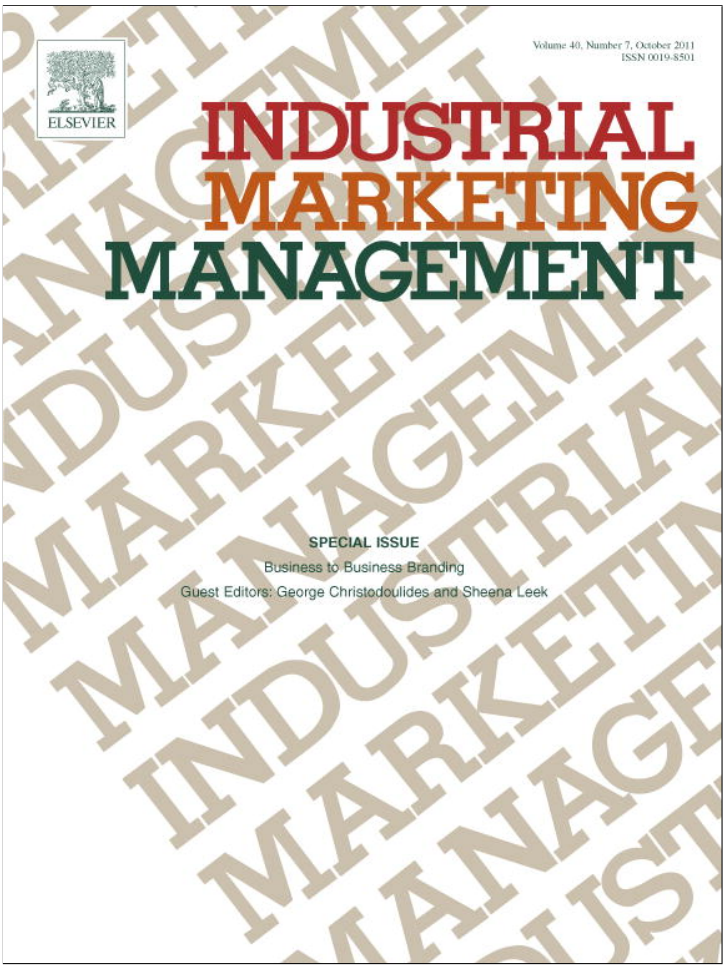

Industrial Marketing Management 40 (2011) 1172–1182

Contents lists available at ScienceDirect

Industrial Marketing Management

Product competence exploitation and exploration strategies: The impact on new product performance through quality and innovativeness

Francisco-Jose Molina-Castillo [a,*], Daniel Jimenez-Jimenez [b], Jose-Luis Munuera-Aleman [a]

[a] Departamento de Comercializacion e Investigacion de Mercados, Facultad de Economia y Empresa, Campus de Espinardo, Murcia, Spain
[b] Departamento de Organización de Empresas y Finanzas, Facultad de Economia y Empresa, Campus de Espinardo, Murcia, Spain

ARTICLE INFO

Article history:
Received 15 February 2010
Received in revised form 14 October 2010
Accepted 19 October 2010
Available online 11 January 2011

Keywords:
Product exploitation
Product exploration
Objective quality
Innovativeness to the firm
New product performance

ABSTRACT

The ability to manage existing assets and capabilities (exploitation) and the development of new capabilities (exploration) are arguably among the most relevant new product success factors. However, while exploitation-related capabilities are based on certainties regarding the efficiency of a company, exploration-related capabilities require the analysis of new technologies and processes. In existing literature, there is a gap concerning the trade-off between the exploitation and exploration of competences. Based on the theoretical background of Resource Based Theory, Dynamic Capabilities Theory and Discovery and Creation Theory, a model is proposed to analyze this gap. In this study, which examines 197 manufacturing organizations, we build on the dualities of the two types of competences and their impact on speed-to-market and market performance. The findings indicate that the choice between exploitation and exploration depends on the goals of new product development. While exploitation increases product objective quality, exploration enhances product innovativeness to the firm. Furthermore, we found that both exploitation and exploration constitute important success factors when it comes to launching new products. Finally, moderate effects of competitive intensity and market turbulence are also examined. High levels of market turbulence improve the results of exploitation, while low levels of competitiveness may encourage exploration.

1. Introduction

New product development (NPD) is a crucial element in the long-term success and growth of businesses (Hooley, Greenley, Cadogan, & Fahy, 2005). One of the most important topics in innovation literature is the way different factors are associated with new product success (Chang & Cho, 2008; Henard & Szymanski, 2001). Among these factors, a company's capabilities in the area of product innovation are considered essential to continued corporate survival (Day, 1994; Menguc & Auh, 2006). Specifically, the introduction of new products depends on the ability to transform organizational competences into reliable input to market innovation (Atuahene-Gima, 2005; Yalcinkaya, Calantone, & Griffith, 2007). At a fundamental level, these competences are related to the knowledge created and accumulated by a firm through human capital and organizational routines, processes, practices and standards (Soosay & Hyland, 2008). When applied correctly, these competences may help develop completely new attributes in NPD or improve existing products, for instance their quality (Rust, Moorman, & Dickson, 2002). In this situation, it is really important for a company with the ambition to grow to decide how to explore and exploit its competences. The aim of this paper is to provide businesses with the information they need to improve their innovative ability and with it the performance of the objective quality their new products.

The relationship between product innovation and market performance not only depends on existing capabilities, but also on their continued renewal (Yalcinkaya et al., 2007). A firm's ability to compete in the long term may lie in its ability to integrate and build on its existing competences, while at the same time developing fundamentally new ones (Lavie & Rosenkopf, 2006). Simultaneous investments in the exploitation of existing product innovation capabilities and the exploration of new ones may help create a competitive advantage (Soosay & Hyland, 2008). Furthermore, for a company to survive and prosper, there has to be a balance between exploration and exploitation (March, 1991).

The two types of competences outlined above are different in nature and few organizations are able to exploit their existing product innovation competences, while at the same time renewing and replacing them with entirely new competences (Atuahene-Gima, 2003). Furthermore, although both types of activities are important to an organization's survival, they are contradictory in nature (Holmqvist, 2004). Literature has shown how the exploitation of competences tends to limit the exploration of new ones and vice versa (Kyriakopoulos & Moorman, 2004). Some researchers argue they are mutually exclusive (Voss, Sirdeshmukh, & Voss, 2008). Moreover, the exploitation of existing competences tends to yield more immediate and certain returns compared to exploring new ones (Sethi & Sethi, 2009). Despite

* Corresponding author. Tel.: +34 868 88 78 26; fax: +34 868 88 79 86.
E-mail addresses: fjmolina@um.es (F.-J. Molina-Castillo), danielji@um.es (D. Jimenez-Jimenez), munuera@um.es (J.-L. Munuera-Aleman).

0019-8501/$ – see front matter © 2010 Elsevier Inc. All rights reserved.
doi:10.1016/j.indmarman.2010.12.017

the trade-off between exploration and exploitation, theoretical and empirical evidence suggests that paying insufficient attention to either one reduces the performance of organizations (Atuahene-Gima, 2005). Furthermore, Garcia and Calantone (2003) show that there is a symbiotic relationship, in that exploitation provides the funds required for successful exploration, which in turn provides technological input for the exploration of vital future competences. In essence, the two types of competences have a complementary and mutually reinforcing effect on company performance (Gupta, Smith, & Shalley, 2006).

In existing literature, there is evidence of a gap regarding the best way to manage the trade-off outlined above. This study builds upon the dualities involved in the exploration and exploitation of competences and their impact on new product performance along two different pathways. We begin by analyzing the relevance of exploiting competences when it comes to improving the ultimate performance of a new product based on quality enhancements and contributing to the exploitation of certainties inside the firm, after which we look at how the exploration of competences drives product innovativeness to the firm, which in turn enhances the ultimate performance of a new product. Our aim is to shed light on how exploitation is related to objective quality and how exploration is related to innovativeness to the firm. Finally, this study contributes to the discussion regarding the trade-off between exploiting and exploring competences by examining the impact of two different environmental conditions (competitive intensity and market turbulence).

