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Determining competition power by performance driver analysis

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Abstract

Competition power is main indicator for performance of a corporate. But the competition concept involves different factors that have affected the performance of corporate in the industry or segment. At the same time competition has vagueness due to coming events, future decisions, and behaviors of rivals. These factors can be driver or brake for corporate performance. Hence, structure of competition requires a fuzzy and multi criteria approach. The aim of this study is to determine the competition power of a corporate based on the driver analysis concept by using fuzzy analytic hierarchy process (AHP) technique. In the study, firstly the factors that have affected the competition power of corporate and strategies were selected. Then factors have been classified as drivers or brakes according to the effects on the competition power of corporate. After these steps integrated, the model has been formed with performance driver analysis and AHP technique. The weight of factors has been calculated by using fuzzy number. At the end of the study, the competition power has been determined based on the proposed model.

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1. Introduction

One of the factors determining performance of a corporate is competition power. The competition power of a corporate indicates how much its success with which level according to rival corporates in its internal and external environmental activities. The competition fact has an uncertain structure such as events, activities, decisions and behaviors of rivals. Because of this feature, studies using the competition fact as an analysis issue with fuzzy logic are seen in the literature^{1,2,3,4,5}. In addition to this, according to studies being in the literature it is realized that the competition fact and so competition power of corporate are related to a lot of variables or parameters. This point

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makes examination of competition fact with multidimensional approach essential. Besides, on the one hand there are driver factors affecting competition power performance of a corporate on the other hand there are brake factors obstructing it. Hence this situation should be taken into consideration to determine competition power performance. When the literature is examined, studies analyzing competition issue with multidimensional approaches are found^{4,6}. However studies making competition power performance of a corporate topic of analysis on the basis of driver and brake factors according to corporate strategies are not found in existing studies. In examination of literature it is concluded that this issue can be solved by performance driver analysis.

Performance driver analysis which is provided to the literature by Grundy and Brown⁷ is a developed approach for diagnosing of fundamental key issues in the context of strategic management. The primary function of this analysis is being able to diagnose performance. Performance driver analysis can have a subject of all or a part of corporate and an activity. In this approach, having determining unit of analysis or an activity, driver and brake factors which affect performance are determined. Driver factors as factors that improve performance through drawn on a horizontal axis are shown upward with vertical drawn arrows. On the other hand, obstructer elements as factors which decrease performance are shown with downward arrow. Arrows are drawn short or long according to driver and brake factors' influence on corporate performance. Long arrows show elements that have higher degree of impact on corporate performance than short arrows. This display indicates relative importance of driver and brake on the performance^{7,8}. Nevertheless, performance driver analysis in literature with its current form is not adequate in terms of measurement and evaluation despite offering analytic approach to any performance issue. According to the aforementioned knowledge, this study aims at determining performance of competition power of a company the context of performance driver analysis. Two issues in this study are considered to contribute to the literature: The first one is the development of performance driver analysis's dimensions of evaluation and assessment; thus, the feature of analytic solution is developed a step further. Another contribution of this study to relevant field is that it has proposed a model so as to determine competition power of a company on the basis of performance driver analysis.

2. Method

In this study Fuzzy Analytic Hierarchy Process (AHP), one of the multi criteria decision making techniques, has been used. As it can be seen in the literature, there are a lot of fuzzy AHP methods that have been proposed by several authors^{9,10,11,12,13}. But in this study Chang's^{11,12} extent analysis method, the steps of this method are functional and easier than the other fuzzy AHP approaches, has been used. As it is well known Chang's^{11,12} extent analysis method has not been explained in this study.

In this study the proposed model for measuring and evaluating competition power of corporate by performance driver analysis includes steps as following:

- Step 1. Determining the corporate strategies.
- Step 2. Determining the factors that affect competition power of corporate.
- Step 3. Determining drivers and brakes factors that affect competition power of corporate as positive and negative.
- Step 4. To structure integrated model according performance driver analysis concept
- Step 5. Calculate the local and global weights of the factors and sub-factors according to the pair wise comparison matrices. In this study pair wise comparisons have been made with fuzzy scale (Figure 1 and Table 1) that has been proposed by Kahraman et al¹⁴.

