Marketing strategy and environmental turbulence: Effects on the intensity of products innovation and firm performance

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Financial support provided by the Spanish Ministry of Economy and Competitiveness
(Project number ECO2015-67122-R)

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(Estrategia de marketing y turbulencia del entorno: Efectos sobre la intensidad de las innovaciones en producto y el resultado empresarial)

Abstract

The aim of this work is to explain the boundary of the type of knowledge in the marketing strategy applied by the company for the development of new offerings. Based on the theory of knowledge management (Grant, 1996), and the concepts of exploitation and exploration (March, 1991), the paper tries to assess the effects of the exploitative/explorative marketing strategy and turbulence as antecedents on the intensity of the product innovation and firm performance.

Previous studies (i.e., Atuagene-Gima, 2005) have focused on explaining the effect of knowledge exploitation/exploration on the degree of novelty (incremental / radical), but has not explained how it affects the performance of the company.

The study is performed on the Spanish food sector, with a sample obtained through the questionnaire conducted by personal interviews. Hypotheses are tested using structural equation modelling. This paper provides evidences of the relevance of exploitation marketing strategy Results

Keywords: exploitation, exploration, knowledge, product innovation, food

1. Introduction

Despite the widely-recognized importance of innovation for a company's long-term survival (Jamrog, 2006), as well as the extensive and burgeoning research on innovation and new products, the failure ratios in new products development are very high overall.

Literature about exploitation and exploration is extensive, but there are some gaps between different research streams, antecedents and consequences related to innovation performance (*Jansen et al.*, 2006). In a context of high dependence between manufacturers and distributors, such as in the food industry, we aim to provide insights about the boundaries to the performance of innovation strategies through organizational learning and knowledge management research (Easterby-Smith and Lyles, 2011).

Though there is consensus that innovations should create value by decreasing costs and enhancing value (Brandenburger and Stuart, 1996), the innovation-performance relationship is not so evident (Rosenbusch *et al.*, 2011), as it is dependent on the appropriate ratio between a customer and organizational focus (Paladino, 2009), the context (Rosenbusch et al., 2011), and resources (Priem et al., 2013). March's (1991) notion of exploitation-exploration provides a well-known framework to analyse the effects of knowledge-based innovation strategies on performance, testing the extreme positions and the ambidexterity effect. At the firm level, innovation decisions can be understood as an external information adquisition, where distant knowledge search is considered as exploration and proximate knowledge search is interpreted as exploitation (Sidhu et al., 2007). This framework can contribute to the literature of innovator's dilemma (Christensen, 2006), since "senior teams are, in essence, captured by their largest, most profitable customers, making it exceedingly difficult to allocate resources to initiatives that serve new customers at lower margins" (p. 5).

Food industry is quite conservative to innovate, with just 2.2% of radically new products compared to the high number of total food product launches annually (77%), implying that

innovation had come to be more incremental (Costa and Jongen, 2006). However, consumers' food consumption patterns today change very fast (Costa and Jongen, 2006). Food markets are global nowadays, the public demand new and differentiated products, ones that are individualized and have high safety and quality standards (Grunert et al., 2005; O'Kane, 2012). Advances in scientific and technological knowledge have indeed contributed to meeting the changing needs of sustainability, providing new streams of research to understand food innovation decisions (Grunert et al., 2008). Thus, the food sector also has the need to continuously innovate and develop its selection in order to maintain or grow in markets and profitability (Stewart-Knox and Mitchell, 2003). However, market constraints for acceptance of food innovations results in high failure rates that limit new product introduction (Grunert et al., 2005).

Assuming that exploration and exploitation innovation is contingent on the environment (Sidhu et al., 2007), the food industry provides an opportunity to examine empirically how companies provide responses to the exploitation/exploration innovation dilemma, analysing how food and beverages manufacturers balance their innovation strategies, unlike other industries. In particular, the food sector encompasses different types of knowledge domains (Li et al., 2008): scientific exploration and exploitation, technological exploration and exploitation, and product market exploration and exploitation.

