organization. The establishment of a proper administrative system and the achievement of the expected results in the conditions of the existence of data and favorable resources require the presence of this factor (French and Bell, 1999).

In order to be able to make a suitable design for the structure, like other management aspects, the use of the model can help to understand the organization and make the desired changes. Several models have been introduced for the design of the structure, the most important of which can be mentioned. Robbins (2018) emphasizes three elements of complexity, formality and focus in his structure design model. From the point of view of Daft (2017), organizational dimensions are classified into two structural and content groups. In his star model, Galbraith (2014) provides a framework for designing a company's organization, which includes strategy, structure, processes, rewards, and human resources.

Goold and Campbell (2002) reviewed the principles of good design and studied the structure of several small and large companies and observed the way managers make decisions regarding the structure and summarized their findings in the form of 9 organization design tests. Nadler and Tushman (1997) believe that every organization is an integrated system whose performance depends on the degree of alignment among its main components. According to their organizational behavior fit model, the components of each organization should be aligned and fit with each other. In one of the latest models presented by Burton et al. (2020), they examine the organization from the perspective of 9 two-dimensional components and determine its appropriateness or lack of appropriateness. These 9 components include 1- organization goals, 2- strategy, 3- environment, 4- configuration, 5- task design, 6- leadership style, 7- organizational climate, 8- coordination and control, and 9- incentives.

It is clear that decision-making regarding the design or selection of the model as well as its implementation and deployment requires organizational data and detailed information. Information is considered as a source of power and having the necessary knowledge of the needs and demands of customers and related factors plays an important role in the success of organizations (Sedan, 2010). Therefore, organizations should use an efficient system for collecting, storing, processing and




reporting information in order to provide the information needed by decision makers and managers at the required time (Moussikhani and Saeedi, 2010).

**Figure 1:** The complete set of component types within the 2×2 organizational architectural space

In this regard, business intelligence systems help managers to make appropriate decisions by using various processes, tools and technologies (Fushi and Kozimski, 2014). Business intelligence is a comprehensive term that combines structures, tools, databases, analytical tools, applications and methodology. The main goal is to enable mutual access to data and give managers and analysts the ability to perform appropriate analysis. By analyzing current and past data, conditions and performances, decision makers gain valuable insight that helps them make better decisions (Turban et al., 2014).

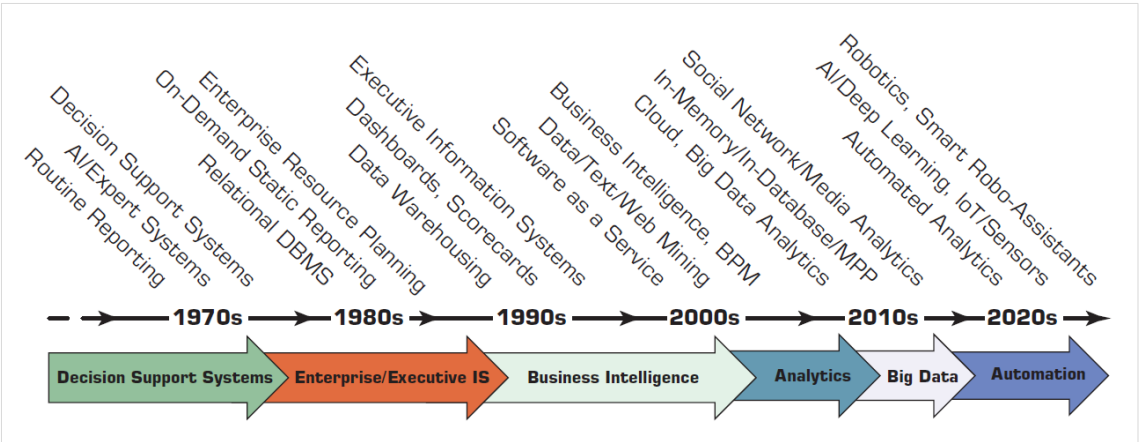



**Figure 2:** Evolution of Decision Support, Business Intelligence, Analytics, and AI

In the highly competitive environment of organizations, where social changes, changes in the level of knowledge and attitudes of employees, the arrival of new technologies, especially information technology, have affected the goals and strategies of organizations, static and mechanical structures even in large industries where changes compared to Areas such as communication, information technology, etc. are slower and the environmental conditions are more stable and cannot be responsive in the long term. Despite the relative stability of the industry environment in terms of technology in industries such as the steel industry, the product market of these industries is currently very variable, complex and competitive due to the presence of competitors and small companies and access to global markets by customers. Therefore, the re-engineering of business processes as well as the design of the organizational structure of companies (organization design) in such a way as to respond to these conditions is inevitable.

As one of the largest industrial units in the country, Esfahan steel company has been operating for more than several decades, and its current situation is in no way comparable to the past. And it requires work, because due to his daily presence in relations with customers, continuous monitoring of competitors, finding out about the quality and quantity of their new products, Identification of market needs and analysis of the surrounding environment, etc., is faced with a lot of data, while the emergence of new private companies in the country's steel industry and their intense competition in acquiring each other's market share has made maintaining the market share and developing it one of their most important concerns. come A problem that can be overcome by developing intelligence in the organization. Although the basis of its technology has remained constant as one of the most important factors influencing the structure, but other factors such as the competitive environment, industry structure, employees, organizational culture and especially the information structure have changed drastically in such a way that other models The static aspects of the organizational structure are not responsive to this dynamic environment. The absence of a proper organizational structure has made the company face major issues and problems.

Also, the lack of appropriateness and coordination between the information systems used, such as the organization's resource planning system, the executive management system, with the organizational structure has caused the low efficiency and ineffectiveness of these systems. To solve many of these problems, it is suggested to use smart business solutions that can increase the competitiveness of an organization and differentiate it from other organizations. This solution allows organizations to use the available information to take advantage of the advantages of being competitive and leading, and makes it possible to better understand the demands and needs of customers and manage relationships with them. This system allows the organization to monitor positive or negative changes and make timely and appropriate decisions. As Figure 2 shows, nowadays leading organizations do not talk about ERP and CRM, etc., but the approach of organizations is towards using smart business systems (Sharda, Delen and Turban, 2020:22).

The review and study of the conducted research shows that no research has been done in the steel industry (and similar large industries) regarding the design of the organizational structure model in such a way that it has an approach and focus on business intelligence. Therefore, the present research, using the results of the analysis of the existing organizational structure of Esfahan Steel Company, seeks to redesign a proportionate and coordinated structure in a way that responds to the conditions of the steel industry and the market, focusing on business intelligence and using business intelligence components. The work is trying to provide a comprehensive model for redesigning the organizational structure.

## 2- Research literature

In the business world and the age of knowledge, intelligence is one of the undeniable requirements for most organizations so that they can acquire and analyze information, as well as increase knowledge and create awareness. Increase their capabilities. Intelligence is the total knowledge that a company has of the environment in which it competes. It is in the light of this knowledge that a complete picture of the current and future state of the business and competition scene is placed in

front of managers so that they can make better decisions (Bostrom, 2014). Currently, most successful institutions in developed countries use intelligence as a They use a powerful tool to gain more awareness of the environment. Undoubtedly, in order to survive in an environment that will face more challenges every day, institutions can increase their intelligence capabilities and overcome their competitors by relying on information and communication technology (Kolakoglu, 2011).

