# Proposing a Framework for Strategic Positioning in Tile and Ceramic Industry (Integrated Approach)

Ahmad Jafarnejad Chaghooshi [1], Mohammad Rahmani [2], Mohammad Karimi Zarchi [3]

[1] Professor, Department of Management, University of Tehran, Tehran, Iran
[2] Assistant Professor, Department of Management, University of Tehran, Tehran, Iran
[3]M.S. Candidate of Industrial Management, University of Tehran, Tehran, Iran
E-mail: Mohammad.karimi@ut.ac.ir

**Abstract**: This paper is proposing a comprehensive framework for the strategic positioning of companies in competitive markets. In this paper, we use the combination of qualitative and quantitative methods for the strategic positioning.At first, the most influential internal and external elements were detected with the help of the techniques of strategy formulation. Using the Strengths, Weaknesses, Opportunities and Threats (SWOT) matrix, we formulated the primary organizational strategies. Then, the Decision Making Trial and Evaluation Laboratory (DEMATEL) is used for obtaining the existing relations between SWOT. After obtaining the relationship between the SWOT, Using analytic network process (ANP) and Formation of super-matrix, weights (SWOT) are obtained. In next step, TOPSIS is used to obtain the score of each strategy. Finally, we will adapt strategies with SPACE matrix postures and put them in the matrix According to scores.Additionally, an empirical study is presented to illustrate the application of the proposed method.
[Ahmad Jafarnejad Chaghooshi, Mohammad Rahmani, Mohammad Karimi Zarchi. **Proposing a Framework for Strategic Positioning in Tile and Ceramic Industry (Integrated Approach).** J Am Sci 2012;8(6):91-99]. (ISSN: 1545-1003). http://www.sciencepub.net/american. 11

**Keywords**: Strategic Planning, Strategic Positioning, SWOT, MCDM, SPACE matrix

## 1. Introduction

Strategic management can be understood as the collection of decisions and actions taken by business management, in consultation with all levels within the organization, to determine the long-term activities of the organization (Houben et al., 1999). Many approaches and techniques can be used to analyze strategic cases in the strategic management process (Dincer, 2004). Important ways in Strategy formulation can be classified in three-step decision framework. Tools or methods presented in this framework are suitable for a variety of organizations and help strategies that identify, evaluate and choose strategists. The first phase strategy includes internal factors evaluation matrix (IFE), external factors evaluation matrix (EFE) and the matrix of competition (CPM). In the first stage that is called input stage, the main information needed to develop strategies is determined. Evaluation matrix of internal factors, formulate and evaluate strengths and weaknesses of carpet industry. Evaluation matrix of external factors and the matrix of competition identified and evaluated the main external factors, environmental opportunities and threats (Lee, 2008). The next step, pay attention to the types of strategies and want to establish a kind of balance among the main causes of domestic and foreign industry. Methods or tools in the second stage are used as follows: threats, opportunities, weaknesses and strengths (SWOT) Matrix, Strategic Position and Action Evaluation Matrix (SPACE), Boston Consulting Group Matrix (BCG), internal and external factors (IE) Matrix and the general strategy matrix (GSM). The third stage is called decision making stage that evaluates strategies derived from the previous steps. Among them, Strengths, Weaknesses, Opportunities and Threats (SWOT) analysis, which evaluates the opportunities, threats, strengths and weaknesses of an organization, is the most common (Hill and Westbrook, 1999). When used properly, SWOT can provide a good basis for strategy formulation (Kajanus et al., 2004). However, SWOT analysis is not without weaknesses in the measurement and evaluation steps (Hill and Westbrook, 1999). In conventional SWOT analysis, the magnitude of the factors is not quantified to determine the effect of each factor on the proposed plan or strategy (Masozera, 2006). In other words, SWOT analysis does not provide an analytical means to determine the relative importanceof the factors, or the ability to assess the appropriateness of decision alternatives based on these factors ( Kajanus et al., 2004). in other hand, The original SPACE model includes generic items that identify factors that determine responsiveness and positioning based upon such conventional strategic frame works as: the Boston Consulting Group (BGC) approach, Scenario Planning (Jeannet & Hennessey, 1992), McKinsey's Industry's Attractiveness/Company Strength Matrix.

In this paper, we use SWOT and SPACE matrix for strategic positioning. The combination of these two methods with the MCDM techniques presents a

suitable framework for determining company's strategic position and selecting the best strategies.

## 2. Research methodology

This research in terms of objective is practical and in terms of methods is descriptive and analytical and the branch of case study. For gathering data, both library and field methods are used. For writing literature, library techniques, scientific journals and databases are used. But the main data has been gathered through interviews with senior managers and experts of company that manufactures tile. To measure the validity, the same questionnaires in other studies were used. Various stages of research and data analysis are shown in Fig 1.

