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Strategic Planning based on SWOT and
Multi-criteria Decision Analysis

SWOT JA MITME KRITEERIUMIGA OTSUSE ANALÜÜSIL PÕHINEV
STRATEEGILINE PLANEERIMINE

MASTER THESIS

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Tallinn, 2019

AUTHOR'S DECLARATION

Hereby I declare, that I have written this thesis independently.

No academic degree has been applied for based on this material. All works, major viewpoints, and data of the other authors used in this thesis have been referenced.

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2. To prioritizing the strategies by using the QSPM matrix and MAPPAC method
3. To compare the result of QSPM and MAPPAC method

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PREFACE

The topic “Strategic Planning based on SWOT Analysis and MAPPAC method “has been selected for my master thesis. This topic for this research originally stemmed from my passion for developing Strategic planning.

I would like to appreciate wholeheartedly the people involved in the guidance during writing the dissertation.

Moreover, I would like to thank the Supervisor Kashif Mahmood from Tallinn University of Technology for his support and assist during completing this work.

I also would like to appreciate the CEO of Nick No Avaran company, and its employees, for providing me the opportunity to take part in the working process at this company.

Key Words: Strategic Planning, SWOT Matrix, QSPM Matrix, MAPPAC Method

List of abbreviations

AS- Attractiveness Score

EFE- External Factors Evaluation

IFE- Internal Factors Evaluation

MAPPAC- Multi-criterion analysis of preferences by means of pairwise actions and criterion comparisons

QSPM- Quantitative Strategic Planning Matrix

SPACE- Strategic Position and Action Evaluation Matrix

SWOT- Strengths–weaknesses–opportunities–threats

TAS- Total Attractiveness Score

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INTRODUCTION

Identifying the problems of organizations internally and externally, which ultimately leads to the discovery and explanation of internal strengths and weaknesses, and opportunities and threats are part of a strategic planning process that can be used to organizations position in a better place in the future [1].

In other words, instead of waiting for environmental incidents and organizations to respond only to strategic planning, they can affect the environment and not allow environmental shocks to affect the performance of the organization. Strategic planning is an empowerment management tool designed to help organizations design their own competitive environment with changes in the environment.

Strategic planning is a systemic point of view to skillfully operate an organization over time by reducing uncertainty in its variable environment to achieve predetermined goals. [2] Most organizations have recognized the importance of strategic planning for the growth and health of their organizations over a long period of time. [3] On the other hand, action in the short term has no meaning unless it occurs in a long-term sense of the program. [4]

Strategic planning creates the direction and context for sequential decisions. [5] The strategic planning process provides an attitude and analysis of the organization and its environment, describes the current situation of the organization or company and identifies the key factors affecting its success. [1] SWOT analysis is an effective tool for identifying the environmental conditions and internal capabilities of the organization. The foundation of this efficient tool in strategic management as well as marketing is to understand the perimeter of the organization. [6]

If SWOT is well implemented, it can be a great basis for strategy development.

1. RESEARCH GENERAL

1.1 Problem statement

In today's world, which is witnessing dramatic changes in various fields, and the environment is confronted with turbulence and uncertainty and has found a lot of competition, organizational systems in order to succeed in the field of competition must use a kind of planning in order to be prospective and environmentally oriented in order to identify the factors and environmental changes in a long-term horizon of their impact on the organization and how the organization interacts with them. This is the same strategic planning. [1]

Strategic management is widely used today by most public and private firms to withstand the unpardonable influx of market competition and environmental change. The complexity and elegance of decision making in business make strategic management essential. [7] Managing diverse and multi-dimensional internal activities is only part of the modern responsibilities of managers. The immediate external environment of the Institute is also a challenging factor. [8] Managers are turning to strategic planning in order to effectively deal with all of these factors that affect the ability of companies to grow profitably. So far, many quantitative tools and techniques have been used in the field of strategic management. Since the main component in this field is decision making, taking simultaneous consideration of multiple considerations, then multi-criteria decision-making techniques have been used. One of the tools used in the strategy development phase to analyze internal and external strategic cases is SWOT analysis, which can summarize the most important internal and external factors that can affect the future of an organization. [7]

The purpose of this research is to examine and evaluate the opportunities and threats of the environment and the weaknesses and strengths of the firm to clarify whether the firm is able to capture opportunities and exploit them and avoid uncontrollable external environment threats such as fluctuations in prices, political instability, social change, changes in laws and regulations.

Nick No Avaran Company is a construction company and active in the local and international markets in the field of development projects (civil and urban plans), water and sewage and power plants industries.

Considering the policy of encouraging the Iranian government to invest in the private sector in infrastructure, the company has several projects underway that require successful strategic planning based on systematic analysis to succeed in these activities. Therefore, developing the strategy of Nick No Avaran based on SWOT analysis and determining the priority of using strategies is an effective step in this regard.

1.2 Importance and necessity

Companies that have a great performance, plan regularly to get ready to cope with the fluctuations and changes that occur in the company's internal and external environments. Companies whose planning systems are similar to those of strategic management theory will perform much better in the long term, financially and administratively. [9]

The strategic management process is an attempt to prepare a second version of what's going on in the brain of a very intelligent and elite human, who has a direct understanding of affairs and combines knowledge with scientific analysis, Identify the changes and ensure the organization's survival in the area of competition and conflict. The first step in the strategic planning process is to determine the goals and missions of the organization, and then it can be tailored to the organization's strategy through SWOT analysis, which is one of the tools for strategy development. Using this analysis, it will be possible to analyze both internal and external as well as strategic decisions that balance the strengths of the organization with external opportunities. [6]

SWOT analysis alone does not provide an analytical tool for determining the importance of identified factors and evaluating various strategic options based on these factors. For this reason, SWOT analysis has shortcomings in measuring and evaluating factors. [6]

According to the vision and mission of Nick No Avaran Company, strategy development can be a great base for the company's performance in the future. Therefore, strategy development based on SWOT analysis and prioritization of strategies for this company is important and necessary.

1.3 Research goals

In this section, the goals of this research are identified in two main goal and sub-goals.

Main goal

- Strategic Planning of Nick No Avaran Company

Sub-goals

- Identifying opportunities and external threats of the company.
- Identify the strengths and weaknesses of different sectors in the company.
- Company's strategy development based on SWOT analysis.
- Identify the appropriate strategy (aggressive, competitive, conservative, and defensive) for the company by using the SPACE matrix.
- Prioritizing the strategies specified in the SPACE matrix by using the QSPM matrix.
- Prioritizing the strategies obtained for the company based on the MAPPAC method.

1.4 Research questions

Based on the goals of the research mentioned in the previous sections, the questions of this research can be as below:

- What is the mission of the Nick No Avaran company in the 2030 outlook considering the comprehensive scientific plan of the country and the general policies of the country's development?
- What are the external opportunities and threats of the company?
- What are the strengths and weaknesses of the different sectors in the company?
- What are the strategies for Nick No Avaran Company?
- Which strategies (aggressive, competitive, conservative, and defensive) are appropriate for the company?
- What is the priority of using strategies for the company?

1.5 Research scope

Subject domain: All issues related to strategy development based on SWOT analysis and use of QSPM as well as using the MAPPAC method (Case Study of Nick No Avaran Company) are the subject matter of this research.

Spatial domain: Nick No Avaran Company and contractors of Azhineh-e-Bana, Establishers of Zanjan and Simayeh Saze-Pardaz and Faculty of Civil Engineering of Azad University, as well as the General Directorate of Road and Urban Development of Zanjan Province, are the spatial domains of this research.

Time domain: Temporal time domain of this research is autumn 2018 to winter of 2019.

1.6 Statistical society

The statistical population of this research includes members of the board of directors and employees of Nick No Avaran Company, all managers of Zanjan construction and contractors and faculty members of Azad University, Civil Engineering Department and managers and deputies of the Road and Urban Development Department of Zanjan province. Among them, 4 members of the board of directors and employees of the company and 4 faculty members of faculty of Civil Engineering of Azad University, as well as 3 managers of other contracting companies, as well as technical assistant of the Directorate of Road and Urban Development of Zanjan province have been chosen; therefore, the information needed for the research has been extracted from the experts' opinions. This means that sampling has gone so far that a new experts' opinion does not add specific data to previous comments.

2. LITERATURE REVIEW

This chapter introduces definitions and materials related to strategic planning and related concepts and examines the history of similar research in this field.

2.1 Strategic planning

In today's world, organizations are confronted with turbulent environments. External threats from all sides threaten the survival of organizations. Organizations must recognize their current status, analyze their strengths and weaknesses, and rely on the strengths of external opportunities and prepare themselves to deal with threats. This matter is possible in terms of strategic planning. [9]

Strategic planning is a structured effort to make fundamental decisions and perform actions that make the nature of the organization, the type of activities and the reason for those activities carried out by the organization in a rational way to deal with environmental changes and phenomena. [10]

About three decades ago, Ackoff wrote about the company's planning, and subsequently, Acomb and Morrissey added a topic to the literature. Bryson attention focused on the nonprofit sector. In 1994, Mintzberg found a fault in planning processes that had a limited impact. Recently, Mulhare has examined the usefulness of strategic planning in nonprofit organizations. However, a process that is not heavy and expensive can make planning efforts as easy as implementing the program's outcomes. The results of the research show that organizations that use strategic management (compared to those who do not use this management mode or its concepts) are more profitable.

Two researchers, Tim Cook and Freese, reported that the excellent performance of the companies being investigated suggests strategic views and attention that they bring in longer-term periods. [8] Companies that have a great performance plan regularly so they are always ready to cope with the fluctuations and changes that occur in the company's internal and external factors. Companies whose planning systems are similar to those of strategic management theory will usually perform much better in the long run, financially and administratively. (In the relevant industry than companies that do not use this method of programming) [11] Companies with high performance appear to make more informed decisions about expectations of short-term and long-term outcomes. On the other hand,

most companies with poor performance often engage in activities that are short-sighted and in no way predict the future.

Olson argued that the strategic planning process consists of five phases of the overall mission statement and the organization's objectives, environmental analysis or review, internal status and resource review, compilation, evaluation, strategy selection, implementation and control of the strategic plan.

[12] David in three general stages, including the formulation, implementation, and evaluation, strategic planning has been outlined to identify the mission, to examine environmental factors, set long-term goals, formulate, evaluate and select strategies, set annual goals and policies, allocate resources, and finally compute and evaluate performance. [11]

2.2 SWOT analysis

SWOT is the Headword of phrases of Strengths, Weaknesses, Opportunities, and Threats. The first step in the strategic planning process is to determine the goals, and missions of the organization, and then it can be tailored to the organization's strategy through SWOT analysis, which is one of the tools for strategy development. By using this analysis, it will be possible first to analyze internal and external factors and, secondly, to make strategic decisions that balance the strengths of the organization with external opportunities. [8]

This matrix has many applications among strategic planners and managers. This analytical tool is used to identify the important internal and external factors for creating strategies that may be considered. In general, this matrix integrates internal and external factors together and serves as a basis for possible strategies. [13] In this matrix, a set of strategies, SO, WT, WO, and ST are introduced. In implementing the SO strategies, the organization tries to exploit external opportunities by using strengths. In the implementation of the ST strategies, the organization also strives to reduce or eliminate the effects of existing threats in the outside world by using its strengths. The goal of WO strategies is to help the organization to improve internal weaknesses by exploiting opportunities in the outside world, and ultimately, organizations that implement WT strategies are defensive and their goal is to reduce internal weaknesses as well as avoiding external threats. [14]

2.3 SPACE matrix

Another tool used to explain the strategy is the SPACE matrix. The matrix is 2×2 and has a total of four quadrants: aggressive, conservative, defensive and competitive strategies. Matrix axes are also based on internal factors such as financial strength (FS) and competitive advantage (CA), and external factors including environmental stability (ES) and industry strength (IS).

The purpose of financial power is to examine all factors that may indicate the ability or financial strength of an institution. And so, in terms of the stability of the environment or the power of the industry, we can point to all the factors that are in both ways in terms of content and subject matter in the two above mentioned. [15]

2.4 QSPM matrix

One of the most commonly used techniques and tools in evaluating strategic options and identifying the relative attractiveness of strategies used in the decision making stage is the QSPM matrix. [16] This matrix is an appropriate tool for strategic planning and prioritizing important internal and external factors. [16] This matrix is based on the results of IFE and EFE matrix and SWOT analysis. The scores given to each of the QSPM matrix factors are the same as those of the IFE and EFE matrixes.

The coefficient of attraction of each factor is determined by its role in the process of selecting the desired strategy and then multiplied the score of attraction in the score of that factor, the score of each factor is obtained. [13]

2.5 Entropy method

Entropy is a major concept in physics, social sciences, and information theory, in a way to indicate the amount of uncertainty (unbalanced distribution of phenomena) in the expected content of a message. In other words, entropy in information theory is a criterion for the P_i value of uncertainty (equilibrium) expressed by a disjoint probability distribution (p_i), it is more than a time when the distribution is more abundant.

