

AN AHP MODEL FOR SELECTING STRATEGIC OPTIONS

Sezi Çevik Onar*
Management Faculty
Istanbul Technical University
Macka, Istanbul, TURKEY
E-mail: sezecevik@yahoo.com

Seçkin Polat
Management Faculty
Istanbul Technical University
Macka, Istanbul, TURKEY
E-mail: polatsec@itu.edu.tr

ABSTRACT

The high level of competition and uncertainty forced firms to make right and on time strategic decisions in order to survive. The management practices for the stable environments are not suitable for the new dynamic environment. In order to respond to this dynamic and uncertain environment, managers and academicians focused on the organization's strategic flexibility. According to the strategic options view the main property of strategic flexibility is the ability to access to the resources and capabilities when they are needed (Sanchez, 1997). Strategic flexibility is defined as "condition of having strategic options that are created through combined effects of an organization's coordination flexibility in acquiring and using flexible resources" (Sanchez, 1993). According to this definition in order to have strategic flexibility, firms need to have strategic options and the main task of the managers is to define, develop, acquire and coordinate the resources and competencies that will optimize the value of strategic options cluster. In order to optimize strategic options cluster managers should effectively manage competence building and competence leveraging processes. In order to have effective competence building and competence leveraging processes we should answer the questions "What are the factors effecting these processes"? However, the selection of a suitable strategic option is not an easy decision, involving a lot of complex considerations. Therefore this study focuses on the factors effecting the exercising decision of a strategic option. An analytical hierarchy process is applied to selecting strategic options that will be exercised.

Keywords: AHP, Strategic Options, Competence Building, Mergers and Acquisitions

1. Introduction

The developments in the recent years such as removal of cross border barriers in Europe; the globalization of product markets, the technology developments, and the change in the organization forms increased the competition among firms. This increased competition caused high level of changes in the firms' environment and uncertainty for organizations of all types. Competence building is defined as the qualitative change in firms' existing assets, capabilities; exercising strategic options will trigger this process. According to this definition the objective of strategic managers is to have valuable strategic options. The management of strategic options includes selecting valuable strategic options.

Several researchers emphasized the relation between resources, capabilities and the strategic options. Kogut and Kulatilaka (2001) defined capabilities as real options which bring future opportunities. Bernardo and Chowdhry (2002) claimed that with the real investment decisions firms learn information about the different types of resources they have, therefore firms should consider this learning process while exercising their strategic options. Pandza et al. (2003) considered real options thinking as an appropriate heuristic for capability development. Kyläheiko and Sandström (2007) developed a framework for managing dynamic capabilities by using strategic options. Maritan and Alessandri (2007) also considered capabilities as real options. They revealed that industry based returns and firm specific returns are the components of returns to capability investment. Most of these studies are conceptual; there are little empirical evidences about these conceptual models.

Selecting strategic options that will be exercised is a multiple criteria problem. It includes both tangible and intangible factors also objective measurements and value judgments can be used to make the decision. This decision should include the behavioral aspects of decision making or the presence of multiple and conflicting objectives. Unfortunately managers lack the cognitive capacity to consider all environmental elements and they do not have enough time (Kasanen, et al., 2000) Several researchers applied MCDM methods for strategic management decisions such as selecting strategic alliances (Ding and Liang, 2005; Büyükozan et al., 2008; Cheng and Li, 2007); strategic planning (Chadrasekaran and Ramesh, 1987; Al-Shemmeri et al, 1997); strategic decision making (Islei et al., 1990; Firouzabadi, 2008). The factors that is important for selecting strategic options have a hierarchical order and also both includes tangible and intangible elements. Analytical hierarchy process can fulfill all the needs for such a problem (Saaty, 1980). Several researchers used Analytical Hierarchy Process in strategic evaluation (Datta, et. al.,1992; Bayazit, et al., 2006; Borenstein and Betencourt, 2005).This paper utilizes AHP approach for selecting a strategic option.