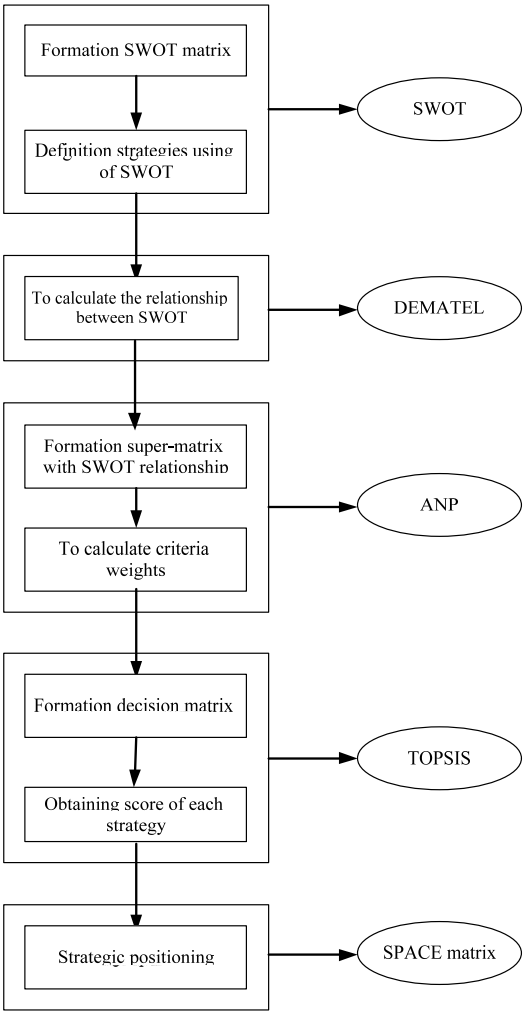



**Fig 1:** Schematic diagram of the proposed model

### 2.1. SWOT analysis

SWOT analysis is an important support tool for decision-making, and is commonly used as a means to systematically analyze an organization's internal and external environments (Kangas and Kurtila, 2003).By identifying its strengths, weaknesses, opportunities, and threats, the organization can build strategies upon its strengths, eliminate its weaknesses, and exploit its opportunities or use them to counter the threats. The strengths and weaknesses are identified by an internal environment appraisal while the opportunities and threats are identified by an external environment appraisal (Dyson, 2004).SWOT analysis summarizes the most important internal and external factors that may affect the organization's future, which are referred to as strategic factors (Kangas and Kurtila, 2003). The external and internal environments consist of variables which are outside and inside the organization, respectively. The organization's management has no short-term effect on either type of variable (Houben and Lenie, 1999). The obtained information can be systematically represented in a matrix; different combinations of the four factors from the matrix (Houben and Lenie, 1999) can aid in determination of strategies for long-term progress. When used properly, SWOT can provide a good basis for strategy formulation (Kangas and Kurtila, 2003). According to Table 1, SWOT matrix offers four types of strategies.

Table 1.SWOT matrix

| Internal factors / External factors | Strengths (S) | Weaknesses (W) |
|---|---|---|
| Opportunities (O) | SO Strategies | WO Strategies |
| Threats (T) | ST Strategies | WT Strategies |

SO strategies: Using the internal strengths and external opportunities will be determined
WO strategies: Use of external opportunities, internal weaknesses can be reduced or eliminated
ST strategies: Using internal strengths, external threats reduced or be removed
WT strategies: Decreases the internal weaknesses and external threats are avoided

For the preparation of SWOT Matrix, six steps must be passed:

1. Preparing a list of major opportunities and threats external environment organizations using PESTEL, Porter Five Forces Competitive models.
2. Prepare a list of the major strengths and weaknesses within the organization using the Porter value chain, EFQM, BSC models.
3. Compared to internal strengths with external opportunities and determining SO strategies.
4. Compared to the internal weaknesses with external opportunities and determining WO strategies

5. Compared to internal strengths and external threats and determining ST strategies
6. Reducing internal weaknesses and avoiding external threats

**2.2. The Decision Making Trial and Evaluation Laboratory (DEMATEL)**

All factors in a complex system may be either directly or indirectly related; therefore, it is difficult for a decision maker to evaluate a single effect from a single factor while avoiding interference from the rest of the system (Liou et al., 2007). In addition, an interdependent system may result in passive positioning; for example, a system with a clear hierarchical structure may give rise to linear activity with no dependence or feedback, which may cause problems distinct from those found in non-hierarchical systems (Tzeng, Chiang, & Li, 2007).

To avoid such problems, the Battelle Geneva Institute created DEMATEL in order to solve difficult problems that mainly involve interactive man-model techniques as well as to measure qualitative and factor-linked aspects of societal problems (Gabus & Fontela, 1972). In addition, DEMATEL has been utilized in numerous contexts, such as industrial planning, decision-making, regional environmental assessment, and even analysis of world problems (Huang, Shyu & Tzeng, 2007); in all cases, it has confirmed interdependence among criteria and restricted the relations that reflect characteristics within an essential systemic and its developmental trends (Liou et al., 2007).