The entropy coefficient has a range between zero and one, and the closer it is to one, the more equitable distribution, and the closer it is to zero, indicates a more unbalanced distribution. In other words, the value of one represents a completely fair distribution, and the zero value represents a completely unbalanced distribution. [17]

2.6 MAPPAC method

This method was first introduced by Matarazzo in 1986. This method is one of the preferred methods of prioritizing and it is based on a paired comparison of possible operations, taking into account all possible criteria paired. This method is based on the comparison of the pair of options related to each pair of criteria defined by the two preference and indifference relationships that constitute a full pre-ranking, the feature of this method is the closest ideal solution for categorizing options in the expression of a multi-criteria ranking index based on measurement. This method is a multi-objective ranking method that consists of two pre-ranking scales. The algorithm of this method consists of three parts, the definition of input data (variables and criteria), and the comparison of the pair of criteria for each pair of criteria results in defining the prefix relationships, indifference and aggregating the priorities in constructing the final ranking. [18]

2.7 Determine the appropriate strategy

David describes one of the methods for the codification of strategy as the main strategy matrix. Each organization, in whatever situation, is located in one of the homes belonging to the main strategy matrix. Depending on the status of each organization, its location can be determined. As shown in the figure, the main strategy matrix is based on two dimensions: For each home of this matrix, the strategies that are appropriate for the organization and can be implemented are listed in figure 2.1, respectively

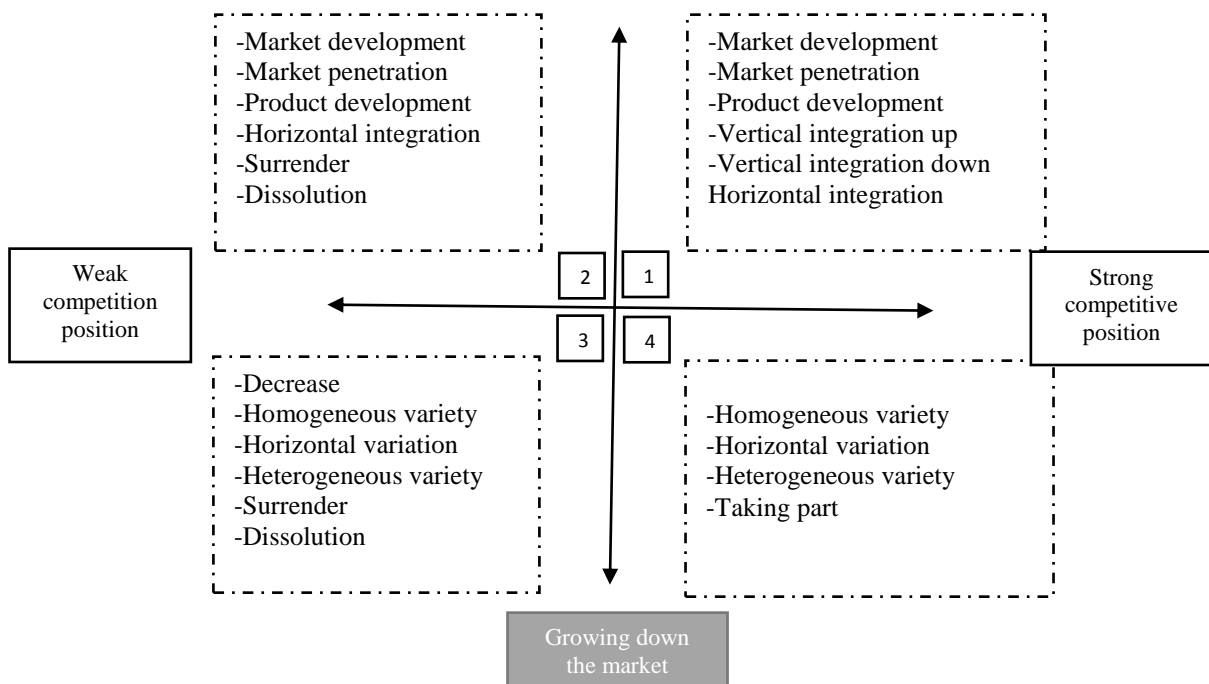


Figure 2.1. The main strategy of the matrix model. [19]

Organizations placed at home number one on the main matrix are strategically in a very good position. The most appropriate strategies for the organization are as follows: First, focus on current markets (market penetration and market development) and products (product development).

For a company located at number one in the house and has a lot of resources, then it is appropriate or successful to use strategies that are based on vertical upward integration, vertical down integration, and horizontal integration.

When the organization owns a house of number 1, it is committed to the production and supply of a unique product. Homogeneous diversity can reduce the risks of a unique product. Organizations located at No. 1 can exploit opportunities in the external environment in different ways. They can become aggressive if they become necessary and become risky. Organizations located at No. 2 house should evaluate the position they are currently on the market and evaluate the strategies they are implementing. Although their industry is growing, they cannot compete in an effective way, and they must understand the inefficiency of the current method and determine which company to make changes to improve its competitive position. Since the companies belonging to No. 2 house are located in the industrial, that market growth is fast, so the first way to focus is to use a focus strategy. But if this organization does not have a privileged advantage or competitive advantage, then the optimal way is to implement a strategy based on horizontal integrity. It may eventually be necessary to sell or dispose of parts of the organization. Selling parts of the company can provide the funds needed to buy competing companies or redeem stocks of the company from the market.

Organizations located at No. 3 house, they compete in industries that grow slowly and compete in a weak position. These organizations are undergoing rapid and underlying changes to prevent their dissolution and destruction. First, they have to reduce assets and costs altogether.

Another strategy is to remove existing resources from current activities and transfer them to other areas. If all these paths are not able to survive, the last solution remaining for Home 3 organizations is to sell parts of the company or eventually dispose of it.

Eventually, Organizations located at house No. 4, competitively, they have a strong position, but they are active in the industry, which grows very slowly. Such companies have the power they need, and they can implement different programs in areas that they promise to grow. Companies in house number 4 have a very good cash flow situation, and on the other hand, internal growth is limited, so they can successfully use the same diversity strategies, heterogeneous variations, and horizontal variations, and choose partnership strategies. [19]

2.8 F.R. David's Model

According to David, the strategic management process involves three phases [11] strategy development, strategy implementation, and strategy evaluations, which are summarized below in the form of a comprehensive strategic management model.

David F.R. describes the comprehensive strategic management model, generally agreed by the thinkers, in figure 2.2.

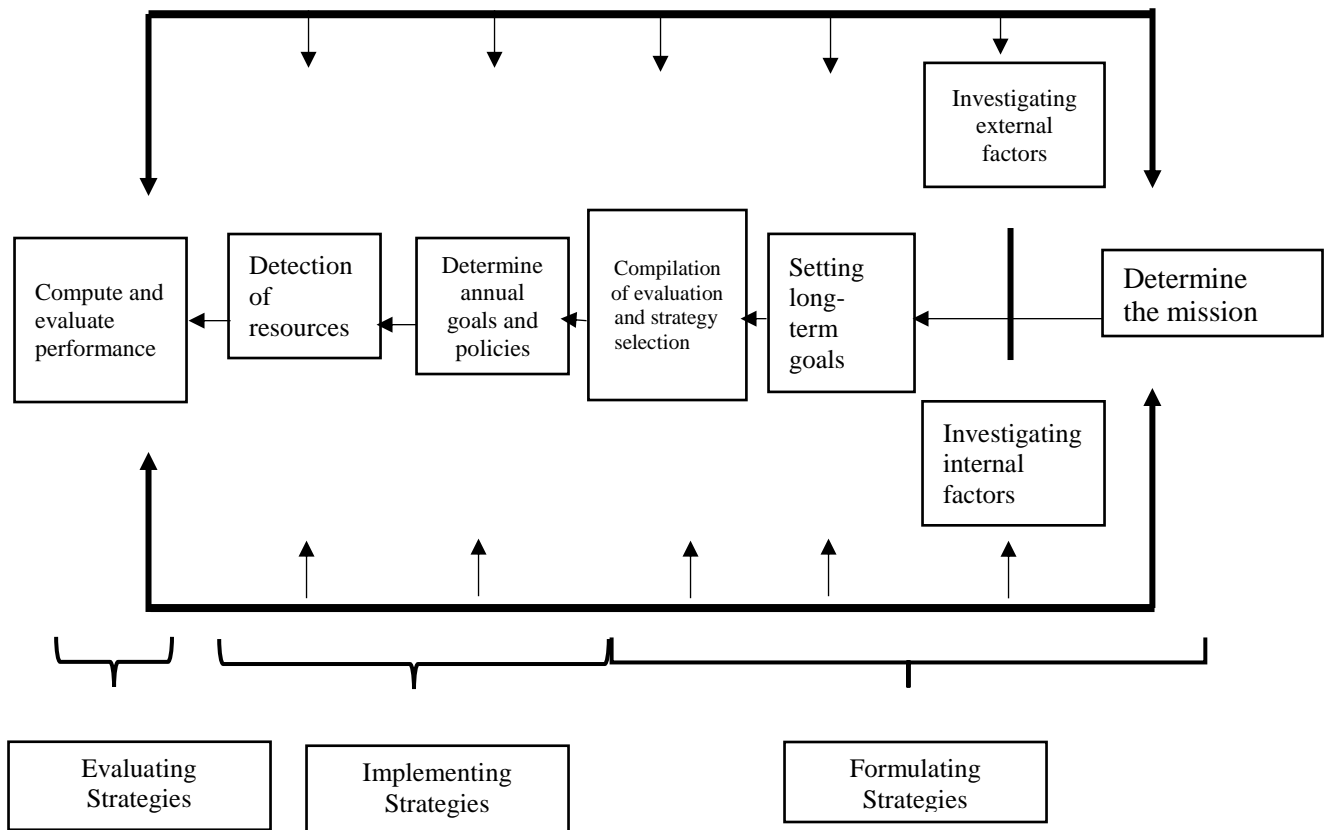


Figure 2.2. Comprehensive Strategic Management Model. [19]

2.8.1 Types of Strategies from F. R. David's point of view

F. R. David has proposed 13 major strategies (David, 2014). They are Integrated Strategies (Vertical Integration, Vertical Integration, Horizontal Integration), Centralized Strategies (market penetration, market development, product development), diversity strategies (homogeneous diversity, heterogeneity of diversity, horizontal variation), Defensive strategies (partnership, reduction, divestiture, and dissolution). Each of these strategies has different types, for example, market penetration involves adding to a number of vendors, increasing advertising costs and using similar measures to increase market share in a specific geographic area.

Integration Strategies (Three Strategies)

In these strategies, the goal is to unite, integrate and take on many of the activities that may be done by individuals and organizations. Integration strategies are divided into three general types:

1. **Forward Integration:** The intention is that the company tries to increase its control over the market by buying distribution companies or retailers. This strategy is taken through the implementation of contracts by which the distribution channel of the product and services is subject to greater control. In fact, in this strategy, the organization finds control over the activities after the production of the goods or the provision of their services until they reach the customers.
2. **Vertical integration:** Companies and companies purchase raw materials and raw materials from suppliers of raw materials. Backward Integration is one of the strategies by which the company tries to increase its ownership by executing it and controls the supplier of raw materials. Particularly when these strategies are appropriate, companies do not have enough confidence in their suppliers of raw materials, they either make very high prices or cannot meet the needs of the company.
3. **Horizontal Integration:** The purpose is to implement one of the strategies that the company is trying to make rival companies own and add to its control over them. At the current time in strategic management, one of the most well-known ways is that companies with horizontal Integration try to use growth strategy. Merging companies into one another, buying rivals and swallowing other companies are one of the strategies that competing rivals are working on and thus try to use a large number of phenomena called "economies of scale."

Focused Strategies (Three Strategies)

These strategies require focused and intensive efforts so that the company can improve its products competitively. Focused strategies are divided into three general types that include:

1. **Market penetration:** Companies are pushing for a market penetration strategy to increase the market share of their products and services through marketing efforts. Often, these strategies are implemented extensively and on their own and sometimes run into other strategies. Market penetration involves increasing wholesalers, increasing advertising costs, promoting massive sales and strengthening public relations and advertising.
2. **Market development:** The purpose of market development, the supply of services or new products to new geographic areas. In many industries, such as aviation, it may not be reasonable to compete only within borders.
3. **Product Development:** The purpose of product development is to implement the strategies by which the company tries to increase sales by improving or modifying existing products and services. Generally, product modifications require a lot of research and development costs.

Diversity Strategies (Three Strategies)

In general, strategies based on diversifying activities lose their reputation every day. Because managers find that it is not easy to manage various business activities and units. In the two decades of the 1960s and 1970s, the diversification of activities was based on the fact that we should not restrict ourselves in an industry (or ourselves dependent on the industry), but in the 1980s we witnessed a reversal of the use of these strategies. Diversity strategies are divided into three broad categories that include:

1. **Concentric Diversification:** The purpose of the concentric diversification is that the company is trying to produce and supply new products, but related to its current products and services. This strategy can also be realized by purchasing a company that is a kind of integration. [11]
2. **Horizontal Diversification:** The purpose of horizontal diversification is to offer new products, services, and services to its current customers, not related to current products and services. Compared to heterogeneous diversity, the risk of such a strategy is less, because the company that is doing this is familiar with current and existing customers.
3. **Conglomerate Diversification:** The aim is to bring the company, new products, and services, but not related to its products and services, to the market, not just its current customers. In fact,

entering into new activities that do not relate to existing technology, current customers and current companies, which also refer to the "variety of cover". [11]

Defensive Strategies (Four Strategies)

In such strategies, organizations (companies) try to maintain as much as they can. Here, the main objective is to maintain the status quo and prevent further losses. Defensive strategies are divided into four general types that include:

1. **Participation:** One of the most famous strategies is that companies are engaging in partnerships, and in the implementation of this strategy, two or more companies, temporary collateral or consortium, and exploit the opportunity. This strategy can be called "cooperative defensiveness" because a company alone does not carry out a project. Often, two or more companies take on the responsibility of a company that acts as a newly established company and provides its joint venture capital.
2. **Reduction:** When an organization uses a reduction strategy that wants to reverse the downside of sales and profits by organizing new assets and costs. Sometimes this phenomenon is called the change of direction or the transformation of the organization's strategy. The goal is to reduce the organization's strength in its specialized work. Strategists face constraints in implementing this strategy and are under pressure from shareholders, employees and media groups. It is possible that the company will be forced to sell parts of its land or buildings, remove some of the production lines, and close off the marginal activities in order to make cash. Use advanced technologies or automated devices to reduce the number of forces and ultimately utilize cost control systems. [11]
3. **Dealing and selling:** In this strategy, an independent entity or part of the organization will be sold to others. This sale may be for the financing of a particular investment or the purchase of other companies; Or as part of a restructuring strategy through which the company is attempting to sell Non-efficient, inactive, and inefficient units to overcome their weaknesses.
4. **Liquidation:** The sale of all assets to real value is called liquidation. Liquidation, although it is actually a kind of failure in the work and it is emotionally difficult to execute, sometimes it may be better to run so that we cannot see any more and more heavy losses.