Innovativeness is assessed on the level of innovativeness to the firm but not with regard to the customer (Lee & O´Connor, 2003; Song & Montoya-Weiss, 2001). Thus, this research does not attempt to categorize projects in a way similar to the approach by Griffin and Page (1996). Thus, our approach of innovativeness is similar to the technological complexity that entails developing a new product inside the firm (Danneels & Kleinschmidt, 2001). Quality is assessed in terms of objective quality and the question whether a product performs as expected (Calantone & Knight, 2000) meets quality standards (Rust et al., 2002) and has a low probability of failing (Curkovic, Vickery, & Dröge, 2000). Therefore, other types of quality, such as service quality and external quality (Zeithaml, 1988), fall outside the scope of this study. Finally, we focus on speed-to-market as an outcome variable, which is defined as "the pace of activities between idea conception and product implementation" (Menon, Chowdhury, & Lukas, 2002), with "speed" being used at times for the sake of brevity.

This paper is organized as follows. To begin with, a literature review is provided regarding the dualities of competence exploitation and exploration and their trade-off. Secondly, building on the theoretical review, the model and hypotheses are proposed for empirical testing. Next, the research methodology, including data collection, construct measurement and non-response bias, are discussed, after which the principal results obtained and managerial contributions of these findings are presented.

2. Conceptual background: resource based view theory, dynamic capabilities theory and discovery/creation theory

The resource-based view theory is a recommendable framework for understanding how firms achieve competitive advantage and how that advantage may be sustained over time (Peteraf, 1993; Prahalad & Hamel, 1990), the central proposition being that firms are heterogeneous in terms of the strategic resources they own and control (Barney, 1991). In particular, the resource-based view assumes that each firm can be conceptualized as a unique bundle of tangible and intangible resources and capabilities (Peteraf, 1993). Resources are viewed as those (physical, human or organizational) assets that can be used to implement value-creating strategies (Prahalad & Hamel, 1990). However, sustainable competitive advantages are the result of the characteristic of some specific resources: valuable, rare, inimitable and non-substitutable (Peteraf, 1993; Prahalad & Hamel, 1990). Capabilities, by contrast, refer to a firm's ability to deploy and coordinate different resources using organizational processes, to achieve a desired objective (Prahalad & Hamel, 1990). They refer to the knowledge skills and related routines that constitute a firm's ability to create and deliver superior customer value (Day, 1994) and attain a competitive advantage (Cooper & Kleinschmidt, 1994). These competences are developed over time through complex interactions among the firm's resources (Lee, Lee, & Lee, 2003). The underlying rationale is that the resource-based view has not adequately explained how and why certain firms realize a competitive advantage in situations of rapid and unpredictable change.

The dynamic capabilities framework (Teece, Pisano, & Shuen, 1997) offers insight into how major or continual environmental change increases the development and use of dynamic capabilities (Zahra, Sapienza, & Davidsson, 2006), suggesting that firms need to possess dynamic capabilities to protect their superior of creating new products and processes, and respond to changing market circumstances performance record in a rapidly changing and turbulent environment (Eisenhardt & Martin, 2000; Teece, 2007). Dynamic capabilities contrast with ordinary capabilities by being concerned with change (Winter, 2003). Dynamic capabilities refer to a firm's ability to integrate, build and reconfigure internal and external competences to respond to rapidly changing environments (Teece et al., 1997). They are understood as the subset of competence/capabilities, which allow the firm to reconfigure a firm's resources and routines in the manner, envisioned and are deemed appropriate by the firm's principal decision-maker(s) (Zahra et al., 2006), even in terms (Teece et al., 1997). Furthermore, increasing dynamic competition in technology-intensive industries demands greater attention to dynamic capabilities (Vaaler & McNamara, 2010). Thus, this framework facilitates not only the ability of an organization to recognize a potential technological shift, but also its ability to adapt to business ecosystems and shape them through innovation (Hill & Rothaermel, 2003). However, this theory focuses mainly on business goals, without clarifying how business opportunities are created.

The Discovery and Creation Theory, which was developed by Alvarez and Barney (2007), proposes an alternative approach to understanding how opportunities are exploited or explored by a firm and addresses another important issue in resource-based theory in the field of strategic management. While the former view (Discovery Theory) positions that opportunities are discovered and exist "out there" waiting to be found, the latter dominant view (Creation Theory) posits that opportunities are created as a function of actions that occur during entrepreneurial processes (Short, Ketchen, Shook, & Ireland, 2009). The decision-making context in Discovery Theory is risky because it assumes that opportunities are objective in nature. Thus, depending on the different transactional difficulties that companies are designed to resolve, they could adopt different organizational forms in uncertain settings (Alvarez & Barney, 2005). Furthermore, companies could pursue different strategies will require diverse capabilities to attaining them. Since organizations are looking for new opportunities to improve their performance, they could adopt different kinds of behavior to make realizing this objective easier (Alvarez & Barney, 2007). On the other hand, in Creation Theory, opportunities are not assumed to be objective phenomena that are the result of exogenous shocks to an industry or market. Instead, they are created by the actions and reaction of firms exploring new ways of producing products or services. Under the Creation Theory, a firm's actions are essential to exploring ways of producing new products or services (Alvarez & Barney, 2007). Furthermore, Creation Theory allows companies to implement strategies that other firms have not internally developed and which, consequently, may help create valuable, rare and inimitable resources and capabilities that provide a competitive advantage.

The three theories discussed above provide a guideline to the relevance of resources, the dynamic capabilities that firms should

developed and alternative ways of exploiting or exploring opportunities in the market. However, there is a lack of understanding on how to implement organizational capabilities to generate innovation and increase their ultimate performance. The distinction between two different strategic logics, namely exploration and exploitation (He & Wong, 2004), rooted in streams of innovation (Ancona, Goodman, Lawrence, & Tushman, 2001), offers a comprehensive approach to learning how to achieve these goals.

2.1. Product exploitation and product exploration

There are two broad types of qualitatively different learning activities between which firms divide their attention and resources: exploration and exploitation (Benner & Tushman, 2003; Voss et al., 2008). From the generation of new ideas through to the launch of a new product, exploration and exploitation play a vital role in product innovation (Rothaermel & Deeds, 2004). Organizations can decide to use existing organizational competences to realize short-term results, or create new competences that may foster the development of innovations in the longer term (Atuahene-Gima, 2005). Both types of capabilities are considered to be dynamic in nature (Winter, 2003), given that their purpose is to transform existing resources into new functional competences that provide a better match for the company's environment (Voss et al., 2008). Because new products are related to a firm's competences, it makes sense to view the firm as a portfolio of competences, rather than as a portfolio of products, which may provide a better perspective on its innovative abilities and prospects (Winter, 2003).

2.2. Product exploitation

The exploitation of competences includes things like efficiency and development process and it promotes "the refinement and extension of existing competences, technologies and paradigms exhibiting returns that are positive, proximate and predictable" (March, 1991). Exploitation involves investing resources to refine and extend existing product innovation knowledge, skills and processes. It is in particular through research and development processes that existing competences are shared across firm boundaries to generate synergy (Garcia & Calantone, 2003), with the object of obtaining greater efficiency and reliability with regard to existing innovative activities (Soosay & Hyland, 2008). However, although standardizing processes may increase efficiency, it also carries an aversion to risk, which provides a motivation to stick to development activities that have proven successful in the past (Miller, Zhao, & Calantone, 2006). To sum up, the exploitation of competences focuses on using and developing existing capabilities, promoting improvements in existing components and building on existing technological elements (Benner & Tushman, 2003; Rust et al., 2002). Similarly, exploitative innovation is aimed at improving existing product-market domains. It is associated with mechanistic structures, tightly coupled systems, path dependence, routines, control and bureaucracy, and stable markets and technologies (Ancona et al., 2001). According to Gupta et al. (2006), the term "exploitation" should be reserved for activities in which the central aim is to use existing knowledge rather than moving down any kind of learning trajectory.

