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The effect of strategic flexibility configurations on product innovation

Effect of
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flexibility
configurations

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Abstract

Purpose – The purpose of this paper is to determine the contribution of company functional areas – production, marketing, and human resources – to strategic flexibility configurations. It also seeks to explore the comparative contributions of functional areas to product innovation.

Design/methodology/approach – The study uses the fuzzy-set qualitative comparative analysis to develop a better understanding of departmental contributions to strategic flexibility configuration and the effect of strategic flexibility on product innovation by functional areas.

Findings – The findings of this study indicate that marketing flexibility has a key role in product innovation.

Research limitations/implications – A limited number of cases may be one of the possible reasons for no proven contribution of HR flexibility to product innovation, and may affect results due to poor representation.

Practical implications – The required flexibility level is at least the one maintaining the company's status and certifying competitive advantage.

Social implications – A pressure for flexibility leads companies to modify their organizational structure, processes, and resources.

Originality/value – The environmental change and uncertainty provide dynamic challenges that increase the need of company flexible reactions

Keywords Product innovation, Strategic flexibility, Configuration approach,

Fuzzy-set qualitative comparative analysis

Paper type Research paper

Introduction

With the advancement of information technologies, company strategy focuses nowadays on sustainable competitive advantage, and gives importance to short-term advantages of flexibility and fast response. As a result, flexibility is accompanied by reorganization of resources and skills, strategic cooperation, and centrifugal hierarchical structure (Grant and Jordan, 2012). A company aims to absorb or exploit uncertainty through flexibility (Cannon



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and John, 2004). Flexibility is relevant to a company's ability to respond to uncertainty in both macro and micro environmental scope, while product innovation is a reaction to competitive environment.

Uncertainty has a substantial role in strategic decision-making processes. Uncertainty within the industry increases the risk and ambiguity for new-product decisions. It is a direct result of inability to forecast the direction and content of change (Thomas, 2014; Chari *et al.*, 2014). In this context, product innovation is also a key tool to cope with uncertainty and sustainable competitive advantage.

In this context, companies need innovative products for their markets. They also seek coherent structure, resources, and processes to support product innovation. In the literature, strategic flexibility mostly relates to uncertainty. Only a few research studies (Sharma and Jain, 2010; Oke, 2013) focus specifically on the effect of strategic flexibility on product innovation. Previous research has focused on either one function or the whole organization, and has not shown comparative contributions by departments to strategic flexibility. This research fills that gap by examining the effect of three functional areas together, and aims to examine the level of their individual contribution to strategic flexibility configuration. Finally, the study also differs from previous ones in the methodology it applies, as it investigates the relationship between strategic flexibility and product innovation in qualitative terms.

In the first part, we determine strategic flexibility configurations and subindicators of strategic flexibility. Production, marketing, and human resources (HR) departments hold the key indicators for analyzing strategic flexibility. In the second part, we examine whether and how strategic flexibility configurations characterize product innovation.

Literature review

Sanchez (1995, 1997) defines flexibility as an ability to respond to varying demands coming from a company's dynamic competitive environment. Hitt *et al.* (1998) define flexibility as the company's ability to immediately respond to the changing conditions of the competition, and thus to maintain or improve its competitive advantage. Strategic flexibility is considered a vital feature, particularly for industries that have highly dynamic environmental conditions (Cannon and John, 2004; Mackinnon *et al.*, 2008). Sharfman and Dean (1997), and Johnson *et al.* (2003) emphasize that a growing level of uncertainty increases the need of the company to become flexible.

From the resource-based perspective, strategic flexibility means the ability to redistribute and reorganize organizational resources, processes, and strategies of the company, based on the environmental change (Sanchez, 1995, 1997).