2. The factors affecting the value of strategic options

According to McGrath et al. (2004) the link between real options, the factors that are effecting these options and the performance is largely unexamined. Several researchers focused on the factors affecting the value of the strategic option that a firm is holding. For instance Sanchez (2003) by combining transaction cost theory and real options theory created a theoretical framework to explain the value created through the strategy under uncertainty. In his early study Kogut (1991) claimed that the joint ventures create real options to expand. In this study the effect of market growth on acquisition of the venture is evaluated. The results supported the interpretation of joint ventures as options to expand. Reuer and Leiblein (2000) analyzed the value of international investments as they expected to enhance corporate flexibility and reduce risk. The results indicate that these investments do not reduce the downside risk. Therefore they do not bring the flexibility they expected to bring. Tong and Reuer (2008) analyzed the firm and industry influences on the value of growth options. The results indicate that the industry effects are important but the firm effect is more dominant on the growth option value. McGrath and Nerkar (2004) utilized real option reasoning in analyzing R&D investment strategies. The scope of opportunity, prior experience and competitive effects claimed to have effect on the value created by these options. Vassolo et al. (2004) considered the equity alliances as real options. The termination of these alliances whether by acquisition or divesture regarded as exercise decision and the researchers focused on the factors effecting this decision. O'Brien et al. (2003) investigated the effects of uncertainty and irreversibility on entrepreneurial entry with real options perspective. The results of the study show that high uncertainty deters the entry decision and irreversibility has a moderator effect on this decision. The factors affecting the value of strategic options can be classified as internal factors, environmental factors and decision related factors. Different studies focused on different factors and measure these factors differently.

Table 1 summarizes these factors in the literature.

Table 1. Factors affecting strategic options

1. Environmental Factors		
Factor	Measurement Style	Related Studies
Industry uncertainty	Monthly standard deviation on returns of an industry index The annual demand variance Conditional variance of industry's gross product generated from generalized autoregressive conditional heteroskedasticity Conditional variance of industry's stock index generated from generalized autoregressive conditional heteroskedasticity Technological uncertainty Standard deviation of the log of weekly returns for each industry index	Vassolo et.al (2004); Folta and O'Brien (2004); O'Brien et al. (2003); Folta and O'Brien (2008); Folta (1998)
Industry generosity	Industry return based on the target industry index Industry's systematic risk, covariance between the total return for value weighted returns in the industry and the total market return Industry market to book ratio , median market to book ratio of all firms in the target industry Median operating income to assets ratio for all firms in the industry Total weekly returns of the selected firms in the industry The growth in the total gross product of the region	Vassolo et.al (2004);O'Brien et al. (2003); Folta and O'Brien (2007); Reuer and Leiblein (2000); Folta and O'Brien (2007);Folta (1998) O'Brien et al. (2003);Kogut(1991)
Irreversibility Fixed assets Intangible assets Inverse leverage ratio Region concentration Industry capital intensity	Ratio of property, plant and equipment to total assets for the median firm in each industry Ratio of intangible assets to total assets for the median firm in each industry Inverse of the leverage for the median firm in each industry Percentage of all employees working in a given industry who worked in the same region Industry's median level of capital expenditures divided by median sales	O'Brien et al. (2003); Folta and O'Brien (2008)
Industry size	Sum of assets across all business segments in the industry Total expected demand in the industry	O'Brien et al. (2003) O'Brien et al. (2003)
Industry concentration	Concentration ratio of the 4 digit SIC level Four firm concentration ratio	Kogut (1991) Folta and O'Brien (2007)

