

A Modified Strategic Position and Action Evaluation (SPACE) Matrix Method

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Abstract— The concept of competition is crucial for every company producing either goods or services unless it is ruling a monopol market. Therefore, companies have to have a strategy in order to acquire better place in that competitive environment. The SPACE Matrix is a useful method to analyze the competitive position of an organization using internal and external dimensions. However it has some drawbacks. In this study, one of them is pointed out and a way of coping with this drawback is presented.

Index Terms— SPACE Matrix, AHP, Strategic Management.

I. INTRODUCTION

ANY organization having its activity in an oligopoly market, have to take into account the competition existing in that market in order to survive. Competitive strategy is the search of favorable, profitable and sustainable competitive position in a market against the forces that determine the competition in that market. Various methods have been proposed for that purpose: the Boston Consulting Group (BCG) approach, Profit Impact of Market Strategy (PIMS), Scenario Planning, etc. The Strategic Position and Action Evaluation (SPACE) Matrix proposed by Rowe et al. [1] attempts to overcome some limitations or drawbacks of the above mentioned methods pointed out by Hunger and Wheelen [2], Barnett and Wilstead [3].

The SPACE Matrix is a relatively easy to understand and use method as a decision aid. It uses two internal dimensions, namely Financial Strength (FS) and Competitive Advantage (CA), and two external dimensions, namely Industry Strength (IS) and Environmental Stability (ES), to determine the organization's strategic posture in the market and determine its course of action. Each of these four dimensions includes several factors assessed individually during the analysis. This will be detailed in the next section.

However, as pointed out by Radder and Louw [4], there are some drawbacks in the method. In this study, only one of them is attempted to be coped with: While the method is applied, the factors included in each dimension are considered of equal importance. Whilst the factors may be considered of equal importance (as a hypothesis) one has to take into consideration the fact that most of the time, the factors under each dimension does not have equal weights. Hence, the final result may show some differences and this will affect the outcome of the method, i.e. the appropriate

strategy of the company under evaluation.

To overcome this drawback, this study proposes a weighting process as an extra step to the original method. This process will be done with Saaty's [5] Analytic Hierarchy Process. For each dimension, a pairwise comparison for the factors belonging to the dimension will be executed and their relative weights will be calculated.

This study is organized as follows: preliminary information on the tools used is given in the next section. Section III explains the proposed methodology. A simple numerical example is given in Section IV where the results found with the proposed method and the results found with the original SPACE Matrix are also compared.

II. PRELIMINARIES

A. SPACE Matrix

The SPACE matrix is a management tool that is used to analyze an organization based on four dimensions, two internal and two external, in order to define an appropriate strategy for that organization. These dimensions form the SPACE matrix (as seen in Fig.1) and the factors that can be included in each one of them can be stated as follows:

--Financial Strength (FS): This is an internal dimension which can include return on investment, leverage, liquidity, capital, risk involved in business etc. as key factors.

--Competitive Advantage (CA): This is an internal dimension which can include market share, product quality, product life cycles etc. as key factors.

--Industry Strength (IS): This is an external dimension which can include growth and profit potential, financial stability, technological know-how etc. as key factors.

--Environmental Stability (ES): This is an external dimension which can include technological change, rate of inflation, demand variability, price range of competing products etc. as key factors.

The method works as follows:

--The key factors under each dimension are evaluated by the decision maker(s) of the organization and a score between 0 and 6 (resp. 0 and -6) is assigned to each one of them belonging to FS and IS (resp. CA and ES).

--Afterwards, the arithmetic mean for each dimension is calculated. By definition, CA and IS values are plotted on the x axis and FS and ES on the y axis.

--The sum of CA and IS (resp. FS and ES) values will give the final x (resp. y) value of the organization's suggested strategy type.

Once the above steps are executed, the appropriate strategy can be found in either one of the following four strategic locations (which also can be observed on Fig.1):

- Aggressive posture,
- Competitive posture,

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- Defensive posture,
- Conservative posture.