Strategic flexibility plays a guiding role in many organizational features such as investments, enabling rapid shifts between competitive approaches, policies, encouraging learning, and structure. Decreasing structural inelasticity and creating a horizontal and flat organizational structure are important to providing desirable flexibility (Beraha, 2014). This flexibility supports adjustment to the competitive environment by decreasing costs and reducing need for time. By means of strategic flexibility, companies find a chance to evaluate available opportunities and to minimize risks to their assets (Roca-Puig *et al.*, 2005). The success of strategic flexibility is proportional to the rate, scope, and cost of the response to uncertainty (Gerwin, 1993).

Approaches to and perspectives on flexibility differ in literature related to strategic management and organization theories. In general, these two conceptual perspectives, organizational and strategic flexibility, are interrelated and complementary. Strategic flexibility can become an organizational feature by achieving organizational flexibility at all levels. Likewise, flexibility at all levels and in functional departments of a company enriches the options of decision-making units, and thus facilitates strategic flexibility. This two-way

relationship helps a company make shifts between activities or enrich them, and turns strategic flexibility into an organizational feature. Both organizational and strategic flexibility become meaningful on the basis of organizational resources, skills, structure, processes, and the number of strategic options.

Zhang (2005) and Roca-Puig *et al.* (2005) discuss the effects of strategic flexibility on organizational performance. One of the desired organizational performance effects is product innovation.

There is vast evidence of the relationship between strategic flexibility and product innovation. In one of his early studies, Sanchez (1995) indicates a positive relationship between strategic flexibility and product innovation. Further, Zhou and Wu (2010), Fan *et al.* (2013) and Wei *et al.* (2014) show a supportive role for strategic flexibility in product innovation. The same results are presented by Kamasak *et al.* (2016).

Production flexibility

Production technology is closely relevant to process flexibility necessary to reach the required level of output flexibility (Urtasun-Alonso *et al.*, 2014). In terms of production, process flexibility means production of various products in the same plant or on the same production line. Therefore, process flexibility depends on the decisions concerning which plants and which production lines will produce the products (Beraha, 2014). When a company possesses few products and plants, decisions about flexibility will be relatively simple. As the variety of products and the number of plants increase, it becomes more difficult to assess benefits that flexibility brings (Jordan and Graves, 1995).

Sethi and Sethi (1990) report that production flexibility consists of operational and material-handling flexibility. In terms of production, flexibility aims to decrease the amount and costs of stock. On the other hand, direct and indirect connections between product and plant groups are also relevant for flexible production decisions. The interpermeability of products and plants increases due to these connections, and thus the traces of each product and plant intertwine with each other (Jordan and Graves, 1995).

In their research, Worren *et al.* (2002) argue that companies performing in particularly dynamic markets need to ensure higher product modularity. The authors stress the importance of modular product design, indicating that the production system that ensures product variety, through design based on new combinations of standard components, may promote its environmental fit. They conclude that modular product architecture has a certain effect on strategic flexibility.

Cannon and John (2004) analyze flexibility in four aspects. The first is tactical input flexibility, which indicates procurement of raw materials of desirable quality, and the abilities to minimize deficiencies arising from suppliers (such as delays or undersupply) and shift to alternative suppliers for any kind of input. Second, strategic input flexibility emphasizes the ability to use new raw materials and inputs. Third, tactical output flexibility covers the abilities to modify product properties as customers demand, accommodate changes to order due dates and amounts, and make rapid modifications in the available products mix. Finally, strategic output flexibility covers the start of production of new products, making modifications in product design and new-product decisions (for the market, the company, or both).

Marketing flexibility

Johnson *et al.* (2003) refer to the long-term strategic advantage of companies that proactively adjust themselves to change. When correlating market-based flexibility and environmental uncertainty, the authors emphasize that provision of high-level market-based strategic flexibility under conditions of high uncertainty increases organizational performance in the long run.

In his research, Sanchez (1999) discusses process flexibility in terms of the marketing function. He points out the need to impose a modular property on marketing processes, so that they can gain flexibility and adaptation skills against the flexibility of the market. Common marketing-process views depend on optimization of the supply and distribution channels, so that they can support a certain production line for a certain market segment. Contrary to this view, the author indicates the need to create a supply and distribution channel that supports a system to produce various products addressing various consumer segments. He also discusses marketing processes within the framework of marketing organizations, such as market research, market development, supply chain, distribution channels, and product design, and claims that these processes will improve their flexibility and fit with the modular structure (Beraha, 2014).