Industry type	Dummy variable coded based on the industry	Tong and Reuer (2008), O'Brien et al. (2003), Folta (1998), Kogut (1991)
2. Internal Factors		
Firm's performance	Total operating profit divided by total sales Return on assets, operating profit divided by assets Accounts receivable divided by sales Inventory divided by sales Selling, general and administrative expenses divided by sales	O'Brien et al. (2003); Folta and O'Brien (2008); Reuer and Leiblein (2000)
Firm size	Logarithmic transaction of sales Logarithmic total firm assets	Vassolo et.al (2004); Reuer and Leiblein (2000); Folta and O'Brien (2004)
Firm's diversification level	Sum of squared shares of the firm's business segments	Folta and O'Brien (2004); Folta and O'Brien (2007b)
Firm's research and development (R&D)intensity	Firm's R&D expense divided by assets	Folta and O'Brien (2008)
Firm's concentration	Sum of the squared market shares of all business segments competing in that industry	O'Brien et al. (2003)
Founder's properties	Formal education of firm's primary founder Age of the entrepreneur Dummy variable; coded 1 if the entrepreneur was male	O'Brien et al. (2003)
Chief Executive Officer (CEO) Duality	Dummy variable; coded 1 if CEO is also chairman of the board	Folta and O'Brien (2008)
Inside ownership	Percent of stock owned by insiders equity joint ventures formed abroad or with a foreign partner	Folta and O'Brien (2008)
Number of large blockholders	The number of block holders owing at least 5%	Folta and O'Brien (2008)
3. Decision related factors		
Prior experience	Number of technologies The count of all total acquisitions that the focal firm made in 3 years prior to the focal year	Vassolo et.al (2004); Folta and O'Brien (2008); Reuer and Leiblein (2000)
Relatedness	Distance between target industry and the firm's industry	Folta and O'Brien (2004); Folta and O'Brien (2008)
Partners' similarity	Dummy variable; coded 1 if the partners are from the same industry The common technological domains among partners	Folta (1998) Vassolo et.al (2004)
Foreign transaction	Dummy variable; coded 1 if partners are from	Vassolo et.al (2004)

	different countries	
Multinationality	Dummy variable; coded 1 if the involved two firms from the same country The number of countries in which a firm had foreign subsidiaries	Folta (1998); Reuer and Leiblein(2000)
License	Dummy variable; coded 1 if technology licensing agreement was initiated	Vassolo et.al (2004)

The objective of this study is to evaluate the factors that affect the effectiveness of exercising strategic options. Yet analyzing all kind of strategic options will be very complicated. Therefore in this study we put some limitations. In literature some strategic decisions are considered as the competence building decision, for instance Sanchez and Heene (1997) considered takeover and alliance decisions as competence building decisions. Table 3 summarizes the strategic decisions considered as strategic options. We focus on the competence building process achieved by the strategic decisions such as mergers, acquisitions, joint ventures and strategic investments. These decisions are mainly based on the external growth (Huber and Meschi, 2000).

Table 3 Strategic Decisions Considered as Strategic Options

Type of the exercised strategic option	Studies
Equity alliances	Folta and Miller (2002), Vassolo et al. (2004), Folta (1998)
Market entry	Folta et al. (2006), Folta and O'Brien (2004), O'Brien et al. (2003), Miller and Folta (2002), Dixit (1989), Campa (1993)
Joint ventures	Cuypers and Martin (2007), Reuer and Tong (2005), Kumar (2005); Reuer and Leiblein (2000), Chi (2000), Chi and McGuire (1996), Kogut (1991), Folta (1998), Hurry et al. (1992)
Acquisitions	Folta and O'Brien (2007), Folta and O'Brien (2008), Laamanen (1999)

A firm can have these strategic options. Each strategic option has an advantage over these factors. Base on this idea the selection of strategic options has main two attributes: Environmental Attributes, and Decision Related Attributes. Internal factors will be same for a company; consequently strategic option will not be able to overcome the problems associated with internal factors. Therefore in this study internal factors that affect the performance of strategic options are not selected. The main criterion environment includes the sub-attributes industry uncertainty, industry generosity, irreversibility, industry size, industry concentration, industry type and number of rivals. Each of the strategic decision's attributes affects the performance of strategic option. For instance high level of uncertainty in the strategic option's industry increases the risks in the area but high generosity increases the value of strategic option. The main criterion Decision related factor includes the sub-attributes prior experience, partners' similarity, relatedness, foreign transaction, multinationality, license. In this area factors have a positive effect on the value of strategic option. For instance prior experience increases the strategic option value. Figure 1 gives this hierarchy among attributes.