On one hand, there exists a necessity to innovate and develop new products as a key strategy to ensure the competitiveness and survival of the sector (FoodDrinkEurope, 2011). This satisfies both the requirements of consumers for safety, quality and variety (Baregheh et al., 2012; Barrena-Figueroa and Garcia-Lopez, 2013). On the other hand, though the food and beverages industry is of high economics and social relevance in the world (Pfitzer and Krishnaswamy, 2007), it faces strong patterns of tradition and standardization (Vanhonacker et al., 2013). Thus, acceptance of innovations in food products by consumers carries

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limitations linked to ~~its~~ their traditional character (Kühne et al., 2010) or to risk a~~d~~version based on changes due to human intervention (Verbeke et al., 2007).

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The paper analyzes the independent and joint effect of exploitation and exploration based innovation strategies on firm performance. We apply the exploitation and exploration concept, together with the incremental and radical processes innovation constructs. The empirical analysis is performed on a sample of 201 Spanish food manufacturing firms. The main conclusion is that waive exploratory strategy may be the price of entering the final market. The theory's main recommendation is that innovation strategy must be subject to push/pull channel management strategy.

2. Literature review and hypothesis

Exploitation, exploration and innovation

The exploration-exploitation framework was introduced by March (1991) and has been adopted in various fields of management, in particular, in marketing strategy (Kyriakopoulos and Moorman, 2004). March (1991, p. 71) states that "Both exploration and exploitation are essential for organizations, but they compete for scarce resources As a result, organizations make explicit and implicit choices between the two". La exploration includes things captured by terms such as search, variation, risk taking, experimentation, play, flexibility, discovery, innovation. Meanwhile, exploitation includes such things as refinement, choice, production, efficiency.

Different perspectives and definitions have been provided for these concepts (see a review in Li et al., 2008, o Lavie et al., 2010). Most authors define exploitation and exploration from a knowledge perspective. Dannels (2007) describes exploration as the development of a new

technology to serve our customers, and exploitation as strengthen existing technology to meet existing customers.

Exploitation and exploration constitute a continuum whose choice may determine the inadequate capabilities involving loss of competitiveness and customer or product failures. This phenomenon has become known as the capability-rigidity paradox in product innovation (Atuahene-Gima, 2005).

March (1991) states that because the benefits of exploration are distant and uncertain, managers tend to put more resources into exploitation than into exploration (March 1991). Atuahene-Gima (2005) posits that the key to resolve that paradox may be factors that can leave no room for exploration so that "firms can the firm can develop incremental and radical innovations simultaneously" (p. 63).

Both concepts have been studied from the learning and knowledge management literature (Zollo and Winter, 2002). Both learning activities are essential for adaptation, exploiting existing competences to produce profits and exploring new opportunities to gain long term efficiency (Smith and Tushman, 2005). These decisions are related to productivity, contributing mainly in the short term and enabling these companies to enhance their performance (Garcia et al., 2003). Exploration activities account for long term performance and are related to new products and markets (Raisch and Birkinshaw, 2008; Li et al., 2008).

Since innovation is a source of market share and firm survival, firms use existing knowledge and search out new forms to achieve success in innovations (Katila and Ahuja, 2002). Furthermore, innovation literature has adopted the concepts of exploitation and exploration to explain the process of innovation (Atuahene-Gima, 2005; Rothaermel and Deeds, 2004). A firm's choice of type of innovation can be distinguished by its motivation to either explore new opportunities or exploit existing income sources (Rothaermel and Deeds, 2004).

In the food industry the adoption of a coherent innovation program is a difficult task since the firm must take into account a great many factors, which are both exogenous and endogenous to the food industry environment (Jongen and Meulenberg, 2005).

Then, manufacturers' innovation programs change and adapt to retailers, being isomorphic with retailers' strategy. Thus, we are assuming a co-evolutionary perspective (Koza and Lewin, 1998), where manufacturers' strategy co-evolves with distributors' strategy and power, driving the industry innovation level, only exploration marketing strategies can distinguish from the competence and provide an advantage. Due to resources are limited, with low returns level in the food industry, es probable que ambas estrategias sean mutuamente excluyentes, y más de una implique menos de la otra (mutualy exclusive) (Gupta et al., 2006).

From the resource theory, organizations carry out exploitation to improve efficiency in the short term and generate profits. However, the consequences may be negative in the long term. Thus, organizations try to counteract the effects on performance within operating activities in the long term by allocating resources to exploration-based innovation, reinforcing both (Lavie et al., 2010). Since each one requires different resources and capabilities (Sirmon et al., 2011), tensions arise between the two regarding resource-allocation decisions (Raisch et al., 2009). A position is that the interplay between them constitutes a zero-sum game due to the constraints of resources and capabilities (Gupta et al., 2006). Therefore, a manufacturers' position is to assume a positive local feedback in the form of customer demand and profits that produce a path dependence tilted toward exploitation (Benner and Tushman, 2003).