Price flexibility covers discounts in prices, and benefits and services offered to customers free of charge. Distribution flexibility refers to the availability of alternative channels, performance of online sales, bargaining power of the company in agency contracts, and a company's ability to shift to alternative agencies in order to take measures against logistical problems. Promotion flexibility includes efficient use of mass-media tools, personal sales attempts, promotional activities, and frequency of participation in national and international fairs, events, and media meetings.

HR flexibility

Becker and Huselid (1998) emphasize that flexible HR systems promote procurement, encouragement, and development of intellectual assets. These systems support environmental fit and add value as a source of competitive advantage (Bhattacharya *et al.*, 2005).

One of the approaches to maintaining a flexibility-based system relies on supporting workforce flexibility in changing conditions, and investing in it (Cannon and John, 2004). HR flexibility is conceptualized by Wright and Snell (1998) within the framework of three components: worker skills flexibility, worker behaviors flexibility, and HR management practices flexibility:

- (1) Worker skills flexibility relates to the amount (variety) of skills that workers possess and can transfer to alternative uses; and rapid reassignment of workers who possess various skills.
- (2) Worker behaviors flexibility refers to the ability to routinize behaviors. In other words, workers have a wide set of behavioral codes that are adjustable to specific needs.
- (3) HR management practices flexibility means the company can adapt HR practices and apply them to various situations in various units. This type of flexibility also refers to the rate of these adjustments and practices.

Methodology

Configuration theory as a research method

The research makes use of the fuzzy-set qualitative comparative analysis (fsQCA). As a theoretical approach tool, the Qualitative Comparative Analysis (QCA) technique studies cases that include groups with qualitative properties suitable for testing configuration theories. As opposed to the regression and correlation methods matching Boolean algebra (Fiss, 2007) linearity theory, QCA may focus on equifinality and togetherness of the variables to obtain simplified statements that create certain results. QCA refers to the scenarios that enable a system to reach at the same final situation from different start points and through different or multiple ways (Katz and Kahn, 1978).

QCA offers a framework for the comparison of organizational configurations. In order to analyze the limited variety between equifinality and configurations, QCA discusses their applicability (Fiss, 2007). This paper follows the recommendations of Fiss (2007) and avoids several analytic methods, such as the cluster analysis, interaction effects, and deviation scores. When demanding complex causality and nonlinear relationships, the paper follows the theories of QCA method. Qualitative focus enables the analysis of a few cases, as it is both intense and complementary (Ragin, 2008). For this reason, this paper uses a specific type of QCA, the fsQCA program, to determine the relationships between product innovation and strategic flexibility configurations.

Methods

The first part of the research identifies the production, marketing, and HR functions affecting strategic flexibility, and their subsidiary aspects. We use a multiple case study methodology and semistructured interviews as the data-collection method. A semistructured interview method enables utilization of prearranged standard questions and additional questions that would enable acquisition of deep knowledge (Yildirim and Simsek, 2011; Buyukozturk *et al.*, 2014).

We study product innovation as an outcome, and calculate outcome with respect to companies' new innovation decisions, new market opportunities, and production mix. While determining the measures for outcome, we use the same method for conditions and take the cumulative valuation of companies' new innovation decisions, new market opportunities, and production mix values.

The industry selection process focused on the electrical household appliances industry, due to its dynamic market structure, which responds to consumer demands, and thus is in great need of flexibility. According to the data supplied by GfK Temax Turkey, more than 50 brands owned by more than 30 producers in the Turkish small electrical household appliances market dominate 98-99 percent of the market as of 2014. Nearly half are domestic producers. The authors contacted the ten largest (in terms of amount and turnover) Istanbul-located (in terms of convenience and research budget) companies, and presented the study to them. From those, four companies agreed to participate (40 percent). These four companies represent 20 percent of the Turkish retail market in terms of amount, and 12 percent of the market in terms of turnover. All interviews took place in Istanbul in May 2014.