The foundation of the DEMATEL method is graph theory. It allows decision-makers to analyze as well as solve visible problems. In doing so, decision-makers can separate multiple measurement criteria into a cause and effect group to realize causal relationships much more easily. In addition, directed graphs, called digraphs, are much more helpful than directionless graphs since they depict the directed relationships among subsystems. In other words, a digraph represents a communication network or a domination relationship among entities and their groupings (Huang et al., 2007).

The steps in DEMATEL are as follows (Liou et al., 2007):

Step 1: Calculate the initial average matrix by scores. Sampled experts are asked to point the direct effect based on their perception that each element i exerts on each other element j, as presented by $a_{ij}$, by utilizing a scale ranging from 0 to 4. No influence is represented by 0, while a very high influence is represented by 4. Based on groups of direct matrices from samples of experts, we can generate an average matrix A in which each element is the mean of the corresponding elements in the experts' direct matrices.

Step 2: Calculate the initial influence matrix. After normalizing the average matrix A, the initial influence matrix D, $[d_{ij}]_{n\times n}$ is calculated so that all principal diagonal elements equal zero. In accordance with D, the initial effect that an element exerts and/or acquires from each other element is given. The map depicts a contextual relationship among the elements within a complex system; each matrix entry can be seen as its strength of influence. This is depicted in Fig. 2; an arrow from d to g represents the fact that d affects g with an influence score of 1. As a result, we can easily translate the relationship between the causes and effects of various measurement criteria into a comprehensible structural model of the system based on influence degree using DEMATEL.

Step 3: Develop the full direct/indirect influence matrix. The indirect effects of problems decreases as the powers of D increase, e.g., to $D^2$,$D^3$,... , $D^\infty$, which guarantees convergent solutions to the matrix inversion. From Fig. 2, we see that the effect of c on d is greater than that of c on g. Therefore, we can generate an infinite series of both direct and indirect effects. Let the $(i, j)$ element of matrix A be presented by $a_{ij}$, then the direct/indirect matrix can be acquired by following Eq. (1) through (4)

$$D = s * A, \quad s > 0 \tag{1}$$

Or

$$[d_{ij}]_{n\times n} = s[a_{ij}]_{n\times n}, \ s > 0, \ i,j \in \{1,2,\dots,n\} \tag{2}$$

$$s = Min\left[\frac{1}{\max\limits_{1\le i\le n}\sum_{j=1}^{n}|a_{ij}|}, \frac{1}{\max\limits_{1\le i\le n}\sum_{i=1}^{n}|a_{ij}|}\right] \tag{3}$$

And

$$\lim_{m\to\infty} D^m = [0]_{n\times n} \quad where\ D = [d_{ij}]_{n\times n}, \quad 0 \le d_{ij} < 1 \tag{4}$$

The total-influence matrix T can be acquired by utilizing Eq. (5). Here, I is the identity matrix

$$T = D + D^2 + \cdots + D^m = D(I - D)^{-1} \quad \text{when } m \to \infty \tag{5}$$

If the sum of rows and the sum of columns is represented as vector r and c, respectively, in the total influence matrix T, then

$$T = [t_{ij}], \ i,j = 1,2,\dots,n, \tag{6}$$

$$r = [r_i]_{n\times 1} = \left(\sum_{j=1}^{n} t_{ij}\right)_{n\times 1} \tag{7}$$

$$c = [c_j]'_{1\times n} = \left(\sum_{i=1}^{n} t_{ij}\right)_{1\times n} \quad (8)$$

where the superscript apostrophe denotes transposition.

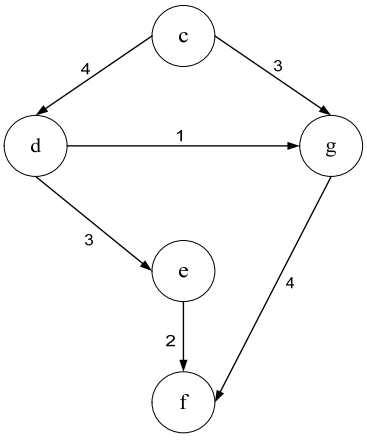



**Fig 2:** An influential map

If $r_i$ represents the sum of the ith row of matrix T, then $r_i$ presents the sum of both direct and indirect affects of factor i on all other criteria. In addition, if $c_j$ represents the sum of the jth column of matrix T, then $c_j$ presents the sum of both direct and indirect affects that all other factors have on j. Moreover, note that $j = i(r_i + c_i)$ demonstrates the degree to which factor i affects or is affected by j. Note that if $(r_i - c_i)$ is positive, then factor i affects other factors, and if it is negative, then factor i is affected by others (Liou et al., 2007; Tzeng et al., 2007).

