

Formulating, Evaluating and Prioritizing a Production Company Strategies using Hybrid FUZZY TOPSIS-SWOT Model (Case Study: Tehran PAK Dairy Company)

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Abstract

To formulate and prioritize PAK Dairy Company strategies is of the objectives the current study pursues. Since so far in food industries, such studies have been rarely done, efforts have been made in this research to identify and prioritize PAK Dairy Company related strategies to provide a theme for the senior decision makers of this organization. In this research, first off the organization's external environment related Strengths, Weaknesses, Opportunities and Threats as SWOT model will be identified via interviewing, counseling and being directed by PAK Company middle and senior managers and at last, this company's strategies will be formulated. Finally, the factors influencing these strategies will be outlined. Then by acquiring the decision makers' ideas about the significance of the strategies and their influencing factors, we get the chance to solve the problem. Regarding the point that all the indices as qualitative have been chosen based on the middle and senior managers' opinions, thus we've applied FUZZYTOPSIS model. In this research, it has been tried to consider the decision makers' ideas very influencing in the computations because apart from the statistics and technical data of the production, financial, accounting and etc., the most critical parameter in decision making problems is the decision makers' opinions, then linguistic variables have been used to outline the strategies importance and their influencing factors. Ultimately, having solved FUZZYTOPSIS model, all the strategies are prioritized and their results indicate each strategy's implementation priority and necessity given its influencing factors.

Keywords: FUZZY TOPSIS Model, Fuzzy Logic, PAK Dairy Company, Strategic Analysis, SWOT Model

1. Introduction

Today organizations are very sensitive to decision making since under tough and competitive conditions of the present markets, there is severe struggle over achieving and consuming the resources and generally, managing the resources. Decision making is a potential issue that may change the resources destiny for long term and involve general policies and macro strategies in the organizations will be vital and decisive. Decision scan affect the future of, for instance, the natural or human resources of a society and overshadow their future (Mirzaei Chaboki¹⁹).

PAK Dairy Company is not an exception in this case and despite being one of the primary country-based dairy products producing and supplying companies, established in 1959, it is facing major challenges competing with its competitors. After the Islamic Revolution, imposing some sanctions and selecting some foreign policies resulted in the organization's decline including cutting relationships with American and Canadian companies. It's worth mentioning that "PAK" brand has been engraved in Iranians' mind and those knowing products like the milk, cream and especially butter with this company but due to management problems in the past and making very

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incorrect decisions in the past history of this organization created competitive gap between PAK company and its competitors. With respect to having three subordinate companies called Sari-based PAKSAR, Shahrekord-based PAKPEY and Sanadaj-based PAKARA and having a very reputed brand, experienced personnel, being supported by the Foundation of the Oppressed, accessing large Tehran and Karaj markets and..., PAK Dairy Company is highly potential.

At the moment, regarding the current internal market conditions, some sanctions being lifted and some foreign policies getting changed, PAK has some strategies at hand that can improve its conditions by executing them. The strategies which are all efficient at the beginning but preserving their order and priority are very important since to execute some strategies is more vital and will influence the company's vital resources like human forces and financial resources.

One of the most important tasks of the management in every organization is decision making and the decisions prioritization for scheduling planning and resources allocation to operationalize those decisions. Most managers' decision making are under the effect of various qualitative and quantitative factors where in most cases these factors are conflicting and they try to choose the best alternative out of the existing ones. Mistake and inaccuracy in decision making involves cost of mistakes payment. The higher the management authority, the more the incorrect decision cost will be (Aghdasipour, 2002).

If you consider various management responsibilities such as planning, organizing, controlling and monitoring, leading and motivating, it is vividly observed that the key to all management activities is decision making. The decision maker can create a model of their desired system and then analyze different results from diverse decisions by using the model. Free from the real world decision making risk, we can adopt the most optimal decision. These models are verbal, graphic, visual, mathematical and deductive (Alvani¹).

PAK Dairy Company similar to many production units is struggling with some difficulties about decision making and the decisions prioritization. The decisions which can affect the company, its human force and resources in near or far future.

This study aims to prioritize PAK Company present strategies some of which will be pointed out: Investment in advertising, signing contracts with other companies, improving packaging and its matching with green

packaging discussion, increasing production volume, keeping exemplary staff, training the staff, exporting to neighboring countries, increasing production area and... Are the goals which may work out at first glance but the point as to which of these strategies has the potential to be executed regarding the current situation, the organization's potential and dairy products conditions is extremely significant. These strategies are the choices PAK Company senior managers have at hand and they have been considered given their indices and influencing factors.

By weighting the factors influencing these strategies, PAK Company middle and senior managers will help the strategies prioritization and finally, by utilizing FUZZY TOPSIS technique, it is possible to determine and prioritize the best solutions.

This research aims to formulate the best strategies employing SWOT analysis matrix for PAK Company regarding the current circumstances, then to prioritize these strategies using FUZZY TOPSIS model.

This study extracted results will be handed out to PAK Company middle and senior managers in order to apply them to improve the company decision making conditions at their discretion. It's worth stating that the models applied in this research can be changed and the decision makers are able to achieve their desired results by changing the model input. The combined method of SWOT strategic analysis matrix and FUZZY TOPSIS model has the potential to be applied in all organizations for decision making.