2.3. Product exploration

The exploration of competences, which involves investing resources with the aim of acquiring entirely new knowledge, skills and processes (Atuahene-Gima, 2005), is defined as the "experimentation with new alternatives having returns that are uncertain, distant and often negative" (March, 1991), and involves risk-taking and experimenting. As such, it is associated with radical innovations (Jansen, Van Den Bosch, & Volberda, 2006), because of its focus on emerging new customers and market needs (Cho & Pucik, 2005), which suggests that innovations are more explorative in nature when a firm has less advance knowledge with regard to the probability of developing and marketing a specific innovation successfully (Greve, 2007). Exploration is associated with groundbreaking improvisation, autonomy and chaos, and emerging markets and technologies. It is motivated by a desire to discover something new (Yalcinkaya et al., 2007), and as such an explorative capability focus on the "research" aspect of the R&D process (Garcia & Calantone, 2003). Also, an exploratory innovation is a technological innovation aimed at entering new product-market domains. According to March (1991), the essence of exploration is experimentation with new alternatives. Accordingly, the exploration of competences involves looking for knowledge to venture onto a different technological trajectory (Atuahene-Gima, 2005).

2.4. Trade-off between product exploitation and product exploration

Traditionally, it has been argued that a tendency to focus on exploitation will result in a lack of new ideas (March, 1991). Similarly, firms that focus too much on exploring new competences risk having to pay the costs involved in experimentation without ultimately reaping the rewards because existing competences are neglected (Atuahene-Gima, 2005). However, the capabilities needed for exploration and exploitation are closely connected (Rothaermel & Deeds, 2004), even at different organizational levels (Voss et al., 2008). They compete for scarce resources, which means that organizations have to make a trade-off (Kyriakopoulos & Moorman, 2004), rely on different organizational routines and capabilities (Benner & Tushman, 2003). Moreover, the increase in environmental turbulence and uncertainty has brought new questions about whether it is wise to focus on either the exploitation or exploration of competences. Gupta et al. (2006) have investigated the balance between exploration and exploitation and the impact on organizational performance and conclude that it depends on whether the two concepts are viewed as mutually opposing or complementary. Some authors (Benner & Tushman, 2003) claim that the answer lies in "ambidexterity", whereas other studies have concluded that it is best to aim for a "punctuated equilibrium". Further research is needed to determine whether and which factors should be taken into account in finding the right balance.

2.5. Theoretical framework

In this study, we examine the relationship between the exploration and exploitation of competences, objective quality, innovativeness to the firm, speed-to-market and market performance. We argue that investments in different competences will contribute to the generation of different new products. Product innovativeness to the firm relies more on explorative competences than on objective quality, which relies more on the exploitation of competences. Both quality and innovativeness will affect the speed-to-market of a new product as well as organizational performance. We also propose that speed-to-market has a direct impact on market performance. Finally, the introduction of two environmental conditions (competitive intensity and market turbulence) provides a closer approximation to the duality of competence exploitation and competence exploration. This set of relationships is illustrated in Fig. 1 and is elaborated further in the following sections.

3. Hypotheses

3.1. Competence exploitation and new product objective quality

The exploitation of competences creates value through existing competences or competences that have been slightly modified (Voss

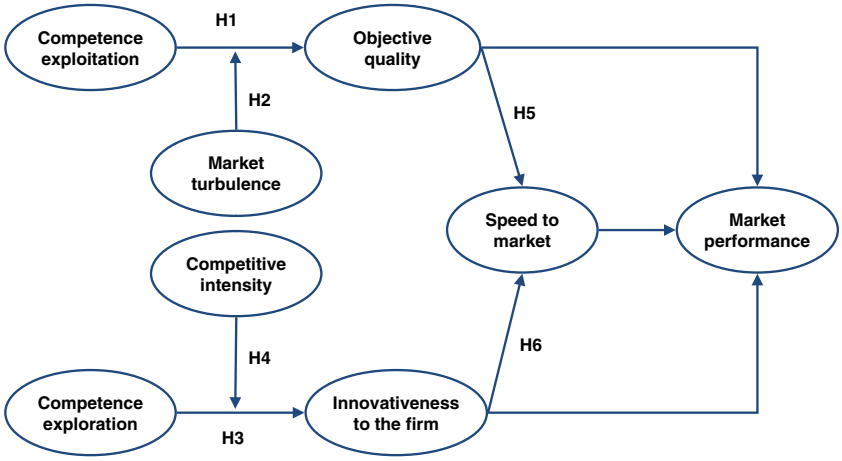

Fig. 1. Conceptual model.

et al., 2008). It promotes a routine-based and repetitive approach to organizational changes (Rust et al., 2002). Furthermore, exploitative innovation builds on existing knowledge and extends existing products and services for existing customers (Soosay & Hyland, 2008). As a result of these repetitive processes, organizations are able to reap the benefits of improvement they make to their products and to continue making incremental improvements (Brucks, Zeithaml, & Naylor, 2000), which are designed to allow the firm to continue its superior performance (Griffin, 1997). In this case, the emphasis is on efficiency and quality improvement, which enable the firm to utilize its resources more effectively (Benner & Tushman, 2003; Voss et al., 2008). As such, a focus on exploitation is related to process improvement initiatives and quality orientation (Sethi & Sethi, 2009). Moreover, it leads to further reliable processes, which in turn allow companies to look for greater efficiency, even in innovation development. Exploitation minimizes the risks and failures in the innovation process of new products by commensurately enhancing its preference for the existing organizational competences that increase its reliance on process improvements to provide new product quality. Thus, we propose that:

H1. Competence exploitation is positively associated with new product objective quality.

Unfortunately, the decision to focus on objective quality is often made under uncontrollable environmental conditions, which encourage companies to market their products in a timely manner (Calantone, Garcia, & Dröge, 2003). Most experts agree that the exploitation of competences is associated with stable markets and technologies (Ancona et al., 2001). Market turbulence is understood as the degree and frequency of changes over time, and refers to the instability or unpredictability of markets, changes in the market structure, or in the existing technology. Market turbulence originating in markets and technologies may have an impact on product development and ultimately on product performance (Bestieler, 2005; Song & Montoya-Weiss, 2001). In non-turbulent markets, managers tend to assign more resources to exploration, because they have an opportunity to improve their new products and market performance. However, in highly turbulent markets, it is to specify in advance the technologies that will prevail and to time technological shifts, which could paralyze strategic planning, because decision-makers will spend more time discussing how the environment will evolve, assess the impact on the organization and develop different courses of action (Augusto & Coelho, 2009). Thus, firms have little choice but to focus on short-term exploitation, because the benefits of exploration are distant and uncertain (March, 1991). Furthermore, in turbulent markets, companies will focus on the objective quality of new products as a way of attaining a competitive advantage, and as, in dynamic environmental settings, product preferences are constantly changing, firms following qualitative strategies should be aware of this information and react consequently engaging in wider innovative activities to meet customers' exigencies (Santos-Vijande & Álvarez-González, 2007). Thus, companies are likely to entrench in their current activities and competences if customers are changing their preferences and the technology could destroy explorative learning activities. As a result, companies tend to focus on improving their existing products rather than explore avenues of future success.

H2. A high level of market turbulence will increase the positive effects of competence exploitation in new product objective quality.