Step 4: Set the threshold value and generate the impact relations map. Last, we must develop a threshold value. This value is generated by taking into account the sampled experts' opinions in order to filter minor effects presented in matrix T elements. This is needed to isolate the relation structure of the most relevant factors. In accordance with the matrix T, each factor $t_{ij}$ provides information about how factor i affects j. In order to decrease the complexity of the impact relations-map, the decision-maker determines a threshold value for the influence degree of each factor. If the influence level of an element in matrix T is higher than the threshold value, which we denote as p, then this element is included in the final impact relations map (IRM) (Liou et al., 2007).

### 2.3. Analytic network process (ANP)

Saaty (1996) stated that the feedback approach, a generalization of the idea of a hierarchy, is used to derive priorities in a system with interdependent influences. Saaty also pointed out that an ANP model is implemented by following three steps. All the interactions among the elements should be evaluated by pairwise comparisons in order to construct the framework of the problem. In addition, a supermatrix – a matrix of the influences among the elements – should be obtained based on these priority vectors. The supermatrix is derived from the limiting powers of the priorities to calculate the overall priorities, and thus, the cumulative influence of each element on every other element with which it interacts is obtained (Saaty and Vargas, 1998). The generalized supermatrix of a hierarchy with three levels – which is used in this paper – is as follows:

$$W = \begin{array}{c} \\ c_1 \\ c_2 \\ c_3 \end{array} \begin{array}{c} \begin{array}{ccc} c_1 & c_2 & c_3 \end{array} \\ \begin{bmatrix} w_{11} & w_{12} & w_{13} \\ w_{21} & w_{22} & w_{23} \\ w_{31} & w_{32} & w_{33} \end{bmatrix} \end{array} \quad (9)$$

W is a partitioned matrix because its entries are composed of the vectors obtained from the pairwise comparisons. Since W is a column stochastic matrix, its limiting priorities depend on the reducibility and cyclicity of that matrix. If the matrix is irreducible and primitive, the limiting value is obtained by raising W to powers such as in Eq. (10) in order to obtain the global priority vectors (Saaty and Vargas, 1998).

$$\lim_{k\to\infty} w^k \quad (10)$$

Finally, after the super matrix is assured of being column stochastic, it is raised to a sufficiently large power until convergence occurs (Saaty, 1996). In other words, the super matrix is then raised to limiting powers to become $\mathbf{W}^{2K+1}$, where k is an arbitrarily large number to capture all the interactions and to obtain a steady-state outcome.

### 2.4. TOPSIS

The TOPSIS method is proposed in Chen and Hwang (1992), with reference to Hwang and Yoon (1981). The basic principle is that the chosen alternative should have the shortest distance from the ideal solution that maximizes the benefit and also minimizes the total cost, and the farthest distance from the negative-ideal solution that minimizes the benefit and also maximizes the total cost (Opricovic and Tzeng, 2003).

TOPSIS method consists of the following steps:

*Step* 1: Calculate the normalized decision matrix. The normalized value $r_{ij}$ is calculated as

$$r_{ij} = X_{ij} \Big/ \sqrt{\sum_{i=1}^{n} X_{ij}^2}, \forall i,j \quad (11)$$

*Step* 2: Calculate the weighted normalized decision matrix. The weighted normalized value $v_{ij}$ is calculated as

$$v_{ij} = w_j \times r_{ij}, \forall i,j \quad (12)$$

Where $w_j$ is the weight of the *j*th criterion, and $\sum_{i=1}^{m} w_j = 1$

*Step* 3: Determine the ideal and negative-ideal solution.

$A^* = \{v_1^*, \dots, v_m^*\} = \{(\max_i v_{ij} \mid j \epsilon C_h), (\min_i v_{ij} \mid j \epsilon C_c)\}$ (13)

$A^- = \{v_1^-, \dots, v_m^-\} = \{(\min_i v_{ij} \mid j \epsilon C_h), (\max_i v_{ij} \mid j \epsilon C_c)\}$ (14)

where $C_b$ is associated with benefit criteria and $C_c$ is associated with cost criteria.

*Step* 4: Calculate the separation measures, using the m-dimensional Euclidean distance. The separation of each alternative from the ideal solution is given as

$$d_i^+ = \sqrt{\sum_{j=1}^{m} (v_{ij} - v_j^*)^2}, \forall i \quad (15)$$

Similarity, the separation from the negative-ideal solution is given as

$$d_i^- = \sqrt{\sum_{j=1}^{m} (v_{ij} - v_j^-)^2}, \forall i \quad (16)$$

*Step* 5: Calculate the relative closeness to the ideal solution. The relative closeness of the alternative $A_i$ with respect to $A^+$ is defined as

$$CC_I^* = \frac{S_i^-}{S_i^+ + S_i^-}, \forall i \quad (17)$$

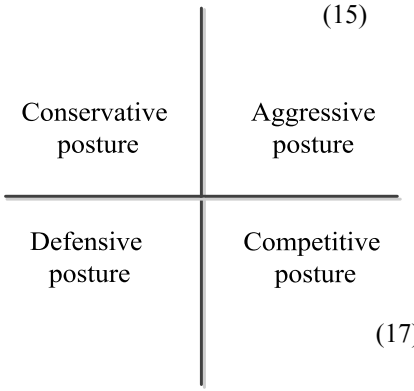
*Step* 6: Rank the preference order.