Therefore, we argue that the effects of exploitation and exploration are different depending on the intensity of product innovation. As a result, we propose the following hypotheses:

H1a: Exploitation marketing strategy is negatively related to the adoption of radical product innovations

H1b: Exploitation marketing strategy is positively related to the adoption of incremental product innovations

Since open innovation is gradually prevailing as a model of innovation in the food industry (Sarkar and Costa, 2008) and the diversity of dietary patterns grows continuously (Naska et al., 2006), opportunities emerge. However, food firms invest more in stability and avoiding risks (Grunert, 2005), producing a path dependence tilted toward exploitation (O'Reilly and Tushman, 2008) and making innovations decisions biased towards short-term projects (Manso, 2011; Narayanan, 1985) restricting adaptation to things already known (Lewin et al., 1999). Exploration of new knowledge is essential for long term survival and to obtain future economic gains. However, given the path dependence of the food and beverage industry (Grunert et al., 2005) and the trade-offs between exploitation and exploration, an increase in exploration may drive out exploitation investment, reducing innovation capabilitities and performance. From the above, we posit then:

H2a: Exploration marketing strategy is positively related to the adoption of radical product innovations

H2b: Exploration marketing strategy has not effect on incremental product innovations

Turbulence and intensity of innovation

Changing environments boost change for organizations and create new opportunities (Calantone et al., 2003). In fact, firms who are sensitive to environment cues are in better position to survive and overcome potential competitors. Environmental turbulence reflects

rapid market and technological changes that managers perceive as hostile and stressful conditions for their firm (Atuahene-Gima, 2005).

Though the relevance of environment for strategy and innovation decisions is clear, it has been considered as both moderator and antecedent (Calantone et al., 2003). Contingency theory suggests that environmental turbulence play a moderating role in adopting a strategy (Voss et al., 2008). Anyway, synthesis about existing contributions comes to consider environmental dynamism and competitive intensity as a focal point to explain innovation decisions (Lavie et al., 2010), since environmental turbulence shape strategy (Jansen et al., 2005).

In the case of the food products, consumer~~s'~~ concern for ~~the~~ low price~~s~~ is very ~~high~~great, ~~complicating~~ and this complicates ~~the~~ decision making (Grunert, 2005). ~~During the last~~ In past years, consumer~~s'~~ innovativeness has increased (Banterle et al., 2011; Barrena-Figueroa and Garcia-Lopez, 2013) to the detriment of personal factors (Urala and Lähteenmäki, 2007). Consumers are more aware of other products, with concerns about safety and quality of food (Fortuin and Omta, 2009). New active stakeholders (i.e., food collectives, users and consumers associations) and concerns have entered the market, incorporating new attributes into the decision-making structure of the consumer, such as the health effects of the products consumed (Golan and Unnevehr, 2008) and food sustainability (Vermeir and Verbeke, 2006; Fortuin and Omta, 2009). These issues should be considered in order to meet the high safety and quality needs of consumers (Fortuin and Omta, 2009; Grunert et al., 2005) and new stakeholders who actively have joined the food supply chain, all of whom are interested in sustainability (Vanhonacker et al., 2013), as it should be done in companies from other industries from other industries (Nag *et al.*, 2007).

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In addition manufacturers are exposed to increasing pressures (Leingpibul et al., 2013). Firstly, markets are fragmenting, which makes it difficult for manufacturers to reach customers (Aaker and Joachimsthaler, 2000). Secondly, customers are becoming increasingly less willing to pay premium prices for manufacturer brands (Zaltman, 2003), partly because of easier access to information on a wide variety of lower priced alternatives (Berthon et al., 2003) via the Internet, which is often accompanied by reviews by customers and customer-focused organizations (e.g., ocu.org, supermarketguru.com). And, finally, an increase in the number of retailer brands that are typically priced lower than manufacturer brands (Gordon, 1994; Hoch, 1996; Hu and Chuang, 2009), but which have improved their quality, has led to a higher acceptance by customers of store brands (Rubio and Yague, 2008).