In today's information society, it seems necessary to use commercial, organizational and competitive intelligence tools to analyze the current situation of organizations and enterprises, determine short-term and long-term goals and control performance indicators; from the point of view of executive management to make decisions in the spaces of uncertainty and ambiguity and to estimate the results of decisions; From the point of view of financial management, to monitor and control financial reports and performance indicators; From the point of view of supply chain management to control and improve relationships with suppliers and partners of the organization and from the point of view of customer relationship management to identify, classify, policy and improve relationships with the organization's customers, etc. (Piraish and Alipour, 2012).
Business intelligence in the organization is formed in different layers. Leibovitz (2006) describes these layers in five levels, the information obtained from each one is used for the other, and in each layer a feature is added to it and makes its function more complete. Note that obtaining each is a prerequisite for other layers. In the diagram below, the layers of organizational intelligence are shown in order: artificial intelligence, knowledge management, business intelligence, competitive intelligence and strategic intelligence.

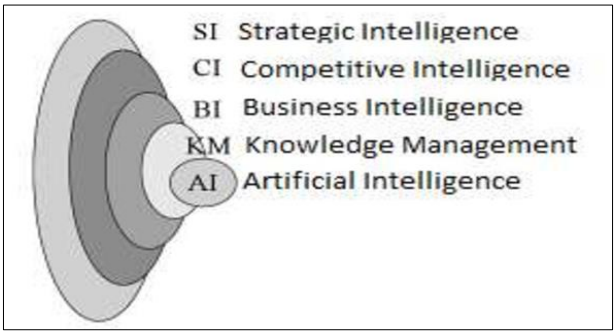



**Figure 3:** Leibowitz's business intelligence model

Artificial intelligence is a branch of computer science that is called simulating human intelligence in programmed machines. think like humans and imitate their actions; This goal may sometimes be achieved using simple algorithms and predetermined patterns, but sometimes it requires extremely complex algorithms. In other words, the study of how to enable computers to perform actions that humans currently perform better (Rich and Knight, 1991).
Business intelligence is the ability of an organization to make meaningful use of the data collected in its daily business operations (Kimble and Miloly Dakis, 2015). Irini and Berta (2012) define business intelligence as a set of economic applications used to analyze company data to transform them into information that helps managers make decisions. Business intelligence can play a very effective role in improving the organization's performance by identifying new opportunities, highlighting potential threats, revealing new business perspectives, and improving decision-making processes (Xia and Gang, 2014).
Competitive intelligence is defined as a process or action that creates intelligence through planning, legal and ethical data collection, processing and analysis of information obtained from the company's

internal or external competitive environment, in order to assist in decision making. And it gains a competitive advantage for the company (Ekomos et al., 2019). Competitive intelligence consists of two concepts: intelligence and competition. Intelligence refers to the ability to anticipate future changes in order to face these changes, and competition refers to the process of competition between at least two organizations or businesses (Köseoglu et al., 2019).

Strategic intelligence is defined as the collection, processing and analysis of environmental data and the dissemination of this information that is strategically related to the organization. This intelligence includes laws, taxes and financial affairs, economic and political scope and human resources categories of the organization. In other words, strategic intelligence observes and analyzes the social, political and economic behaviors of an organization. Strategic intelligence is evaluated with factors such as strategic vision, having social and human resources, examining economic and political issues of the organization (Gaber, 2007). In fact, according to experts' statements, strategic intelligence is a broad and multidimensional concept that cannot be given a fixed and definite definition (McCoby, 2011).

The Institute of Strategic and Competitive Intelligence Specialists (SCIP) by combining and using past organizational intelligence models, such as Rach and Santi (2010) and Lebiwitz (2006) intelligence models and using operational experiences in large companies such as Microsoft and Apple, has developed a model of organizational intelligence introduces what is called holistic intelligence. This IQ model of an organization depends on how the organization manages information, culture, knowledge and strategies to stay competitive through innovation and operational excellence. In this model, in addition to the dimensions of strategic, competitive and business intelligence, it also includes the dimension of interpretive intelligence (Balasubramanian, 2014).

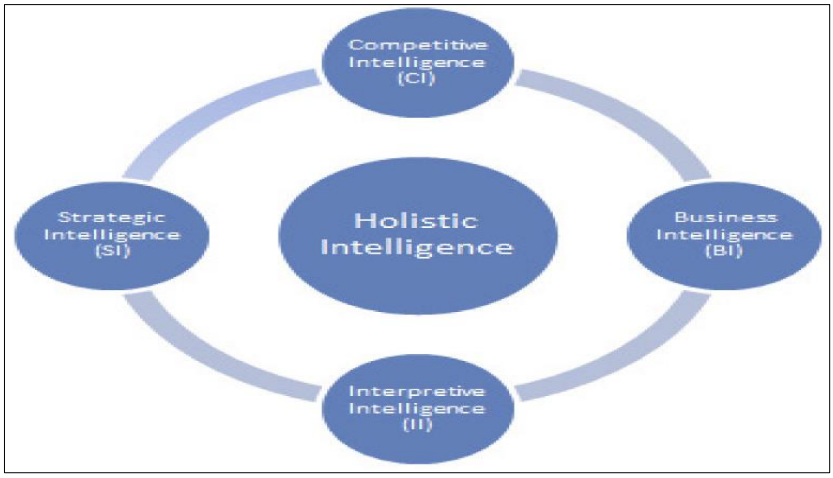



**Figure 4:** SCIP Business Intelligence Model

In the review of research literature, the first principle is to find the theoretical foundations and backgrounds related to the research topic. This requires special accuracy and fussy exactitude in searching and citing scientific and research articles. To access the research background, databases and external sites such as Google Scholar, Emerald, Science Direct, Springer, ProQuest, etc.; Also, internal databases such as the National Library of Iran, Normags, Magiran, Comprehensive

Humanities Portal[4] (ensani), IRANDOC[5], National Digital Library of Iran[6], etc., were searched. The search results showed that few studies have been done on the subject of this research and there is an obvious study gap in the field Providing a comprehensive model for redesigning the organizational structure that meets the requirements of activity in the era of the fourth industrial revolution with an intelligent business development approachand investors in the country. Some related researches are mentioned below:

Rudko et al. (2021) in a research entitled "Artificial intelligence and organizational structure: internal modeling in response to artificial intelligence incidents" using a descriptive-survey method with an online survey of business owners to investigate the suitability of the macro and middle levels of organizations with the consequences of artificial intelligence they did By designing a model, they divided business owners into four groups: pessimists, suspicious pessimists, optimists, and suspicious optimists. The results of the research showed that the group of doubtful optimists is the most important group that has been able to determine organizational trends and influence other groups. Also, due to the fact that this research was conducted during the corona epidemic, its sociological and managerial consequences will be related to the future post-corona events.

Rahimi, Baghalinejad and Nadaf (2020) conducted research entitled Designing a business intelligence model with a data-based approach and with a qualitative research method of the data-based theory type (paradigm approach) in Mahshahr petrochemical companies. The results in the form of the resulting model of 50 cases characteristic of an intelligent organization, which are divided into five categories: economic (such as saving costs in the long term), competitive (such as increasing competitive intelligence), managerial (such as improving the decision-making space in the organization), communication (such as improving the support space and increasing the satisfaction of all stakeholders) and technological (such as increasing the speed of interpretation of raw data) have been proposed.

Hsiaowu and Wu (2019) in a research entitled "How organizational structure and strategic alignment affect new product success" among a sample of 80 of the top 5000 Taiwanese companies (the annual list of the China Credit Information Service Association) and using a descriptive-correlational method (Regression analysis) with the aim of investigating and re-examining the role of organizational level determining factors from the point of view of competence. The results showed that formalization has a positive relationship with new product performance, while decentralization has an inverse linear curve effect on new product performance. In addition, the regression findings also show that market-oriented strategy has a negative moderating role in the relationship between formalization and new product performance, while technology-oriented strategy has a positive moderating role in relation to decentralization and new product performance. Finally, the findings showed that to increase the performance of the new product, the dimensions of formality and concentration in the organizational structure should be reduced and high-level strategies should be emphasized.