3.2. Competence exploration and product innovativeness to the firm

Compared to exploitation, exploration focuses mainly on trying to create variety, to adapt and hence exploit ever-decreasing windows of opportunity (Soosay & Hyland, 2008). This behavior is beneficial to the kind of product innovativeness to the firm that is characterized by radical change, risk and experimentation and that allows for the creation of new methods, relationships, products or services (Augusto & Coelho, 2009). Organizations engaging in exploratory innovation pursue new knowledge and develop new products and services for emerging markets (Yalcinkaya et al., 2007). Because it provides new insight into the design of new features and benefits of a given product, that product is guaranteed to contain new ideas (Cho & Pucik, 2005). Explorative innovation require fundamental changes in the way an organization operates and represents a clear departure from existing practices (Menguc & Auh, 2006). Based on these assumptions, we propose:

H3. Competence exploration is positively associated with product innovativeness to the firm.

Competition intensity refers to the degree of competitive strength in a product market. One of the goals of developing innovative new products is to outperform competing firms, because an ability to innovate better and more quickly implies an ability to respond to changing conditions more quickly (Calantone et al., 2003). However, intensified competition increases market uncertainty and unpredictability (Auh & Menguc, 2005; Gupta et al., 2006). Thus, organizations should reduce investments in innovative ventures and revert to competences the outcome of which is more predictable in order to limit potential losses (Voss et al., 2008). Furthermore, in a highly competitive intensity environment, it becomes more difficult for firms to gain access to the resources necessary to commercialize an innovation successfully (Lee et al., 2003). The role of exploratory

Table 1
Sample characteristics.

SIC code and sectors		Number of employees		Sales volume (mill. €)	
20 to 27. Consumer products	14.2%	<50	20.3%	<6	13.7%
28. Chemical products	27.9%	51–150	25.4%	6–18	20.8%
35, 37. Machinery and transport devices	28.9%	151–250	18.8%	18–30	11.2%
36. Electric and electronic machinery	28.9%	251–500	19.8%	30–60	21.8%
		>500	13.7%	>60	21.3%
		No response	2.0%	No response	11.2%
Total	197		197		197

capacity in creating differential advantages is supposed to be less evident in highly competitive markets, which requires prompt and concurrent responses to competing forces (Kim & Atuahene-Gima, 2010). Furthermore, they pay greater attention to the organizational costs as a result of competitive pressure on prices and are more tempted to imitate competitors rather than exploring new opportunities (Day, 1994; Kim & Atuahene-Gima, 2010; Zhou, 2006). Imitation enables firms to reduce the high cost of product innovation and thus improve their performance (Day, 1994). As a result, companies will focus less on exploring new competences when they operate in a highly competitive environment. Based on this, we propose that:

H4. A high level of competitive intensity will decrease the positive effects of competence exploration in product innovativeness to the firm.

3.3. Objective quality/innovativeness to the firm and speed-to-market

The rapid development of products has quickly become a top priority for many organizations, with competitors rushing to commercialize emerging technologies and satisfying fragmenting customer needs (Ancona et al., 2001). This has had several effects with regard to quality and innovativeness. The short-term certainty provided by exploitation takes priority over exploratory learning and innovation by triggering a reduction in explorative investments (Yalcinkaya et al., 2007). When there is a pressure to launch new products, incremental product innovations can be made within a relatively limited timeframe. As a result, future developments and research into new, potentially profitable breakthrough technologies are sacrificed (Cooper & Kleinschmidt, 1994; Crawford, 1992). Thus, there is a connection between speed-to-market on the one hand, and product objective quality and customer satisfaction on the other (Lukas & Menon, 2004), and because the marketing of new products that incorporate incremental modifications based on the exploitation of competences generally speaking implies a shorter time-to-market, we propose the following hypothesis:

H5. New product objective quality is positively associated with speed-to-market.

Conversely, the length of the product development cycle is always related to product complexity and the newness of projects (Griffin, 1997). Pressure to market new products quickly comes from changes in the industry, response to competition, customer expectations or company targets. In this context, 'speed' means being faster than one's rivals, short development cycles and competitive advantage. Furthermore, there is a correlation between the timeframe within which a new product can recover development and marketing costs and earn a profit (Crawford, 1992; Kessler & Bierly, 2002). Based on the arguments presented here, product innovativeness to the firm leads to a reduction in speed-to-market, due to the time it takes to develop a completely new product. Based on this, we propose the following hypothesis:

H6. Product innovativeness to the firm is negatively associated with speed-to-market.

4. Research design

4.1. Data collection and sampling issues

Data was collected using a cross-sectional survey methodology. The initial sampling frame included 1403 innovative Spanish firms operating in different sectors[1]: consumer products, chemical products, machinery and transport devices, and electric and electronic machinery. To be eligible, firms had to meet two criteria. First, the firm must have developed and launched a new product in the last three years (Lee & O´Connor, 2003). Also, the product must have been on the market for at least 12 months to ensure that sufficient time had elapsed to be able to evaluate the product and its performance (Langerak, Hultink, & Griffin, 2008).

Data were obtained through a key informant technique, which is consistent with earlier studies (Calantone et al., 2003). The informants had input into innovation activities and were familiar with the overall strategies in their organization. Their familiarity with the subject matter was assessed through the data collection instrument. Thus, to assess their suitability, respondents used a seven point Likert-type scale to indicate their degree of knowledge (1 = "very limited knowledge", 7 = "very substantial knowledge") about the new product, the new product development process and launching activities (Atuahene-Gima, 2005). The mean responses were 5.95, 5.30 and 5.58 respectively, which indicates sufficient knowledge levels.

Before collecting the data, two pre-tests were conducted. One pre-test used six R&D and marketing executives while the other drew on six academics. Based on their responses, a number of items were reworded. Feedback from these pre-tests improved the clarity of the questionnaire and ensured effective, accurate and unambiguous communication with the respondents. Data was collected through a web-based questionnaire. Respondents were offered a free summary of the most relevant findings of the study and a small gift in exchange for their participation. In all, 197 usable questionnaires were received, representing a response rate of 14.04%, which is consistent with the result is reported in similar studies (Sivadas & Dwyer, 2000). Table 1 provides size and industry characteristics of the sample

A routine check for industry bias did not reveal significant differences in the firms' mean responses across industries for any of the constructs of interest. In addition, chi-square distribution analyses revealed no significant differences between this sample and the population it was drawn from in terms of industry distribution, number of employees or sales volume. Non-response bias was assessed with Armstrong and Overton's (1977) time-trend extrapolation procedure. In comparing early (first quartile) and late (fourth quartile) respondents, no significant differences emerged in the mean responses on any of the constructs. Together these results suggest that

[1] These sectors were selected according to the innovation rates based on R&D expenditures, percentage of innovative firms, innovation awards, etc. This information was obtained from a national technological innovation survey and the Dun and Bradstreet directory. In addition, our selection of sectors is in accordance with other studies in this area.

neither industry bias nor nonresponse bias are major concerns for this study.

4.2. Common method variance

Most researchers agree that common method variance is a potentially serious bias threat in behavioural research, especially when using single informant surveys (Lindell & Brandt, 2000; Malhotra, Kim, & Patil, 2006; Podsakoff, Mackenzie, Lee, & Podsakoff, 2003; Spector, 2006). We used two procedures to determine empirically whether or not common method bias threatened the interpretation of our results: 1.) a Confirmatory Factor-Analytic approach to Harman one-factor test and 2.) the single method factor approach.

The rationale behind the first of these tests is that, if common method bias poses a serious threat to the analysis and interpretation of the data, a single latent factor would account for all manifest variables or one general factor would account for the majority of the covariance among the measures. A worse fit for the one-factor model, in comparison to a multi-factor model, would suggest that common method variance does not pose a serious threat. The one-factor model yielded a $\chi^2 = 2129.96$ with 230 degrees of freedom (compared with the $\chi^2 = 317.43$ with 202 degrees of freedom for the measurement model). The fit is considerably worse for the one-dimensional model than it is for the measurement model, which indicates that common method bias is not a serious threat in our study.