2.9 Evaluation and selection strategy

Concurrent attention to strategies, long-term goals, the mission of the organization, and the examination of internal and external information of the organization provides the basis upon which the applicable strategies can be identified and evaluated. Strategies lead the organization to go beyond its present state by gradually reaching the target base (in the future). Various strategies are not presented in the face of random affairs, they emerge from the mission of the organization, long-term goals, and the evaluation of internal and external factors. [19]

Strategists will never pay attention to all the options and ways that will benefit the organization because there is an infinite practical way and there are many ways to implement each one. Therefore, a series of attractive and applicable strategies (which can be applied to management) are considered.

All those who participate in the review and selection of strategies must have information from the organization's internal and external investigations. Awareness of this information and the nobility to the mission of the organization helps the participants to become very clear about the specific strategies that they have in their minds and minds. (Of course, these strategies are the ones that they believe are most beneficial to the organization.)

At regular gatherings and meetings, strategy designers must discuss different strategies. The proposed strategies should be listed. After the participants understood all the strategies in the process, then each of them should write the proposed strategies in order of importance. The shape of a particular strategy evolves over time and changes as the situation changes. [19]

Most large companies use several strategies at the same time, depending on market conditions and industry characteristics. The overall goals of the organization are clearly linked to its strategies. Strategies must follow goals. Organizations must decide what they want to do and then decide on the strategy that they are asking for. However, in reality, strategies and goals are often set up together. [20]

In order to provide various possible strategies in an effective manner, the process of comparing internal and external factors plays an important and decisive role. [19] The goal is not to identify the best strategies but to determine which strategies are applicable.

2.10 Related work

Since 1991, sponsors from African universities have recommended directors and leaders of these universities to develop strategic planning for themselves. Because they believe that universities, whether independent or non-independent, need to be strategically functioned because strategic planning has its own unique advantages. For example, having relationships with the government is one of the essential requirements for universities to develop strategic planning. In the program, it should be well demonstrated how the university can use the skills and capabilities of its personnel to serve the community. Strategic planning can play an important role in accessing universities for their goals. The forms of strategic planning vary from university to university, because the situations and opportunities of each university vary, and therefore, it is necessary for each one to use specific models and methods and strategic techniques. [21]

As a result of the environmental changes and challenges that have emerged in Japan since 1991, many educational standards for universities have changed in this country. In sum, new curricula have emphasized some of the curriculum curricula that have more weaknesses. Accordingly, Hokkaido University has been trying to turn its weaknesses into strengths. To this end, the University has tried to pay special attention to interdisciplinary systems in its lower-level courses, and conversely, at higher levels, it will pay more attention to work flexibility in a way that is suitable for competitive, changing and challenging environments. Conclusion Overall, the above and many other things not mentioned here are related to the 21st Century Strategic Planning of the University of Hokkaido. [22]

Effective strategic planning can enable university libraries to focus on their predetermined goals and objectives and to be able to respond to changes and environmental challenges in a timely manner. For this reason, in 2001, Florida University libraries have undertaken some strategic planning activities. This has led to strategic thinking among current officials and a great interest in obtaining and retrieving data and information related to the improvement of the quality and performance of services that can be provided to customers, and to include their perceptions and their interests among the staff of the university. The result is improved communication with customers and a move towards strategic thinking and decision making that has led to better allocation of available resources. [23]

Like many universities, the Bowling Green State University has faced challenges such as decreasing capital, competition, and the development of new technologies, which had negative effects on the libraries of the university. These factors led the university administrators to review and review the roles

and operations of the university and make decisions to improve the affairs and management on the challenges posed. To this end, they began to formulate and implement strategic planning for the university to explain and explain the role of university libraries in higher education. In order to formulate the strategic planning of the university, the views and administrations of customers and users of the university services were highlighted and focused on various ways, including interviewing certain groups. [24]

In an article aimed at determining management strategies in construction companies, SWOT analysis (strengths, weaknesses, opportunities, and threats) was developed as a tool for formulating management strategies. The best way to do this is by analyzing hierarchical analysis. According to experts, using the AHP technique, an appropriate strategy was chosen and it was concluded that the management perspective of construction companies is possible considering the SWOT based on the chosen description. [25]

In the research, the evaluation of alternative strategies was conducted to determine the best business environment in the airport industry using strengths, weaknesses, opportunities, and threats (SWOT). The aim of this study was to provide a quantitative basis for determining the ranking of factors influencing SWOT analysis through the decision making the process of the Multi-Criteria Construction Method, Analytic Network Process (ANP). Due to the capabilities of this model and the existence of potential dependencies among SWOT factors, this study was preferred. Finally, ANP can also be used as an effective tool for complex process decision making. [7]

Research on SWOT analysis aims at assessing environmental systems in the Middle East and North Africa through a review of the status of software and the structure of existing systems based on the legal, institutional and procedural framework of the country. Decision analysis is an analytical framework that includes both performance analysis based on predefined evaluation criteria. Finally, the results showed some of the weaknesses and shortcomings of the system and stated that the heterogeneous situation was accompanied by a delay in overall progress that was integrated with different levels of the decision-making process. [26]

In a paper entitled "A Fuzzy consecutive model for Strategic Planning in Manufacturing Companies", conducted in 2016, the authors propose a sequential fuzzy model to assist the organization in the strategic planning process. The program consists of four steps, which are respectively: Determine the

areas and units that need improvement, determine the root causes of problems, develop operational plans for each reason (root), and identify priority areas and units that need improvement. In this article, the local production of intermediate organizations has been studied as a case study in the real world. The results of this research show that in the intermediate organizations, these sections have the highest priority respectively: Lack of sufficient creativity for middle-level managers, failure to comply with the design scheduling calendar in the processes of product research and development, and ultimately the very small units of the organization. [7]

3. RESEARCH METHODOLOGY

In this chapter, first research steps and structure of analysis and then introduced the used research methodology in this study and its details, and finally, the data analysis methods are specified.

3.1 Research steps

The present study was carried out in six steps is as follows:

Step 1: In this step, the literature of the research was examined and, in an interview with the CEO of the Company, the mission, and goals of the company were identified.

Step 2: In the second step, by attending in the company, was closely observing the conditions of the company and relations between the members of the company. In this step, an interview was conducted with the CEO and members of the board of directors and some employees of the company, during that internal and external factors affecting the company were examined.

Step 3: In this step, using the results of the previous steps, the IFE matrix, and the EFE matrix and following by them the SWOT matrix, were prepared.

Step 4: Using existing information, an interview with company staff was conducted to determine the SPACE matrix and the type of strategy required by Nick No Avaran Company and then the QSPM matrix was drawn up and the priority of utilizing the specified strategies have been determined by SPACE matrix.

Step 5: During this step, an interview was conducted with the managers of construction companies and the technical assistant of the Directorate of Roads and Urban Planning in Zanjan province. The factors affecting the construction industry were investigated and then these factors were weighed by the Shannon entropy method.

Step 6: Finally, in the sixth step, a questionnaire was distributed among the experts and asked them to determine the effect of each identified factors in step five on each of the strategies derived from the SWOT matrix. Then, using the results of the questionnaires and using the MAPPAC method, the strategies were prioritized.

3.2 Structure of analysis

The figure below shows the method or way in which this analysis is carried out.

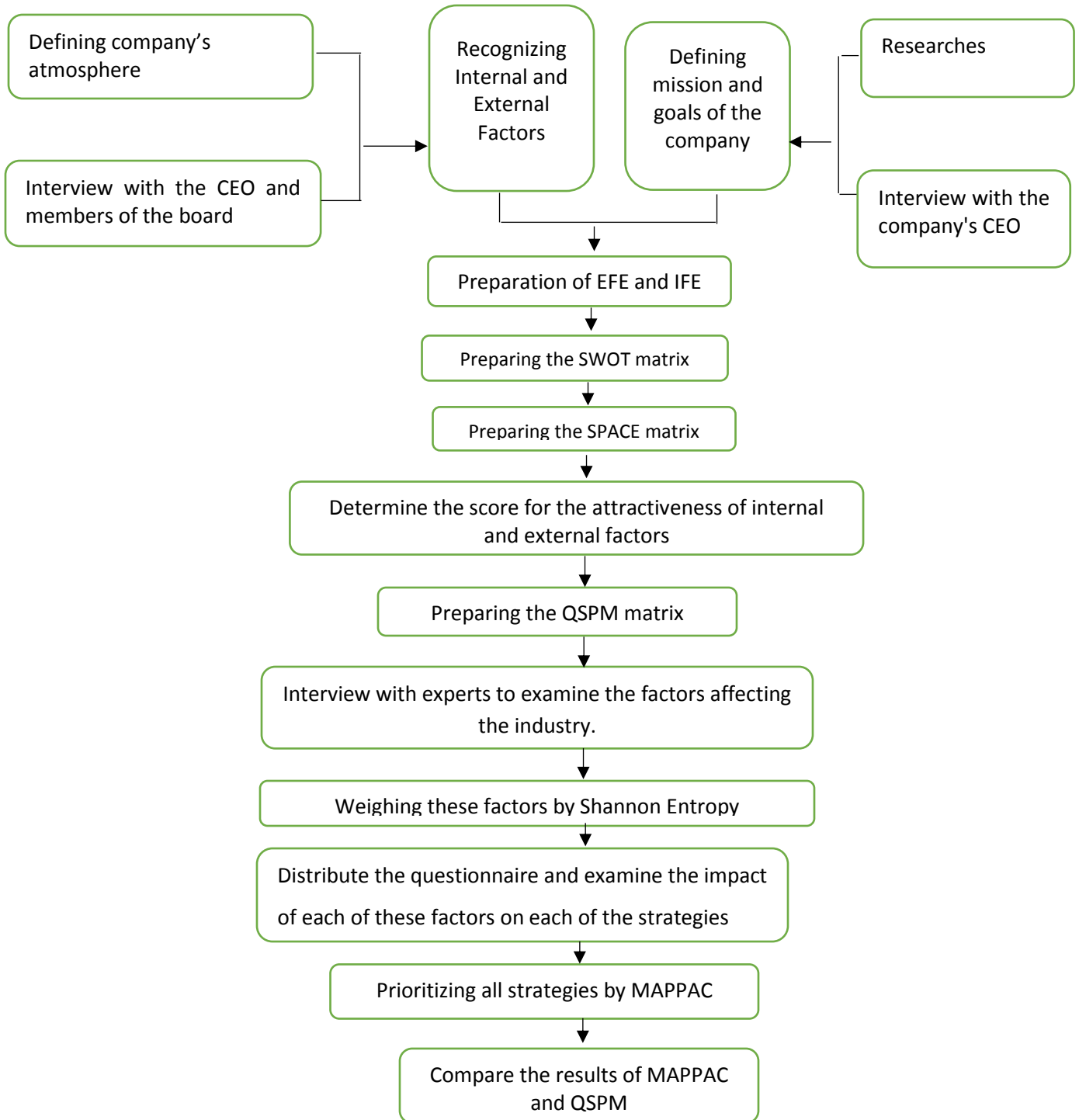


Figure 3.1. Structure of Analysis

3.3 Data analysis method

Data analysis in this study has been done in the form of matrices and diagrams, the most important of which are: SWOT analysis, SPACE Matrix, QSPM Matrix, and Entropy Charts and MAPPAC method. The information obtained from the interview and the questionnaire and observation, this information and data were finally studied in the form of SWOT and SPACE and QSPM analysis tables, as well as tables and graphs related to entropy and MAPPAC for each section to answer the questions of this research through the strategic planning process.

3.3.1 IFE matrix

After identifying the internal and external factors, it is time to evaluate them. To do this I used the internal and external factors evaluation matrix. In addition to the list of key internal and external factors, the tables have been presented in Importance Coefficient and Rating tables. The final sum of scores in each table is a score between 1 and 4 with an average of 2.5. [27]

It's notable that the key internal and external factors were obtained by observing the circumstances surrounding the company and also interviewing the employees of the Company and board of directors and the Importance Coefficient and the Rating of each of these factors was obtained through interviews with the company's employees.

The internal factors evaluation matrix consists of four columns. In the first column, the internal factors (strengths and weaknesses) of the company are listed. Then, in the second column, depending on the importance and sensitivity of each factor, the importance coefficient is assigned between zero and one. The sum of these coefficients should be equal to 1. In the third column, depending on the regularity of the strengths, they rank 4 or 3, respectively, and 2 or 1 for the weaknesses. Score 1 indicates a basic weakness, a score of 2 indicates of the weaknesses, a score of 3 indicates a strong point, and a score of 4 indicates of the high strength.