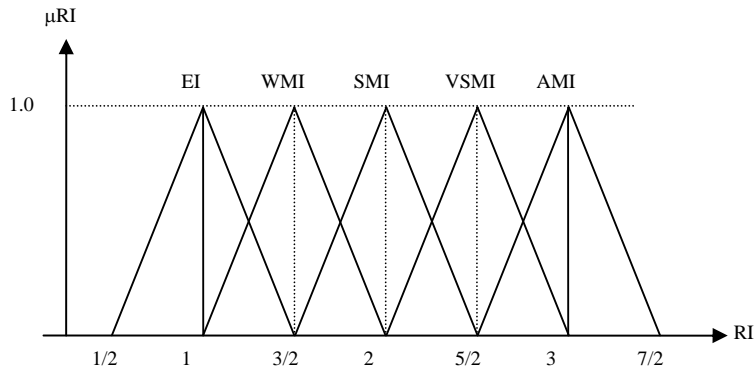


Fig. 1. Linguistic scale for relative importance

Table 1. Linguistic scales for difficulty and importance

Linguistic scale for difficulty	Linguistic scale for importance	Triangular fuzzy scale	Triangular fuzzy reciprocal scale
Just equal	Just equal	(1, 1, 1)	(1, 1, 1)
Equally difficult (ED)	Equally important (EI)	(1/2, 1, 3/2)	(2/3, 1, 2)
Weakly more difficult (WMD)	Weakly more important (WMI)	(1, 3/2, 2)	(1/2, 2/3, 1)
Strongly more difficult (SMD)	Strongly more important (SMI)	(3/2, 2, 5/2)	2/5, 1/2, 2/3)
Very strongly more difficult (VSMD)	Very strongly more important (VSMI)	(2, 5/2, 3)	(1/3, 2/5, 1/2)
Absolutely more difficult (AMD)	Absolutely more important (AMI)	(5/2, 3, 7/2)	(2/7, 1/3, 2/5)

Step 6. Determine current situation of the competition factors. Linguistic scale has been used (Figure 2 and Table 2) in measurement of the current situation of the factors. This scale has been developed by Cheng et al.¹⁵ that has been used in fuzzy decision-making problems⁴.

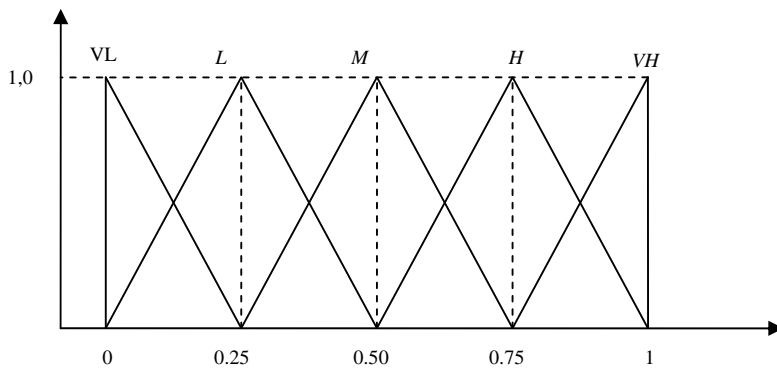


Fig. 2. Membership functions of linguistic values for criteria rating

Table 2. Linguistic values and mean of fuzzy numbers

Linguistic values for sub-factors	The mean offuzzy numbers
Very high (VH)	1
High (H)	0.75
Medium (M)	0.50
Low (L)	0.25
Very Low (VL)	0

Step 7. Determine level of competition power of corporate.

3. Development of the Proposed Model

Based on the explanation of the introduction and method section, application of the model for measuring and evaluating the performance of the competition power of a corporate was given in this section.

Step1.Determining the corporate strategies. In this study firstly according to the internal and external environmental analysis strategies of corporate have been determined. In the result of analysis three strategies have been formed. These strategies are as follows:

- Strategy 1: Innovation based marketing (ST1)
- Strategy 2: Organizing according product diversification (ST2)
- Strategy 3: Minimizing costs (ST3)

Step 2. Determining the factors that affect competition power of corporate. In this study these factors have been named according to previous study^{4,8}. In this study determined factors are as follows:

- Core competency of rivals
- Competition pressure
- Extent of competition
- Famous rivals
- Intensity of competition
- Innovation activity
- Growth rate of the market
- Core competency of corporate
- Competition advantages
- Functionality of the fixed investments
- Increasing of production capacity
- Product range

Step 3. Determining drivers and brakes that affect competition power of corporate as positive and negative. These factors have been determined according to the evaluation by the authors of this study and decision makers of the corporate. Accordingly drivers and brakes factors have been classified as follows:

Brake factors that affected negatively competition power:

- Famous rivals (BS1)
- Core competency of rivals (BS2)
- Competition pressure (BS3)
- Extent of competition (BS4)
- Intensity of competition (BS5)

Driver factors that affected positively competition power:

- Innovation activity (DV1)
- Growth rate of the market (DV2)

- Core competency of corporate (DV3)
- Competition advantages (DV4)
- Functionality of the fixed investments (DV5)
- Increasing of production capacity (DV6)
- Product range (DV7)