Then, since manufacturers seek to adapt to environmental changes, they have to adopt incremental innovation as the normal response to satisfy customer. However, when the environment is more dynamic and competition more intense, firms may overcome their competitors by offering innovations more exploratory. The, we propose these hypotheses:

H3a: Environmental turbulence is positively related to the adoption of radical product innovations

H3b: Environmental turbulence has not effect on the adoption of incremental product innovations

Radical and incremental innovations and performance

Globalization, with the product competitiveness from emerging countries combined with the market penetration capacity of firms from other advanced countries, has boosted innovation strategies merely aimed at cheapening the product (Capitanio et al., 2009). Also, many

manufacturers' and vendors' strategies emphasize differentiated products (Mérel et al., 2011), leading to infer that a high degree of exploration innovation could have a positive effect on performance.

However, acceptance of innovations in food products by consumers carries limitations linked to their traditional character (Kühne et al., 2010) or risk aversion based on changes due to human intervention (Verbeke et al., 2007). So, traditionally, the food industry has been characterized by low levels of RandD intensity (Connor and Schiek, 1997). This behavior also occurs in the Spanish case (Garcia and Briz, 2000). Previous empirical studies noted that food firms develop more process innovations than product innovations, and that the majority of product innovations are incremental (Brewin et al., 2009; Menrad, 2004), which would translate to a preference for exploiting. This could imply that incremental innovations help to have customers satisfied and maintain the image of the company's products, what it is considered a high open system performance (Quinn and Rohrbaugh, 1983).

Moreover, innovation value benefit may be appropriated by other firms (Teece, 1986), particularly in the context of high co-specialization. Thus, the more powerful supply chain actors (distributors) benefit from the architectural advantage of the food industry (Jacobides et al., 2006). Innovation decisions are now very important for B2B markets, where the supply chains are characterized by an acute unbalanced bargaining power in favor of distributors (Meehan and Wright, 2012) and manufacturers are immersed in collaboration with distributors along the supply chain (Van Dock et al., 2008). Additionally, a fact to consider is that a significant part of the innovations in the food industry innovations are indirect, coming from ancillary sectors and from other industries (Alvarez-Coque et al., 2012).

Then, radical innovations are planned carefully and carried out as the only way to overcome competitors and increase market performance, posing increasing sales and market share, as

firm's rational goals (Quinn and Rohrbaugh, 1983). Then, we posit the following alternative hypotheses:

H4a: Radical product innovations are not associated with a higher level of open system performance.

H4b: Radical product innovations are associated with a higher level of rational goals performance.

H5a: Incremental product innovations are associated with a higher level of open system performance.

H5b: Incremental product innovations are associated with a higher level of rational goals performance.

3. Research methods

Sample and data collection

The target sample for this study consisted of a sample of companies in the Spanish food and beverages industry. The food and beverages industry in Spain is comprised of more than 28,000 companies, which represents 15.8% of the national industrial production. It is a sector of strategic importance with relevant innovation activity.

Measures

This study has measured the constructs of interest using the existing scales in the literature to suit the research context. To assess the clarity and understandability of the measures and ensure an accurate implementation of the procedure, the authors pre-tested the initial version of the questionnaire with face-to-face interviews with five executives of the industry. Based on their comments, this study refined the measures and completed the final version of the questionnaire.

We measured the dependent and independent variables with multiple-item, ten-point Likert-type scales, ranging from 0 ("strongly disagree") to 10 ("strongly agree"), ensuring statistical variability across the survey responses. In the case of the dependent variable (firm performance), we switched to a five-point scale, with "1=not at all" and "10=completely".

Table 1 presents the detailed description of the scales for the measurement of the constructs considered.

Insert Table 1.

The measures of exploitation and exploration marketing strategies were adapted from prior works by Atuahene-Gima (2005) and Zahra et al. (2000). They included five items for measuring the enhancement or refinement of existing products (*exploitation marketing strategy*) and five items for assessing the development of new technologies, products, or services that could make existing ones obsolete or non-competitive (*exploration marketing strategy*) (Bierly et al., 2009). *Turbulence* measurement was measured using previous scales adapted from Atuahene-Gima (2005) and Jaworski and Kohli (1993).