Key Internal strengths		Importance coefficient	Rating	Weighted Score
1				
2				
3				
4				
5				
6				
7				
Key Internal weaknesses		Importance coefficient	Rating	Weighted Score
1				
2				
3				
4				
5				
6				
7				
8				
Total points				

Table 3.1. The general form of IFE matrix. [28]

3.3.2 EFE matrix

The external factors matrix also includes four columns. In the first column, external factors are listed in terms of opportunities and threats. Then, in the second column, considering the importance of each factor, by comparing these factors with each other, the importance coefficient is assigned between zero and one to those factors. The sum of these coefficients should be 1. In the third column, according to the key or the regularity of the opportunities and threats, respectively, rank 4 or 3 for opportunities and rank 2 or 1 for threats respectively. Score 1 expresses basic threat, score 2 indicates a threat, Score 3 indicates the opportunity, and Score 4 indicates the high opportunity. In the fourth column, the coefficients of the second column and the third column points for each factor are multiplied to determine the weighted score of that factor (opportunity or threat). If the total sum of the weighted score in this matrix is more than 2.5, it means that the opportunities will overcome the threats, and if this score is less than 2.5, then the threats will be overcome on the opportunities. [28]

Key External Opportunities		Importance coefficient	Rating	Weighted Score
1				
2				
3				
4				
5				
6				
7				
8				
Key External Threats		Importance coefficient	Rating	Weighted Score
1				
2				
3				
4				
5				
6				
7				
8				
Total points				

Table 3.2. The general form of EFE matrix. [28]

3.3.3 SWOT matrix

This matrix has nine houses. Four houses have the main factor, four houses show strategies and a white or empty house (upper house, right hand). Four houses that represent strategies have SO, WO, ST, and WT titles, and after completion of the four main houses (houses S, W, O, and T) these houses are created. To create a matrix of threats, opportunities, weaknesses, strengths, we have to go through eight steps:

- 1 - Provide a list of main opportunities that exist outside the organization.
2. List the main threats in the outside of the organization.
- 3 - Provide a list of the main strengths of the organization.
4. List the main weaknesses of the organization.
5. Compare the internal strengths and opportunities and write the result in the "SO strategies" group.
6. Compare internal weaknesses with opportunities outside the organization and write the result in the "WO Strategies" group.
7. Compare internal strengths with external threats and write the result in the "ST strategies" group.

8. Compare internal weaknesses with external threats and write the result in the "WT strategies" group.

In each step, the two factors are compared, and the goal is not to identify the best strategies, but to determine which strategies are applicable; hence, all strategies presented in the matrix of threats, opportunities, strengths, and weaknesses will not be selected and implemented. [19]

Weaknesses(W): List of weaknesses.	Strengths(S): List of strengths.	
Strategies WO Take advantage of opportunities, eliminate weaknesses.	Strategies SO Trying to exploit the opportunities by taking advantage of the strengths	Opportunities(O): List of opportunities.
Strategies WT Reduce your weaknesses and avoid threats.	Strategies ST Use the strengths to avoid threats.	Threats(T): List of threats.

Table 3.3. The general form of the SWOT matrix. [19]

3.3.4 SPACE matrix

This matrix has four houses. They are aggressive, conservative, defensive and competitive strategies. The axes of the SPACE matrix represent two internal dimensions Financial Strength (FS) and Competitive Advantage (CA) and two external dimensions Environmental Stability (ES) and Industrial Strength (IS). It is better to consider the factors previously included in the internal and external factors evaluation matrix of the organization during the developing of the SPACE matrix. [19]

To prepare the SPACE matrix, the following steps should be done:

1. Select variables that represent the following: Financial Strength (FS), Competitive Advantage (CA), Environment Stability (ES) and Industry Strength (IS).
2. Give these variables from +1 (worst) to 6+ (best) and create two FS and IS arms. Make two ES and CA arms and score each of the variables from -1 (best) to -6 (worst).
3. Sum the values of each of the variables on the arm of each of these axes and then divide to the number of variables to obtain the average scores of FS, IS, CA and ES.
4. Place the average scores for FS, IS, ES, and CA on the axes of the SPACE matrix.
5. Sum the scores on the X-axis and specify the point belonging to the X-axis and then sum the scores on the Y-axis and specify the point on that Y-axis. Connect these two points together.
- 6 - Connect the coordinate point to this point. This line represents the type of strategy recommended for the organization and can be aggressive, competitive, defensive or conservative. [19]

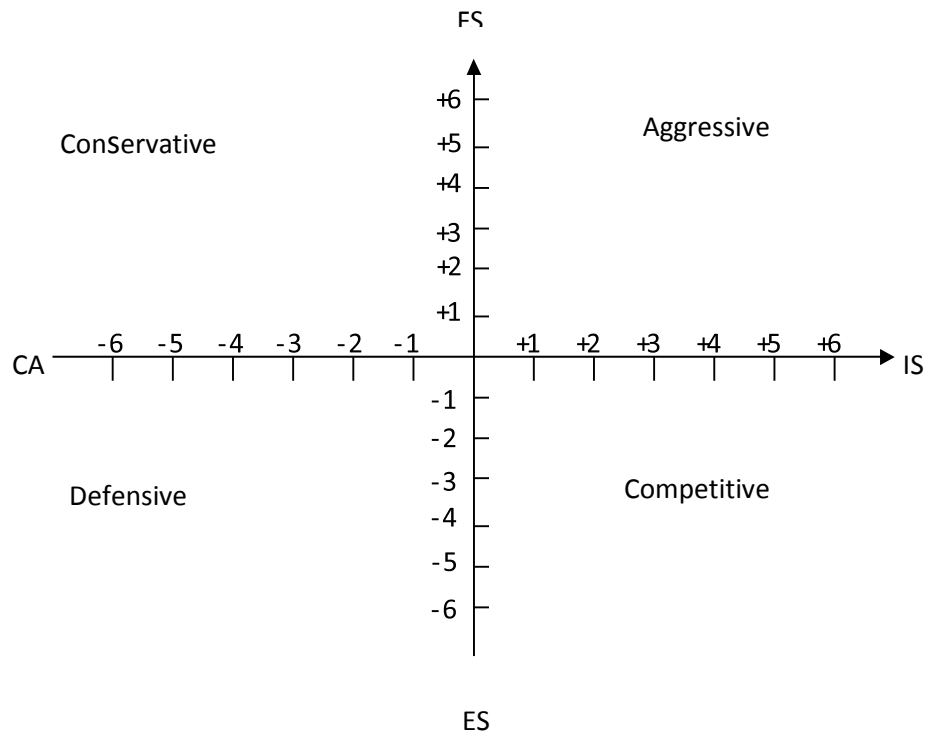


Table 3.4. The overall shape of the SPACE matrix. [19]

3.3.5 QSPM matrix

The left-hand column of this matrix includes internal and external factors, and in the top row, different possible strategies are written. The left-hand side of this matrix contains information that is directly derived from the IFE and EFE matrix .[19]

To provide a QSPM matrix, the following six steps should be taken [19]:

1. External Opportunities and external threats, internal strengths and internal weaknesses written in the left-hand side of the QSPM matrix. This information should be obtained directly from the IFE and EFE matrix.
2. Give weight or coefficient to each of the internal and external factors that play a major role in the organization's success. These coefficients are exactly the same as the coefficients of the IFE and EFE matrix. These coefficients are written in a column, left side of each of the internal and external factors that play a key role in the company's success.

3. Identify the strategies that the organization must implement (or pay attention to). Write down these strategies in the top row of the QSPM matrix.

4 - Identify the Attractiveness Score, they are the number that represents the attraction of each strategy in a set of strategies. In order to determine the attractiveness score, we must examine the internal and external factors that play a main role in the company's success, and then ask about each of them: "Is this factor playing the main role in the process of choosing strategies?" The score of attractiveness is as follows:

1 = No Attractiveness, 2 = Somewhat Attractiveness, 3 = Have a reasonable Attractiveness, 4 = So Attractiveness. If the answer to the above question is "No", it means that in the process of selecting strategies, this factor does not play any significant role (in terms of strategic success).

5 - Count the total attractiveness score. The sum of the Attractiveness Scores is the result of multiplication of the weight (second column) in the Attractiveness Score (third column). The sum of Attractiveness Scores represents the relative attractiveness of each strategy, which is only obtained due to the effect of the internal and external factors involved. The more sum the score is high, the strategy will be more attractive.

6 - Count the Total Attractiveness Score. The Total Attractiveness Score shows that in each set, which strategy has the most attraction. The high scores represent the most attractiveness of strategies. The difference between the Total Attractiveness Score in each set of strategies represents the desirability of a strategy relative to another strategy.

External and Internal factors	Weight	Strategies							
		First strategy		Second strategy		Third strategy		Fourth strategy	
		AS	TAS	AS	TAS	AS	TAS	AS	TAS
External factors:									
economic									
Political / Legal / Government									
Sociocultural/									
Statistical									
Peripheral									
technology									
Competitive									
Internal Factors:									
Management									
Marketing									
Accounting / financial									
Operation / Production									
Research and Development									
Information systems									
Total									

Table 3.5. The general form of the QSPM matrix. [13]

3.3.6 Shannon Entropy method

The measurement of this uncertainty (E_j) by Shannon is as follows:

Equation: 3.1

$$E_i = S(p_1, p_2, \dots, p_n) = -k \sum_{i=1}^n [p_i - \ln p_i]$$

k is a constant value, and in order for E_i to be between zero and one. E is calculated from the probability distribution P_i based on the statistical mechanism and its value in the case of P_i equation, that's mean $p_i=1/n$, the maximum value will be calculated as follows:

Equation: 3.2

$$k \sum_{i=1}^n [p_i - \ln p_i] = -k \left\{ \frac{1}{n} \ln \frac{1}{n} + \frac{1}{n} \ln \frac{1}{n} + \dots + \frac{1}{n} \ln \frac{1}{n} \right\} = -k \left\{ \ln \frac{1}{n} \left(\frac{n}{n} \right) \right\} = -k \times \ln \frac{1}{n}$$

k as a constant value is calculated as follows:

Equation: 3.3

$$k = \frac{1}{\ln(m)}$$

The decision matrix contains information that entropy can serve as a benchmark for its evaluation. Suppose that the decision matrix is as follows.

Indicator \ Persons	C ₁	C ₂	...	C _n
N ₁	a ₁₁	a ₁₂	...	a _{1n}
N ₂	a ₂₁	a ₂₂	...	a _{2n}
⋮	⋮	⋮	⋮	⋮
N _m	a _{m1}	a _{m2}	...	a _{mn}
W _j	W ₁	W ₂	...	W _n

Table 3.6. Decision makers' views on indicators.

a_{ij} : The i-th person's opinion is about the j-th indicator.

Using this matrix, P_{ij} is calculated as follows:

Equation: 3.4

$$p_{ij} = \frac{a_{ij}}{\sum_{i=1}^m a_{ij}} ; \forall_{i,j}$$

And the entropy of j-th (E_j) index is calculated as follows:

Equation: 3.5

$$E_j = -k \sum_{i=1}^m [p_{ij} \ln p_{ij}] ; \forall_j$$

The uncertainty or degree of deviation (d_j) from the information obtained for the (j) index indicates that the relevant index (j) provides the decision maker with the amount of useful information for decision making. The value (d_j) is obtained as follows:

Equation: 3.6

$$d_j = 1 - E_j ; \forall_j$$

Then the weight of w_j is obtained as follows:

Equation: 3.7

$$w_j = \frac{d_j}{\sum_{j=1}^n d_j} ; \forall_j$$

If the decision maker already considers a specific weight such as λ_j for the j index, then the adjusted weight (w'_j) is calculated as follows:

Equation: 3.8

$$w'_j = \frac{\lambda_j w_j}{\sum_{j=1}^n \lambda_j w_j} ; \forall_j$$

The Shannon Entropy procedure is carried out in five steps:

Step 1 – Calculate P_{ij} :

With regards to the decision matrix and equation 3.4, P_{ij} is obtained. The results of this step are indicated in the table named the results of the first step.

Step 2 - Calculate the entropy value (E_j):

According to the results of the first step table and equation 3.5, the amount of entropy is obtained. The values of each entropy indicators are presented in the table titled "obtained quantities".

Step 3 - Calculate the amount of uncertainty (d_j):

The uncertainty values are obtained with entropy values and equation 3.6. These values are brought in the obtained quantities table.

Step 4 - Calculate Weights (w_j):

The weight of each index is obtained with the uncertainty values and equation 3.7. The weight of each index (w_j) is shown in the table of obtained quantities.

Step 5 - Calculate Modified Weights (w'_j)

Adjustable weights are obtained with the values of w_j and mental weights (λ_j) according to Equation 3.8.

In the end, the final weights of indicators are displayed in the graph.

3.3.7 MAPPAC method

This method is based on three assumptions [18]:

- For each value k_i , a quantitative value v_{ij} can be assigned to each α_j option that represents the function α_j relative to k_{ij} .
- Quantitative value v_{ij} can be determined for each α_j option based on each k_i criterion.
- The value $\vartheta(v_{ij})$ of each v_{ij} can be set at any interval of [1.0].

The criteria are mutually independent and different. For each k_i , the value of v_{ij} , which represents the function α_j , which is based on k_i , is determined. A numerical weight is ω_i for every k_i , which indicates the significance of k_i and shows its equation 3.9:

Equation: 3.9

$$\sum_{i=1}^n \omega_i = 1$$

For each k_i , a value function has been created and used to determine the value of $\vartheta(v_{ij})$ for each v_{ij} with $0 \leq \vartheta(v_{ij}) < 1$. Basic Priority Indicators $\pi_{g,h}(\omega_e, \omega_f)$ are calculated from each pair of options ω_e and ω_f for each pair of criteria k_g and k_h through equation 3.10; and the value of $\pi_{e,f}$ is also followed by the equation 3.11. Also, a general circuit of π_e for option α_e is determined in accordance with equation 3.12 [18]

Equation: 3.10

$$\pi_{gh}(\omega_e, \omega_f) = 1 \text{ if } v(v_{ge}) > v(v_{gf}) \wedge v(v_{he}) > v(v_{hf})$$

$$\pi_{gh}(\omega_e, \omega_f) = 0 \text{ if } v(v_{ge}) < v(v_{gf}) \wedge v(v_{he}) < v(v_{hf})$$

$$\pi_{gh}(\omega_e, \omega_f) = \frac{1}{2} \text{ if } v(v_{ge}) = v(v_{gf}) \wedge v(v_{he}) = v(v_{hf})$$

$$\pi_{gh}(\alpha_e, \alpha_f) = \frac{\omega_g(v(v_{ge}) - v(v_{gf}))}{\omega_g(v(v_{ge}) - v(v_{gf})) + \omega_h(v(v_{hf}) - v(v_{he}))} \text{ if } \begin{cases} (u(v_{gh}) > u(v_{gf}) \wedge u(v_{he}) \leq u(v_{hf})) \vee \\ (u(v_{ge}) = u(v_{gf}) \wedge u(v_{he}) < u(v_{hf})) \vee \end{cases}$$

$$\pi_{gh}(\alpha_e, \alpha_f) = \frac{\omega_h(v(v_{he}) - v(v_{hf}))}{\omega_g(v(v_{gf}) - v(v_{ge})) + \omega_h(v(v_{he}) - v(v_{hf}))} \text{ if } \begin{matrix} (v(v_{ge}) \leq v(v_{gf}) \wedge v(v_{he}) \leq v(v_{hf})) \vee \\ (v(v_{ge}) < u(v_{gf}) \wedge v(v_{he}) \geq u(v_{hf})) \vee \end{matrix}$$

Equation: 3.11

$$\pi_{ef} = \sum_{i < j} \pi_{ij}(\alpha_e, \alpha_f) \frac{\omega_i + \omega_j}{m-1}$$

Equation: 3.12

$$\pi_e = \sum_{a \in A \setminus a} \pi_{ef}$$

Then α_e is chosen with the largest π_e dependent, and on the other hand, it is defined as an optimal option. π_e except for the optimal option of A and the remainder α_e with the largest assigned amount π_e selected as the second best option is recalculated. This process is repeated until all options are ranked.