2. Literature Review

2.1 Strategy

Strategy refers to a model or plan consistently putting the main objectives, policies, the activities and procedures sequence in an interconnected set (Fard-ara, 2000).

2.2 Strategic Management

Strategic management is a sort of prospective, adaptable, creative and dynamic management. It is the sort of management exclusive for crisis period, rapid environmental changes period, social and political system structural transformation era, sudden and unpredictable developments, primary resources deficiency and crisis, environmental pollution and limitations, social, political and cultural turbulences (Asadi, Ali⁵).

Henry Mintzberg has generally classified strategic management into two categories he called the first of which as Prescriptive Schools and the second one Descriptive Schools. The first school assumes formal designing and predicting analytical measures for long-term objectives and the latter depends on timely action consistent with the current circumstances and is almost enforcing informal and ad hoc measures. Strategic management under the influence of Prescriptive Schools is defined as it follows:

Strategic management refers to regulating and organizing, executing and analyzing all measures and the operation empowering the organization to draw its future more accurately and vividly and meet the organization's objectives. Strategic management is a decision making opportunity able to link the external organizational environment opportunities and threats, where the value of each of these factors is clearly drawn in the objectives realization (Alan²). Observing the external organizational environment opportunities and threats and the organization's resources and capabilities, the strategy paves the ground for achieving the objectives (Leslie¹⁷). These sorts of strategies have the following specifications:

Strategy formation has to be a conscious process. The organization's leader is in charge of controlling and giving knowledge. This figure is the real organization strategist and leader not just a manager (Zaleznik²⁴). Strategic management under the effect of descriptive schools is as the following. Strategic management is focusing on thought and timely action not having a massive strategic program in your pocket (Bryson, John⁷). Compared with tactical and operational thinking, strategic thought and measure concentrates on interactions and the success of whole complex not a part of it. Strategic management is a measure and or executing a macro contingency and adaptive solution. As inference from the above definitions, emerging schools stress strategic thought and measure more than strategic planning. Emerging school doesn't consider long-term planning feasible under unpredictable circumstances. In fact, it can said that strategies are usually designed given the existing capabilities of the organization and strategy can be influenced by the factors such as organizational structure, technology and human resources structure as much as it affects them. Under the circumstances that the organizations and environmental conditions are constantly altering, strategies can't be followed as predetermined and certain since the organization's environment is under rapid transformation (Fred¹³). Strategic management process is based on this

belief that an organization has to continually consider the events and internal and external procedures to be able to exert timely changes. In this sense that the organizations shouldn't be satisfied with strategies formulation, rather they need to constantly monitor their internal and external environment and change their formulated strategies if necessary, or exert some alterations on their execution style (David, Fardara¹²).

2.3 Strategic Planning

Strategic planning refers to a set of theories, concepts, procedures and tools designed accompanied with supplementary tools and methods to help the managers and planners for thinking, planning and strategic measure (Dereli¹⁰ Stonehouse and Pemberton²¹).

In other words, strategic management can be defined as the present time prospective perspective and decision making considering future consequences (Hoogstrw, M and Schanz, H¹⁵).

Strategic planning is basically a game plan for a company. So in order to compete successfully, a company requires a decent strategy. A strategic planning results from difficult managerial options out of several good alternatives and indicates commitment to markets, certain policies and operations instead of adopting other practices with lower utility (David, Fardara¹²).

2.4 Strategic Analysis of an Organization

In the strategic analysis process of an organization, usually regarding the organization's objectives, missions, and perspective, the internal environment including the strengths, weaknesses and the external environment covering the opportunities and threats are investigated. The above information are usually obtained by organizational document, personal observation, interview and using questionnaire. The information helps the organization to be identified well and compared with its competitors and serves as a tool to get successful through setting up and selecting the proper strategies and ultimately, it will bring about the strategies implementation (Khodadad Hosseini, Azizi¹⁶).

2.5 SWOT Strategy Analysis Matrix

SWOT analysis matrix is of the most powerful strategic tools targeting to maximize the strengths and opportunities and on the other hand, to minimize the threats and weaknesses (Arslan and ER⁴).

SWOT matrix is of the most significant and widely

applied tool to identify and define an organization's strategies considering the internal environment's strengths and weaknesses and the external environment's opportunities and threats. In this method, each of the internal and external environment's factors has been determined and assigned scores and weights so that finally, the organization's score has been judged in the internal and external environment. The SWOT matrix is provided. In this matrix, considering to the strengths, weaknesses, opportunities and threats, four types of strategy are achieved:

- SO or Offensive Strategies: The strategies achieved by the strengths and opportunities. In these strategies, efforts are made to use the environmental opportunities in the best way possible regarding the strengths. Pursue opportunities that are a good fit to the company's strengths. Strategies that use strengths to maximize opportunities.
- WO or Conservative Strategies: These strategies are obtained by formulating the weaknesses and opportunities. In this strategy, it is tried to benefit from the opportunities at maximum to overcome the weaknesses. Overcome weaknesses to pursue opportunities. Strategies that minimize weaknesses by taking advantage of opportunities.
- ST or Competitive Strategies: Identify ways that the firm can use its strengths to reduce its vulnerability to external threats. Strategies that use strengths to minimize threats.
- WT or Defensive Strategies: The strategies gained via formulating the weaknesses and threats. These strategies are mainly defensive and are applied to minimize the weaknesses and avoid the threats. Establish a defensive plan to prevent the firm's weaknesses from making it highly susceptible to external threats. Strategies that minimize weaknesses and avoid threats (Amini Khabaz Babil³) (Khodadad Hosseini, Azizi¹⁶).