Performance was measured under a broad efficient perspective, pursuing a better understanding of the formation of the financial result, which constitutes a 'black box'. This characterizes the exclusive use of financial indicators (Venkatraman and Ramunujam, 1986, p. 804). Thus, we adopt a rational performance approach (Quinn and Rohrbaugh, 1983). The

rational goal model views the organization as being in the hands of a rational set of decision makers who have in mind a specific set of goals (Gouldner, 1959; Scott, 1987). Thus, the main objectives of an organization according to the rational goal model are productivity and efficiency or, stated alternatively, maximizing outputs relative to pertinent conditions such as obstacles and costs (Quinn and Rohrbaugh, 1983). These objectives can be assessed by examining their contribution to profits and sales. In particular, the scale for firm performance consisted of three items that were adapted from prior studies (e.g., Kandemir et al., 2006; Kumar et al., 1992).

This study measured the *process innovation* capability as the abilities, resources, technologies and routines *ex-ante* to develop product innovations. Traditionally, innovation intensity has been measured using a direct scale, considered as a continuum of radical-incremental position (e.g., Dewar and Dutton, 1986, Song and Thieme, 2009), and as a sum-index of indicators or items (e.g., Chandy and Tellis, 2000; Tellis et al., 2009). A more rewarding approach was conducted by Atuahene-Gima (2005), later applied by Arnold et al. (2011). This approach consisted of measuring differentially radical and incremental innovation by means of specific scales for each type of innovation. Thus, a more large and detailed comprehension of the concept of measurement is obtained. Both scales for process innovation (radical and incremental) each consisted of five items that were adapted from Tuominen and Hyvönen (2004). Scales descriptives and main statistics are contained in table 1.

Validity and reliability

Analysis procedures from prior studies were followed in order to assess the validity and reliability of measurement scales, (e.g., Hair et al., 2010; Anderson and Gerbing, 1988). Firstly, we conducted an exploratory factor analysis using principal component analysis with

Varimax rotation (SPSS version 22.0) to test the unidimensionality of different measured constructs. All items loaded on their hypothesized factor. Cronbach's alpha values were then calculated for each construct to consider their reliability, obtaining satisfactory results supporting such reliability (Peterson, 1994). Table 2 presents these coefficients for purified scales.

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Finally, confirmatory factor analysis was then conducted (Anderson and Gerbing, 1988), using the maximum likelihood estimation method with LISREL 8.80 (Jöreskog and Sörbom, 2006), for evaluating constructs validity and estimating the measurement model. The reliability analysis suggested refinements to the measurement scales. The results obtained from confirmatory factor analysis are contained in table 1. Results show a reasonable fit to the data, based on the recommended criteria (Hair et al., 2010).

All of the measures show adequate reliability with composite reliability indices higher than the desirable .60 level (Bagozzi and Yi, 1988), indicating that the set of indicators for each scale was consistent. The average variance extracted values ranged higher than the .50 threshold (Fornell and Larcker, 1981). Furthermore, all of the items loaded on their hypothesized factors (see Table 1), and the estimates were very significant (the lowest *t*-value is 8.53), which provides evidence of convergent validity (Bagozzi and Yi, 1988). Discriminant validity was assessed by calculating the 99% confidence interval for each pair of construct correlations. None of them included one, confirming discriminant validity (Anderson and Gerbing, 1988). Content validity of scales is guaranteed by the way scales have been developed and their application in different research studies and contexts. We calculated variance inflation factors (VIFs) to check for multicollinearity. The results confirm that multicollinearity does not represent a problem in this study (Hair et al., 2010).

Insert Table 2.

4. Analysis and results

Hypotheses were tested by structural equation modelling using LISREL 8.8 with ML as estimation method. Results are shown in table 3.

H1a is confirmed, as exploitation marketing strategy negatively influences radical product innovation (γ_{11}=-0.17, p>0.05). H1b is also confirmed because exploitation strategy exerts a positive and significant influence on incremental product innovation (γ_{21}=0.24, p>0.01). With regard to exploration marketing strategy, we find that exploration marketing strategies significantly impacts on radical product innovations confirming H2a (γ_{12}=0.38, p>0.01), with no significant effects on incremental product innovation. Regarding turbulence, our evidences show a positive and significant relationship of turbulence on radical product innovation, supporting H3a (γ_{13}=0.22, p>0.01). No significant effects of turbulence on incremental product innovation are obtained.

Insert Table 3.

Insert Figure 1.