The second approach to test for common method variance is to use latent variable models (Podsakoff et al., 2003), which involves adding a first-order factor to all of the measures, as indicators, to the theoretical model. The single method factor approach yielded a $\chi^2 = 339.65$ with 171 degrees of freedom (compared to the $\chi^2 = 317.43$ with 202 degrees of freedom for the measurement model). The fit is considerably worse for the single method factor approach than for the measurement model, suggesting that common method bias is not a serious threat.

The results proved that instrument bias absence was in evidence. Overall, we can conclude that common method bias does not threaten the interpretation of our data analysis.

4.3. Measure development

Our multi-item scales (Appendix A) were predominantly drawn from earlier studies. Competence exploitation and exploration were measured based on the study by Atuahene-Gima (2005). Speed-to-market was operationalized on the basis of the work by Rindfleisch and Moorman (2001) and Menon et al. (2002). Innovativeness to the firm was assessed on the basis of Sarin and Mahajan (2001) and Danneels and Kleinschmidt (2001). With regard to objective quality, we relied on the original scale proposed by Garvin (1987) and the contributions by Zeithaml (1988), but we also took recent into account, including Lukas and Menon (2004) and Curkovic et al. (2000). To obtain an accurate measure of competitive intensity and market turbulence, we relied on the work by Menguc and Auh (2006). Finally, to measure new product market performance, we reviewed recent studies, including Molina-Castillo and Munuera-Alemán (2009) and Hooley et al. (2005).

4.4. Scale purification

The unidimensionality and reliability of the dataset were assessed via different procedures. First of all, an initial exploration of unidimensionality was carried out using principal component factor analyses. Next, confirmatory factor analysis (CFA) using Lisrel 8.8 and alpha reliability analysis were performed to establish the required convergent validity. We investigated the psychometric properties of these measures through the composite reliability index (Bagozzi & Yi, 1988) and the average variance extracted index (Fornell & Larcker, 1981). Both indices exceeded the recommended benchmarks of .60 and .50 respectively. Table 2 presents the eigenvalues, the reliability measures and CFA results for the dataset. The fit indices for the overall model were as follows: chi-square value ($df = 202$) = 317.43; comparative fit index (CFI) = 0.98, non-normed fit index (NNFI = 0.98); standardized root mean square error of approximation (RMSEA = 0.05). These values collectively indicate that the measurement model has an acceptable fit. All item-construct loadings are high and significant (smallest t-value = 8.97), providing evidence of adequate convergent validity. Subsequently, evidence of discriminant validity among the dimensions was provided by two different procedures recommended in literature, as follows: 1) the 95% confidence interval constructed around the correlation estimate between two latent variables never includes value 1 (Anderson & Gerbing, 1988); and 2) the comparison of the square root of the AVE with the correlations among constructs reveals that the square root of the AVE for each component is greater than the correlation between components, in support of discriminant validity (Fornell & Larcker, 1981). Overall, the results obtained from these tests provided strong evidence of scales reliability and discriminant validity.

5. Empirical testing of hypothesized model

5.1. The structural model

After making sure the requirements discussed above were satisfied, we tested the structural model in Fig. 1. The fit indices for the overall model were as follows: chi-square value ($df = 111$) = 187.40; comparative fit index (CFI) = 0.98, non-normed fit index (NNFI) = 0.98; standardized root mean square error of approximation (RMSEA = 0.05). These values collectively indicate that the structural model has an acceptable fit. All proposed paths except one are significant. The coefficient on the paths from the exploitation of competences to new product objective quality and from the exploration of competences to new product innovativeness are .49 ($t = 6.04$, $P < .01$) and .63 ($t = 7.78$,

Table 2
Reliability, validity and measurement model.

	Mean	SD	Eigenvalue	Lowest t-value	Cronbach alpha	SCR[a]	AVE[b]
Competence exploitation	4.84	1.35	2.46	13.50	0.90	0.90	0.74
Competence exploration	5.17	1.36	2.35	11.33	0.88	0.87	0.70
Objective quality	5.71	0.95	2.31	11.85	0.86	0.86	0.67
Innovativeness to the firm	4.43	1.30	2.32	12.57	0.86	0.86	0.67
Market turbulence	3.88	1.51	2.19	9.12	0.82	0.82	0.60
Competitive intensity	4.81	1.53	2.17	8.97	0.82	0.82	0.61
Speed to market	4.37	1.65	1.90	14.46	0.94	0.94	0.90
Market performance	4.71	1.47	2.74	16.71	0.95	0.95	0.87

$\chi^2(202) = 317.43$.
CFI = 0.98 IFI = 0.98 NNFI = 0.98 RMSEA = 0.05.
[a] Scale composite reliability ($q_c = (Aki)_2$ var (n)/[$(Ak_i)_2$ var (n) + Ah_{ii}]; (Bagozzi & Yi, 1988).
[b] Average variance extracted ($q_c = (Ak_i)_2$ var (n)/[$(Ak_i)_2$ var (n) + Ah_{ii}]; (Fornell & Larcker, 1981).

$P<.01$) respectively. These positive relationships suggest that Hypothesis 1 and Hypothesis 3 are supported. The path coefficient from new product objective quality to speed-to-market is .30 ($t=3.65$, $P<.01$), which supports Hypothesis 5. The path coefficient from new product innovativeness to speed-to-market is .05 ($t=0.61$, $P>.10$), so Hypothesis 6 is not supported. This research have focused on the major research questions and have left the relationships among exploitation/exploration and performance and between speed and performance as proposed relationships (Rosenkopf & Nerkar, 2001) as these antecedents of market performance have substantial support in the literature. With regard to market performance antecedents, the paths from new product objective quality to market performance .45 ($t=6.19$, $P<.01$), from speed-to-market to market performance .27 ($t=4.17$, $P<.01$) and from new product innovativeness to market performance .20 ($t=2.72$, $P<.01$), are significant. Thus, these proposed relationships are also supported. The structural model explains 40% and 24%, respectively, of the variance in innovativeness to the firm and objective quality. The structural model also explains 43% of the variance in the final dependent variable, market performance.

The results of the structural model indicate that objective quality and innovativeness to the firm mediate the relationship between the exploitation and exploration of competences and new product performance. There is general agreement, however, that researchers should compare rival models, rather than merely testing the performance of the model they propose (Anderson & Gerbing, 1988). In this study, an alternative model was used that analyzes the direct relationship between competence exploitation and market performance and also between competence exploration and market performance was used. The theoretical model (TM) discussed in this study was tested against a less parsimonious alternative model (AM), since the latter includes an additional path in the model. Anderson and Gerbing (1988) recommend this procedure and suggest using a chi-square difference test (CDT) to test the null hypothesis: TM-AM = 0. Accordingly, a non-significant CDT would lead to the acceptance of the more parsimonious of the two models. Based on the non-significant change in chi-square between the TM and the AM, it can be concluded that TM offers as a better specification. Therefore, our theoretical model is more appropriate for analyzing the proposed relationships.

5.2. The moderating effect of competitive intensity and market turbulence

The moderating effects of competitive intensity between competence exploration and innovativeness to the firm, and the moderating effects of market turbulence between competence exploitation and objective quality were tested through multigroup analyses, splitting the sample into subsamples as high/low competitive intensity and high/low market turbulence. This procedure has been frequently used in different studies (Calantone et al., 2003; Coote, Forrest, & Tam, 2006; Dayan & Di Benedetto, 2010) and the steps to check for moderator effects are as follows:

1) The items of competitive intensity and market turbulence were summed to create a composite scale.
2) The sample was split into two groups representing low/high levels of competitive intensity and low/high levels of market turbulence.
3) A constrained model was estimated in which all the parameters were held as invariant across the subsamples.
4) A unconstrained model was estimated in which the structural paths were allowed to vary across the groups.
5) A chi-square difference test reveals whether the unconstrained model represent a significant improvement in fit over the constrained model.