Then a similar process is initially performed by selecting the minimum optimal option from A. Then this option is left out of A, and π_e is recalculated, and the remainder α_e with the lowest π_e will be selected as the second highest option. This process will continue until all options are ranked. This ascending and descending ranking are combined to achieve a very weak A ranking .[18]

In the first step, the MAPPAC method must be used to determine the decision-making matrix of the ideal values and the basal of each of the criteria. In the second step, we must obtain the normal matrix C using the weights and matrices.

Then for each k_i a value function was created and used to determine the value $\vartheta(v_{ij})$ for each v_{ij} with $0 \leq \vartheta(v_{ij}) < 1$.

Base priority indices $\pi_{g,h}(\omega_e, \omega_f)$ for each pair of options ω_e and ω_f are calculated for each pair of criteria k_g and k_h using equation 3.10 and displayed in the preferred matrix. The preferred matrix represents the ranking of data in two ways (in terms of row and column).

4. CASE STUDY

After determining the research method, it is now time to analyze the collected data by using the appropriate methods described in the previous chapters. In this chapter, the mission and main objectives of Nick No Avaran Company have been examined and data collection tools and data collection software have been described and after that data analysis method is carried out, finally, the collected data are presented as valuable information for exploitation after analysis.

4.1 Company's mission

The company is committed to using its advanced methods of construction and using expert human resources and adherence to the principles and standards of quality and environment to fulfill its mission of satisfying customers and stakeholders.

4.2 Company's main objectives

- Increasing customer satisfaction through quality, affordable and timely delivery of projects,
- Use of efficient and expert human resources as the company's main assets,
- Use of appropriate equipment and materials for the implementation of projects,
- Expanding the company's activities by increasing market share and creating new markets,
- Compliance with legal and technical requirements and efforts to implement global standards;
- Efforts to reduce the environmental consequences of project implementation,
- Efforts to maintain and enhance the health of employees through education and the spread of health and safety culture.

4.3 Data collection tool

Data and information collection tools in this study are: referring to documents, observation, interviews, and questionnaires. First, by studying the literature in the form of books, articles and publications, related dissertations and searching on Internet sites, the steps of strategic planning and prioritization of strategies were identified according to previous studies. Then, in order to obtain the required information by attending to the Nick No Avaran Company, relations between the employees and the general situation of the company were observed, as well as interviews with experts. To weigh the factors affecting the construction industry, experts were asked to rate these factors on an important basis. Then weighing was done by using Shannon entropy method. Finally, for the purpose of policy making and analysis of the MAPPAC, a questionnaire was designed and distributed among the experts and its information was used.

4.4 Data collection software

Today, many software applications are made in different fields and in different sciences, which helps to make research more precise and less time-consuming. In this research, at first, the entropy software was used and the criteria were weighed. Then with the help of SANNA software, the strategies obtained for Nick No Avaran Company were prioritized by MAPPAC method. This software has the same space as Microsoft Excel. The data obtained from the questionnaires as well as the weights obtained from the entropy method were provided to the software and with the help of that, strategies are prioritized. After the experts respond to the questionnaire, the score is given to the responses according to each option based on the Likert scale. Then the average score is calculated for each question. These average scores and the weight of each criterion are given to the software and the software determines the priority of using the strategies.

4.5 Data analyzing

4.5.1 IFE and EFE Matrix

The steps for preparing IFE and EFE matrix are described in Chapter 3

Tables 4.1 and 4.2 show the internal factors evaluation matrix and the external factors evaluation matrix for the Company.

Key Internal Strengths		Importance coefficient	Rating	Weighted Score
1	Risk-taking of senior managers	0/09	4	0/36
2	Coherence in the organization	0/03	3	0/09
3	Belief in modern management methods in the company	0/08	4	0/32
4	A Suitable place for the company	0/03	3	0/09
5	The Open mindset of managers of the company	0/05	3	0/15
6	Place of growth and promotion of staff rating in comparison with other organizations	0/03	3	0/09
7	Use of young and energetic employees	0/04	3	0/12
Key Internal Weaknesses		Importance coefficient	Rating	Weighted Score
1	Insufficient experience of staff and managers in their scope of work and poor management of projects	0/09	2	0/18
2	Low knowledge and culture of the organization	0/08	1	0/08
3	Motiveless Personnel	0/07	1	0/07
4	Poor internal communication	0/1	1	0/1
5	Lack of financial resources and weak financial management	0/08	2	0/16
6	Not a fast-paced organization	0/1	1	0/1
7	Weakness in getting the right projects	0/08	1	0/08
8	Poor education in the organization	0/05	1	0/05
Total points		1		2/04

Table 4.1. IFE matrix.

Key External Opportunities		Importance coefficient	Rating	Weighted Score
1	International communication	0/13	3	0/39
2	A Suitable place for the company in the south of the country	0/05	4	0/2
3	The gradual removal of economic sanctions	0/12	3	0/36
4	Take advantage of the knowledge and experience of other similar and leading companies	0/04	3	0/12
5	A Small number of rival companies in Zanjan province	0/03	4	0/12
6	The existence of a workforce with high knowledge and hard worker	0/02	4	0/08
7	Welcoming occupational native workers in other provinces	0/03	3	0/09
8	The proper labor market in the south of the country	0/08	4	0/32
Key External Threats		Importance coefficient	Rating	Weighted Score
1	Being away from project suppliers	0/03	2	0/06
2	Disapproval of suppliers and contractors to work with the company	0/06	1	0/06
3	Housing market stagnation	0/08	1	0/08
4	Negative effect of economic problems on building industry	0/09	1	0/09
5	Bank's higher interest rate than business profit	0/07	2	0/14
6	The lack of attractiveness of Iran's domestic market for attracting foreign investors	0/1	2	0/2
7	Existence of a workforce with a high degree of education and their dissatisfaction with doing low-level jobs	0/01	2	0/02
8	The existence of unhealthy communications and lobbying in the labor market	0/06	2	0/12
Total points		1		2/45

Table 4.2. EFE matrix.

4.5.2 SWOT matrix

The steps for establishing a SWOT matrix are described in Chapter 3.

<p>Weaknesses(W):</p> <ul style="list-style-type: none"> - Insufficient experience of staff and managers in their field of work and poor management of projects - Weak organizational culture and knowledge - Unmotivated staff - Team and systematic not working - Lack of financial resources and lack of financial management - Slow organization - Weakness in getting the right projects - poor education in the organization 	<p>Strengths(S):</p> <ul style="list-style-type: none"> - Risk management of senior managers - Coherence within one - Belief in modern management practices in the company - Location of the company - Visibility of top managers of the company - Possibility of growth and promotion of staff rating in comparison with other organizations - Use of young and energetic employees 	
<p>Strategies WO</p> <ul style="list-style-type: none"> - Establishing training courses by industry experts for management and personnel of the organization - Participation with eligible investors in order to reduce risk - Motivate employees through the expansion of international communication - Increase the ability of financial and strategic analysis of managers to make optimal decisions - The attraction of expert and experienced staff 	<p>Strategies SO</p> <ul style="list-style-type: none"> - Use of advanced and innovative methods in the building industry - Use of new technologies - Obtaining standards for management and quality management in accordance with the International Standards (EFQM). - Diversification of activities by maintaining their professionalism - Doing high standard works as a package for branding 	<p>Opportunities(O):</p> <ul style="list-style-type: none"> - International communication - The proper location of the company in the south of the country - The gradual removal of economic sanctions - Ability to use the knowledge and experience of other companies - A small number of rival large companies in Zanjan province - The existence of a workforce with high and hard knowledge - Welcome native specialists working in other provinces - The proper labor market in the south of the country

<p>Strategies WT</p> <ul style="list-style-type: none"> - Participation and cooperation with other companies - dissolution - Selling part of the company's shares to other companies - Dismissal of some organization personnel 	<p>Strategies ST</p> <ul style="list-style-type: none"> - Hiring and using a strong project team - Explaining the best ways to build and institutionalize it - The use of inexpensive and inexpensive machinery and equipment, and at the same time of high quality and standard 	<p>Threats(T):</p> <ul style="list-style-type: none"> - Being away from project suppliers - Lack of cooperation between suppliers and contractors with the company - Housing market stagnation - The negative impact of the country's economic problems on the building industry - The higher interest rates of a bank relative to business profits - The lack of attractiveness of the domestic market for foreign investors - Workforce with high academic qualifications and their dissatisfaction with doing low-level jobs - The existence of unhealthy rents and communications in the labor market
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Table 4.3. SWOT matrix.

4.5.3 Identify the appropriate strategy by using the SPACE matrix

In this section, with the help of SPACE matrix, the type of strategy that is appropriate for the Nick No Avaran Company is obtained (aggressive, conservative, defensive, and competitive).

	Internal and external factors	
1	Financial Strength (FS):	
1-1	Lack of financial resources and weak financial management	1
	SUM	1
2	Competitive Advantage (CA):	
2-1	Risk-taking of senior managers	-3
2-2	Coherence in the organization	-1
2-3	Belief in modern management methods in the company	-1
2-4	A Suitable place for the company	-2
2-5	The Open mindset of managers of the company	-3
2-6	Place of growth and promotion of staff rating in comparison with other organizations	-3
2-7	Use of young and energetic employees	-1
2-8	Insufficient experience of staff and managers in their scope of work and poor management of projects	-5
2-9	Low knowledge and culture of the organization	-5
2-10	Motiveless Personnel	-5
2-11	Poor internal communication	-5
2-12	Not a fast-paced organization	-4
2-13	Weakness in getting the right projects	-5
2-14	Poor education in the organization	-5
	SUM	-48
3	Environmental stability (ES):	
3-1	A suitable place for the company in the south of the country	-1
3-2	A small number of rival companies	-1

3-3	The proper labor market in the south of the country	-2
3-4	Being away from project suppliers	-4
3-5	The lack of attractiveness of Iran's domestic market for attracting foreign investors	-4
3-6	Existence of a workforce with a high degree of education and their dissatisfaction with doing low-level jobs	-5
3-7	The existence of unhealthy communications and lobbying in the labor market	-5
	SUM	-22
4	Industry Strength (IS):	
4-1	International communication	5
4-2	The gradual removal of economic sanctions	6
4-3	Take advantage of the knowledge and experience of other similar and leading companies	4
4-4	The existence of a workforce with high knowledge and hard worker	5
4-5	Welcoming occupational native workers in other provinces	3
4-6	Disapproval of suppliers and contractors to work with the company	1
4-7	Housing market stagnation	1
4-8	The negative effect of economic problems on building industry	1
4-9	Bank's higher interest rate than business profit	1
	SUM	27

Table 4.4. SPACE matrix.

In this step, the calculations are made to draw up a SPACE matrix:

$$\text{FS average} = 1 \div 1 = +1$$

$$\text{IS Average} = 27 \div 9 = +3$$

$$\text{CA Average} = 48 \div 14 = -3.42$$

$$\text{EU Average} = 22 \div 7 = -3.14$$

A point that is placed on the X-axis. $-3.42 + (+3) = -0.42$

A point that is placed on the Y-axis. $-3.14 + (+1) = -2.14$

With the help of numbers that obtained from the calculations, the SPACE matrix is drawn:

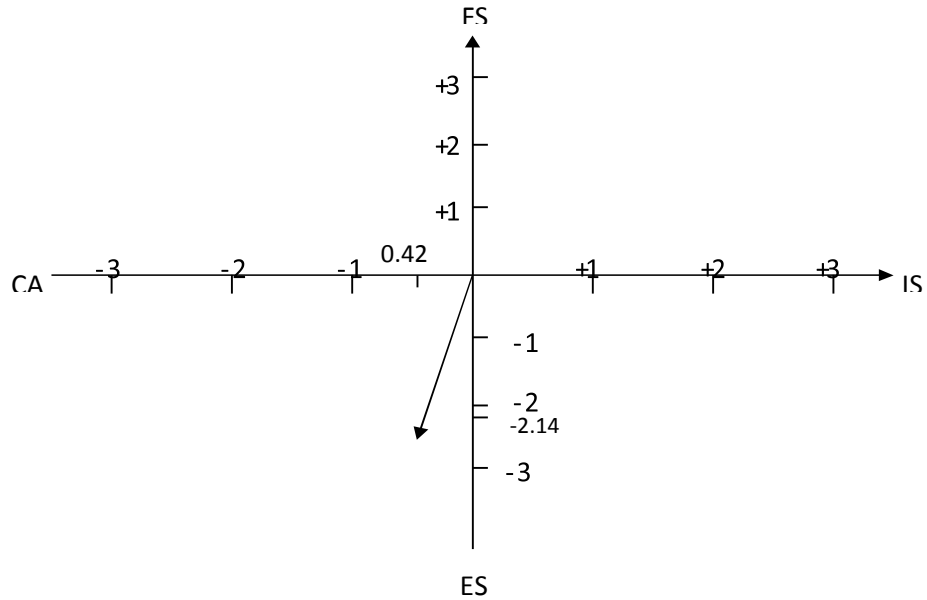


Table 4.5. SPACE matrix.