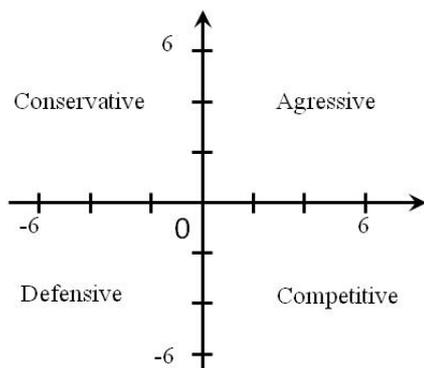


Fig. 1. SPACE Matrix

B. Analytic Hierarchy Process - AHP

AHP is a very well known and widely used Multi-Criteria Decision Making (MCDM) method proposed by Saaty [5]. It is a theory of measurement that has been extensively applied in modeling the human judgment process. It decomposes a complex decision into a multi-level hierarchical structure enabling people to effectively combine both measurable and subjective factors in the decision process.

When we take a look for the last ten years, as before, we can see that AHP is being used in various fields such as supplier selection [6], tissue engineering [7], firm's performance evaluation [8], hydrogen production method selection [9], military personnel assignment [10], maintenance strategy selection [11], macroergonomics [12].

In this study, the essential concept of AHP, the pairwise comparison will be used in order to cope with the drawback of the SPACE Matrix method mentioned above. The factors included in four dimensions of the method were considered as equally important. Here, with the pairwise comparison, their relative importance will be determined.

Pairwise comparison of AHP method is conducted with the experts or decision makers using the well known 1-9 scale of Saaty [5].

For the n factors under one dimension, subjective judgments of experts, forming a square matrix of dimension n , which is called pairwise comparison matrix, are collected. The matrix can be represented as follows where $a_{ij} = 1/a_{ji}$ for all i and $j=1, \dots, n$:

$$A = \begin{bmatrix} a_{11} & a_{12} & \dots & a_{1n} \\ a_{21} & a_{22} & \dots & a_{2n} \\ \vdots & \vdots & \dots & \vdots \\ a_{n1} & a_{n2} & \dots & a_{nn} \end{bmatrix}$$

Then these comparisons are checked to see if they are consistent. And then finally they are transformed to relative weights using the eigenvector method. The eigenvector of the pairwise comparison matrix will give the relative priority of each factor under that dimension.

TABLE V
PAIRWISE COMPARISON MATRIX AND RELATIVE IMPORTANCE OF THE KEY FACTORS UNDER ES

	I	T	DV	TX	w
I	1	3	2	5	0,482
T	0,3	1	0,5	2	0,158
DV	0,5	2	1	3	0,272
TX	0,2	0,5	0,3	1	0,088

III. PROPOSED METHOD

The proposed pairwise comparison included SPACE Matrix method, which will further be called the Modified SPACE Matrix method, works, in a step by step procedure, as follows:

- Evaluate the key factors under each dimension of the SPACE Matrix method as usual.
- Perform the pairwise comparison for the key factors included in each dimension separately.
- Determine the relative importance of the factors.
- Calculate the weighted average for each dimension.
- Take the sum of CA and IS values and FS and ES values to find x and y axis values.
- Find which quadrant of the SPACE Matrix the company is actually in.
- Determine the appropriate strategy.

IV. NUMERICAL APPLICATION

A. Key Factors

Let's take the following situation where the key factors for each dimensions for a given company are determined as follows:

- For ES:
 - Rate of inflation - I,
 - Technology - T,
 - Demand Variability - DV,
 - Taxation - TX.
- For IS:
 - Barriers to Entry - BE,
 - Growth Potential - GP,
 - Access to Financing - AF,
 - Consolidation - C.
- For CA:
 - Market Share - MS,
 - Product Quality - PQ,
 - Product Life Cycles - LC,
 - Brand and Image - BI.
- For FS:
 - Return on Assets - ROA,
 - Leverage - LV,
 - Liquidity - LQ,
 - Cash Flow - CF.

B. The Data

The key factors are evaluated by the decision makers and as a result of a consensus, the data are collected in Table I.

The x and y axis scores are found with regular SPACE Matrix method. Therefore, in that case the strategy of the

company would be advised to be an aggressive one.