Claibornesrud (2018), in a research entitled "participatory organizational forms" and concluded that with rapid changes in technology, competitive market, newly emerging concepts of organizations should be transformed towards new structures including adaptive, self-organizing and innovative organizations. given and redesigned

Montazer, Outarkhani and Shekohiar (2016) conducted a research to evaluate business intelligence systems on organizational performance with a structural equation modeling approach in the country's payment industry, and the results showed the impact of the quality of information content and the quality of access to information on the maturity of business intelligence systems. And the impact of the quality of access to information and the impact of the application of information obtained from

[4] . http://ensani.ir/fa
[5] . https://irandoc.ac.ir/
[6] .https://www.nlai.ir

business intelligence systems on the functional benefits of the organization was also confirmed in this research.

Najari et al. (2015) in a research entitled "Presenting the framework of intelligent organization factors in manufacturing companies" with a descriptive survey type method in manufacturing companies of Kermanshah province, concluded that the variables of organizational insight, system thinking, free thinking and openness of the organization, Knowledge management, attitude towards information technology, organizational communication and learning ability of the organization have had a positive and meaningful effect on the intelligence of the organization and also the effect of the variables on each other has been significant. In the meantime, it was found that organizational communication had the greatest impact on the intelligent organization.

Tabarsa and Nazaripour (2013) conducted a research with the title "Evaluation of factors affecting human-structural intelligence in knowledge-based organizations" using a survey method of correlation analysis and causal comparison among scientific research members of knowledge-based research institutes of the Ministry of Science, Research and Technology. The results of the research showed that the temporary special structure has the most direct effect on structural intelligence processes. Therefore, organizing people and groups around knowledge-oriented work processes, creating dynamic and flexible structures in knowledge communities, specialized knowledge teams, creating informal links and temporary structures between knowledge communities and specialized knowledge teams are among the factors that can promote structural intelligence and the process of achieving intelligence in knowledge-based organizations.

Low and Donaldson (2013), by researching the organizational structure of a number of organizations and examining the degree of fit between their dimensions, found that when the fit between the dimensions was severely reduced, the inconsistency in the entire organization increased. Also, the results showed that if there is no possibility of alignment and fit in all dimensions, by increasing the fit in important dimensions, the incompatibility can be reduced. In the meantime, raising the capacity of information processing as one of the components of business intelligence played an effective role in creating appropriateness and alignment.

Farhangi et al. (2012), in a research entitled "Investigation of the impact of information technology on the organizational structure and performance of the company" which was conducted for the analysis of consulting engineering companies in Iran, which was carried out using a descriptive method of correlation type using the structural equation model, showed that that information technology has a direct and indirect effect on the company's performance and the organizational structure has a direct effect on the company's performance. Finally, the results of this study showed that information technology has a direct impact on organizational structure.

## 3- Methodology

In this research, the qualitative research method was used in two stages based on group discussion and Delphi method of fuzzy type. The sampling method is purposive sampling dependent on the criteria. In this sampling method, people are selected for the sample who are in the best position to provide the required data. According to this method, experts who had knowledge of organizational structure and business intelligence and could provide the desired data (for academic experts: related education, teaching and research related to the subjects and for industry experts: relevant education and relevant work experience), were used. In order to reach the answer of determining the optimal design type of Zob Ahan Company of Isfahan, the community of senior managers and members of the structure committee of table number one in the form of the company's strategic committee of 15 people were used as a group discussion. Also, the selection of business intelligence components was done with the same method and in the statistical sample of 11 university experts from table number one.

Fuzzy Delphi method was used in the impact of business intelligence components on organizational design dimensions. Selection of panel members is a vital element in the success of Delphi studies. To ensure the suitability of the panel, one should pay attention to its size and composition. The number

of Delphi panel experts can be changed from 10 to 50 members. The main emphasis should be on the selection of panel members who have expertise in the subject matter. The Delphi panel of the present study consists of 30 academic experts and iron smelting experts with sufficient expertise and relevant experience (Table No. 1).

**Table No. 1:** Characteristics of the statistical sample of the qualitative method

| Sample for study | place | number of people |
|---|---|---|
| University experts | Shahid Beheshti University | 3 |
| | University of Esfahan | 3 |
| | Islamic Azad university | 3 |
| | Payam Noor university | 2 |
| Industry experts (iron smelting) | Company deputies | 3 |
| | Supreme Committee of Company Structure | 2 |
| | Planning managers | 1 |
| | Commercial and financial managers | 2 |
| | Human resource managers | 3 |
| | Industrial engineering experts | 3 |
| | Research and development experts | 2 |
| | Organizational experts and methods | 2 |
| | Information technology and systems experts | 2 |
| Academic experts and industry experts | | 30 |

Considering that the panel members (academic experts and iron smelting experts) are representatives of the desired group or field of knowledge, content validity is guaranteed. In the current research, the member's validity criterion was used in Newman's validation method. Member validity in Newman's validation criteria occurs when a researcher returns the results to the members to judge its adequacy. In the current research, considering that the results of each stage are returned to the experts and their opinions are received again, the credibility of the members is established.

To achieve the organizational structure redesign model based on business intelligence, the fuzzy Delphi method was used in four rounds, the summary of the rounds is as described in table number two.

**Table No. 2:** Summary of fuzzy Delphi steps for the impact of intelligence components on organizational design dimensions

| round number | The number of questionnaires sent | Number of responses received | The number of dimensions sent | Number of approved dimensions | Number of new open response dimensions |
|---|---|---|---|---|---|
| First | 25 | 20 | 80 | 56 | - |
| Second | 20 | 18 | 56 | 51 | - |
| Third | 18 | 15 | 51 | 51 | - |
| Fourth | 15 | 15 | 51 | 51 | - |

## 4- Findings

Question 1- What is the current status of the organizational structure of Esfahan Steel Company based on Burton's multi-contingency model?

In order to answer the question of the optimal (proportionate) model of the organizational structure of Esfahan Steel Company, which is based on the development of business intelligence; First, Burton et al.'s multi-contingency model for members of the Organizational Structure High Committee and senior managers of Zob Ahan Company(3 meetings of the Supreme Structure Committee and one meeting of the Council of Deputies) and then the results of the quantitative part, including the state of the company's organizational structure, were described and explained according to Burton et al.'s model. With the reviews of the structure committee and considering the policies and in line with the company's macro strategies, choosing the goal of efficiency and effectiveness together with the proposal to the senior management of the company, which was approved and the basis for the continuation of the research.