3. Fuzzy Logic

The problems human deals with in reality are usually accompanied with a sort of ambiguity and uncertainty resulting in their complexity. In order to be analyzed completely, a subject has to contain sufficient and accurate information. But facing complicated problems in the real world, human analyzes their nature approximately. In this respect, Professor Lotf-Ali Asgarzade, the founder of logic and fuzzy sets, has stated:

"As the knowledge about a system increases, that

system's complexity declines and its perception and analysis rise. When the system's complexity decreases, the modeling method's accuracy increases and provides a useful tool for the system analysis"

For the systems with less complexity, since their uncertainty is low, it is possible to model and analyze their behavior accurately by applying mathematical relations. While if the system gets somewhat complicated, uncertainty goes up. In this state, getting an accurate analysis is impossible. To analyze this kind of systems appropriately, Fuzzy Logic Approach is employed (Tanaka, Kazuo²³).

Fuzzy theory contributes in removing the ambiguities in the decision makers' linguistic expressions. Also Fuzzy theory is highly suitable for varying and incomparable conditions (Semith Soner Kara and Isik²⁰).

3.1 Fuzzy Thinking

Science has always been accompanied with a mistake, the mistake all scientists have probably made. Based on the basics and principles of science, everything is subject to a fixed rule where due to these basics, that thing is true or false (Azar, Mir Fakhredini, Pour-hamidi⁶).

Since the time human started thinking, he has constantly spoke of some expressions having no clear borders. Words like "good", "bad", "young", "old", "tall", "short", "strong", "weak", "hot", "cold", "happy", "intelligent", "beautiful" and some adverbs such as "usually", "often", "almost" and "rarely". It is vivid that no certain border can be found for these words (Casco⁸).

In traditional logic based sciences, every proposition is true or false. Real phenomena are either "white" or "black". This belief in blacks and whites, zeros and ones and this divalent system dates back at least to the ancient Greece or Aristotle (Taheri, Mahmoud²²).

3.2 FUZZY TOPSIS Model

Classical FUZZY TOPSIS model was proposed by Hwan and Yoon in 1981. Based on this model, each problem is of MADM type with (m) alternatives analyzed by (n) indices that can be taken as a "geometric system" including (m) points in (n) dimensional space. FUZZY TOPSIS model also was coined by Hwang and Chen in 1992. In this model, decision making matrix and weights are defined as fuzzy numbers and similar to classical FUZZY TOPSIS, performed based on distance from the positive and negative ranking ideal. In this technique, the factors influencing the alternatives are chosen and their

effect level or their significance is determined based on the linguistic variables converted into numbers by their own related technique.

The alternatives' significance level is defined in the same manner. FUZZY TOPSIS model has been based on this concept that the selected alternative has the least distance from the positive ideal solution (the best possible mode) and the most distance from the negative ideal solution (the worst possible mode). It's assumed that each index utility is steadily ascending (or descending). In this sense that the higher the , the more the utility and vice versa (Casco⁸).

Step 1: Decision matrix formation

Step 2: Criteria weight matrix determination

If the triangular fuzzy numbers are used, each of the components (the weight of each criterion) will be defined as the following:

$$W_j = (W_{j1}, W_{j2}, W_{j3}) \quad (1)$$

If the decision making committee has (k) elements and the decision maker's (k)th significance factor equals:

$$W_{jk} = (W_{jk1}, W_{jk2}, W_{jk3}) \quad (2)$$

For $j = (1, 2, \dots, m)$,

The combined fuzzy ranking

$W_j = (W_{j1}, W_{j2}, W_{j3})$ Can be achieved by the following equations:

$$\begin{aligned} W_{j1} &= \min(W_{jk1}) \\ W_{j2} &= \frac{1}{k} \sum_{e=1}^k W_{jke2} \\ W_{j3} &= \max(W_{jk3}) \end{aligned} \quad (3)$$

Step 3: Fuzzy decision matrix normalization:

$$r_{ij} = \left(\frac{a_{ij}}{c_j^*}, \frac{b_{ij}}{c_j^*}, \frac{c_{ij}}{c_j^*} \right) \quad (4)$$

Step 4: Weighted normalized fuzzy decision matrix determination

Regarding various criteria's weight, the weighted normalized fuzzy decision matrix is obtained via multiplying each criterion's significance factor by the

fuzzy normalized matrix as it follows:

$$v_{ij} = r_{ij} \times w_j \quad (5)$$

Where w_j indicates the significance factor of criterion c_j .