According to the SPACE matrix, the Company should use defensive strategies.

4.5.4 Evaluating the priority of defensive strategies by using QSPM matrix

By considering that defensive strategies in the SWOT matrix were recognized for the Company, the priority of using the defensive strategies identified with the help of the QSPM matrix at this stage.

Internal and External Factors	Weight	Strategies							
		Cooperation with other companies		Dissolution		Selling part of the company's shares to other companies		Dismissal of some personnel	
		AS	TAS	AS	TAS	AS	TAS	AS	TAS
Opportunities: International communication	0.13	-	-	-	-	-	-	-	-
A Suitable place for the company in the south of the country	0.05	-	-	-	-	-	-	-	-
The gradual removal of economic sanctions	0.12	-	-	-	-	-	-	-	-
Take advantage of the knowledge and experience of other similar and leading companies	0.04	1	0.04	-	-	1	0.04	-	-
A Small number of rival companies	0.03	-	-	-	-	-	-	-	-
The existence of a workforce with high knowledge and hard worker	0.02	-	-	-	-	-	-	-	-
Welcoming occupational native workers in other provinces	0.03	-	-	-	-	-	-	1	0.03
The proper labor market in the south of the country	0.08	-	-	-	-	-	-	-	-
Threats: Being away from project suppliers	0.03	2	0.06	1	0.03	3	0.09	1	0.03
Disapproval of suppliers and contractors to work with the company	0.06	4	0.24	2	0.12	3	0.18	3	0.18
Housing market stagnation	0.08	4	0.32	2	0.16	4	0.32	3	0.24
Negative effect of economic problems on building industry	0.09	3	0.27	2	0.18	3	0.27	2	0.18
Bank's higher interest rate than business profit	0.07	1	0.07	-	-	1	0.07	-	-
The lack of attractiveness of Iran's domestic market for attracting foreign investors	0.1	1	0.1	-	-	1	0.1	-	-

Existence of a workforce with a high degree of education and their dissatisfaction with doing low-level jobs	0.01	3	0.03	1	0.01	1	0.01	1	0.01
The existence of unhealthy communications and lobbying in the labor market	0.06	1	0.06	-	-	1	0.06	-	-
Strengths: Risk-taking of senior managers	0.09	1	0.09	-	1	0.09	-	-	-
Coherence in the organization	0.03	-	-	-	-	-	-	-	-
Belief in modern management methods in the company	0.08	-	-	-	-	-	-	-	-
A Suitable place for the company	0.03	-	-	-	-	-	-	-	-
The Open mindset of managers of the company	0.05	-	-	-	-	-	-	-	-
Place of growth and promotion of staff rating in comparison with other organizations	0.03	-	-	-	-	-	-	-	-
Use of young and energetic employees	0.04	-	-	-	-	-	-	-	-
Weaknesses: Insufficient experience of staff and managers in their scope of work and poor management of projects	0.09	3	0.27	2	0.18	2	0.18	2	0.18
Low knowledge and culture of the organization	0.08	-	-	-	-	-	-	1	0.08
Motiveless Personnel	0.07	3	0.21	1	0.07	2	0.14	3	0.21
Poor internal communication	0.1	2	0.2	-	-	1	0.1	1	0.1
Lack of financial resources and weak financial management	0.08	4	0.32	3	0.24	4	0.32	4	0.32
Not a fast-paced organization	0.1	1	0.1	-	-	-	-	1	0.1
Weakness in getting the right projects	0.08	3	0.24	2	0.16	3	0.24	2	0.16
Poor education in the organization	0.05	2	0.1	2	0.1	2	0.1	2	0.1
SUM			2.72		1.92		2.31		1.27

Table 4.6. QSPM matrix.

Regarding the Total Attractiveness Scores which obtained from the QSPM matrix, the Company should use respectively: The strategy of Participation and cooperation with other companies, selling part of company's shares to other companies, Dismissal of some organization personnel, and eventually liquidation strategies.

4.6 Prioritizing all strategies

With assuming that the company wants to use all of its strategies as much as it can, the priority of using all these strategies are determined.

To do this, first of all, based on the information obtained from the interview with the experts, the most important factors affecting the construction industry are determined and subsequently, by using the Shannon entropy method and using its software, the identified factors are weighed. Finally, by using the MAPPAC method, the priority of using the strategies is obtained.

4.6.1 Identification of factors affecting the construction industry

In order to identify these factors, interviews were conducted with the executives of construction companies and professors of the Zanjan University of Civil Engineering as well as the Deputy of Technical of the Zanjan Road and Urban Planning Department. According to the expert's interviews, the most important factors affecting are as follows: 1. Exchange rate, 2. The inflation rate, 3. Government policies, 4. Sanctions against Iran 5. The state of the housing market in terms of prosperity or stagnation, 6. Lack of supervision of specialized people on regulatory and control rules, 7. less attention to the private sector, 8. Far away from the technology of the day.

4.6.2 Weighing the factors by Shannon entropy Method

In this section, I weighed the eight factors affecting the construction industry by using the Shannon entropy method by using its software. To begin with, eleven experts have been asked to give each of these 8 factors a score of 1 to 5 in importance.

In this matrix N1 to N11, are research experts and C1 to C8 are eight factors that affect the construction industry.

	C1	C2	C3	C4	C5	C6	C7	C8
N1	1	3	3	5	2	3	3	5
N2	2	4	5	5	3	2	4	3
N3	2	3	5	4	4	2	3	4
N4	3	4	4	5	3	4	4	4
N5	2	3	4	4	2	5	4	3
N6	1	4	4	4	2	4	3	5
N7	2	4	3	4	3	3	4	3
N8	2	3	5	4	4	4	4	2
N9	1	4	3	5	3	2	5	4
N10	1	5	4	3	4	3	4	5
N11	3	4	4	4	3	4	4	4

Table 4.7. Decision matrix.

Step 1 - Calculate p_{ij} :

According to Table 4.7 and Equation 3.4, P_{ij} is obtained, Table 4.8 shows the values of P_{ij} .

	C1	C2	C3	C4	C5	C6	C7	C8
N1	0.05	0.073	0.068	0.106	0.061	0.083	0.071	0.119
N2	0.1	0.098	0.114	0.106	0.091	0.056	0.095	0.071
N3	0.1	0.073	0.114	0.085	0.121	0.056	0.071	0.095
N4	0.15	0.098	0.091	0.106	0.091	0.111	0.095	0.095
N5	0.1	0.073	0.091	0.085	0.061	0.139	0.095	0.07
N6	0.05	0.098	0.091	0.085	0.061	0.111	0.071	0.119
N7	0.1	0.098	0.068	0.085	0.091	0.083	0.095	0.071
N8	0.1	0.073	0.114	0.085	0.121	0.111	0.095	0.048
N9	0.05	0.098	0.068	0.106	0.091	0.056	0.119	0.095
N10	0.05	0.122	0.091	0.064	0.121	0.083	0.095	0.119
N11	0.15	0.098	0.091	0.085	0.091	0.111	0.095	0.095

Table 4.8. Results of the first step.

Step 2 - Calculate the entropy values (E_j):

According to Table 4.11, and Equation 3.5, the entropy value is obtained. The entropy values of each indicator are shown in Table 4.12.

Step 3 - Calculate the amount of uncertainty (d_j):

Uncertainty values are obtained with regards to the entropy values and the Equation of 3.6. These values are given in Table 4.12.

Step 4: Calculate Weights (w_j):

The weight of each index is obtained with regards to the uncertainty values in accordance with equation 3.7. The weight of each indicator (w_j) is shown in Table 4.9.

Step 5 - Calculation of Modified Weights (w'_j)

Adjusted weights are obtained according to the values of w_j and mental weights according to 3.8

Criteria	Entropy value (E_j)	Amount of uncertainty (d_j)	Benchmark weight (W_j)	Mental weights	Adjusted weight
C1	0.967	0.033	0.329	0.05	0.181
C2	0.994	0.006	0.057	0.15	0.094
C3	0.993	0.007	0.072	0.2	0.159
C4	0.996	0.004	0.045	0.25	0.123
C5	0.987	0.013	0.13	0.1	0.143
C6	0.982	0.018	0.186	0.05	0.102
C7	0.995	0.005	0.048	0.1	0.053
C8	0.987	0.013	0.133	0.1	0.146

Table 4.9. Obtained values (steps 2 to 5), created by Shannon entropy software

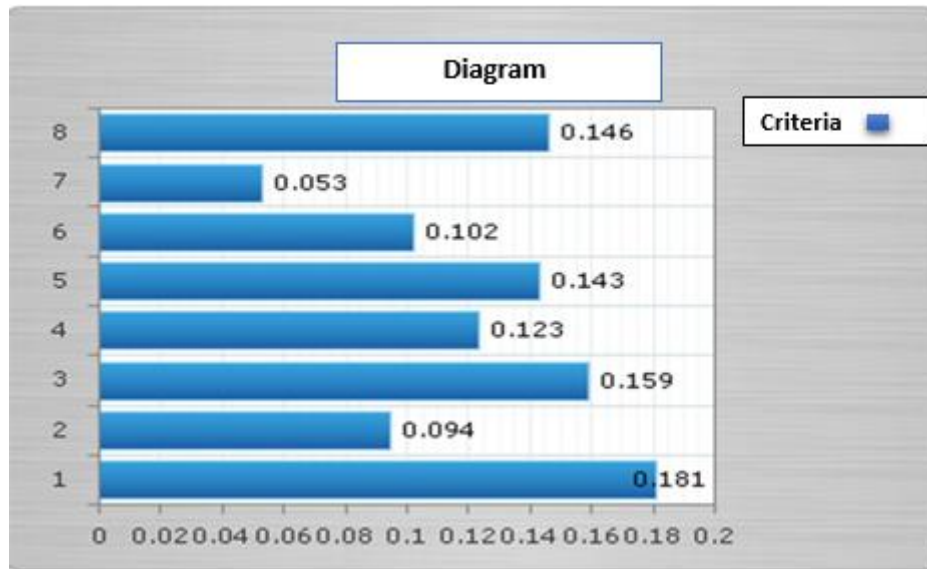


Figure 4.1. Final weights (w'_j) of indicators created by Shannon entropy software

As shown in Figure 4.1, the exchange rate has the highest weight and less attention to the private sector has the lowest weight.

4.6.3 Prioritizing all strategies by using MAPPAC method

The priority of using all strategies identified in the SWOT matrix is done through a MAPPAC method.

The steps in performing the MAPPAC method are described in Chapter 3. To perform this analysis, the software of this method has been used.

Due to lack of space, there is no possibility of using the full title of the strategies in the tables and used an abbreviation for each strategy. In Table 4.10, the name of each of the strategies is specified.

The used name in the MAPPAC method	Strategies
Strategy 1	Use of advanced and innovative methods in the building industry
Strategy 2	Use of modern technology
Strategy 3	Obtaining Standards for Managing Quality and Quality Compliance with Global Standards (EFQM)
Strategy 4	Diversification of activities by maintaining their specialty
Strategy 5	Doing high-quality jobs as a package for branding
Strategy 6	Establishing training courses by industry experts for management and personnel of the organization
Strategy 7	Participation with eligible investors to reduce risk
Strategy 8	Motivate employees through the expansion of international communication
Strategy 9	Increasing the ability of financial and strategic analysis of managers to make optimal decisions
Strategy 10	Attraction of expert and experienced staff
Strategy 11	Hiring and using a strong project team
Strategy 12	Explaining the best ways to build and institutionalize it
Strategy 13	The use of inexpensive and inexpensive machinery and equipment, and at the same time of high quality and standard
Strategy 14	Participation and cooperation with other companies
Strategy 15	Dissolution
Strategy 16	Sale of part of the company's shares to other companies
Strategy 17	Dismissal of some organization personnel

Table 4.10. An abbreviation for each strategy.

In the first step, in addition to the decision matrix, the ideal values and the basis of each criterion should be determined.