The index values of $CC_I^*$ lie between 0 and 1. The larger index value means the closer to ideal solution for alternatives.

**2.5. The SPACE framework for strategic analysis**

The Strategic Position and Action Evaluation (SPACE) framework developed by Rowe, Mason, Dickel, Mann and Mockler (1994) achieves this integration by focusing upon two key strategic factors: strategic positioning and strategic responsiveness. Strategic positioning refers to the ability of an organization to place products and services in attractive markets competitively. Strategic responsiveness refers to the ability of the organization to marshal sufficient resources to cope with environmental change and instability. It's clear that a strategically healthy firm is one that achieves both good positioning and responsiveness. The SPACE framework has been used in the literature to analyze a range of industries: biotechnology in the UK (Ranchhod & Henderson, 1995); manufacturing in South Africa (Radder & Iouw, 1998); manufacturing in the UK (Li & Hamblin, 2003); professional football in England (Cross & Henderson, 2003) and leisure centers in the UK (Benson & Henderson, 2005a, 2005b). The original SPACE model includes generic items that identify factors that determine responsiveness and positioning based upon such conventional strategic frame works as: the Boston Consulting Group (BGC) approach, Scenario Planning (Jeannet & Hennessey, 1992), McKinsey's Industry's Attractiveness/Company Strength Matrix.In this method, to determine the strategic position, four indicators are calculated that include financial strength, competitive advantage, industry attractiveness and macro environment. The first two indicators reflect local conditions, and other indicators show the status of the company's external environment. There are four strategic locations in the SPACE Matrix which include the following and illustrated in Fig 2:

(15)




(17)

**Fig 3:** SPACE matrix

In the aggressive posture, the company has a good posture and using its strengths tries to take advantage of environmental opportunities. Posture conservative means the company must maintain its own competencies and not put itself at great risks. In defensive posture, company need to improve internal weaknesses and avoid external threats. Posture competitive means the company should use the competitive strategies.

**3. Data analysis**

In this study, first an external environment analysis is performed by an expert team familiar with the operation of the organization. In this way, those SWOT sub-factors which affect the success of the organization but cannot be controlled by the organization are identified. In addition, an internal analysis is performed to determine the sub-factors which affect the success of the organization but can be controlled by the organization. In based on these analyses, the strategically important sub-factors, i.e. the sub-factors which have very significant effects on the success of the organization, are determined. Using the SWOT sub-factors, the SWOT matrix and alternative strategies based on these sub-factors are developed (Table 2).

**Table 2**: SWOT matrix

| Internal factors / External Factors | Strengths | Weakness |
|---|---|---|
| | 1. Efficient management, Specialists and educated forces and Using management systems<br>2. Reputation, credibility and experience in tileindustry<br>3. High profit margins, diversity and quality of products and introduce new products to market<br>4. Utilization of efficient infrastructure and availability of raw materials and energy needed | 1. Using old technology to produce and High maintenance, repairing and depreciation costs<br>2. Dependence on foreign suppliers in the supply of parts, raw materials and equipment<br>3. Low efficiency and effectiveness of processes<br>4. Not institutionalized culture of customer orientation and teamwork among employees |
| Opportunities<br><br>1. High demand in the country for tile and changing the culture of society toward consumerism<br>2. Existing extensive and attractive markets in neighboring countries and the possibility of export to them<br>3. Existing rules and regulations to support private sector in the country and government support<br>4. Possibility of utilizing specialists in the community and attracting investment from outside of the company | SO strategies<br><br>1. Introducing the brand company in neighboring countries and Provide diverse and high quality products according to their cultural characteristics<br>2. Use of specialized and skilled personnel to innovation in manufacturing and marketing products<br>3. Using experience company and information management systems to improve efficiency, quality and variety of products to compete in markets abroad | WO strategies<br><br>7. Institutionalize a culture of customer orientation and teamwork to succeed in domestic and foreign markets<br>8. Attract foreign investment and use government support in order to improve technology and reduce dependence on overseas<br>9. Provide distinctive and unique products to dominate certain sectors and markets with high profitability |
| Threat<br><br>1. Iran sanctions and problems created<br>2. Constantly changing demands and interests of customers<br>3. Powerful rivals inside and outside of the country and the possibility of entry new competitors<br>4. Inflation, currency rate fluctuations and economic instability in the country | ST strategies<br><br>4. Supporting research and development, marketing research and innovations in order to identify and respond to the diverse and changing needs of customers<br>5. Using the Experience Company, creativity and innovation and expertise forces in order to overcome the difficulties sanctions and economic challenges<br>6. Benchmarking of competitors' capabilities in the areas of production, marketing, cost reduction, quality, etc. | WT strategies<br><br>10. To consider the sanctions and the economic challenges as an opportunity to reduce dependence on overseas and replace existing systems<br>11. Using modern technologies and increasing processes efficiency in order to reduce costs and maintain the company profitability<br>12. Collaboration with suppliers and Benchmarking of competitors to reduce the problems of technology, reduce costs and enhance quality |