If fuzzy numbers are triangular, for positive and negative criteria, we will have the following:

$$\begin{aligned} v_{ij} &= r_{ij} \times w_j = \left(\frac{a_{ij}}{c_j^*}, \frac{b_{ij}}{c_j^*}, \frac{c_{ij}}{c_j^*} \right) \times (w_{j1}, w_{j2}, w_{j3}) \\ v_{ij} &= r_{ij} \times w_j = \left(\frac{a_j^-}{c_{ij}}, \frac{a_j^-}{c_{ij}}, \frac{a_j^-}{c_{ij}} \right) \times (w_{j1}, w_{j2}, w_{j3}) \end{aligned} \quad (6)$$

Step 5: Finding Fuzzy Positive Ideal Solution (FPIS, A^*) and Fuzzy Negative Ideal Solution (FNIS, A^-).

$$A^* = \{v_1^*, v_2^*, v_3^*\} \quad (7)$$

$$A^- = \{v_1^-, v_2^-, v_3^-\}$$

Fuzzy Positive Ideal Solution and Fuzzy Negative Ideal Solution introduced by Chen are as it follows:

$$\begin{aligned} v_j^* &= (1, 1, 1) \\ v_j^- &= (0, 0, 0) \end{aligned} \quad (8)$$

Step 6: Distance from Fuzzy Positive Ideal Solution and Fuzzy Negative Ideal Solution:

$$\begin{aligned} S_j^+ &= \sum_{i=1}^n d(v_{ij}, v_j^*) \quad i = 1, 2, \dots, m \\ S_j^- &= \sum_{i=1}^n d(v_{ij}, v_j^-) \quad i = 1, 2, \dots, m \end{aligned} \quad (9)$$

d_{ij}^+, d_{ij}^- Stand for S_j^+, S_j^-, S_{ij} distance, respectively, computed by the following formulas:

$$(M_1, M_2) = \sqrt{\frac{1}{3}[(a_1 - a_2)^2 + (b_1 - b_2)^2 + (c_1 - c_2)^2]} \quad (10)$$

It is noted that $d(M_1, M_2)$ is a certain number.

Step 7: Calculate the closeness coefficient

$$C_i^* = \frac{C_i^-}{C_i^+ + C_i^-} \quad i = 1, 2, \dots, m \quad (11)$$

Step 8: Alternative ranking (Ataee, 2009).

4. Linguistic Variables for Criteria and Alternatives Weighting

For weighting the alternatives and the factors influencing the alternatives, the method proposed by Chen in the paper titled “Fuzzy Sets and Systems” in 2000, has been employed (Chen, Chen-Tung⁹).

To determine the alternatives’ significance, Chen used the following table included fuzzy numbers:

Table 1. Linguistic variables for alternatives significance ranking

Fuzzy numbers	Symbol	Linguistic variables
(0,0,0.1)	VL	Very low
(0,0.1,0.3)	L	Low
(0.1,0.3,0.5)	ML	Medium low
(0.3,0.5,0.7)	M	Medium
(0.5,0.7,0.9)	MH	Medium high
(0.7,0.9,1.0)	H	high
(0.9,1.0,1.0)	VH	Very high

Table 2. Linguistic variables for Criteria significance ranking

Fuzzy numbers	Symbol	Linguistic variables
(0,0,1)	VP	Very poor
(0,1,3)	P	Poor
(1,3,5)	MP	Medium poor
(3,5,7)	F	Fair
(5,7,9)	MG	Medium good
(7,9,10)	G	Good
(9,10,10)	VG	Very good

Besides, he proposed the fuzzy numbers inserted in the following table for determining the indices significance:

5. Methods

Generally, the study aims to formulate the most suitable strategies for PAK Dairy Company and to prioritize the strategies. For this, first, the internal environment’s strengths and weaknesses and the external environment’s opportunities and threats are discovered via interviewing and consulting with PAK Company middle and senior managers and each one of the influencing factors is assigned the weight and score. Then the strategies consistent with each of the factors influencing SWOT

matrix framework will be determined. Following that, the decision makers are asked to set the factors affecting their desired strategies. Defining the influencing factors is essential in order to employ FUZZY TOPSIS algorithm since in fact the strategies are the same alternatives and factors affecting the strategies implementation, i.e., FUZZY TOPSIS model criteria. With respect to this issue that in this study all the variables, criteria and alternatives are qualitative, it has been tried to use fuzzy logic for solving this problem. Thus this study model is a mathematical one, too. Finally, by choosing the appropriate linguistic variables’ fuzzy numbers, a form of fuzzy numbers and linguistic variables is provided and the decision makers are asked to weigh up the significance of each of the criteria and alternatives under the influence of the criteria using the linguistic variables.

First off, by applying PAK Dairy Company middle and senior managers’ observation, personal experiences, consultation and confirmation, the internal environment’s strengths and weaknesses, and the external environment’s opportunities and threats of the organization have been outlined. Then regarding the defined SWOTs, their related strategies and their influencing factors have been determined. In the next step, the decision makers have been asked to score each of the strategies and their influencing factors based on the linguistic variables. At last, using FUZZY TOPSIS algorithm, the strategies have been prioritized and the strategies with minimum distance from the positive ideal solution and maximum distance from the negative ideal solution have been identified as the best priority (the first priority) and the alternative with maximum distance from the positive ideal and the minimum distance from the negative ideal will be the worst alternative. Similarly, all the strategies will be prioritized.