5. Discussion and conclusions

This paper applies the exploitation-exploration schema to understand the innovation-performance relationship of food manufacturers, including the effects of turbulence. We assume that environmental turbulence as an antecedent of marketing strategy, shape the innovation strategy. The core aim of our research has been to contribute to identifying the boundary of an innovation strategy of food producers.

From the general tensions raised by March (1991), and the specific features of the food industry, we analyze the independent effects of exploitation and exploration based innovation strategies on the type of innovation, and how the intensity of innovation strategies influence on performance levels. Despite the strong theoretical suggestion leading to such research questions, the extant literature of exploitation/exploration has rarely explicitly tested this hypothesis in the food and beverages industry. Our results show that, unlike what occurs in other more technological sectors ~~more technological~~, typical scenarios for research in exploitation/exploration, such as in pharmaceutical (Kim et al., 2012) or manufacturing sectors (He and Wong, 2004), reveal the effects of exploration ~~are~~ to be negative.

Our results show how resources, in general, and knowledge, in particular, govern innovation decisions to develop new products. This paper provides evidence of the negative effects of exploitation marketing strategy on radical product innovations, and the positive effects on incremental innovations. This result is aligned to the evidence obtained by Atuagene-Gima (2005), which is shown as market orientation sets the effect that the type of knowledge exerts on the development of radical and incremental innovations.

Our results demonstrate that food companies are more inclined to ~~enhancing~~ enhance a firm's market position through improvement ~~in~~ of existing products and refinement of processes~~,~~ than offering new products. Exploitation ~~it~~ is awarded as the basic component of the contribution of innovation to performance (above exploration). Our evidence highlights exploitation as the more feasible innovation strategy in a sector like food. In particular, we find support to the findings of previous empirical studies (i.e., Groysberg and Lee, 2009), ~~who~~ which reinforce the tendency toward exploitation, suggesting that the probabilities of success in exploration activities are lower than in exploitation activities.

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~~In particular,~~In more specific terms, in the food and beverages industry, where products are often perishable or there is a likely loss of market value, exploitation gives these organizations a chance to leverage their existing resources, thus ensuring their immediate survival and enhacing ~~its~~ financial performance. Although returns from successful exploitation activities are less profitable on average than those of successful exploration activities, it is assumed that the food and beverages industry prefers undertaking exploitation projects to less certain and distant outcomes of exploration projects. The probability of survival in this industry is higher for exploitation activities than for exploration activities (Yalcinkaya et al., 2007). However, increase of profitability and market share maybe obtained only through radical product innovations. Due to the particular characteristics of food, radical innovations are only adopted when environmental turbulence is high.

Several organizational theories may justify the greatest contribution that exploitation strategies made to firm performance. Firstly, these results validate the general agreement in the innovation research literature that considers the food industry as a traditional sector characterized by low research intensity and incremental innovations (Sparke and Menrad, 2011), where little truly new or radical innovation is taking place (Lagnevik et al., 2003; Fornari et al., 2009).

Another set of explanations ~~are~~ is focused on the nature of the product and consumer behavior. The difficulty of developing truly new food products, the distrust of the unknown (i.e., genetic modified foods are not well accepted by European markets, Siegrist, 2008) and the greater conservatism of demand, much higher than those observed in other sectors, such as electronic or financial (Moskowitz and Hartmann, 2008), prevent the acceptance and development of innovative products in the food industry (Huotilainen et al., 2006), justifying the great~~est~~ contributions that exploitation strategies make to the results of the company.

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Future research may analyze exploration/exploitation dilemma in the context of the distribution channel, considering the network as the level of analysis (Stadler et al., 2014). Also, it is interesting to extend the dilemma between learning myopia and lock-in argument due to the existence of externalities of channel power (Lee et al., 2003). On the one hand, evidences suggests that high levels of retailers' market power discourages manufacturers to from innovate innovating (Weiss and Wittkopp, 2005). However, innovation is a key strategy that can contribute allow producers to improve their market performance. On the other handAt the same time, the lock-in argument posits that due to the difficulty to of gaining market out ofbeyond existing large retailers, producers should focus on satisfying retailers's expectations. Further research should advance the trade-offs between both alternatives and provide conditions to adopt one versus the other.

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Finally, in order to improve manufacturers' innovation decisions, we propose that extend this research be extended to distributors or third party channels, to find out what actions distributors can arrange take to lower innovation risks and study their role in creating an optimal experience for B2B customers. Also, implications are generated to study the influence of innovativeness on food end-consumers and the role of retailers in mitigate mitigating perceived risks.