	Exchange rate	The inflation rate	Government policies	Sanctions against Iran	The state of the housing market in terms of prosperity or stagnation	The lack of supervision of specialists in regulatory and control laws	Less attention to the private sector	Far away from the latest technologies
Strategy 1	3.82	4.18	3.18	4.64	3.91	2.82	3.64	4.91
Strategy 2	4.27	4.45	2.73	4.72	3.73	2.91	3.55	4.82
Strategy 3	3.45	3.36	3	3.82	3.27	2.64	3.45	4.45
Strategy 4	3	3	2.55	3.18	3.55	2.82	3.18	3.27
Strategy 5	3.27	2.73	2.82	3.36	2.91	2.73	3	4.18
Strategy 6	2.73	3.18	2.55	2.82	3.45	2.27	2.82	2.64
Strategy 7	2.82	2.45	2.73	3.09	3.18	2.82	2.82	2.55
Strategy 8	3.82	3.18	3.91	4.36	3.45	3.64	4	3.91
Strategy 9	2.73	3.18	2.73	3.09	3.36	2.64	3	3.18
Strategy 10	2.64	3.27	2.73	2.82	3	2.45	2.73	3.73
Strategy 11	2.73	3.36	2.45	3	3.27	2.36	3	2.82
Strategy 12	3	3.45	3.18	3.45	3.55	2.64	3.27	3.27
Strategy 13	4	4.09	3.09	3.45	3.36	3	3.18	3.45
Strategy 14	2.55	2.36	3.09	2.64	3.09	2.36	2.64	2.64
Strategy 15	2	2.18	1.55	1.55	2.27	1.64	2.18	2.09
Strategy 16	2.09	2.64	2.55	2.18	3	3.09	2.91	2.73
Strategy 17	2.18	2.45	2.45	2.36	3.18	2.36	2.91	2.73
Weight	0.181	0.094	0.159	0.123	0.143	0.102	0.053	0.146

Table 4.11. Initial Decision matrix

	Exchange rate	The inflation rate	Government policies	Sanctions against Iran	The state of the housing market in terms of prosperity or stagnation	The lack of supervision of specialists in regulatory and control laws	Less attention to the private sector	Far away from the latest technologies
Strategy 1	3.82	4.18	3.18	4.64	3.91	2.82	3.64	4.91
Strategy 2	4.27	4.45	2.73	4.72	3.73	2.91	3.55	4.82
Strategy 3	3.45	3.36	3	3.82	3.27	2.64	3.45	4.45
Strategy 4	3	3	2.55	3.18	3.55	2.82	3.18	3.27
Strategy 5	3.27	2.73	2.82	3.36	2.91	2.73	3	4.18
Strategy 6	2.73	3.18	2.55	2.82	3.45	2.27	2.82	2.64
Strategy 7	2.82	2.45	2.73	3.09	3.18	2.82	2.82	2.55
Strategy 8	3.82	3.18	3.91	4.36	3.45	3.64	4	3.91
Strategy 9	2.73	3.18	2.73	3.09	3.36	2.64	3	3.18
Strategy 10	2.64	3.27	2.73	2.82	3	2.45	2.73	3.73
Strategy 11	2.73	3.36	2.45	3	3.27	2.36	3	2.82
Strategy 12	3	3.45	3.18	3.45	3.55	2.64	3.27	3.27
Strategy 13	4	4.09	3.09	3.45	3.36	3	3.18	3.45
Strategy 14	2.55	2.36	3.09	2.64	3.09	2.36	2.64	2.64
Strategy 15	2	2.18	1.55	1.55	2.27	1.64	2.18	2.09
Strategy 16	2.09	2.64	2.55	2.18	3	3.09	2.91	2.73
Strategy 17	2.18	2.45	2.45	2.36	3.18	2.36	2.91	2.73
Weight	0.181	0.094	0.159	0.123	0.143	0.102	0.053	0.146
Ideal	4.27	4.45	3.91	4.72	3.91	3.64	4	4.91
Basal	2	2.18	1.55	1.55	2.27	1.64	2.18	2.09

Table 4.12. Decision matrix, ideal and bases values by using MAPPAC method

In the second step, the C matrix and then the preferred matrix and the ranking should be formed and the priorities defined.

	Exchange rate	The inflation rate	Government policies	Sanctions against Iran	The state of the housing market in terms of prosperity or stagnation	The lack of supervision of specialists in regulatory and control laws	Less attention to the private sector	Far away from the latest technologies
Strategy 1	0.80176	0.88106	0.69068	0.97476	1	0.59	0.8022	1
Strategy 2	1	1	0.5	1	0.89024	0.635	0.75275	0.96809
Strategy 3	0.63877	0.51982	0.61441	0.71609	0.60976	0.5	0.6978	0.83688
Strategy 4	0.44053	0.36123	0.42373	0.5142	0.78049	0.59	0.54945	0.41844
Strategy 5	0.55947	0.24229	0.53814	0.57098	0.39024	0.545	0.45055	0.74113
Strategy 6	0.32159	0.44053	0.42373	0.40063	0.71951	0.315	0.35165	0.19504
Strategy 7	0.36123	0.11894	0.5	0.4858	0.55488	0.59	0.35165	0.16312
Strategy 8	0.80176	0.44053	1	0.88644	0.71951	1	1	0.64539
Strategy 9	0.32159	0.44053	0.5	0.4858	0.66463	0.5	0.45055	0.38652
Strategy 10	0.28194	0.48018	0.5	0.40063	0.44512	0.405	0.3022	0.58156
Strategy 11	0.32159	0.51982	0.38136	0.45741	0.60976	0.36	0.45055	0.25887
Strategy 12	0.44053	0.55947	0.69068	0.59937	0.78049	0.5	0.5989	0.41844
Strategy 13	0.88106	0.84141	0.65254	0.59937	0.66463	0.68	0.54945	0.48227
Strategy 14	0.24229	0.0793	0.65254	0.34385	0.5	0.36	0.25275	0.19504
Strategy 15	0	0	0	0	0	0	0	0
Strategy 16	0.03965	0.20264	0.42373	0.19874	0.44512	0.725	0.4011	0.22695
Strategy 17	0.0793	0.11894	0.38136	0.25552	0.55488	0.36	0.4011	0.22695
Weight	0.18082	0.09391	0.15884	0.12288	0.14286	0.1019	0.05295	0.14585

Table 4.13. C Matrix, by using MAPPAC method

	Strategy 1	Strategy 2	Strategy 3	Strategy 4	Strategy 5	Strategy 6	Strategy 7	Strategy 8	Strategy 9	Strategy 10	Strategy 11	Strategy 12	Strategy 13	Strategy 14	Strategy 15	Strategy 16	Strategy 17	FROM ABOVE	TOTAL
Strategy 1	0.00000	0.50664	1.00000	1.00000	1.00000	1.00000	1.00000	0.59020	1.00000	1.00000	1.00000	1.00000	0.78259	1.00000	1.00000	0.96048	1.00000	1	1
Strategy 2	0.49336	0.00000	0.88335	1.00000	0.95636	1.00000	1.00000	0.62720	1.00000	1.00000	1.00000	0.86844	0.82134	0.92302	1.00000	0.96166	1.00000	2	2
Strategy 3	0.00000	0.11665	0.00000	0.80158	0.95028	0.90682	0.93868	0.19061	0.90603	1.00000	0.98309	0.62957	0.37443	0.95496	1.00000	0.91858	1.00000	5	5
Strategy 4	0.00000	0.00000	0.19842	0.00000	0.40000	0.90647	0.85805	0.05560	0.73557	0.66684	0.88541	0.22588	0.13064	0.84192	1.00000	0.90091	1.00000	7	7
Strategy 5	0.00000	0.04364	0.04972	0.60000	0.00000	0.74089	0.78114	0.06993	0.68837	0.78266	0.73395	0.40376	0.16777	0.78406	1.00000	0.81107	0.87779	8	7
Strategy 6	0.00000	0.00000	0.09318	0.09353	0.25911	0.00000	0.43509	0.01691	0.16896	0.41020	0.35531	0.00000	0.05059	0.70637	1.00000	0.70021	0.81954	13	10
Strategy 7	0.00000	0.00000	0.06132	0.14195	0.21886	0.56491	0.00000	0.00000	0.31280	0.61663	0.50578	0.06607	0.00000	0.72968	1.00000	0.68089	0.77940	11	9
Strategy 8	0.40980	0.37280	0.80939	0.94440	0.93007	0.98309	1.00000	0.00000	1.00000	0.97881	0.96849	0.88412	0.75845	1.00000	1.00000	1.00000	1.00000	3	3
Strategy 9	0.00000	0.00000	0.09397	0.26443	0.31163	0.83104	0.68720	0.00000	0.00000	0.71285	0.85591	0.00000	0.00000	0.84441	1.00000	0.88410	1.00000	9	8
Strategy 10	0.00000	0.00000	0.00000	0.33316	0.21734	0.58980	0.38337	0.02119	0.28715	0.00000	0.46667	0.14129	0.08633	0.70422	1.00000	0.79989	0.83983	12	9
Strategy 11	0.00000	0.00000	0.01691	0.11459	0.26605	0.64469	0.49422	0.03151	0.14409	0.53333	0.00000	0.00000	0.00000	0.78580	1.00000	0.76288	0.98138	10	9
Strategy 12	0.00000	0.13156	0.37043	0.77412	0.59624	1.00000	0.93393	0.11588	1.00000	0.85871	1.00000	0.00000	0.31710	1.00000	1.00000	0.91320	1.00000	6	6
Strategy 13	0.21741	0.17866	0.62557	0.86936	0.83223	0.94941	1.00000	0.24155	1.00000	0.91367	1.00000	0.68290	0.00000	1.00000	1.00000	0.97343	1.00000	4	4
Strategy 14	0.00000	0.07698	0.04504	0.15808	0.21594	0.29363	0.27032	0.00000	0.15559	0.29578	0.21420	0.00000	0.00000	0.00000	1.00000	0.62413	0.60105	14	11
Strategy 15	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	17	13
Strategy 16	0.03952	0.03834	0.08142	0.09909	0.18893	0.29979	0.31911	0.00000	0.11590	0.20011	0.23712	0.08680	0.02657	0.37587	1.00000	0.00000	0.49198	16	12
Strategy 17	0.00000	0.00000	0.00000	0.00000	0.12221	0.18046	0.22060	0.00000	0.00000	0.16017	0.01862	0.00000	0.00000	0.39895	1.00000	0.50802	0.00000	15	12
FROM BELOW	1	2	5	8	7	13	11	3	9	10	12	6	4	14	17	15	16		

Table 4.14. Preferred matrix, by using MAPPAC method

Finally, these priorities are well defined in the Final Prioritized matrix of Strategies.

Strategies	Prioritize from above	Prioritize from bottom	Total
Strategy 1	1	1	1
Strategy 2	2	2	2
Strategy 8	3	3	3
Strategy 13	4	4	4
Strategy 3	5	5	5
Strategy 12	6	6	6
Strategy 4	7	8	7
Strategy 5	8	7	
Strategy 9	9	9	8
Strategy 10	12	10	9
Strategy 11	10	12	
Strategy 7	11	11	
Strategy 6	13	13	10
Strategy 14	14	14	11
Strategy 16	16	15	12
Strategy 17	15	16	
Strategy 15	17	17	13

Table 4.15. Final Prioritized matrix of Strategies.

Thus, the priority of using the strategies for the company was determined by using the MAPPAC method.

5. CONCLUSIONS AND SUGGESTIONS

In this chapter, the results of the research are presented and suggestions are presented based on the obtained results and the knowledge. So, at first, a brief review of the research was carried out, then the main results of the research were presented and finally, suggestions to management have been provided as well as a proposal for conducting further research in this field.

5.1 Conclusion

According to the research carried out and the answers given to each of the research questions, the results are as follows:

Nick No Avaran Company, like any other organization, has a number of strengths and weaknesses, as well as a number of opportunities and threats, but the weight and importance of its weaknesses are more important than its strengths. Also, the weight and importance of the Nick No Avaran Company's threats are more than the weight and importance of its opportunities. These cases are well defined in the study of internal and external factors.

By using the SWOT matrix, a total of 17 strategies were identified for the Nick No Avaran Company, which were 5 SO (Aggressive) strategies, 5 WO (Conservative) strategies, 3 ST (Competitive) strategies, and finally 4 WT (Defensive) strategies. It's notable that at this stage, strategies have been introduced are fully accessible for Company.

From among four types of strategies identified in the SWOT matrix, the company should use defensive strategies based on the SPACE matrix. These strategies include participation and cooperating with other companies, Liquidation, selling part of the company's shares to other companies, and expelling some of the organization's personnel. In fact, the company is in an unstable industry, financially faced with a problem. This problem was also well visible in evaluating internal and external factors. The use of aggressive, conservative and competitive strategies requires a lot of investment, which, due to the not so good situation of the company, cannot use these strategies and it is better to use defensive strategies.

If Nick No Avaran Company decided for any reason to implement all the strategies identified in the SWOT matrix, it would be better to implement these strategies based on the priority that was obtained

by using the MAPPAC method. If the company wants to implement only defensive strategies, it can use the results of both QSPM and MAPPAC method.

The most important result from this research is the comparison between the QSPM matrix and MAPPAC method. Both of these methods rank or prioritize identified strategies but the QSPM matrix prioritizes only the strategies identified by the SPACE Matrix for the firm, while the MAPPAC method prioritizing all identified strategies.

The other difference between these two methods is the results of them, which show a slight difference. If we only consider the priority of using defensive strategies based on the QSPM method, the priority of the strategies is as follows: Participation and cooperation with other companies, selling part of the company's shares to other companies, Dismissal of some organization personnel, and eventually liquidation ; but according to the MAPPAC method, there is no difference in the use of Selling part of the company's shares to other companies and the Dismissal of some of the personnel, and these two strategies have the same priority.

5.2 Research constraints

Undoubtedly, any research has limitations that can occur at any stage. The present study has been limited to:

- The present research is conducted on Nick No Avaran Company in accordance with the conditions and facilities and factors which influence this company; therefore, its results cannot be extended to other companies and organizations.
- The lack of adequate research and studies on MAPPAC method was one of the most important limitations of this study.

5.3 Suggestions

In this section, I have drawn suggestions based on the conclusions and the constraints mentioned in, the following suggestions will be presented to researchers in future studies:

5.3.1 Research suggestions

For future research into strategic management researchers, the following topics are suggested:

- Conduct research on new methods and tools in strategy development, such as Analytic Network Process (ANP) or Fuzzy SWOT for the Nick No Avaran Company.
- It is suggested that this research be carried out in other contractors in Zanjan, as well as in other provinces and cities, and compares the results with each other. From this comparison, can see the general situation of the construction market in the country.
- Researchers can use the Analytical Hierarchy Process (AHP) (or AHP fuzzy) in weighing the criteria.