6. Study Statistical Community PAK Dairy Company History

Following Iran Islamic Revolution Victory in 1978, pursuant to the government’s policies, PAK Company cut its relationships with American and Canadian companies. Then in 1997, it purchased three domestic and foreign companies called “PAKPEY” in Shahrekord, “PAKARA” in Sanadaj and “PAK SAMAN” in Tajikistan, and became the possession of PAK Company in 1997. “Mazandaran based Milk and Meat Complex” company in Sari was bought in 1998, later changed to “PAKSAR”.

This study statistical community consists of PAK Company middle and senior managers and all study steps have been carried out via consulting, interviewing with and being directed by them.

7. Data Collection and Analysis

The data have been gathered by observation, personal interview and consultation with PAK Company middle and senior managers and the Internet network. Two models as SWOT strategic analysis matrix and FUZZY TOPSIS mathematical model have been employed to analyze the data.

8. Strategic Analysis Steps

8.1 Mission

Mission refers to an organization's existential reason or objective. Mission involves organizational philosophy, too. Organizational philosophy refers to the philosophical beliefs, values, goals and priorities to which the strategic decision maker is committed. The mission of an organization encompasses an organization's existential philosophy or purpose, audiences and customers and it can include the scope of activity, product or service types, the applied technologies, the obligations and responsibilities of the organization to the society and stakeholders and the existential philosophy of the organization committed to them. To identify the customers, their needs and how to respond to them is part of the organization's mission. Mission stands for the organization's values and priorities and to put simply, the organization's mission deals with the reason or reasons it has been developed for that organization (Khodadad Hossini, Azizi¹⁶).

Therefore, the mission of PAK Company will be described this way: To create and develop dairy industries, to design and produce healthy and various dairy products leading to the country community food health improvement, employment and business booming, investment and participation in various projects.

8.2 Vision

Vision indicates the future business position. Vision displays how the organization's far future position is. In simpler words, vision means: "A realistic, certainly realized and appealing future, clearly stated, the

destination the organization has to move towards". Mission describes the organization's current status and vision displays the condition the organization will have in future. The organization's vision is a written or oral statement formulated by the most senior management of the organization. This statement reveals the management's perception of the organization's optimal future and shows that it has to be performed in order to build the organization's future and make its vision realized. The vision statement inspires the personnel's activities through presenting a positive and motivating future image of the organization and focusing on the management's strong belief in the mentioned future realization (Khodadad Hossini, Azizi¹⁶). This way, PAK Company vision has been depicted: To be converted into dairy and ice-cream products market leader, to increase export to the neighboring countries, to penetrate in the consumers' mind and heart as they get to consume various products.

8.3 Objectives

Objectives are the final results of the planned activities and state what is done at what time. To achieve the organization's objectives meets the organization's mission (Khodadad Hossini, Azizi¹⁶).

Thus the objectives of PAK Company will be this way: To increase internal market share, to raise daily received raw milk, to increase production tonnage, to design and produce various products, to produce the products with minimum waste and returned products from the market.

8.4 Goal

The term objective shouldn't be mistaken with goal. Goal refers to an unlimited statement about the thing a person wants to get without quantification and considering time criterion. For instance, the term profitability is a goal not an objective (Khodadad Hossini, Azizi¹⁶).

The goals of PAK Company are illustrated this way: To decrease costs and to increase profitability, to promote PAK brand reputation, to enhance the personnel's job security and welfare and to participate in social health plans.

9. Discussion

9.1 SWOT Strategic Analysis

PAK Company strategic analysis process starts with

identifying the internal environment's influencing factors such as the strengths and weaknesses and the external environment's influencing factors including the opportunities and threats and after evaluating and weighing those factors, two matrices termed the Internal Factors Evaluation Matrix (IFE) and External Factors Evaluation Matrix (EFE) will be gained. Then we deal with formulating the strategies in SWOT strategic analysis matrix. Ultimately, by FUZZY TOPSIS model, it will be defined which of the formulated strategies is of priority.

9.1.1 Internal Factors Evaluation (IFE)

Internal Factors Evaluation (IFE) is for the organization's internal factors strategic analysis. This matrix formulates and evaluates the main strengths and weaknesses of the organization's functional units and also introduces some strategies to identify and evaluate the relationships between these units.

This matrix develops in five steps as the following:

- After getting the strengths and weaknesses, these factors will be written in order.
- Each of the strengths and weaknesses will be assigned coefficient from zero (insignificant) to one (very significant). Each factor's coefficient indicates that factor's relative significance in the company getting successful in the industry. The sum of these coefficients equals 1.
- Each of the factors is given a score from 1 to 4. Score 1 implies the basic weakness, 2 low weakness, 3 stands for strength and 4 very high strength of the desired factor. It's worth mentioning that score 1 and 2 are for weaknesses and scores 3 and 4 are for strengths.
- Each factor's coefficient is multiplied by that coefficient's score.
- The final scores sum of each factor is calculated to set the organization's final score. If the organization's final score is less than 2.5, it is inferred that the organization is weak in terms of the internal factors. If its final score is more than 2.5, the organization is strong regarding the internal factors (Mintzberg and Quinn¹⁸).