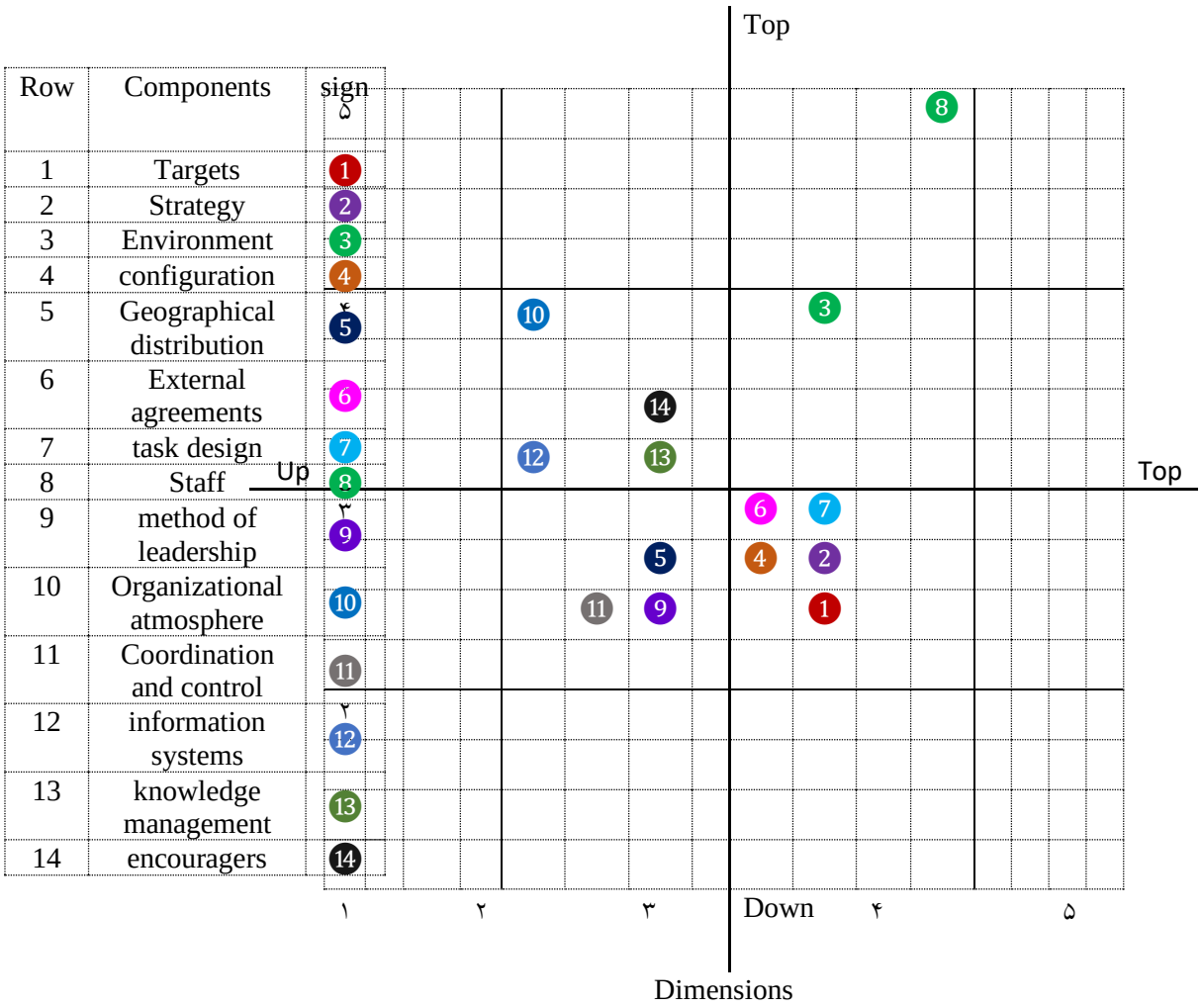



**Figure 5.** Organizational structure status (organization plan) of Esfahan Steel Company according to Burton et al.'s model

The findings showed that the different dimensions of Zob Ahan Isfahan's organizational plan based on Burton's multi-contingency model were not located on one area and were scattered in four different areas of the diagram as shown in Figure 5, and the dimensions were not proportional and aligned. Also, according to the academic experts' opinion, to select the components of business intelligence, the commonalities of the two intelligence models of Leibovitz (2006) and the SCIP model (2014) were accepted; These components include strategic intelligence, competitive intelligence, business intelligence and artificial intelligence, which were used in the second stage.

Question 2- What is the optimal model of the organizational structure of Esfahan Steel Company with the approach of developing smart business?

In order to design the organizational structure with the smart business development approach, by examining the background of researches related to the subject and also the research literature related to them, various concepts of organizational pathology, organizational structure and business intelligence are explained using the fuzzy Delphi technique in three stages and nine. Round used:

a) Choosing the effective dimensions of redesigning the organizational structure with a smart business development approach (two steps);

b) Choosing effective intelligence (artificial intelligence, business intelligence, knowledge management, competitive intelligence and strategic intelligence) in business intelligence (three stages);

c) The impact of the components of artificial intelligence, business intelligence, knowledge management, competitive intelligence and strategic intelligence on the dimensions of organization design (four stages).

After determining the effective dimensions in redesigning the organizational structure and effective intelligence in the development of smart business, in the third stage, through the fuzzy Delphi technique, the impact of the components of strategic intelligence, business intelligence, competitive intelligence and artificial intelligence on the dimensions of organization design was discussed. The continuation of its results is presented.

In the first stage of the survey, 25 questionnaires containing 1 open question and one question about the impact of intelligences selected in the second stage of Delphi on 20 dimensions of organizational structure were sent to the experts and collected. The 20 dimensions include all the effective dimensions of the organizational structure selected in the first Delphi, which are classified in 10 categories. In the open question, the experts were asked to introduce another component that is effective on 20 organizational structure dimensions in addition to the intelligence components mentioned in the questionnaire.

In strategic intelligence, the dimensions of goals (efficiency, effectiveness), strategy (exploitation, discovery), environment (complexity, unpredictability), configuration (customer-centered, specialization), leadership (delegating authority, avoiding uncertainty), coordination and control (lack of concentration and formality), incentives (result-based payment, goal-based payment) obtained the highest level of agreement. The other mentioned dimensions also got the lowest level of agreement (below 70 percent), so they were removed from the process.

In the component of competitive intelligence, the dimensions of goals (efficiency, effectiveness), strategy (exploitation, exploration), environment (complexity, unpredictability), configuration (customer-oriented), leadership (delegating authority, avoiding uncertainty), organizational climate ( Readiness for change, tension), the most agreed upon other dimensions also got the lowest amount of agreement (below 70 percent), that's why they were removed from the process.

In the business intelligence component, the dimensions of goals (efficiency, effectiveness), strategy (exploitation, exploration), environment (complexity, unpredictability), configuration (customer-centered, specialization), task design (repeatability), leadership (authorization) , avoiding uncertainty), coordination and control (lack of concentration and formality), incentives (result-based payment, goal-based payment) obtained the highest level of agreement. The other mentioned

dimensions also got the lowest level of agreement (below 70 percent), so they were removed from the process.
In the artificial intelligence component, the dimensions of goals (efficiency, effectiveness), environment (complexity, unpredictability), configuration (customer-centered, specialization), task design (repeatability), leadership (delegating authority, avoiding uncertainty), coordination and Control (lack of concentration and formality) got the highest level of agreement, and the other mentioned dimensions also got the lowest level of agreement (below 70 percent), that's why they were removed from the process.