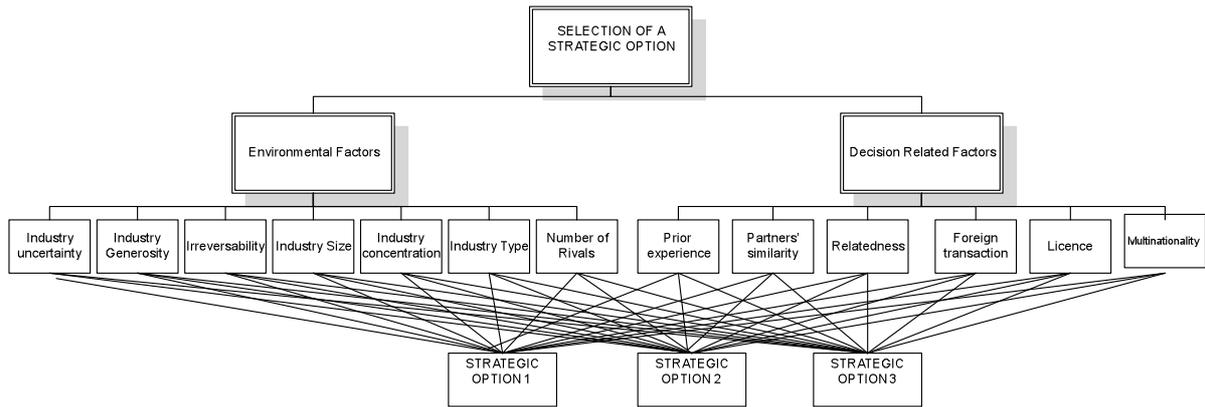


Figure 1 An Analytical Hierarchy Model For Selecting Among Strategic Options

3. Implementation and ranking

Three strategic options of an automotive company are evaluated using the Analytical Hierarchy Process given above. Taking into consideration the hierarchy in Figure 1, a questionnaire for fuzzy AHP were prepared to receive the individual weights of main and sub-attributes. Samples of questionnaire are given in Appendix. The results show that Decision Related Factors has 0.6 importance weight whereas Environmental factors have 0.4 importance weight. Table 3 shows the importance weights of sub factors.

Table 3 Importance weights of sub-factors

Sub-attribute	Importance weight
industry uncertainty	0.08
industry generosity	0.01
irreversibility	0.03
industry size	0.07
industry concentration	0.05
industry type	0.06
number of rivals	0.10
prior experience	0.05
partners' similarity	0.11
relatedness	0.12
foreign transaction	0.08
license	0.12
multinationality	0.01

The results in Table 3 show that Strategic Option1 has the highest performance among all strategic options where Strategic Option2 is the third with corresponding priority weights in Table 4.

Table4 4 Results of AHP

	Priority Weights
Strategic Option1	0.41
Strategic Option 3	0.34
Strategic Option 2	0.25

4. Conclusion

In this paper a model for selecting strategic options base on environmental and decision related factors has been presented. The model is based on the premise that strategic options should be considered via multiple criteria decision making methods.

Selecting strategic options is a complex problem in which many qualitative attributes must be considered. These kinds of attributes make the evaluation process hard. Hierarchical structure is a good approach to describe complicated system. AHP has the capability of taking pairwise comparisons of these attributes into account with a hierarchical structure. For further research a sensitivity analysis can be utilized in order to check the robustness of the model. Also a model which includes the internal factors can be utilized.

APPENDIX

With respect to the overall goal “*selection of the strategic option*”,

Q1. How important is Environmental Factors when it is compared with Decision Related Factors?

With respect to: the selection of the best performance among faculty		Importance (or preference) of one main-attribute over another	
Questions	Attributes	Absolutely More Important Very Strongly More Important Strongly More Important Weakly Important Equally Important Just Equal Equally Important Weakly Important Strongly More Important Very Strongly More Important Absolutely More Important	Attributes
Q1	E	▼	DR

With respect to the sub-attribute “*prior experience*”

Q2. What is your preference on Option-1 when it is compared with Option-2?

Q3. What is your preference on Option-1 when it is compared with Option-3?

Q4. What is your preference on Option-2 when it is compared with Option-3?

With respect to: Community service		Preference of one alternative over another	
Questions	H Alternatives	Absolutely More Preferred Very Strongly More Preferred Strongly More Preferred Weakly Preferred Equally Preferred Just Equal Equally Preferred Weakly Preferred Strongly More Preferred Very Strongly More Preferred Absolutely More Preferred	Alternatives
Q2	Option-1	▼	Option-1

Q3	Option-2	✓	Option-2
Q4	Option-3	✓	Option-3

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