As In terms of limitations of the paper, it should be noted that the model presented in this study reflects a rather simplistic linear relationship among these constructs, not as it does not considering nonlinear models. Also, measures of performance used have are more of a financial and short / medium term nature. The effects of exploration could change when long term performance is considered.

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	Variables	Mean	s.d.	1	2	3	4	5	6	7
1	Exploitation-marketing strategy	6.66	1.62	1						
2	Exploration-marketing strategy	5.04	2.59	0.84	1					
3	Turbulence	5.36	1.72	-0.33	0.32*	1				
4	Radical product innovation	4.17	2.55	-0.21*	0.54*	0.32*	1			
5	Incremental product innovation	5.98	1.76	0.33*	0.34*	0.08	0.23*	1		
6	Open system performance	6.98	1.45	0.39*	0.45*	0.11	0.29*	0.44*	1	
7	Rational goals performance	6.14	1.99	-0.09	0.39*	0.02	0.54*	0.25*	0.49*	1

*Correlation significant at .01 level (two-tailed test).

TABLE 1

Descriptive statistics and correlation matrix.

Item description	Loading	*t*-value	Cronbach's α	SCR[a]	AVE[b]
Exploitation-based innovation (Adapted from Atuahene-Gima, 2005).[c]			0.86	0.87	0.57
1. Strategy based on familiar knowledge and abilities	0.69	10.46			
2. Enhancing skills in exploiting mature technologies	0.80	12.82			
3. Solutions to customer near to existing solutions.	0.81	13.22			
4. Upgraded skills in experienced product development processes.	0.77	12.22			
5. Targeted the effort to improve the efficiency of the innovation processes.	0.69	10.56			
Exploration-based innovation (Adapted from Atuahene-Gima, 2005).			0.93	0.94	0.77
1. New manufacturing technologies and skills.	0.81	13.66			
2. New product development skills and processes.	0.87	15.25			
3. New managerial organisational skills for innovation					
4. New skills in technical and management areas.	0.89	15.92			
5. Strengthened innovation skills.	0.90	16.27			
	0.90	16.39			
Turbulence (Adapted from Atuahene-Gima, 2005).[c]			0.86	0.86	0.55
1. Actions of competitors changing quite rapidly.	0.65	9.72			
2. Technological changes rapid and unpredictable.	0.74	11.53			
3. Market competitive conditions unpredictable.	0.74	11.48			
4. Customers' product preferences changed rapidly.	0.77	12.05			
5. Changes in customers' needs unpredictable.	0.81	12.97			
Radical product innovation (Adapted from Tuominen and Hyvönen, 2004).			0.94	0.94	0.79
1. Higher percentage of sales from product innovations that are radically different from the existing.	0.84	14.53			
2. Anticipates competence in the introduction of radical innovations	0.92	16.76			
3. Introduced new products radically different.					
4. Introduced new products more radical than those introduced by the competition.	0.89	15.86			
	0.91	16.64			
Incremental product innovation (Adapted from Tuominen and Hyvönen, 2004).			0.89	0.89	0.68
1. Higher percentage of sales from product innovations that are just better than existing ones.	0.65	10.05			
2. New products are only improvements to existing ones.	0.86	14.73			
3. Introduced a greater number of products are only improvements to existing ones.	0.93	16.76			
4. Introduced new more similar to the above products.	0.82	13.78			
Open system performance (adapted from Kumar et al., 1992 and Quinn and Rohrbaugh, 1983).			0.75	0.77	0.54
1. Improved the quality of products	0.63	8.53			
2. Increased ability to adapt the changing needs	0.66	8.87			
3. Improved image of firm and products	0.88	11.47			
Rational goal performance (Kandemir et al., 2006, Kumar et al., 1992 and Quinn and Rohrbaugh, 1983). To what extent in the past four years has your firm…[d]			0.92	0.91	0.77
6. Increased sales	0.94	16.96			
7. Increased market share	0.93	16.65			
8. Increased profitability	0.75	12.18			

Fit statistics for measurement model of 29 indicators for 7 constructs: $\chi^2(377)=1143.97$; GFI=0.70; RMSEA=0.11; SRMR=0.10; CFI=0.91; TLI (NNFI)=0.90; NFI=0.87; $\chi^2/df=3.03$

[a] Scale composite reliability ($\rho c=(\sum\lambda_i)^2 \text{ var}(\xi)/[(\sum\lambda_i)^2 \text{ var }(\xi) + \sum\theta_{ii}]$; Bagozzi and Yi, 1998).