In this paper the strengths and weaknesses, opportunities and threats are criteria which are used for evaluation and ranking of strategies. In this research, 15 company experts and managers were invited to survey about strategies. This research framework includes 16 evaluation criteria that include Strengths, weaknesses, Opportunities and threats. In addition, there are 12 alternatives (strategies). After the construction of the hierarchy, the weights of each criterion are calculated using

DEMATEL and ANP. Then, alternatives scores (strategies) is obtained with TOPSIS and using SPACE matrix, the company's strategic positioning is determined.The proposed method is as follows.

Step 1: To determine the relationship between the SWOT using DEMATEL technique

At this stage, In accordance with Eq. (1) through (3), we next generated the normalized direct-relation matrix D from A. After that, Eq. (5) is used to calculate the total influence matrix T, as show in Table 3.

Step 2: Formation super-matrix and calculation of the weight using ANP.

In this stage, we used ANP to calculate the weights. Relations between SWOT factors are obtained by Matrix T, Used as input for the super-matrix. Then we calculate the weights. Calculated Weights are shown in Table 4.

**Table** 3: T matrix

| | $C_1$ | $C_2$ | $C_3$ | … | $C1_4$ | $C1_5$ | $C_{16}$ |
|---|---|---|---|---|---|---|---|
| $C_1$ | .03 | .03 | .02 | … | .03 | .03 | .03 |
| $C_2$ | .04 | .04 | .02 | … | .03 | .04 | .04 |
| $C_3$ | .04 | .04 | .02 | … | .04 | .04 | .04 |
| ⋮ | ⋮ | ⋮ | ⋮ | ⋮ | ⋮ | ⋮ | ⋮ |
| $C_{14}$ | .09 | .09 | .04 | … | .08 | .09 | .10 |
| $C_{15}$ | .08 | .08 | .04 | … | .07 | .08 | .09 |
| $C_{16}$ | .07 | .07 | .03 | … | .06 | .07 | .08 |

**Table 4**: The criteria weights

| Goal | Evaluating Dimensions | Criteria | Global Weights | Alternatives |
|---|---|---|---|---|
| Selecting the best strategy | Strengths | $C_1$ | 0.02 | Strategies |
| | | $C_2$ | 0.02 | |
| | | $C_3$ | 0.03 | |
| | | $C_4$ | 0.05 | |
| | Weaknesses | $C_5$ | 0.07 | |
| | | $C_6$ | 0.06 | |
| | | $C_7$ | 0.06 | |
| | | $C_8$ | 0.07 | |
| | Opportunities | $C_9$ | 0.08 | |
| | | $C_{10}$ | 0.08 | |
| | | $C_{11}$ | 0.09 | |
| | | $C_{12}$ | 0.09 | |
| | Threats | $C_{13}$ | 0.09 | |
| | | $C_{14}$ | 0.07 | |
| | | $C_{15}$ | 0.07 | |
| | | $C_{16}$ | 0.06 | |

Step 3: To calculate normalized weighted decision matrix

In this paper, TOPSIS is used to prioritize the strategies. In the beginning, we create the decision matrix is shown in Table 5. Then, we calculate the normalized weighted decision matrix.

**Table 5**: The decision matrix

| | $C_1$ | $C_2$ | $C_3$ | … | $C_{14}$ | $C_{15}$ | $C_{16}$ |
|---|---|---|---|---|---|---|---|
| $St_1$ | 4.25 | 5.64 | 6.42 | … | 6.24 | 6.96 | 6.18 |
| $St_2$ | 6.52 | 5.83 | 4.54 | … | 3.55 | 3.68 | 4.45 |
| $St_3$ | 4.20 | 6.70 | 4.65 | … | 4.82 | 4.50 | 5.28 |
| ⋮ | ⋮ | ⋮ | ⋮ | ⋮ | ⋮ | ⋮ | ⋮ |
| $St_{10}$ | 5.27 | 2.45 | 3.61 | … | 5.65 | 2.22 | 3.87 |
| $St_{11}$ | 4.54 | 3.64 | 4.85 | … | 5.20 | 3.15 | 4.25 |
| $St_{12}$ | 5.33 | 5.52 | 4.9 | … | 5.22 | 4.55 | 3.22 |

Step 4: Determine the positive and negative-ideal reference points. Then we can define the positive-ideal solution and the negative-ideal solution as: $A^+$ and $A^-$.