Table 3.

Row	Strengths	Weight	Factors score	Weighted score
1	Low hierarchy	0.01	3	0.03
2	Modern equipment	0.05	3	0.15
3	High financial potential	0.07	4	0.28
4	Suitable geographic position	0.04	4	0.16
5	High quality of two products as cream and butter	0.04	4	0.16
6	Not using preservatives in the products	0.02	4	0.08
7	Having branches in Sanadaj, Shahre Kord and Sari	0.04	3	0.12
8	Neighboring Tehran and Karaj markets	0.04	3	0.12
9	Job stability and on time payment	0.03	3	0.09
10	Accessing the resources	0.05	3	0.15
11	Active R and D department	0.04	3	0.12
12	Very reputable brand and long history	0.07	4	0.28
Row	Weaknesses	Weight	Factor score	Weighted score
1	Lack of major stakeholder and inconsistent decision making	0.03	2	0.06
2	Plant small space	0.05	2	0.1
3	Lack of motivation in the personnel	0.04	1	0.04
4	Lack of variety in the products	0.03	1	0.03
5	Instable management team	0.04	2	0.08
6	Lack of monitoring the personnel's performance	0.03	1	0.03
7	Few suppliers	0.03	2	0.06
8	Poor communication between the customers and shopkeepers	0.03	1	0.03
9	Lack of study about the market	0.02	1	0.02
10	Lack of advertisement	0.04	1	0.04
11	Undesirable packaging	0.03	1	0.03
12	Lack of training the human resources	0.02	2	0.04
13	Low received raw milk	0.03	1	0.03
14	Low production capacity	0.04	2	0.08
15	Poor accounting system	0.04	1	0.04
Total sum		2.45		1.00

The above table demonstrates that the final score of the strengths and weaknesses has been 2.45 indicating weakness in the internal factors.

9.1.2 External Factors Evaluation Matrix (EFE)

To evaluate the external factors, EFE matrix has been employed. The steps to work with this matrix are similar to IFE matrix except that this time the opportunities and threats are listed. Another difference is the concept of scoring the factors. In this matrix, like IFE matrix, the factors are given scores 1-4 so that these scores denote the organization's reaction to the related factor. Score 4 stands for the organization's excellent reaction to the question factor. Score 3 implies lower than average reaction, score 2 indicates average reaction and score 1 displays poor reaction of the organization to that factor. The mean

final scores sum is 2.5. If this mean gets 4, that means the organization has reacted excellently to external factors. Score 1 means the organization wasn't able to benefit from the existing opportunities and or avoid the factors threatening it (Mintzberg and Quinn¹⁸).

The above table shows that score 2.33 has been obtained for the external factors indicating that PAK Company couldn't act well against the external factors. To sum up, it means the organization couldn't benefit from the factors creating opportunities or avoid the threatening factors.

10. SWOT Matrix

After analyzing PAK Company's internal and external environment, applying the strengths and weaknesses, taking the opportunities and avoiding the threats,

Table 4.

Row	Opportunities	Weight	Factor score	weighted score
1	Branding	0.09	4	0.36
2	Export to the neighboring countries	0.04	3	0.12
3	High domestic market capacity	0.05	3	0.15
4	The culture of dietary products consumption	0.02	3	0.06
5	Using attractive packaging	0.06	3	0.18
6	Green industry consistent packaging	0.04	3	0.12
7	Advertisement	0.05	3	0.15
8	Offering services to customers and shopkeepers	0.05	3	0.15
9	Producing non-dairy products	0.05	3	0.15
10	Attending food industries and packaging conventions and fairs	0.04	3	0.12
11	Some sanctions get lifted	0.05	4	0.20
Row	Threats	Weight	Factor score	Weighted score
1	Extensive advertisement by the competitors	0.05	1	0.05
2	The competitors rapid advancement and variety creation	0.07	1	0.07
3	New competitors entering the market	0.04	1	0.04
4	The competitors recruiting efficient forces	0.03	1	0.03
5	Inflation	0.08	2	0.16
6	Foreign investors entering the domestic markets	0.04	1	0.04
7	Rating limitation	0.03	1	0.03
8	Sanction	0.06	1	0.06
9	Importing some raw material from abroad and decreasing domestic suppliers	0.03	2	0.06
10	Exchange currency rate increase	0.03	1	0.03
Total sum		1.00		2.23

Table 5.