**Table No. 4:** Results and calculations of the fourth round of Fuzzy Delphi

| Condition | Average difference with the previous round | Definite average | Fuzzy average | | | NO 5 | NO 4 | NO 3 | NO 2 | NO 1 | questions |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Confirmation | 0/667 | 0/667 | 0/667 | 0/667 | 0/667 | 11 | 3 | 1 | 0 | 0 | SI1 |
| Confirmation | 0/917 | 0/917 | 0/917 | 0/917 | 0/917 | 14 | 1 | 0 | 0 | 0 | SI2 |
| Confirmation | 0/983 | 0/983 | 0/983 | 0/983 | 0/983 | 8 | 4 | 3 | 0 | 0 | SI3 |
| Confirmation | 0/856 | 0/856 | 0/856 | 0/856 | 0/856 | 12 | 2 | 1 | 0 | 0 | SI4 |
| Confirmation | 0/000 | 0/000 | 0/000 | 0/000 | 0/000 | 9 | 5 | 1 | 0 | 0 | SI5 |
| Confirmation | 0/733 | 0/733 | 0/733 | 0/733 | 0/733 | 10 | 2 | 3 | 0 | 0 | SI6 |
| Confirmation | 0/983 | 0/983 | 0/983 | 0/983 | 0/983 | 8 | 7 | 0 | 0 | 0 | SI11 |
| Confirmation | 1/000 | 1/000 | 1/000 | 1/000 | 1/000 | 12 | 3 | 0 | 0 | 0 | SI12 |
| Confirmation | 0/906 | 0/906 | 0/906 | 0/906 | 0/906 | 3 | 10 | 2 | 0 | 0 | SI15 |
| Confirmation | 0/000 | 0/000 | 0/000 | 0/000 | 0/000 | 5 | 7 | 2 | 1 | 0 | SI16 |
| Confirmation | 0/583 | 0/583 | 0/583 | 0/583 | 0/583 | 9 | 6 | 0 | 0 | 0 | SI19 |
| Confirmation | 0/833 | 0/833 | 0/833 | 0/833 | 0/833 | 9 | 5 | 1 | 0 | 0 | SI20 |
| Confirmation | 0/950 | 0/950 | 0/950 | 0/950 | 0/950 | 7 | 8 | 0 | 0 | 0 | CI1 |
| Confirmation | 0/789 | 0/789 | 0/789 | 0/789 | 0/789 | 11 | 4 | 0 | 0 | 0 | CI2 |
| Confirmation | 0/000 | 0/000 | 0/000 | 0/000 | 0/000 | 10 | 5 | 0 | 0 | 0 | CI3 |
| Confirmation | 0/683 | 0/683 | 0/683 | 0/683 | 0/683 | 12 | 2 | 1 | 0 | 0 | CI4 |
| Confirmation | 0/933 | 0/933 | 0/933 | 0/933 | 0/933 | 11 | 4 | 0 | 0 | 0 | CI5 |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Confirmation | 0/983 | 0/983 | 0/983 | 0/983 | 0/983 | 13 | 2 | 0 | 0 | 0 | CI6 |
| Confirmation | 0/867 | 0/867 | 0/867 | 0/867 | 0/867 | 12 | 3 | 0 | 0 | 0 | CI11 |
| Confirmation | 0/000 | 0/000 | 0/000 | 0/000 | 0/000 | 8 | 6 | 1 | 0 | 0 | CI12 |
| Confirmation | 0/633 | 0/633 | 0/633 | 0/633 | 0/633 | 9 | 4 | 2 | 0 | 0 | CI13 |
| Confirmation | 0/883 | 0/883 | 0/883 | 0/883 | 0/883 | 9 | 3 | 3 | 0 | 0 | CI14 |
| Confirmation | 0/983 | 0/983 | 0/983 | 0/983 | 0/983 | 9 | 4 | 2 | 0 | 0 | CI17 |
| Confirmation | 0/833 | 0/833 | 0/833 | 0/833 | 0/833 | 9 | 5 | 1 | 0 | 0 | CI18 |
| Confirmation | 0/000 | 0/000 | 0/000 | 0/000 | 0/000 | 11 | 3 | 1 | 0 | 0 | BI1 |
| Confirmation | 0/617 | 0/617 | 0/617 | 0/617 | 0/617 | 7 | 6 | 2 | 0 | 0 | BI2 |
| Confirmation | 0/867 | 0/867 | 0/867 | 0/867 | 0/867 | 5 | 10 | 0 | 0 | 0 | BI3 |
| Confirmation | 0/950 | 0/950 | 0/950 | 0/950 | 0/950 | 7 | 7 | 1 | 0 | 0 | BI4 |
| Confirmation | 0/811 | 0/811 | 0/811 | 0/811 | 0/811 | 5 | 8 | 1 | 1 | 0 | BI5 |
| Confirmation | 0/000 | 0/000 | 0/000 | 0/000 | 0/000 | 9 | 4 | 2 | 0 | 0 | BI6 |
| Confirmation | 0/633 | 0/633 | 0/633 | 0/633 | 0/633 | 9 | 3 | 3 | 0 | 0 | BI7 |
| Confirmation | 0/883 | 0/883 | 0/883 | 0/883 | 0/883 | 8 | 5 | 2 | 0 | 0 | BI8 |
| Confirmation | 1/000 | 1/000 | 1/000 | 1/000 | 1/000 | 8 | 3 | 2 | 2 | 0 | BI11 |
| Confirmation | 0/839 | 0/839 | 0/839 | 0/839 | 0/839 | 8 | 3 | 3 | 1 | 0 | BI12 |
| Confirmation | 0/000 | 0/000 | 0/000 | 0/000 | 0/000 | 5 | 8 | 2 | 0 | 0 | BI15 |
| Confirmation | 0/700 | 0/700 | 0/700 | 0/700 | 0/700 | 6 | 6 | 3 | 0 | 0 | BI16 |
| Confirmation | 0/950 | 0/950 | 0/950 | 0/950 | 0/950 | 9 | 5 | 1 | 0 | 0 | BI17 |
| Confirmation | 1/000 | 1/000 | 1/000 | 1/000 | 1/000 | 8 | 7 | 0 | 0 | 0 | BI18 |
| Confirmation | 0/883 | 0/883 | 0/883 | 0/883 | 0/883 | 8 | 5 | 2 | 0 | 0 | BI19 |
| Confirmation | 0/000 | 0/000 | 0/000 | 0/000 | 0/000 | 11 | 3 | 1 | 0 | 0 | BI20 |
| Confirmation | 0/517 | 0/517 | 0/517 | 0/517 | 0/517 | 9 | 5 | 1 | 0 | 0 | AI1 |
| Confirmation | 0/767 | 0/767 | 0/767 | 0/767 | 0/767 | 8 | 6 | 1 | 0 | 0 | AI2 |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Confirmation | 0/967 | 0/967 | 0/967 | 0/967 | 0/967 | 4 | 11 | 0 | 0 | 0 | AI5 |
| Confirmation | 0/750 | 0/750 | 0/750 | 0/750 | 0/750 | 5 | 9 | 1 | 0 | 0 | AI6 |
| Confirmation | 0/017 | 0/017 | 0/017 | 0/017 | 0/017 | 8 | 7 | 0 | 0 | 0 | AI7 |
| Confirmation | 0/517 | 0/517 | 0/517 | 0/517 | 0/517 | 11 | 4 | 0 | 0 | 0 | AI8 |
| Confirmation | 0/767 | 0/767 | 0/767 | 0/767 | 0/767 | 8 | 7 | 0 | 0 | 0 | AI9 |
| Confirmation | 0/933 | 0/933 | 0/933 | 0/933 | 0/933 | 9 | 6 | 0 | 0 | 0 | AI10 |
| Confirmation | 0/739 | 0/739 | 0/739 | 0/739 | 0/739 | 7 | 5 | 3 | 0 | 0 | AI11 |
| Confirmation | 0/017 | 0/017 | 0/017 | 0/017 | 0/017 | 6 | 8 | 1 | 0 | 0 | AI12 |
| Confirmation | 0/650 | 0/650 | 0/650 | 0/650 | 0/650 | 11 | 4 | 0 | 0 | 0 | AI15 |
| Confirmation | 0/900 | 0/900 | 0/900 | 0/900 | 0/900 | 5 | 10 | 0 | 0 | 0 | AI16 |
| Confirmation | 1/000 | 1/000 | 1/000 | 1/000 | 1/000 | 13 | 2 | 0 | 0 | 0 | AI17 |
| Confirmation | 0/850 | 0/850 | 0/850 | 0/850 | 0/850 | 14 | 1 | 0 | 0 | 0 | AI18 |

The Delphi steps continued for the second, third and fourth rounds and at the end of the fourth round, the amount of disagreement between the experts in the third and fourth rounds was less than the very low threshold (0.1) and there was no change in the opinions of the experts and in all the questions. The amount of agreement was not very low, so the Delphi technique was stopped. Therefore, the dimensions of re-designing the organizational structure with the smart business development approach were selected after four stages, the results of which are shown in Table 4.
By implementing the results obtained from Table 4 in the form of graphic diagrams, it is possible to draw the communication model of the organization design dimensions affected by the business intelligence dimensions in the redesign of the structure of Zob Ahan Company as described in Figures 6 to 9.