Step 5: rank the alternatives

In order to calculate the closeness coefficients of each of the alternatives $d_i^+$ and $d_i^-$ calculation is used as an example as follows:

$$CC_1 = \frac{0.0444}{0.0444+0.0205} = 0.6831$$

Finally, we obtain the criteria scores and rank of the strategies. The results are shown in Table 6. From the alternative evaluation results in Table 6, the best strategy is $st_6$ (Benchmarking of competitors' capabilities in the areas of production, marketing, cost reduction, quality, etc).

**Table 6**: Closeness coefficients and ranking

| | $St_1$ | $St_2$ | $St_3$ | $St_4$ | $St_5$ | $St_6$ | $St_7$ | $St_8$ | $St_9$ | $St_{10}$ | $St_{11}$ | $St_{12}$ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| $d_i^+$ | .0205 | .0351 | .0313 | .0250 | .0211 | .0134 | .0299 | .0440 | .0300 | .0427 | .0298 | .0414 |
| $d_i^-$ | .0444 | .0257 | .0321 | .0348 | .0402 | .0435 | .0332 | .0194 | .0316 | .0233 | .0369 | .0233 |
| $CC_i$ | .6831 | .4215 | .5054 | .5818 | .6559 | .7639 | .5264 | .3055 | .5117 | .3523 | .5534 | .3566 |
| Ranking | 2 | 9 | 8 | 4 | 3 | 1 | 6 | 12 | 7 | 11 | 5 | 10 |

Step 6: The strategic positioning with SPACE matrix

After obtaining the score of strategies using TOPSIS, strategies adapt to space matrix postures. As can be seen in Figure 4, aggressive posture in space matrix consistent with SO strategy, because company has numerous strengths and using them is to take advantage of environmental opportunities.

In conservative posture, organization using their strengths to deal with environmental threats and seeks to maintain its position against environmental threats. In Figure 4, different postures of space matrix and strategies are shown.

After matching Space matrix and strategies, we use the scores which are obtained from TOPSIS in order to illustrate the strategy position in space matrix. According to this method, strategies are sorted in ascending in each posture.

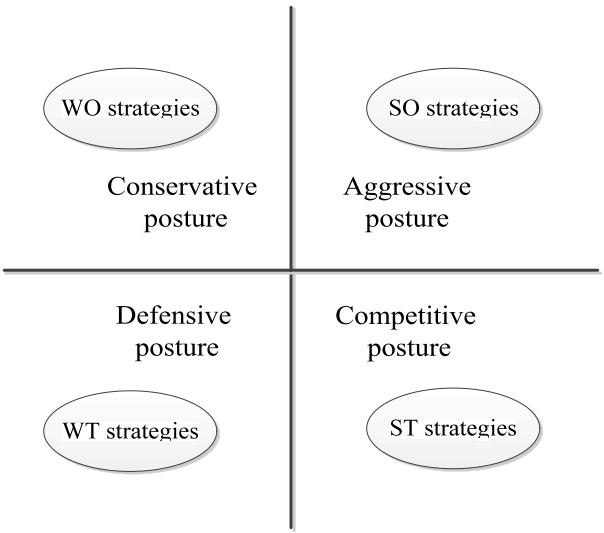



**Fig 4**: Adapting strategies with postures of SPACE matrix

For example, as can be seen in Figure 5, in aggressive posture, $SO_1$ is the best strategy. The best situation for this company is the competitive posture with the score of 2.01. This shows that the company has much strength and there are threats in the environment. Therefore, the best strategy for this company is $ST_3$ that has the highest score and located in the competitive posture.

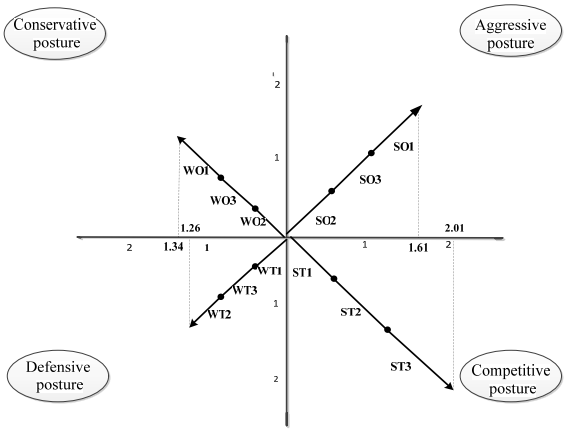



**Fig 5:** Strategic Positioning using of SPACE matrix

## 4. Conclusion

Increasing complexity of activities and environment has caused managers to understand the traditional planning will not be able to solve their problems and the smallest neglecting has a consequence. Hence strategic management in organizations has been proposed and managers with the help of strategic management want to find the proper orientation in order to lead their organizations. Strategic management can be understood as the collection of decisions and actions taken by business management, in consultation with all levels within the organization, to determine the long-term activities of the organization (Houben et al., 1999). Since market environment changes constantly and companies will face new situations, Strategic positioning can be a good way to overcome these changes. In this paper, SWOT matrix is used to determine the company's strategies and DEMATEL and ANP is used to calculate the weights. Then, we calculate the alternative scores using TOPSIS. Finally, using of SPACE matrix; optimal strategy in each posture is specified. In this paper, the best posture is the competitive, because the strategies that are situated in this posture have the highest score. In the other hand, the optimal strategy in this situation is a $ST_3$ strategy. The proposed framework helps companies to apply the best strategies indifferent market situations and response to changes.