Internal Factors	Strengths 1. Few hierarchy 2. Modern equipment 3. High financial potential 4. Suitable geographic location 5. High quality cream and butter 6. Not using preservatives in the products 7. With branches in Sanadaj, Share Kord and Sari 8. Adjcent to Tehran and Karaj markets 9. Job stability and on time payment 10. Accessing the resources 11. Active R and D department 12. Very reputable brand and long history	Weaknesses 1. Lack of major shareholder and decision making turbulence 2. Small plant space 3. Lack of motivation in the personnel 4. Lack of variety in the products 5. Instability in management team 6. Not monitoring the personnel's performance 7. Few suppliers 8. Poor communication between the customers and shopkeepers 9. No study about the market 10. No advertisement 11. Unfavorable packaging 12. Lack of human resources training 13. Low received raw milk 14. Low production capacity 15. Poor accounting system
External Factors		
Opportunities 1. Branding 2. Export to the neighboring countries 3. High domestic market capacity 4. The culture of dietary products' consumption 5. Using attractive packaging 6. Green industry consistent packaging 7. Advertisement 8. Offering services to customers and shopkeepers 9. Producing non-dairy products 10. Attending food industries and packaging conventions and fairs 11. Some sanctions get lifted	SO Strategies 1. Ads on not using preservatives and branding (S3,S6,O7) 2. Delivering or producing cream and butter by subordinate companies or the main company to the domestic and foreign markets (S5,S7,O2,O3) 3. Producing dietary products (S11,O4) 4. Promoting packaging quality (S3,O5,O6) 5. Allocating budget for offering services to the customers and shopkeepers (S3,O8) 6. Coopearing and communicating with foreign companies (S2,S3,S5,O11)	WO Strategies 1. Motivating the personnel and deploying human resources and appropriate salary and compensation system (W3, O1) 2. Producing non-dairy products(W4, O4, O9) 3. Selecting green industry matching packaging(W11, O5, O6) 4. Deploying inventory control system(W2,W14,O3) 5. Transferring the plant to wider environment (W2, W13, W14, O3) 6. Deploying proper accounting systems such as ABC(W15, O11)
Threats 1. Extensive ads by the competitors 2. The competitors ' rapid advancement and variety creation 3. New competitors entering the market 4. Efficient forces recruitment by the competitors 5. Inflation 6. Foreign investors entering the domestic market 7. Limited rating 8. Sanction 9. Importing some raw material from abroad and reducing domestic suppliers 10. Currency rate increase	ST Strategies 1. Choosing proper pricing methods to fight against new competitors (S3, S8, T3) 2. Deploying knowledge management system to keep the creative, talented and interested personnel and planning the personnel training program (S3, S9, T4) 3. Deploying supply chain management (SCM) system (S3, T9)	WT Strategies 1. Increasing area and building production halls for raising the production (W2, T2, T3) 2. Increasing the received raw milk to raise tonnage (W13, T2) 3. Signing contracts with several suppliers (W7, T2, T3) 4. Privatizing to improve management and decision making (W1, W5, T2, T3) 5. Cooperating with reputable companies for covering the weaknesses and achieving competitive advantage (W2,W4,T2,T3)

PAK Company strategies have been achieved by this organization's authorities and decision makers. The matrix below depicts the formulated strategies.

11. Results

11.1 Determining Factors Affecting Strategies Implementation

After consulting and interviewing with PAK Company's middle and senior managers, ten factors affecting the selected strategies implementation have been determined. The first five factors are negative-oriented and the other five ones are positive-oriented. The factors influencing PAK Company's strategies implementation are as it follows:

Cost, technology and equipment, specialist human force, infrastructures, execution time, being compatible and aligned with the company objectives, affecting the operations and process improvement, affecting the stakeholders' satisfaction, including the business partners and shareholders, the effect on personnel satisfaction and the effect on the customers' satisfaction, these factors will virtually be FUZZYTOPSIS model criteria.

11.2 FUZZYTOPSIS Model Solution

Solving FUZZYTOPSIS Model has been carried out using FUZZYTOPSIS Solver 2014 software and the alternatives final ranking is as the following:

12. Discussion

In order to boost an organization's status, it is necessary to consider short-term, mid-term and long-term planning and get to design, schedule, implement, and monitor and modify the organization's executive plans via meticulous expertise. In the next step, the plans are prioritized for implementation and then they are executed. After that, the achieved results and the current status are compared with the previous condition of the organization to determine the progress or regress percent and level. Applying this study derived results, we can observe the strategies prioritization concerning the factors influencing them and in order to implement the strategies, some measures such as scheduling and financial planning and etc. have to be done. Some suggestions have been made about the prioritized strategies as such:

- To promote the products packaging: To update and

Table 6.

Strategies	Closeness Index
Packaging quality promotion	0.47294
Cooperating and communicating with foreign companies	0.46691
Advertising about not using preservatives and branding	0.44808
Selecting green industry matching packaging	0.44734
Producing non-dairy products	0.43916
Selecting suitable pricing methods to fight against new competitors	0.43685
Motivating the personnel and deploying human resources and proper salary and compensation system	0.43459
Privatizing in order to enhance management and decision making	0.41760
Cooperating with reputable dairy industries related companies to cover the weaknesses and achieve the competitive advantage	0.40570
Allocating budget for offering services to the customers and shopkeepers	0.40349
Producing dietary products	0.40331
Signing contracts with several suppliers	0.36787
Increasing daily received raw milk to raise production tonnage	0.36017
Deploying supply chain management (SCM) system	0.35617
Transferring the plant to a wider environment	0.33263
Producing cream and butter by the subordinate companies or the main one throughout the domestic market and exporting to foreign market	0.32853
Deploying knowledge management system to keep the exemplary personnel, recruit creative, talented and interested personnel and plan training program for the personnel	0.32596
Increasing the area and building production halls to raise production	0.29998
Deploying inventory control systems	0.29212
Deploying proper accounting systems such as Active Based Cost (ABC)	0.26981

design new packaging is very critical since the customers' first contact with the company products is by observing the packaged product's appearance.