**4-1 Strategic intelligence**

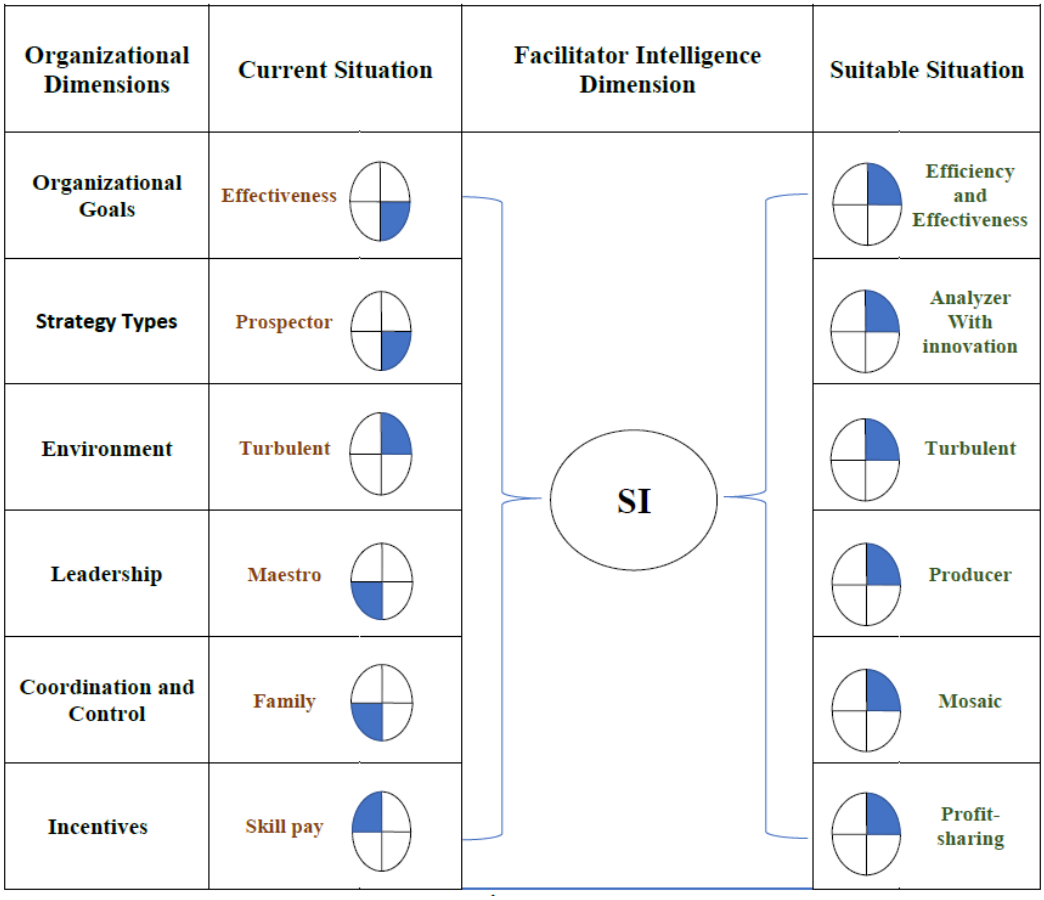



**Figure 6:** Communication model of organization design dimensions affected by strategic intelligence in structure redesign

The findings of Table No. 4, which is drawn in Figure No. 6, show that strategic intelligence is an effective dimension of business intelligence to change the dimensions of goals, strategy, environment, leadership, coordination and control, and organizational design incentives in order to redesign the organizational structure.

**4-2 Competitive Intelligence**

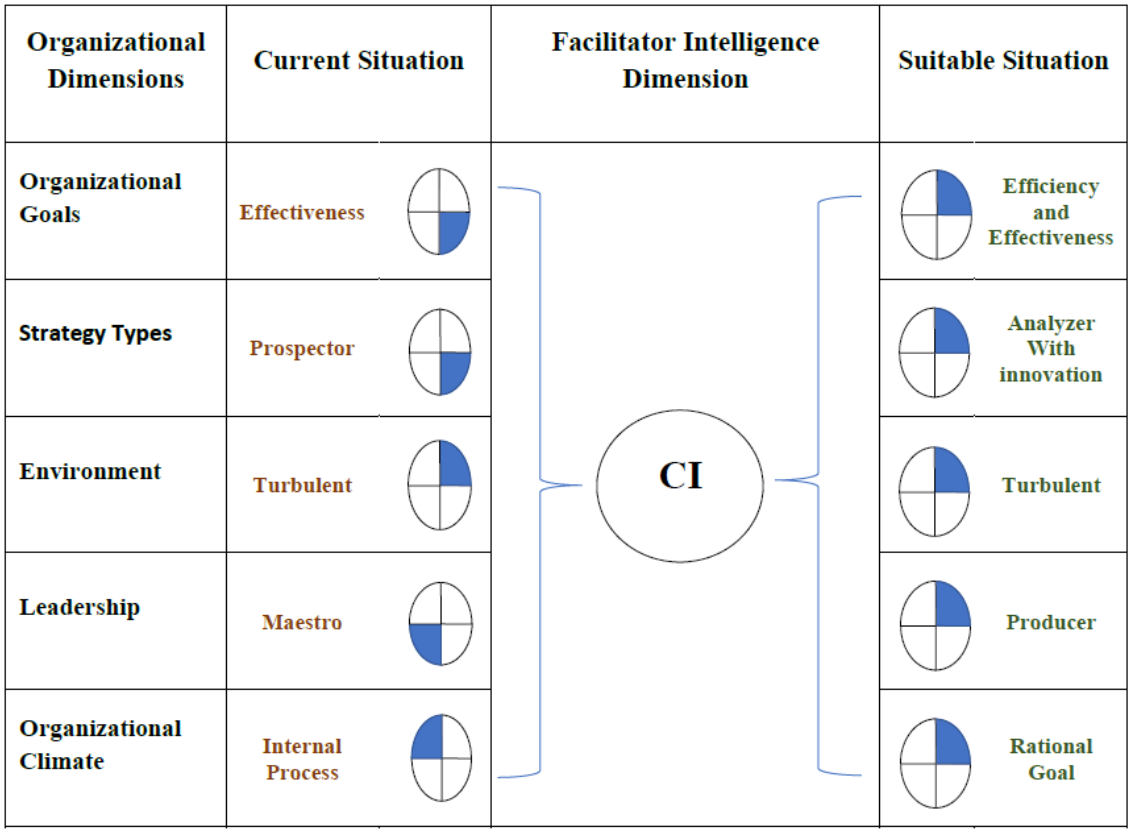



**Figure 7.** Communication model of organization design dimensions affected by competitive intelligence in structure redesign

The findings of Table No. 4, drawn in Figure No. 7, show that competitive intelligence is an effective dimension of business intelligence to change the dimensions of goals, strategy, environment, leadership, and organizational climate in order to redesign the organizational structure.