**Corresponding Author:**
Mohammad Karimi Zarchi
M.S. Candidate of Industrial Management, University of Tehran, Tehran, Iran
E-mail: Mohammad.karimi@ut.ac.ir

**References**

1. Benson, A.M., & Henderson, S. 2005a. Strategic characteristics of sport and recreation provision: An application of SPACE analysis. Managing Leisure, 10(4), 251–267.
2. Cross, J., & Henderson, S. 2003. Strategic analysis of the English football clubs. Strategic Change, 12(8), 409–420.
3. Dyson, R.G, 2004. Strategic development and SWOT analysis at the University of Warwick, European Journal of Operational Research 152, 631–640.
4. Gabus, A., and E. Fontela, 1972. World problems, an invitation to further thought within the framework of DEMATEL. Geneva, Switzerland: Battelle Geneva Research Center.
5. G. Houben, K. Lenie, K. Vanhoof, A knowledge-based SWOT-analysis system as an instrument for strategic planning in small and medium sized enterprises, Decision Support Systems 26 (1999) 125–135.
6. Houben, G, Lenie, K, Vanhoof, K. 1999. A knowledge-based SWOT-analysis system as an instrument for strategic planning in small and medium sized enterprises, Decision Support Systems, 26, 125–135.
7. Huang, C. Y., J. Z. Shyu, and G. H. Tzeng, 2007. Reconfiguring the innovation policy portfolios for Taiwan's SIP Mall industry.Technovation, 27(12), 744–765.
8. Hwang .C.L and K. Yoon, Multiple Attributes Decision Making Methods and Applications, spring, New York (1981).
9. J. Jeannet and H. D. Hennessey, 1992.Global Marketing Strategies, Houghton Mifflin Co., Boston.
10. Kangas, J., Kurtila, M., Kajanus, M., Kangas, A. 2003. Evaluating the management strategies of a forestland estate-the S-O-S approach, Journal of Environmental Management, 69, 349–358.
11. Lee K-l, Lin S-C, A fuzzy quantified SWOT procedure for environmental evaluation of an international distribution center, Information Sciences, 178, 2008, 531–549.
12. Li, X., & Hamblin, D.J. 2003. The impact of performance and practice factors on UK manufacturing companies' survival. International Journal of Production Research, 41(5), 963–979.
13. Liou, J. H., G. H. Tzeng, and H. C. Chang, 2007. Airline safety measurement using a hybrid model. Journal of Air Transport Management, 13, 243–249.
14. M. Kajanus, J. Kangas, M. Kurttila, The use of value focused thinking and the A'WOT hybrid method in tourism management, Tourism Management 25 (2004) 499–506.
15. M.K. Masozera, J.R.R. Alavalapati, S.K. Jacobson, R.K. Shresta, Assessing the suitability of community-based management for the Nyungwe Forest Reserve, Rwanda, Forest Policy and Economics 8 (2006) 206–216.
16. Opricovic. S and Tzeng. G.H, 2003, Compromise solution by MCDM methods: a comparative analysis of VIKOR and TOPSIS, European Journal of Operational Research 156 (2), pp. 445–455.
17. O. Dincer, Strategy Management and Organization Policy, Beta Publication, Istanbul, 2004.
18. Radder, L., &Iouw, L. 1998. The SPACE matrix: A tool for calibrating competition. Long Range Planning, 31(4), 549–559.
19. Ranchhod, A., & Henderson, S. 1995. Strategic management in smaller bio-technology companies. In B. Richardson & I. Boyatt (Eds.), Enterprise in action. London: Pavic Press.
20. Rowe, A.J., Mason, R.D., Dickel, K.E., Mann, R.B., &Mockler, R.J. 1994. Strategic management: A methodological approach (4th ed.). Reading, MA: Addison-Wesley.
21. Saaty .T.L, 1996, Decision Making with Dependence and Feedback: The Analytic Network Process, RWS publications, Pittsburgh.
22. Saaty .T.L and Vargas .L.G, 1998, Diagnosis with dependent symptoms: bayes theorem and the analytic hierarchy process, Operational Research 46 (4), pp. 491–502.
23. Tzeng, G. H., C. H. Chiang, and C. W. Li, 2007. Evaluating intertwined effects in elearning programs: A novel hybrid MCDM model based on factor analysis and DEMATEL. Expert Systems with Applications, 32, 1028–1044.
24. T. Hill, R. Westbrook, SWOT analysis: it's time for a product recall, Long Range Planning 30 (1997) 46–52.

4/29/2012