To comment on it a little bit more: Given that the company has a relatively strong competitive position in the

TABLE I
THE DATA FOR THE KEY FACTORS

Internal Strategic Position			External Strategic Position		
CA			IS		
x Axis	Product Quality – PQ	-3	Barriers to Entry – BE	4	
	Market Share – MS	-1	Growth Potential – GP	3	
	Brand&Image - BI	-4	Access to Financing – AF	2	
	Product Life Cycle - LC	-2	Consolidation – C	4	
x axis score: 0.75					
FS			ES		
y Axis	ROA	4	Inflation – I	-2	
	Leverage – LV	4	Technology – T	-1	
	Liquidity – LQ	5	Demand Var.– DV	-2	
	Cash Flow – CF	3	Taxation – TX	-4	
y axis score: 1.75					

market (as it is seen under CA) with rapid growth; it needs to use its internal strengths such as liquidity and cash flow to develop a market penetration and market development strategy.

C. Relative Importance of Key Factors

The experts are asked to compare the factors under each dimension. The pairwise comparison matrices are filled by them after a consensus has been reached.

Relative priorities are calculated and together with the pairwise comparison matrices they are presented in Tables II – V.

Once the relative priorities have been found, using these values the consistency ratios (CR) for each comparison matrix is also calculated in order to check whether the experts’ judgments are consistent. By definition, the CR value has to be smaller than 0.1 to assume that the judgments are consistent. The CR values for the comparison matrices are 0.024, 0.005, 0.015 and 0.005 respectively.

D. Final Results

Using the relative priorities found above, the weighted sum of the key factor values will give the x and y axis values for the company as explained in Section III. The data and the results are collected in the following table.

TABLE II
PAIRWISE COMPARISON MATRIX AND RELATIVE IMPORTANCE OF THE KEY FACTORS UNDER CA

	PQ	MS	BI	LC	w
PQ	1	3	2	5	0,473
MS	0,3	1	0,3	2	0,142
BI	0,5	3	1	3	0,298
LC	0,2	0,5	0,3	1	0,087

TABLE III
PAIRWISE COMPARISON MATRIX AND RELATIVE IMPORTANCE OF THE KEY FACTORS UNDER IS

	BE	GP	AF	C	w
BE	1	0,5	0,3	2	0,158
GP	2	1	0,5	3	0,272
AF	3	2	1	5	0,482
C	0,5	0,3	0,2	1	0,088

As it can be observed in Table VI above and Fig. 2 below, the results indicate that the company’s strategy lies in the aggressive quadrant of the SPACE Matrix when the traditional method is applied. However with the modified method, the strategy lies in the conservative quadrant of the SPACE Matrix.

TABLE VI
THE RESULTS WITH THE PROPOSED METHOD

Internal Strategic Position			External Strategic Position		
CA			IS		
Factor	w	Score	Factor	w	Score
PQ	0,473	-3	BE	0,1575	4
MS	0,1425	-1	GP	0,2718	3
BI	0,2978	-4	AF	0,4824	2
LC	0,0867	-2	C	0,0883	4
x axis score:			-0,163		
FS			ES		
Factor	w	Score	Factor	w	Score
ROA	0,1338	4	I	0,4824	-2
LV	0,0855	4	T	0,1575	-1
LQ	0,258	5	DV	0,2718	-2
CF	0,5227	3	TX	0,0883	-4
y axis score:			1,716		

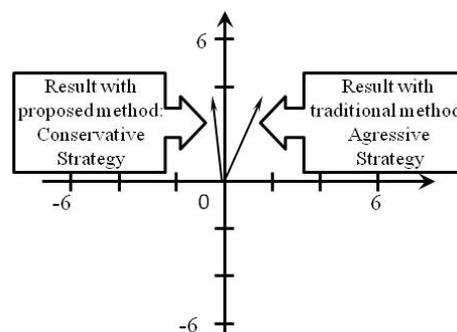


Fig. 2. Results on SPACE Matrix

V. CONCLUSION

Here, with a relatively simple example, it is observed that the modified SPACE Matrix method proposed in this study, may give different results than the one found with the classic SPACE Matrix method. And this is due only to the fact that the importance of the key factors under each dimension of the method may and most probably will be different for the DMs of the company under evaluation.

It has to be noted that this is not a proof that the results will %100 be different with the proposed method. However it is a proof that changes are bound to happen. Such a change in the results, will affect the final decision of the company’s actions in the market. Hence it can jeopardize its overall performance.

In the numerical example, the strategy found with traditional SPACE Matrix method was “aggressive” whereas with modified SPACE Matrix method, it is found to be “conservative”. The reason is the fact that DMs of the company attached different levels of importance for each key factor under a given dimension.

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