**4-3 Business Intelligence**

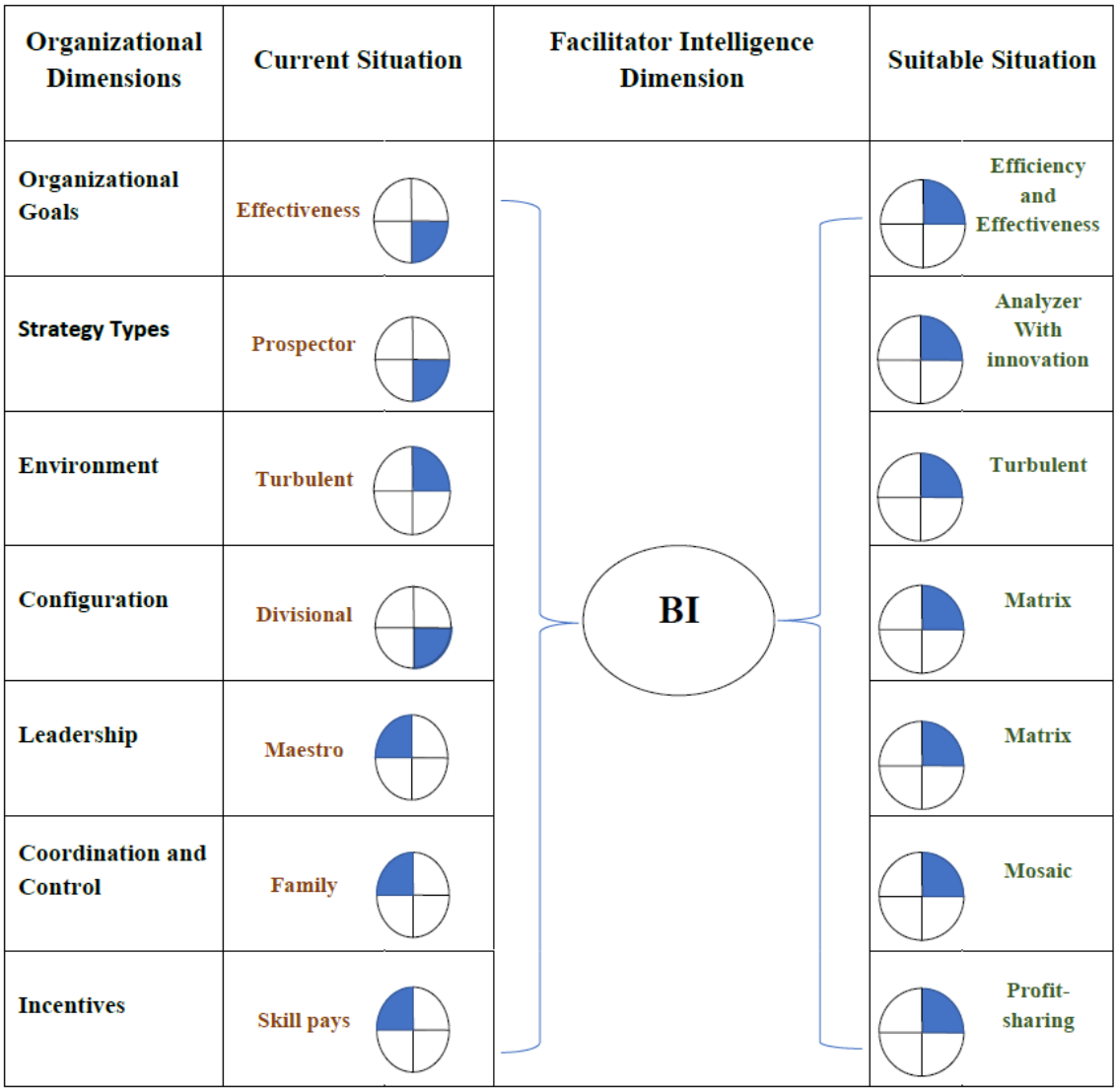



**Figure 8:** Communication model of organization design dimensions affected by business intelligence in structure redesign

The findings of Table No. 4 drawn in Figure 8 show that business intelligence is an effective dimension of organizational intelligence for changes in the dimensions of goals, strategy, environment, configuration, leadership, coordination and control, and organizational design incentives in order to redesign the organizational structure.

### 4-4 Artificial intelligence

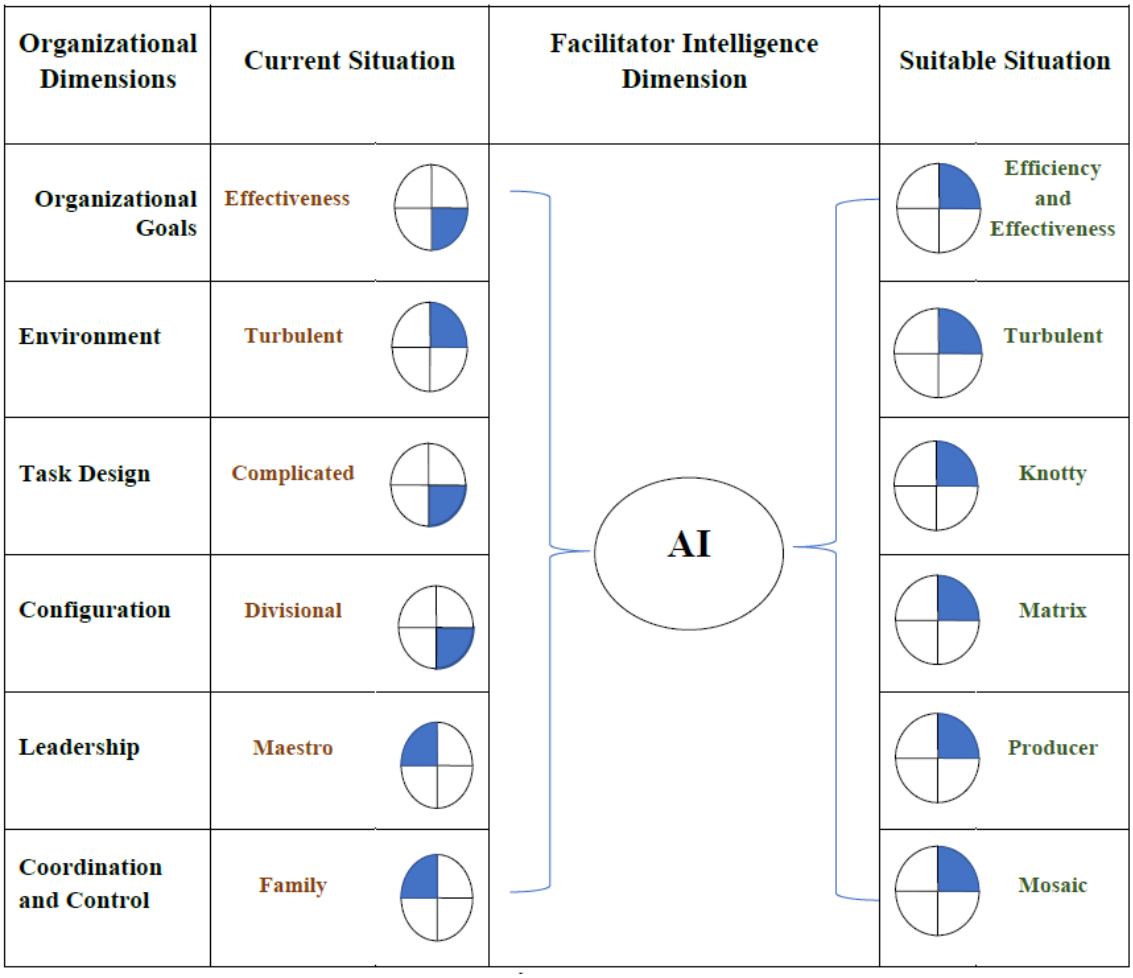



**Figure 9.** Communication model of organizational design dimensions affected by artificial intelligence in structure redesign

The findings of Table No. 4, drawn in Figure No. 9, show that artificial intelligence is a dimension of business intelligence to change the dimensions of goals, environment, configuration, task design, leadership and coordination and control of organization design in order to redesign the organizational structure.