[b] Average variance extracted ($\rho c=(\sum\lambda_i^2\text{var}(\xi))/[\sum\lambda_i^2\text{var }(\xi) + \sum\theta_{ii}]$; Fornell and Larcker, 1981).

Anchors: 0=strongly disagree/in no extent at all; 10=strongly agree/completely
(*) Item deleted during the scale validation process

TABLE 2

Variables measurement summary: Confirmatory factor analysis and scale reliability.

Variable	*Standardized parameter estimates*		
	Parameter	Estimation	t-value
H_{1a}: Exploitation marketing strategy --> Radical product innovation	γ_{11}	-0.17	-2.51*
H_{1b}: Exploitation marketing strategy --> Incremental product innovation	γ_{21}	0.24	2.83**
H_{2a}: Exploration marketing strategy --> Radical product innovation	γ_{12}	0.38	4.59**
H_{2b}: Exploration marketing strategy --> Incremental product innovation	γ_{22}	0.15	1.48
H_{3a}: Turbulence --> Radical product innovation	γ_{13}	0.22	3.54**
H_{3b}: Turbulence --> Incremental product innovation	γ_{23}	0.00	0.03
H_{4a}: Radical product innovation --> Open system performance	β_{31}	0.01	0.09
H_{4b}: Radical product innovation --> Rational goals performance	β_{41}	0.36	5.63**
H_{5a}: Incremental product innovation --> Open system performance	β_{32}	0.22	2.00*
H_{5b}: Incremental product innovation --> Rational goals performance	β_{42}	0.10	1.30

* $p<0.01$; ** $p<0.05$

Concerning to innovation, radical product innovation has no effects on open system performance but it exerts a significant effect on rational goals of firm performance (β_{41}=0.36, $p>0.05$), supporting H_{4b}. For the case of incremental product innovation, the confirmed significant effect is on open system performance (β_{32}=0.36, $p>0.05$). All relationships and their significance are depicted in figure 1.

TABLE 3

Results of structural equation modelling estimation.

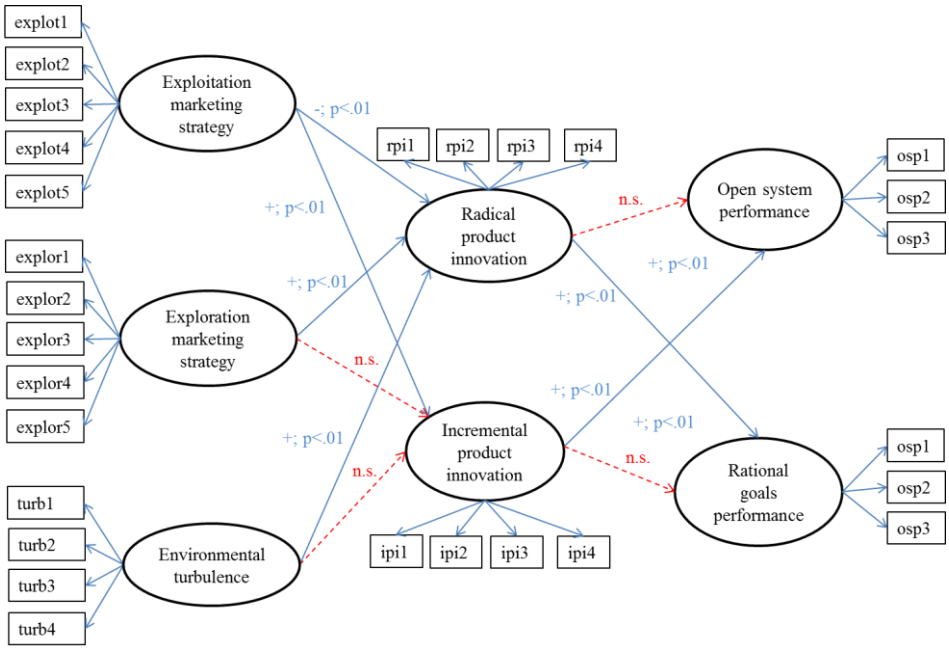

FIGURE 1

Estimation of the marketing strategy-product innovation-performance model.