Step 4. Structuring the integrated model according performance driver analysis concept. The integrated model has been formed based on the AHP and the performance driver analysis

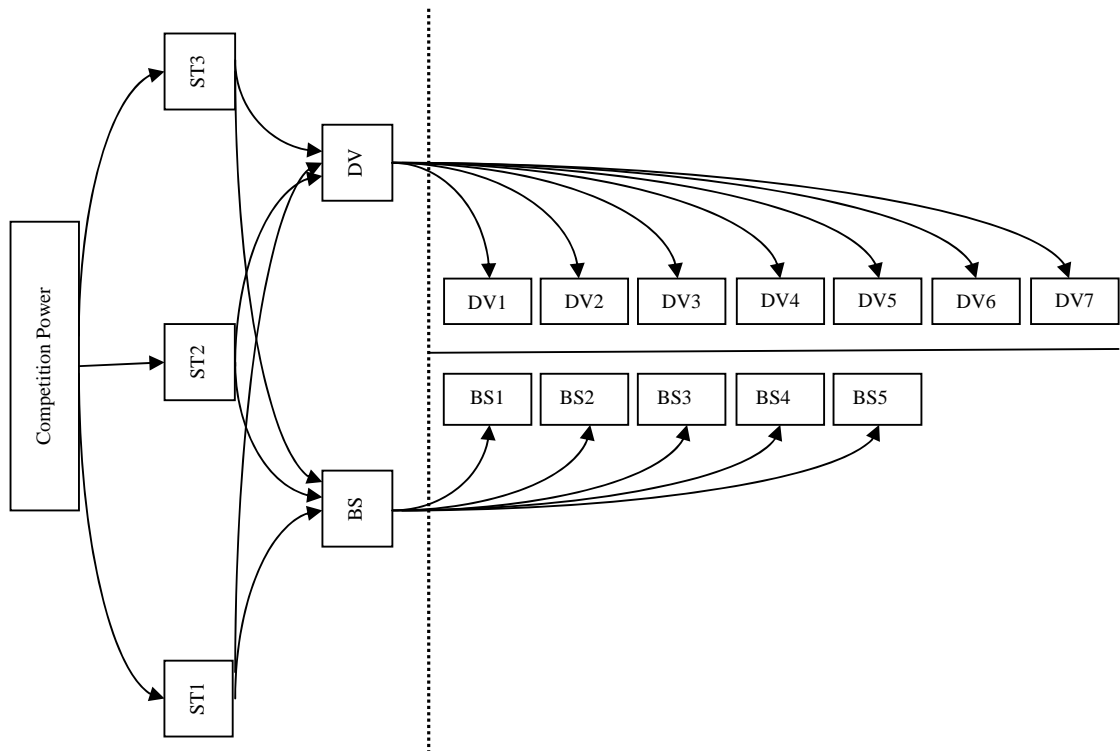


Fig. 3. The Integrated Model

Step 5. Calculate the local and the global weights of the factors and sub-factors according to the pair wise comparison matrices.

Table 3. Weights of corporate strategies

Strategies	ST1	ST2	ST3	LocalWeights
Innovation based marketing (ST1)	(1, 1, 1)	(1/2,1,3/2)	(1,3/2,2)	0.354
Organizing according product diversification (ST2)	(2/3, 1, 2)	(1, 1, 1)	(1/2,1,3/2)	0.357
Minimizing costs (ST3)	(1/2, 2/3, 1)	(2/3, 1, 2)	(1, 1, 1)	0.288

Table 4. Weights of drivers and brakes dimension according to ST1

Dimensions	DV	BS	Local Weights
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Drivers (DV)	(1, 1, 1)	(1,3/2,2)	0.591
Brakes (BS)	(1/2, 2/3, 1)	(1, 1, 1)	0.408

Table 5. Weights of drivers and brakes dimension according to ST2

Dimensions	DV	BS	Local Weights
Drivers (DV)	(1, 1, 1)	(2/3,1,2)	0.510
Brakes (BS)	(1/2, 1, 3/2)	(1, 1, 1)	0.490

Table 6. Weights of drivers and brakes dimension according to ST3

Dimensions	DV	BS	Local Weights
Drivers (DV)	(1, 1, 1)	(2/5,1/2,2/3)	0.347
Brakes (BS)	(3/2, 2, 5/2)	(1, 1, 1)	0.653