First, the two-group comparison of structural equation modelling was used to test the moderating effect of market turbulence and new product objective quality, after which we tested the moderating effect of competitive intensity on the relationship between competence exploration and product innovativeness to the firm.

With regard to the moderator effect of market turbulence, the sample was divided into two groups, based on the mean of market turbulence. Organizations above the mean were defined as competing in highly turbulent markets, while those below the mean were defined as competing in less turbulent markets. Two-group comparison was then performed to examine whether there were any differences in structural parameters between highly and less turbulent markets. In the first step, the parameter from the exploitation of competences to new product quality was constrained to be equal. In the second step, the parameter was not constrained (allowing it to be free). The difference between the two tests was significant (chi-square difference = 8.21, $df=1$, $P<.01$), which supports the proposition that market turbulence modifies this relationship.

In the test concerning the moderating effect of competitive intensity on the relationship between the exploration of competences and new product innovativeness to the firm, the same procedure was used. Organizations above the mean were defined as operating in highly competitive markets, while those below the mean were defined as operating in less competitive markets. Again, the difference between the two tests was significant (chi-square difference = 7.11, $df=1$, $P<.01$), which supports the proposition that competitive intensity modifies this particular relationship. The results are summarized in Table 3.

When examining the coefficients of the two groups, we found that the coefficient for firms competing in markets with low turbulence is .43 ($t=3.83$, $P<.01$) and for firms competing in markets with high turbulence is .68 ($t=4.95$, $P<.01$). In other word, as far as organizations competing in a highly turbulent market are concerned, there is a strong relationship between the exploitation of competences and new product objective quality, whereas, in the case of organizations competing in less low turbulent markets, that relationship is weak, which supports Hypothesis 2. With regard to the relationship between the exploration of competences and new product innovativeness to the firm, the coefficient for less competitive markets is .80 ($t=6.00$, $P<.01$), as compared to .56 ($t=4.84$, $P<.01$) for highly competitive markets. In other words, when organizations compete in a less competitive market, there is a strong relationship between the exploration of competences and new product innovativeness to the firm, whereas that relationship is weak when organizations compete in a highly competitive market. This result also supports Hypothesis 4.

As will become clear in the discussion section, this study provides recommendations to managers on what type of competence (exploitation vs. exploration) they should focus, based on market conditions,

Table 3
Moderating effects of multi-group analysis.

Path	Moderator		Standardized coefficient	χ^2 difference
C. Exploitation → objective quality	Market turbulence	High	0.68(4.95)	$\chi^2(1)=8.21$
		Low	0.43(3.83)	
C. Exploration → innovativeness to the firm	Competitive intensity	High	0.56(4.84)	$\chi^2(1)=7.11$
		Low	0.80(6.00)	

Table 4
Hypotheses validation.

H1	Competence exploitation is positively associated with new product objective quality.	Supported
H2	A high level of market turbulence will increase the positive effects of competence exploitation in new product objective quality.	Supported
H3	Competence exploration is positively associated with product innovativeness to the firm.	Supported
H4	A high level of competitive intensity will decrease the positive effects of competence exploration in product innovativeness to the firm.	Supported
H5	New product objective quality is positively associated with speed-to-market.	Supported
H6	Product innovativeness to the firm is negatively associated with speed-to-market.	Supported

in order to increase final new product performance. Interestingly, there are several environmental factors that suggest a possible contingency effect on these relationships.

6. Discussion

The benefits of NPD have clearly been identified in academic literature and practice. In accordance with earlier findings, the results of this study show the importance of developing organizational competences in this area. As can be observed in Table 4, all hypotheses were supported.

However, several questions remain unanswered, such as: "Should a firm focus on exploring or exploiting competences if it wants to reduce its time-to-market or market performance?", "Is there always a best route for all companies or are there contingent factors that suggest different alternatives?" To answer these questions, we have examined our results in great detail. In this context, on the one hand, we have analyzed the effect of organizational competences on speed-to-market and performance. On the other hand, we have identified the effect of both competitive intensity and market turbulence on these relationships (Table 5).

With regard to the first question, our results show that the indirect effect of exploitation on speed-to-market through product objective quality is .14 ($t=3.26$, $P<.01$). Conversely, the indirect effect of exploration through product innovativeness to the firm is not significant. These results confirm that the exploitation of competences will facilitate a speedy market introduction of new products due to the relative ease with which incremental changes can be introduced. The question is, however, if this always true. The answer to this question is no, it depends of several conditions. Firstly, in less competitive sectors, exploitation influences speed-to-market (0.15, $t=2.49$, $P<.01$), while in highly competitive sectors, exploration is the best option (0.12, $t=2.14$, $P<.01$), which reinforces the idea that the external pressure forces companies to look for quick and unusual ways to distinguish themselves from their competences. In this case, incremental innovations would not help a company distinguish itself from its competitors, because any improvements to its existing products are easy to copy. Product innovativeness to the firm, as a more radical focus, may require a larger development timeframe. However, competitive rivalry and imitation force companies to reduce this timeframe and market new products quickly in order to enjoy the benefits of having a temporary monopoly. Secondly, the moderate effect of market turbulence on the relationship between organizational competences and speed-to-market reinforces the results with regard to hypotheses five and six. In this case, we have only found a positive indirect influence of exploitation on speed-to-market. However, the strength of the relationship is different for low and high market turbulence. In this sense, it is clear that a stable market environment allows companies to use organizational abilities and capabilities that constitute their core competences and sources of competitive advantage.

With regard to the indirect effect of organizational competences over market performance, the results are similar. Both competences have a positive effect (0.26, $t=5.04$, $P<.01$ for exploitation; 0.12, $t=2.51$, $P<.01$ for exploration), although the effect of exploitation is higher compared to the results found in other academic studies. Thus, the major uncertainty, risks and investment in innovation associated with exploration could limit the profits of the new products. However, market conditions influence these conclusions. On the one hand, competitive intensity has a different effect on exploitation and exploration. The indirect effect of exploitation is higher in more competitive markets (0.37, $t=4.10$, $P<.01$). The opposite is true for exploration, where companies focusing on exploration and operating in less competitive sectors (0.20, $t=2.54$, $P<.01$) obtain better results compared to those operating in more competitive sectors. Similar results have been found with regard to market turbulence (0.36, $t=4.25$, $P<.01$ for exploitation and high turbulence; 0.18, $t=2.68$, $P<.01$ for exploration low turbulence). These results are explained in strategic management literature. Under stable conditions, both exploration-related and exploitation-related competences are found to be sources of competitive advantage. Moreover, and in spite of the risks, exploration could give companies a monopoly position because of their newly developed and marketed products. However, under highly turbulent conditions, companies tend to focus on existing competences at the expense of new ones, allowing them to reinforce their own business rather than having to operate in a hostile environment.

7. Conclusions

An organization's dynamic capabilities depend on its ability to simultaneously exploit existing technologies and resources to secure efficiency benefits and create variation through exploratory innovation (Ghemawat & Costa, 1993; March, 1991; Teece et al., 1997). According to the Dynamic Capabilities Theory (Winter, 2003), organizations depend on simultaneously exploiting existing technologies and resources to secure efficiency benefits and create variation through exploratory innovation. Thus, exploitation frequently tends to drive out exploration (Atuahene-Gima, 2005), due to the high level of uncertainty involved in completely new activities.

Our first main contribution is based on this topic. The choice between exploitation and exploration is also based on the organizational targets of NPD. While the former increases product objective quality, the latter enhances product innovativeness to the firm. The

Table 5
Indirect effects of competence exploitation and exploration in the speed-to-market and performance of new products.