5.3.2 Practical suggestions

Successful managers operate their strategic thinking in the form of strategic planning. Considering that planning is the foreground of all other management tasks. Planning, and at the top of it, is to create a hierarchy of programs within an organization to prevent waste of resources and to direct the organization into a clear and enforceable framework. Therefore, community managers in general, as well as managers and employees of the Nick No Avaran Company can partially use the research and its results for its strategic planning. The review of related literature suggests that a systematic approach should be used to formulate strategic planning in order to create coherent planning for the company. Based on the research carried out, suggestions to the Nick No Avaran company are:

- According to Nick No Avaran Company which does not have a good financial situation and defensive strategies are appropriate for it, it is suggested that the company be given the same priority as it sees fit to carry out the strategies. At the outset, the Company should make every effort to partner with other companies to manage its situation after a while and return to normal.

- The Company must simultaneously pursue defensive strategies, aggressive, competitive, and conservative strategies that do not cost a lot, and the company can handle it, while at the same time preventing the deterioration of the situation. For example, setting up training classes, recruiting experienced staff and using a strong project team.
- After the Nick No Avaran Corporation has done this and returning to normal to some extent, it has to re-engage in strategic planning to continue its activities under its new circumstances.
- Implementing and performance the strategies presented in this study and monitoring and reviewing their results.
- Evaluating the impact of strategic planning on the performance indicators of the Nick No Avaran Company.

SUMMARY

Recognition of existence organizations' problems, internally and externally, that leads to detection and development of the internal weaknesses and strengths and external threats are considered as part of the strategic planning process. One equipment used in the strategic development stage for analysis of internal and external strategic elements is SWOT analysis which is able to summarize the most important internal and external factors which can affect the future of an organization. In this study, I accomplished the strategic planning for Nick No Avaran Company and prioritize recognized strategies during that. The approach used in this study is survey and case study and is operational in terms of the goal. Tools of data collection are a reference to the documentation, observation of the company's atmosphere, interview, and questionnaire. The population includes board of directors and Nick No Avaran Company employees, CEOs of construction and contracting company of Zanjan and civil engineering faculty of Zanjan University, Managers and Deputy Director- General of Roads and Urban Development of Zanjan province. Data needed for this study is extracted from available expert opinions. Some interviews are accomplished for this study with Nick No Avaran Company to achieve missions, goals, strengths, and weaknesses, opportunities, and threats of the company and some questionnaires' distributed among all mentioned members. During this study, considering internal and external effective factors and using the SWOT matrix, some strategies determined for the company. Then defensive strategies recognized suitable for Nick No Avaran by using SPACE matrix and then these strategies were ranked by using QSPM matrix and finally all identified strategies were ranked using MAPPAC analysis. Comparing results from the QSPM matrix and MAPPAC analysis shows just minor differences. Among defensive strategies, based on QSPM, strategies priority are like this: participation and cooperation with other companies, selling some shares of the company to other companies, dismissal of some organizations personnel and dissolution, but based on MAPPAC analysis, there is no difference in the priority of using strategies of selling some shares of the company to other companies and lay off some employees, and both of them have equal priority.

KOKKUVÕTE

Osaks strateegilise planeerimise protsessist peetakse nii organisatsiooni-siseste kui -väliste probleemide olemasolu äratundmist, mis viib sisemiste nõrkuste ja tugevuste ning väliste ohtude tuvastamiseni ja tugevuste arendamiseni. Üheks vahendiks, mida kasutatakse strateegilises arendusfaasis strateegiliste sisemiste ja väliste elementide analüüsiks on SWOT-analüüs. SWOT-analüüs võimaldab kokku võtta kõige olulisemad organisatsiooni-sised ja -välised faktorid, mis selle tulevikku võivad mõjutada.

Käesolevas töös tehti läbi strateegilise planeerimise protsess ettevõtte Nick No Avaran Company jaoks ning prioritseeriti tuvastatud strateegiad. Uuringu metodoloogiana kasutati küsitlusuuringut ja juhtumiuuringut. Andmete kogumiseks kasutati ettevõtte dokumentatsiooni, vaatlust, intervjuusid ja küsimustikku. Uuringu valimisse kuulusid Nick No Avaran Company juhatuse liikmed ja töötajad, Zanjani ehitus- ja allhanke ettevõtte tegevjuhid ja Zanjani ülikooli tsiviilehituse osakond, Zanjani provintsi teede ja linnaplaneerimise direktor ning juhid. Uuringu jaoks vajaminevad andmed võeti kättesaadavatest ekspertarvamusest. Lisaks viidi läbi intervjuud Nick No Avaran Company esindajatega, et teha kindlaks Nick No Avaran Company eesmärgid, tugevused, nõrkused, võimalused ja ohud; samuti täitsid eelpool loetletud osalised küsitlusankeedi. Uuringu käigus kaaluti sise- ja välisfaktoreid ning kasutades SWOT-maatriksit, tehti kindlaks mõned ettevõtte jaoks sobivad strateegiad. Nick No Avarani jaoks sobilikud kaitsestrateegiad valiti SPACE-maatriksi abil ning seati tähtsuse järjekorda MAPPAC-analüüsi kasutades. QSPM-maatriksi ja MAPPAC-analüüsi tulemuste võrdluses esines vaid väikseid erinevusi. QSPMi järgi oli kaitsestrateegiate järjestus järgmine: osalus ja koostöö teiste ettevõtetega, ettevõtte aktsiate müümine teistele ettevõtetele ja personali koondamist; ent MAPPAC-analüüsi ei sea ühte teisest – aktsiate müüki või töötajate koondamist – prioriteetsemaks.

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APPENDICES

Dear responder;

A questionnaire that is ahead of you is for conducting research in the field of "Strategic Planning based on SWOT and Multi-criteria Decision Analysis." Thanks and grateful to you for the accuracy and attention and consider that your responses are only for research purposes and all your information and responses will be confidential.

Age: 30-40 years 40-50 years 50-60 years

Sex: Male Woman

Education: Bachelor Master PhD

please specify the impact of each of the criteria on each of the following factors:

A1:

Exchange rate						
Factors		Extremely Effective	Very Effective	Moderately Effective	Slightly Effective	Not at all Effective
1	Use of advanced and innovative methods in the building industry					
2	Use of modern technology					
3	Obtaining Standards for Managing Quality and Quality Compliance with Global Standards (EFQM)					
4	Diversify activities by maintaining their specialty					
5	Doing high-quality jobs as a package for branding					
6	Establishing training courses by industry experts for management and personnel of the organization					
7	Participation with eligible investors to reduce risk					
8	Motivate employees through the expansion of international communication					
9	Increasing the ability of financial and strategic analysis of managers to make optimal decisions					
10	Attraction of expert and experienced staff					
11	Hiring and using a strong project team					
12	Explaining the best ways to build and institutionalize it					
13	The use of inexpensive and inexpensive machinery and equipment, and at the same time of high quality and standard					
14	Participation and cooperation with other companies					
15	Dissolution					
16	Sale of part of the company's shares to other companies					
17	Dismissal of some organization personnel					

A2:

The inflation rate						
Factors		Extremely Effective	Very Effective	Moderately Effective	Slightly Effective	Not at all Effective
1	Use of advanced and innovative methods in the building industry					
2	Use of modern technology					
3	Obtaining Standards for Managing Quality and Quality Compliance with Global Standards (EFQM)					
4	Diversify activities by maintaining their specialty					
5	Doing high-quality jobs as a package for branding					
6	Establishing training courses by industry experts for management and personnel of the organization					
7	Participation with eligible investors to reduce risk					
8	Motivate employees through the expansion of international communication					
9	Increasing the ability of financial and strategic analysis of managers to make optimal decisions					
10	Attraction of expert and experienced staff					
11	Hiring and using a strong project team					
12	Explaining the best ways to build and institutionalize it					
13	The use of inexpensive and inexpensive machinery and equipment, and at the same time of high quality and standard					
14	Participation and cooperation with other companies					
15	Dissolution					
16	Sale of part of the company's shares to other companies					
17	Dismissal of some organization personnel					

A3:

Government policies						
Factors		Extremely Effective	Very Effective	Moderately Effective	Slightly Effective	Not at all Effective
1	Use of advanced and innovative methods in the building industry					
2	Use of modern technology					
3	Obtaining Standards for Managing Quality and Quality Compliance with Global Standards (EFQM)					
4	Diversify activities by maintaining their specialty					
5	Doing high-quality jobs as a package for branding					
6	Establishing training courses by industry experts for management and personnel of the organization					
7	Participation with eligible investors to reduce risk					
8	Motivate employees through the expansion of international communication					
9	Increasing the ability of financial and strategic analysis of managers to make optimal decisions					
10	Attraction of expert and experienced staff					
11	Hiring and using a strong project team					
12	Explaining the best ways to build and institutionalize it					
13	The use of inexpensive and inexpensive machinery and equipment, and at the same time of high quality and standard					
14	Participation and cooperation with other companies					
15	Dissolution					
16	Sale of part of the company's shares to other companies					
17	Dismissal of some organization personnel					

A4:

Sanctions against Iran						
Factors		Extremely Effective	Very Effective	Moderately Effective	Slightly Effective	Not at all Effective
1	Use of advanced and innovative methods in the building industry					
2	Use of modern technology					
3	Obtaining Standards for Managing Quality and Quality Compliance with Global Standards (EFQM)					
4	Diversify activities by maintaining their specialty					
5	Doing high-quality jobs as a package for branding					
6	Establishing training courses by industry experts for management and personnel of the organization					
7	Participation with eligible investors to reduce risk					
8	Motivate employees through the expansion of international communication					
9	Increasing the ability of financial and strategic analysis of managers to make optimal decisions					
10	Attraction of expert and experienced staff					
11	Hiring and using a strong project team					
12	Explaining the best ways to build and institutionalize it					
13	The use of inexpensive and inexpensive machinery and equipment, and at the same time of high quality and standard					
14	Participation and cooperation with other companies					
15	Dissolution					
16	Sale of part of the company's shares to other companies					
17	Dismissal of some organization personnel					

A5:

The state of the housing market in terms of prosperity or stagnation						
Factors		Extremely Effective	Very Effective	Moderately Effective	Slightly Effective	Not at all Effective
1	Use of advanced and innovative methods in the building industry					
2	Use of modern technology					
3	Obtaining Standards for Managing Quality and Quality Compliance with Global Standards (EFQM)					
4	Diversify activities by maintaining their specialty					
5	Doing high-quality jobs as a package for branding					
6	Establishing training courses by industry experts for management and personnel of the organization					
7	Participation with eligible investors to reduce risk					
8	Motivate employees through the expansion of international communication					
9	Increasing the ability of financial and strategic analysis of managers to make optimal decisions					
10	Attraction of expert and experienced staff					
11	Hiring and using a strong project team					
12	Explaining the best ways to build and institutionalize it					
13	The use of inexpensive and inexpensive machinery and equipment, and at the same time of high quality and standard					
14	Participation and cooperation with other companies					
15	Dissolution					
16	Sale of part of the company's shares to other companies					
17	Dismissal of some organization personnel					

A6:

The lack of supervision of specialists in regulatory and control laws						
Factors		Extremely Effective	Very Effective	Moderately Effective	Slightly Effective	Not at all Effective
1	Use of advanced and innovative methods in the building industry					
2	Use of modern technology					
3	Obtaining Standards for Managing Quality and Quality Compliance with Global Standards (EFQM)					
4	Diversify activities by maintaining their specialty					
5	Doing high-quality jobs as a package for branding					
6	Establishing training courses by industry experts for management and personnel of the organization					
7	Participation with eligible investors to reduce risk					
8	Motivate employees through the expansion of international communication					
9	Increasing the ability of financial and strategic analysis of managers to make optimal decisions					
10	Attraction of expert and experienced staff					
11	Hiring and using a strong project team					
12	Explaining the best ways to build and institutionalize it					
13	The use of inexpensive and inexpensive machinery and equipment, and at the same time of high quality and standard					
14	Participation and cooperation with other companies					
15	Dissolution					
16	Sale of part of the company's shares to other companies					
17	Dismissal of some organization personnel					

A7:

Less attention to the private sector						
Factors		Extremely Effective	Very Effective	Moderately Effective	Slightly Effective	Not at all Effective
1	Use of advanced and innovative methods in the building industry					
2	Use of modern technology					
3	Obtaining Standards for Managing Quality and Quality Compliance with Global Standards (EFQM)					
4	Diversify activities by maintaining their specialty					
5	Doing high-quality jobs as a package for branding					
6	Establishing training courses by industry experts for management and personnel of the organization					
7	Participation with eligible investors to reduce risk					
8	Motivate employees through the expansion of international communication					
9	Increasing the ability of financial and strategic analysis of managers to make optimal decisions					
10	Attraction of expert and experienced staff					
11	Hiring and using a strong project team					
12	Explaining the best ways to build and institutionalize it					
13	The use of inexpensive and inexpensive machinery and equipment, and at the same time of high quality and standard					
14	Participation and cooperation with other companies					
15	Dissolution					
16	Sale of part of the company's shares to other companies					
17	Dismissal of some organization personnel					

A8:

Far away from the latest technologies						
Factors		Extremely Effective	Very Effective	Moderately Effective	Slightly Effective	Not at all Effective
1	Use of advanced and innovative methods in the building industry					
2	Use of modern technology					
3	Obtaining Standards for Managing Quality and Quality Compliance with Global Standards (EFQM)					
4	Diversify activities by maintaining their specialty					
5	Doing high-quality jobs as a package for branding					
6	Establishing training courses by industry experts for management and personnel of the organization					
7	Participation with eligible investors to reduce risk					
8	Motivate employees through the expansion of international communication					
9	Increasing the ability of financial and strategic analysis of managers to make optimal decisions					
10	Attraction of expert and experienced staff					
11	Hiring and using a strong project team					
12	Explaining the best ways to build and institutionalize it					
13	The use of inexpensive and inexpensive machinery and equipment, and at the same time of high quality and standard					
14	Participation and cooperation with other companies					
15	Dissolution					
16	Sale of part of the company's shares to other companies					
17	Dismissal of some organization personnel					