Table 7. Weights of brakes factors

Brakes	BS1	BS2	BS3	BS4	BS5	Local Weights
BS1	(1, 1, 1)	(1/2,1,3/2)	(2/3,1,2)	(1, 1, 1)	(1/2,1,3/2)	0.203
BS2	(2/3, 1, 2)	(1, 1, 1)	(1/2,1,3/2)	(1/2,2/3,1)	(2/5,1/2,2/3)	0.170
BS3	(1/2, 1, 3/2)	(2/3, 1, 2)	(1, 1, 1)	(1/2,1,3/2)	(1, 1, 1)	0.203
BS4	(1, 1, 1)	(1, 3/2, 2)	(2/3, 1, 2)	(1, 1, 1)	(2/3,1,2)	0.211
BS5	(2/3, 1, 2)	(3/2, 2, 5/2)	(1, 1, 1)	(1/2, 1, 3/2)	(1, 1, 1)	0.212

Table 8. Weights of driver factors

Drivers	DV1	DV2	DV3	DV4	DV5	DV6	DV7	LocalWeights
DV1	(1, 1, 1)	(1, 3/2, 2)	(2/3, 1, 2)	(2/3, 1, 2)	(1, 3/2, 2)	(1/2, 1, 3/2)	(1, 1, 1)	0.149
DV2	(1/2, 2/3, 1)	(1, 1, 1)	(1/2, 1, 3/2)	(1, 3/2, 2)	(2/3, 1, 2)	(2/3, 1, 2)	(1/2, 2/3, 1)	0.137
DV3	(1/2, 1, 3/2)	(2/3, 1, 2)	(1, 1, 1)	(1/2, 1, 3/2)	(2/3, 1, 2)	(1/2, 2/3, 1)	(2/3, 1, 2)	0.149
DV4	(1/2, 1, 3/2)	(1/2, 2/3, 1)	(2/3, 1, 2)	(1, 1, 1)	(1/2, 2/3, 1)	(2/3, 1, 2)	(2/3, 1, 2)	0.137
DV5	(1/2, 2/3, 1)	(1/2, 1, 3/2)	(1/2, 1, 3/2)	(1, 3/2, 2)	(1, 1, 1)	(1, 3/2, 2)	(1/2, 1, 3/2)	0.146
DV6	(2/3, 1, 2)	(1/2, 1, 3/2)	(1, 3/2, 2)	(1/2, 1, 3/2)	(1/2, 2/3, 1)	(1, 1, 1)	(1, 3/2, 2)	0.149
DV7	(1, 1, 1)	(1, 3/2, 2)	(1/2, 1, 3/2)	(1/2, 1,3/2)	(2/3, 1, 2)	(1/2, 2/3, 1)	(1, 1, 1)	0.132

Step 6. Determine current situation of the competition factors. Situation of the brakes and drivers factors has been determined according to scale (Figure 2 and Table 2). Results are shown in Table 9.

Step 7. Determine the level of competition power of corporate.

Table 9. Competition power of corporate according to proposed model

Factors	Global weights	Drivers Dimension			Brakes Dimension		
		Situation	Scale Value	Level	Situation	Scale Value	Force
BS1	0.1030				M	0.50	0.0515
BS2	0.0863				H	0.75	0.0647
BS3	0.1030				VH	1.00	0.1030
BS4	0.1071				H	0.75	0.0803
BS5	0.1076				H	0.75	0.0807
DV1	0.0732	H	0.75	0.0549			

DV2	0.0673	L	0.25	0.0168		
DV3	0.0732	M	0.50	0.0366		
DV4	0.0673	L	0.25	0.0168		
DV5	0.0717	H	0.75	0.0538		
DV6	0.0732	H	0.75	0.0549		
DV7	0.0648	VH	1.00	0.0648		
Total effect to the competition power			Drivers Dimension	0.2986	Brakes Dimension	0.3803

4. Conclusion

In this study, a fuzzy AHP model has been proposed to evaluate a corporate's competition power performance on the basis of performance driver analysis. The proposed model is able to both determine the degree of competition power performance and distinguish which factors are driver and brake for competition power performance. In addition to this, driver dimension of competition power performance and what level of effect of factors which are included in this dimension on competition power performance could be determined. Furthermore, the brake dimension of competition power performance and degree of negative effects of factors which are included in this dimension on competition power performance of a corporate could be calculated. The proposed model can also determine competition power according to strategies of a corporate. This feature of the model enables determining competition power performance of a corporate in accordance with aims of corporate. In this study it is assumed that there is no relation among strategies, driver and brake factors of the proposed model. However, expecting this kind of relation always is not possible. In other words, there can be interaction among corporate's strategies or factors having effect on corporate's competition power. Thus, a problem defined on the basis of this way of thinking can be a study subject with ANP technique. The other point is choosing factors taking part in the model. Factors in the model are determined by judgmental approach in this study. In the future studies, determining factors for model can be done by TOPSIS technique.

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