Indirect effects coefficients	Overall model	Competitive intensity		Market turbulence	
		Low	High	Low	High
C. Exploitation → speed to market	0.14 (3.26)	0.15 (2.49)	n.s.	0.16 (2.64)	0.12 (1.99)
C. Exploitation → market performance	0.26 (5.04)	0.17 (2.89)	0.37 (4.10)	0.21 (3.17)	0.36 (4.25)
C. Exploration → speed to market	n.s.	n.s.	0.12 (2.14)	n.s.	n.s.
C. Exploration → market performance	0.12 (2.51)	.20 (2.54)	n.s.	0.18 (2.68)	n.s.
R^2 (speed to market)	0.09	0.10	0.09	0.15	0.05
R^2 (market performance)	0.43	0.43	0.56	0.47	0.42

n.s. = not significant. (t-values).

two have often been seen as opposing management paradigms (Cho & Pucik, 2005), despite the fact that literature has shown that they share basic principles and are related in complex ways (Curkovic et al., 2000). Both objective quality and innovativeness to the firm are positively related to market performance, although the effect of objective product quality is greater. In effect, high-quality and highly innovative products, incorporate unique features for the customer and are better at meeting customer needs than competing products, which allows companies to develop solutions that provide a significant value to the market, what can in turn mean that the products are more successful.

Secondly, we have found a positive relationship between speed-to-market and performance. This result is consistent with earlier studies. What is especially important is the indirect effect of organizational competences on speed-to-market. In this case, it is only exploitation, and not exploration, that constitutes is an important success factor with regard to launching new products to the market. Thus, exploitation through quality initiatives based on variance reduction and increased process control will drive both speed and organizational efficiency (Benner & Tushman, 2003).

Our third contribution focuses on the important results related to the moderate effect of competitive intensity and market turbulence. High levels of market turbulence foster the results of exploitation, that is to say, the strength of exploitation with objective product quality and market performance is higher. However, they inhibit the market performance effect of exploration. Thus, under high levels of market turbulence, companies must opt in favour of exploitative strategies that reinforce their own core business. Conversely, low levels of competitiveness may foster exploration. Minor pressure from competitors allows companies to dedicate efforts to developing radically new products to sustain their position in the future. Moreover, it allows companies to recover the important investments, through market performance, involved in NPD. High levels of competitiveness will foster the adoption of exploitative strategies that allow companies to defend against competitors with better short-term results.

8. Managerial implications

Overall, the results of this study offer several guidelines to help companies develop new and successful products. In concrete terms, it sheds light on decisions regarding the relationship between exploitation and exploration. The study builds on the two types of competences: exploitation (existing assets and capabilities) and exploration (the development of new capabilities), and their impact on new product performance. One of the main implications for managers is that both exploratory and exploitative product competences should consider in parallel when developing products. As the two competences affect different aspects of new product advantage along different paths, the use of one type of competence at the exclusion of the other can diminish the effectiveness of the product development process and ultimately lead to a weak product performance, similar to the results reported by Kim and Atuahene-Gima (2010). For example, in a company, excessive exploration at expense of exploitation can be costly, as the tangible outcomes of exploration will only be realized in the distant future and then only with a considerable uncertainty. On the other hand, a concentration on exploitation without exploration discourages the organization from pursuing learning and development (Auh & Menguc, 2005).

Firms must be aware of the limitation of their existing product innovation capabilities. Firms should develop strategic flexibility in their resource allocation and coordination, as such flexibility stimulates greater exploration of new technology and markets, which may help firms escape the competence trap (Zhou, 2006).

Although many advantages of using exploitative/explorative strategies have been identified, their effect on market performance depends on the company's environment, in particular with regard to competitive intensity and market turbulence. We can conclude that, under highly turbulent conditions, companies should opt in favour of exploitative strategies, such as product quality, which will defend best against external threats. These implications are similar to what is argued by Kim and Atuahene-Gima (2010), who state that exploitative learning contributes more to new product cost efficiency in highly competitive market conditions.

The implications of this study as far as managers are concerned are primarily related to this topic. Companies should analyze the conditions of their markets, competences and technology. With low levels of competitiveness or market turbulence, they should develop explorative competences, which allow them to develop new radical products and, consequently, create a competitive advantage.

To take advantage of their exploratory and exploitative competences in new product development, companies should carefully examine the differences between these two competences and the particular situation under which each can be more or less effective to develop a successful new product. The effective distribution of resources needs to take the dominant paradigm of the firm into account. For example, a company with a greater exploitation competence will find tend to invest more in objective product quality. On the other hand, a company with a great explorative competence will tend to put more of its resources into improving its innovative capabilities. These tendencies can create a potential threat in the mix of competence that managers should avoid.

9. Limitations and future research guidelines

Our study is obviously subject to some limitations that need to be addressed, but there are also promising future research ideas that emerge from this study. Given the diversity of products and industries included in the investigation, using real figures for the research variables seems inappropriate, since objective measures can only be interpreted with regard to specific industries and product categories. Thus, we use subjective measures based on the perceptions of the managers participating in our survey. Despite the extensive use of such retrospective perceptual data in strategy research, and especially in new product research (Langerak et al., 2008), we should not rule out the potential shortcomings associated with subjectivity, which means a cautious interpretation of the findings is necessary. Furthermore, although a sample of firms in a varied set of industries allows for the generalization of the results beyond the idiosyncratic nature of a specific industry, studies involving individual sectors would be useful for validating the results.

Secondly, for each company, a single key informant provided the data. Studies employing single-source methodology may be biased by artificially high inter-correlations because of an overall, positive or negative, response bias. Aviolo, Yammarino, and Bass (1991) observe, however, that simply assuming that single-source data are less valid than multi-source data is overly simplistic. Without wanting to minimize the importance of common method bias, the different data analyses conducted and explained in the methodology section support the relative lack of such a bias, which in this study does not threaten the interpretation of the data analysis. However, future research should address the single-source issue, since past research calls attention to the diversity of goals and perceptions that the R&D, manufacturing and marketing functions have with regard to new product performance (Song & Montoya-Weiss, 2001). Also, as Gupta et al. (2006) point out, it is important to analyze how exploration at one level interacts with exploitation at a lower or higher level. We only examined exploration and exploitation, as they pertain to the operational domain of product strategies (Voss et al., 2008). Therefore, an interesting avenue for future research will be to include data from different sources and, if possible, other objective performance indicators (Hooley et al., 2005) (stock market value, revenues, etc).

The model proposed in this study is not comprehensive. Clearly, much more can be learned from expanding and refining the

relationships under investigation. To begin with, it would be interesting to look at the tension between the exploitation and exploration of competences. They are fundamentally different approaches that create tension, but there may also be a potential synergy, which means there is a need for firms to balance the two (Calantone et al., 2003). Although there are clear situations in which organizations need to focus on exploitation at the expense of exploration, the more common situation in practice is one where exploitation tends to drive out exploration. The promise of process management is that focusing on variance reduction and increased process control will drive both speed and organizational efficiency. However, long-term survival and success require an ability to be ambidextrous (Nemanich & Vera, 2009).

Acknowledgements

We acknowledge the funding received from the Education and Science Ministry (research project SEJ2006-08854/ECON), Fundacion Cajamurcia and the Seneca Foundation—Science and Technology Agency from the Region of Murcia (research project 03119/PHCS/05) to undertake this research. The authors are grateful to the editor and anonymous reviewers for their help in improving this article.

Appendix A

A.1. Competence exploitation

- We have upgraded skills in product development processes where the firm already possesses significant experience.
- We have strengthened our knowledge and skills regarding projects that improve the efficiency of existing innovation activities.
- We have invested in enhancing skills to exploit mature technologies that improve the productivity of existing innovative operations.

A.2. Competence exploration

- We have acquired manufacturing technologies and skills that are entirely new to the firm.
- We have acquired new technologies that are entirely new to the firm.
- We have acquired new innovation skills that are entirely new to the firm.