The interview guide was prepared after the literature review, and used scales from empirical research studies in the strategic flexibility literature as a basis. Within this framework:

- Production flexibility questions use Cannon and John's (2004) scale, developed on the basis of four aspects: tactical input, tactical output, strategic input, and strategic output.
- Marketing literature does not include any flexibility-relevant scale. Consequently, marketing flexibility questions focus on the marketing-mix elements. This paper adds two more dimensions to determining marketing flexibility. The consumer and agency knowledge aspect relates to the presence or absence of a database containing consumer and agent customer information that guides marketing processes, due to market uncertainty necessitating extensive market information to cope with uncertainty (Chari *et al.*, 2014). The new markets aspect relates to capability of expanding market scope and depth. The research aims to measure marketing flexibility that includes marketing department functions and market data. As production flexibility items include questions about the product, the product aspect does not have a part in the marketing questions. The marketing

flexibility research structures the subsidiary aspects of price, distribution, and promotion factors, according to the studies of Sanchez (1999), Johnson *et al.* (2003), and Combe and Greenley (2004), and prepares the questions accordingly. Apart from the marketing-mix factors, the research also includes questions about new market opportunities, and agent, customer, and consumer information (Fan *et al.*, 2013; Combe and Greenley, 2004).

- HR flexibility questions make use of the scale that Bhattacharya *et al.* (2005) developed, which they based on three aspects: worker skills flexibility, behavioral flexibility, and HR management practices flexibility.

Average number of new products released into the market over years is accepted as an indicator for product innovation.

While collecting the measures for conditions, we take the cumulative valuation of departments' affect. Production flexibility condition includes 9 sub-affects summation (4 main affects); marketing flexibility includes 15 sub-affects summation (5 main affects) and HR flexibility includes 13 sub-affects (3 main affects). After collecting the measures for the conditions and the outcome, we calibrate the conditions so that they are computable in a fsQCA (Schneider and Wagemann, 2012). For the conditions, we set the maximum value for outcome at 100, the threshold for the crossover value for outcome at 60, and the minimum value at 0. We set the threshold for the crossover value higher. Intense competition, home fashion trends, and economic developments influence the electrical household appliances industry. The industry requires medium-level flexibility as a configurative feature. Electrical household appliances industry actors must achieve flexibility that can meet medium-level uncertainty, to obtain sustainability. Consequently, the industry must renew its products and/or production, and offer innovative products to present and/or new markets. We appoint the threshold for the crossover value at 80, due to both the industry features and the need for objective and robust results to show the effect of strategic flexibility configuration on product innovation. For the causes/conditions, we set the maximum value at 100, threshold for the crossover value at 80, and minimum value at 50. In doing so, we ensure that they calibrate the entire strategic flexibility configuration with respect to all cases.

This research processes product innovation as an outcome, testing for certain combinations of strategic flexibility degrees of the companies, with respect to product, marketing, and HR departments' affects. The study then uses each of the negations separately.

The process of analyzing findings primarily makes use of descriptive analysis. Then the process rates the findings using the hundred-point system intended for analysis through the fsQCA program, utilized to assess the relationship between product innovation and strategic flexibility, which makes up the second part of the research. A quantitative scale shows the flexibility of the company by department, to enable the program to process them. Table I summarizes the main and subsidiary dimensions of flexibility.

Conditions and outcomes

This research determines strategic flexibility configurations – that is, production flexibility, marketing flexibility, and HR inventory – and HR management practices flexibility acquaintance links as causes/conditions. It uses product innovations as outcomes that relate to hypotheses. The outcome shows average number of product innovations over years.