- To cooperate and communicate with foreign companies: In dairy industry, the companies in some countries like Germany, Denmark, Australia, the US and... are equipped with the most up-to-the science and communicating with them can lead to remarkable scientific sources advancement such as the most novel production methods and formulation in this area.
- To advertise not using preservatives and branding: Using very powerful brand and logo, PAK Company can easily regain its reputation in the domestic market and get well-known once more. Also to set forth not using preservatives in the products can serve as a positive issue in the advertisement for this company.
- To choose packaging consistent with green industry: Today, regarding the empowerment of the environmentalist organizations, the industry has to move towards the green industry. Choosing green industry matching packaging is a matter few organizations in the country have particularly focused on.
- To produce non-dairy products: With respect to their financial status, technological equipment and organizational knowledge, the companies are going to produce some products though irrelevant to their activity field. Producing non-dairy beverages like kinds of juice or cola can be a good example.
- To pick up proper pricing methods to fight against the new competitors: Besides considering the defined issues, in the pricing process, this matter should be taken into account that the customers often don't consider price very important but it happens when the company can present valuable products and services, this is the time when the customers are motivated to get valuable products and services even at high cost.
- To motivate the personnel and to deploy human resources system and fair salary and compensation system: The biggest capital of every organization is its human force. Thus there should be a highly codified plan for the human force salary and compensation system and even non-financial methods have to be applied. To give them opportunity to reveal their talent, to challenge, to pose the personnel some questions, to assign responsibility and decision making power, to offer them easy leave, to monitor performance, to let the personnel design their workplace as they desire.
- To privatize in order to enhance management and decision making: Currently, the Foundation of the Oppressed and other shareholders are in charge of selecting PAK Company directing manager for a limited period of time which brings about some nuisances including lack of recognizing the internal and external environment of the organization for short term, lack of job stability for the directing manager, lack of motivation, frustration, lack of determination and...., as incorrect governmental management consequences.
- To cooperate with reputable companies in dairy industry to cover their weaknesses and gain competitive advantage: In order to obtain competitive advantage, they can cooperate and sign contracts with reputable companies in this field. Also they can cooperate through merging and diversifying with various companies that can involve horizontal and vertical, forward or backward merging.
- To allocate budget for offering services to customers and shopkeepers: To observe customers' rights is of the current world hot topics. To offer special privileges to the communication channels and support them will be highly effective.
- To produce dietary products: The life style today that involves physical inactivity and fat, sugar and high calorie intake out of unhealthy food stuff has resulted in the consumers resorting to dietary and low fat products.
- To sign contracts with several suppliers: Signing contracts with few suppliers will lead to some problems by the suppliers for the organization.
- To raise daily received raw milk in order to increase production tonnage: Increasing daily received raw milk will raise production tonnage.
- To deploy supply chain management system: Supply chain refers to the set of factors creating added value in economy. This way the company will succeed to market its product and lower waste costs and production time.
- To transfer the plant to a wider environment: Having a broader environment will significantly help production tonnage raise and facilitate other units' tasks such as transportation, export, sales, technical units and etc.
- To produce cream and butter by the subordinate companies or the main one throughout the domestic market and export to foreign markets: Enjoying these two very important advantages can lead the company towards profit making increase and expanding its activity in the domestic markets and the Middle East.
- To deploy knowledge management system in order to keep the exemplary personnel, to recruit creative, talented and interested staff and to plan the personnel training program: Knowledge management includes all methods by which the organization manages its

knowledge assets. That is how to collect, save, transfer, apply, update and create knowledge. Implementing this method can save, upgrade and increase all personnel's experience and knowledge and transfer them to the fresh staff.

- To increase the area and build production halls or make production halls, resulting in production tonnage rise that can greatly affect the advancement of this company.
- To establish the inventory control systems: Planning and controlling the material and goods in order to maintain the inventory at optimal level aiming to meet the customers' demand so that total systems cost gets minimized and or the profit gets maximized.
- To deploy proper accounting systems such as ABC: Rapid transformation in the world production industries includes intense competition in the world markets, technology innovations and computer systems progress. These transformations have caused the companies with the potential to coordinate their operations with the new conditions turning them into world successful companies and the companies lacking such potential have exited the competitive market.

13. Conclusion

The mathematical model employed in this study can be applied in other studies with the subject dealing with prioritizing and ranking. Also the aforementioned FUZZY TOPSIS problems solution software can be used to facilitate the computation. Formulation in Excel program can facilitate FUZZY TOPSIS computation.

Besides, in mathematical modeling, it is preferred to utilize all effective factors and parameters and of course, with accurate data as the input data because the model output will be estimated based on its input, thus the better model input is selected and the more accurate and up-to-date their data, the more optimal and acceptable the model output will be. Therefore, simplifying the model and ignoring some of these influencing factors should be avoided. It has to be noticed that human plays the role as the main determinant in decision making and if the model be based on and approach the decision makers' views as much as possible, a better model and output will be achieved. Among this, using fuzzy logic is highly applicable in such problems since it makes the model get close to reality.

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