## 5- Discussion and conclusion

The greatest connection and impact is through business intelligence (corresponding to seven dimensions), artificial intelligence and strategic intelligence (6 dimensions each), followed by competitive intelligence (corresponding to 5 dimensions). The results show that the use of business intelligence components consisting of strategic, competitive, commercial and artificial intelligence models are effective platforms for making appropriate decisions in the direction of making changes and redesigning the organizational structure (organization plan) and creating appropriateness and alignment. It is between dimensions with the aim of developing smart business.

- Strategic intelligence for changes in the dimensions of goals (efficiency and effectiveness), strategy (exploitation and exploration), environment (complexity and unpredictability), leadership (delegating authority and avoiding uncertainty), coordination and control (lack of concentration and formality) and Incentives (result-based payment and goal-based payment) are foundational This relationship is drawn and expressed in the form of a graphic model in Figure 6. The results of this part of the research

with the related parts of Zare's research (2021) under the title of the effect of strategic intelligence on macro-environmental intelligence, organizational resource intelligence, competitive intelligence and the intelligence of organizational processes, as well as the research of Farid Fathi et al. (2017) under the title of examining the effect of strategic intelligence on capacity Organizational change is consistent with the moderating role of the legal environment in sports organizations. Based on this, it should be acknowledged that the use of strategic intelligence tools is effective and in making the right decision that can achieve the desired fit to achieve the development of smart business. It is helpful.

-Competitive intelligence is a platform for changes in the dimensions of goals (efficiency and effectiveness), strategy (exploitation and exploration), environment (complexity and unpredictability), leadership (delegating authority and avoiding uncertainty) and organizational atmosphere (readiness for change and tension). . This relationship is drawn and shown as a graphic model in Figure 7. Based on this, it should be said that the use of competitive intelligence tools is effective and can help the organization in making appropriate decisions to create the desired fit to achieve the development of smart business. In other words, if it is possible to increase the competitive intelligence of managers and employees in the organization by using related methods and tools, more effective and better decisions will be made in order to create alignment and appropriateness of the dimensions of the organization in Burton et al.'s model. The results of this section with the research results of Salvati et al. (2013) and Heydari et al. (2014) which focused on the relationship of competitive intelligence to dimensions related to the organization (responsiveness to the customer, readiness to face changes, organizational knowledge, virtualization, strategies and effectiveness ) Is consistent. If the tools and methods of collecting, analyzing and using information related to competitors, customers and other market factors that help in the competitive advantage of the organization are provided to the managers, the field of increasing competitive intelligence in the organization will be created. to be Competitive intelligence, like strategic intelligence, is a combination of other types of intelligence in the organization, which includes market intelligence, competitor intelligence, technological intelligence, and social intelligence (Tarkh, 2011).

- Business intelligence for changes in the dimensions of goals (efficiency and effectiveness), strategy (exploitation and exploration), environment (complexity and unpredictability), configuration (customer centricity and specialization), leadership (delegating authority and avoiding uncertainty), coordination and Control (lack of concentration and formality) and incentives (result-based payment and goal-based payment) are the basis. This relationship is drawn and shown as a graphic model in Figure 8. The results of this part of the research are consistent with the related parts of the research results of Cheng et al. (2020) under the title of the role of business intelligence and organizational agility on the speed of internationalization. Paying attention to this dimension of organizational intelligence has significant effects on changes in the organizational structure plan. Since business intelligence is a set of technologies and processes that allow people at all levels of the organization to access and analyze and ultimately make accurate decisions, it is more possible to implement and deploy it. Therefore, paying attention to the establishment of this intelligence through its tools, which include management dashboards, online analysis systems, data warehouses, data mining, knowledge management systems and the like, is effective in increasing the intelligence of the organization. Also, business intelligence systems can be an alternative to management information systems and at a higher level than systems such as organization resource planning and decision support systems.

-Artificial intelligence for changes in the dimensions of goals (efficiency and effectiveness), environment (complexity and unpredictability), configuration (customer-centricity and specialization), task design (repeatability and divisibility), leadership (delegating authority and avoiding uncertainty) and coordination And control (lack of concentration and formality) is the foundation. This relationship is drawn and shown as a graphic model in Figure 9. The results of this section are consistent with the researches of Roshan et al. (2021) under the title of applying artificial intelligence in the public sector and Hunt et al. (2021) under the title of measuring the effects of artificial intelligence on organizational level jobs. Wide use of artificial intelligence tools such as

office and industrial automation systems, speech and image recognition and processing systems, neural networks, intelligent robots, expert systems, genetic algorithms, vision and machine learning, etc. in organizational processes related to the dimensions of memory. Besides facilitating the possibility of structural changes, it also reduces the cost of frequent changes. Therefore, it is necessary for the company to consider the possibility of using this tool in the redesign of organizational processes as an effective platform-building and facilitating factor.

The comprehensive model of communication shows that in order to change the dimensions of the goals, environment and leadership of the organization design model, using strategic intelligence, competitive intelligence, business intelligence and artificial intelligence can help in making appropriate decisions in order to create alignment and appropriateness. Using strategic intelligence, competitive intelligence, and business intelligence to change the strategy dimension of the organization's design model is a facilitator and helps to make appropriate decisions. To change the configuration dimension of the organization design model, the use of business intelligence and artificial intelligence is effective and helps to make appropriate decisions.

To change the design dimension of the organization's design model, the use of artificial intelligence is a platform and helps to make appropriate decisions. For change in the leadership dimension of the organization design model, all four strategic, competitive, commercial and artificial intelligences are related and facilitate and create a platform. Setting the foundation for the dimension of organizational atmosphere is possible only through competitive intelligence. The dimension of coordination and control is influenced by strategic, commercial and artificial intelligence and by using these intelligences, decision-making in connection with appropriate change is facilitated and finally to influence the dimension of incentives, the use of strategic intelligence and commercial intelligence with It will be appropriate to pay attention to their relationship.

Finally, according to the obtained results, if the subject company of the research (Zob Ahan Isfahan) or any other organization wants to use the obtained model to redesign the organizational structure or plan of its organization, it is necessary to check the facilities, infrastructure and conditions. To choose the tools and methods related to each of the mentioned intelligences and to implement the most suitable ones for use in carrying out organizational changes with the aim of creating a balance between the dimensions of the organization design model. Therefore, it is suggested that the top management of the company (business area, planning area) put the following items on the agenda:

- ✓ Continuous monitoring of internal and external environment information
- ✓ Timely analysis and processing of information
- ✓ Distribution and dissemination of environmental information and analytical reports in the organization.

Applying or expanding the use of business intelligence components such as strengthening strategic thinking, strategic planning, SWOT matrix, analysis of competitors' advertisements, competitor profiles, analytical online processing system, future research, data mining, decision support systems, expert systems, networks Neural and genetic algorithms are suggested to facilitate these changes.

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