Study propositions

The principal objectives of this paper are as follows: to analyze the relationship between strategic flexibility configurations and product innovation; to analyze contribution of

Strategic flexibility		Effect of strategic flexibility configurations
<i>Production</i>	Tactical input Tactical output Strategic input Strategic output	
<i>Marketing</i>	New market opportunities Price Distribution Promotion	
<i>Human Resources</i>	Agent customer, supplier and consumer information Knowledge-skills Behavior HR management practices	

Table I.
Main and subsidiary dimensions of strategic flexibility

flexibility configurations of functional areas (production, marketing, and HR) to product innovation using the fuzzy logic model; to analyze the functions of strategic performance in terms of production, marketing, and HR.

Propositions:

- P1.* Strategic flexibility configurations have a significant role in product innovation.
- P2.* The flexibility configurations of functional areas (production, marketing, and HR) contribute to product innovation at different levels.
- P3.* Functional areas (production, marketing, and HR of companies) have significant effect on strategic performance.

Results

Data collection resulted in 13 interviews conducted with individuals in the role of general manager, production manager, marketing manager, and HR manager, or their respective assistants. In one company, a single manager represented all other positions. The authors assume managers present their subjective views, opinions, and perceptions.

Truth table analysis

The core of fsQCA is a truth table analysis that seeks to identify causal combinations that are sufficient for the outcome. Truth tables give an indication of identical cases and “limited diversity phenomenon.” The truth table for the interrelatedness of innovation and strategic flexibility configurations is found below (Table II).

The truth table lists every possible combination of conditions, in this case 2^3 , with 3 being the number of conditions (Schneider and Wagemann, 2012). We set the consistency threshold to 0.8, a value expected to create robust results (Fiss, 2011; Rihoux and Ragin, 2009; Schneider and Wagemann, 2012). The only solutions that belong to more than zero cases appear. The truth table for the interrelatedness of innovation and strategic flexibility configurations does satisfy the required assumptions. The numbers in the first four columns

Production flexibility	Marketing flexibility	Human resource flexibility	Product innovation	Row cons.	PRI cons.	SYM cons.
1	1	0	1	0.954	0.897	1
1	0	0	0	0.754	0	0

Table II.
Truth table for the outcome “product innovation”

represent whether causal condition exists or not – that is, 1 means causal condition exists (fully in) and 0 means causal condition does not exist (fully out) (Ragin, 2006).

We also present a truth table for the negation of product innovation and strategic flexibility configurations for checking the results (see Table III).

Product innovation as outcome

According to the first procedure, we determine the following solutions (see Table IV).

Table IV shows that one solution may explain the interrelatedness of strategic flexibility configurations and product innovation in the electrical household appliances market. Ragin (2006) suggests using raw and unique coverages to assess empirical importance. Findings of Schneider and Wagemann (2012) suggest that raw coverage refers to the size of overlaps between the causal condition sets and the outcome sets. Additionally, unique coverage partitioning the raw coverage controls the overlapping explanations.

The total coverage with respect to the importance of all causal paths is 0.873, which explains that a causal path covers most of the outcome. The notable expression with a unique coverage of 0.873 is Production flx.*market flx.* ~hr. flx, which shows that product innovation interrelates with the strategic flexibility configurations of production, market, and negation of HR departments' affects in the electrical household appliances market. Companies with production flexibility and marketing flexibility, but without HR flexibility, are prevalent. These findings align with others from the literature. Oke (2013) presents evidence on positive effects of production flexibility on product innovation performance. Sharma and Jain (2010) assert that marketing flexibility has a positive effect on product innovation. The contradiction of the results with empirical evidence is with HR flexibility. Here, for instance, Chen *et al.* (2014) found that HR management practices affect product innovation performance of the company. Preenen *et al.* (2017) focus on internal labor flexibility and confirmed the relationship between internal labor flexibility and product innovation. A possible explanation could be an early study of Arvanitis (2005), who argues that product innovation requires highly-skilled technicians and scientists, while companies sometimes hire high-skilled personnel temporarily for certain tasks, from other institutions. Thus, company employees stay focused on routine tasks. Another possible explanation is that the findings of this research refer to the homogeneity of HR flexibility for these four companies. Because of this similarity, HR flexibility does not show its contribution in product innovation. The limited number of cases may affect this result.

In sum, the outcome of this analysis determines that production and market flexibility configuration counterparts are consistent indicators of product innovation. Results show that marketing processes provide crucial information about market trends guiding new products.

Table III.
Truth table for the outcome “~product innovation”

Production flexibility	Marketing flexibility	Human resource flexibility	Product innovation	Row cons.	PRI cons.	SYM cons.
1	0	0	1	1	1	1
1	1	0	0	0.546	0	0

Table IV.
Solution terms for product innovation

Solution term	Coverage (raw)	Coverage (unique)	Consistency
Production flx.*market flx.* ~hr. flx	0.873	0.873	0.954
Overall solution	0.873		0.954

Negation of product innovation as outcome

The concept of asymmetric causality (Lieberson, 1985) is important when evaluating the potential of QCA for social science research. Unlike most statistical procedures, QCA links conditions and outcome through set theoretical relations that are asymmetric. Therefore, QCA provides both presence and absence of phenomena in two distinct analyses (Schneider and Wagemann, 2012). The analysis of the negation of outcome determines the understanding of causal logic driving the positive cases, with respect to negative ones (Ragin and Rihoux, 2004).

Table V shows that only one solution may explain the interrelatedness of strategic flexibility configurations and the absence of product innovation.

The most notable expression with a unique coverage of 0.396 is production flx.*~market flx.* ~hr. flx, which shows that a strategic flexibility configuration of production department affect and negations of market and human resource affects are consistently indicators of negation of product innovation. The solution of the negation of product innovation is a different solution from product innovation. So we accept production flx.*market flx.* ~hr. flx solution when they determine product innovation and strategic flexibility configurations relatedness.

Conclusions

The findings reveal that the strategic flexibility configurations have a significant role in product innovation, as referred to in the first proposition. The results indicate that strategic flexibility configurations related to production and marketing flexibility have a significant role in product innovation. This result proves the second proposition. Each functional area has shown different performance in product innovation. Only HR flexibility produces no result in a comparison of functional contributions to product innovation. Solution terms for product innovation show that negation of marketing flexibility creates a little more change, in comparison to production flexibility. Findings also show functional areas contribute to strategic performance by advancing innovation related to the third proposition.

Nowadays, companies can provide both productive capacity and product diversity by means of freight production. This makes a considerable contribution to meeting production flexibility requirements, enabling companies to focus more on developing new products and their sales. Consequently, the results indicate that marketing flexibility plays a distinctive role in product innovation.

The capabilities of the production department also play a decisive role in the production of innovative products. The availability of a wide range of components and raw materials in the production process also encourages companies to innovate, and makes it easier to bring innovative products to production. For this reason, production flexibility is effective in product innovation. On the other hand, if companies have facilities for freight production to meet their requirements for production flexibility, flexibility of production system within the company has limited significance for product innovation.

The findings show that multifaceted communication with the industry environment and end users is effective in marketing flexibility. Sector fairs and events, in terms of supplier and market information and the use of social media contribute significantly to tool and end-user information. Companies also increase their marketing flexibility by using distribution

Solution term	Coverage (raw)	Coverage (unique)	Consistency
Production flx.*~market flx.* ~ hr. flx	0.396	0.396	0.1
Overall solution	0.396		0.1

Table V.
Solution terms for
~product innovation

channels, such as electronic platforms, and promotional efforts. These processes not only increase sales, but also contribute to the acquisition of end-user information to guide product innovation.

Limitations

A limited number of cases may be one of the possible reasons for no proven contribution of HR flexibility to product innovation, and may affect results due to poor representation. On the other hand, four companies are enough to satisfy fsQCA requirements. More empirical studies of heterogeneous cases can contribute to determining the role of HR flexibility in product innovation. Another limitation is the subjective character of information provided. Data analysis thus occurs on the basis of perceptions and opinions. Another study in the same context is recommended, to validate the results.

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