A.3. Objective quality

- The probability of the product failing is low.
- The product has performed as expected.
- The product has been developed according to manufacturing guidelines.

A.4. Innovativeness to the firm

- Developing this product was a technologically complex affair.
- The development process was complicated.
- The new product developed was complex.

A.5. Market turbulence

- In this market, the products/brands change frequently.
- In this market, marketing strategies change frequently.
- In this market, consumer preferences change frequently.

A.6. Competitive intensity

- Competitive intensity on this market is very high.
- Companies compete aggressively to maintain market share.
- Companies have increased their marketing expenditures due to competitive pressures.

A.7. Speed to market

- The new product was developed faster than our typical product development time.
- The new product was developed far ahead of our project timeline.

A.8. Market performance

- Sales objectives.
- Growth objectives.
- Market share objectives.

References

Alvarez, S. A., & Barney, J. B. (2005). How do entrepreneurs organize firms under conditions of uncertainty? *Journal of Management*, *31*(5), 776—793.
Alvarez, S. A., & Barney, J. B. (2007). Discovery and creation: Alternative theories of entrepreneurial action. *Strategic Entrepreneurship Journal*, *1*(1), 11—26.
Ancona, D. G., Goodman, P. S., Lawrence, B. S., & Tushman, M. L. (2001). Time: A new research lens. *Academy of Management Review*, *26*(4), 645—663.
Anderson, J. C., & Gerbing, D. W. (1988). Structural equation modelling in practice: A review and recommended two-step approach. *Psychological Bulletin*, *103*(3), 411—423.
Armstrong, J. S., & Overton, T. S. (1977). Estimating nonresponse bias in mail surveys. *Journal of Marketing Research*, *14*(3), 396—402.
Atuahene-Gima, K. (2003). The effects of centrifugal and centripetal forces on product development speed and quality: How does problem solving matter? *Academy of Management Journal*, *46*(3), 359—373.
Atuahene-Gima, K. (2005). Resolving the capability-rigidity paradox in new product innovation. *Journal of Marketing*, *69*(3), 61—83.
Augusto, M., & Coelho, F. (2009). Market orientation and new-to-the-world products: Exploring the moderating effects of innovativeness, competitive strength, and environmental forces. *Industrial Marketing Management*, *38*(1), 94—108.
Auh, S., & Menguc, B. (2005). Balancing exploration and exploitation: The moderating role of competitive intensity. *Journal of Business Research*, *12*, 1652—1661.
Aviolo, B. J., Yammarino, F. J., & Bass, B. M. (1991). Identifying common methods variance with dates collected from a single source: An unresolved sticky issue. *Journal of Management*, *17*(4), 571—587.
Bagozzi, R. P., & Yi, Y. (1988). On the evaluation of structural equation models. *Journal of the Academy of Marketing Science*, *16*(1), 74—94.
Barney, J. B. (1991). Firm resources and sustained competitive advantage. *Journal of Management*, *17*(1), 99—120.
Benner, M., & Tushman, M. L. (2003). Exploitation, exploration, and process management: The productivity dilemma revisited. *Academy of Management Review*, *28*(2), 238—256.
Bestieler, L. (2005). The moderating effect of environmental uncertainty on new product development and time efficiency. *Journal of Product Innovation Management*, *22*(3), 267—284.
Brucks, M., Zeithaml, V. A., & Naylor, G. (2000). Price and brand name as indicators of quality dimensions for consumer durables. *Journal of the Academy of Marketing Science*, *28*(3), 359—374.
Calantone, R., Garcia, R., & Dröge, C. (2003). The effects of environmental turbulence on new product development strategy planning. *Journal of Product Innovation Management*, *20*(2), 90—103.
Calantone, R. J., & Knight, G. (2000). The critical role of product quality in the international performance of industrial firms. *Industrial Marketing Management*, *29*(6), 493—506.
Chang, D., & Cho, H. (2008). Organizational memory influences new product success. *Journal of Business Research*, *61*(1), 13—23.
Cho, H., & Pucik, V. (2005). Relationship between innovativeness quality, growth, profitability, and market value. *Strategic Management Journal*, *26*(6), 555—575.
Cooper, R. G., & Kleinschmidt, E. J. (1994). Determinants of timeliness in product development. *Journal of Product Innovation Management*, *11*(5), 381—396.
Coote, L., Forrest, E., & Tam, T. (2006). An investigation into commitment in non-western industrial marketing relationships. *Industrial Marketing Management*, *32*(7), 595—604.
Crawford, C. M. (1992). The hidden costs of accelerated product development. *Journal of Product Innovation Management*, *9*(3), 188—189.
Curkovic, S., Vickery, S., & Dröge, C. (2000). Quality-related action programs: Their impact on quality performance and firm performance. *Decision Sciences*, *31*(4), 885—905.
Danneels, E., & Kleinschmidt, E. J. (2001). Product innovativeness from the firm´s perspective: Its dimensions and their relation with project selection and performance. *Journal of Product Innovation Management*, *18*(6), 357—373.
Day, G. S. (1994). The capabilities of market-driven organizations. *Journal of Marketing*, *58*(4), 37—52.
Dayan, M., & Di Benedetto, C. (2010). The impact of structural and contextual factors on trust formation in product development teams. *Industrial Marketing Management*, *39*(4), 691—703.
Eisenhardt, K. M., & Martin, J. A. (2000). Dynamic capabilities: What are they? *Strategic Management Journal*, *21*, 1105—1121.
Fornell, C., & Larcker, D. F. (1981). Evaluating structural equation models with unobservable variables and measurement error. *Journal of Marketing Research*, *18*(1), 39—50.
Garcia, R., & Calantone, R. (2003). The role of knowledge in resource allocation to exploration versus exploitation in technologically oriented organizations. *Decision Sciences*, *34*(2), 323—350.

Garvin, D. A. (1987). Competing on the eight dimensions of quality. *Harvard Business Review*, *6*(1), 101—109.
Ghemawat, P., & Costa, J. (1993). The organizational tension between static and dynamic efficiency. *Strategic Management Journal*, *14*(S2), 59—73.
Greve, H. R. (2007). Exploration and exploitation in product innovation. *Industrial and Corporate Change*, *16*(5), 945—975.
Griffin, A. (1997). The effect of project and process characteristics on product development cycle time. *Journal of Marketing Research*, *20*, 24—35.
Griffin, A., & Page, A. L. (1996). PDMA Success measurement project: Recommended measures for product development success and failure. *Journal of Product Innovation Management*, *13*(6), 478—496.
Gupta, A. K., Smith, K. G., & Shalley, E. (2006). The interplay between exploration and exploitation. *Academy of Management Journal*, *49*(4), 693—706.
He, Z., & Wong, P. (2004). Exploration vs. exploitation: An empirical test of the ambidexterity hypothesis. *Organization Science*, *15*(4), 481—494.
Henard, D. H., & Szymanski, D. M. (2001). Why some new products are more successful than others? *Journal of Marketing Research*, *38*(3), 362—375.
Hill, C., & Rothaermel, F. (2003). The performance of incumbent firms in the face of radical technological innovation. *Academy of Management Journal*, *28*(2), 257—274.
Holmqvist, M. (2004). Experiential learning processes of exploitation and exploration within and between organizations: An empirical study of product development. *Organization Science*, *15*(1), 70—81.
Hooley, G. J., Greenley, G. E., Cadogan, J. W., & Fahy, J. (2005). The performance impact of marketing resources. *Journal of Business Research*, *58*(1), 18—27.
Jansen, J. P., Van Den Bosch, F., & Volberda, H. W. (2006). Exploratory innovation, exploitative innovation, and performance: Effects of organizational antecedents and environmental moderators. *Management Science*, *52*(11), 1661—1674.
Kessler, E. H., & Bierly, P. E. (2002). Is faster really better? An empirical test of the implication of innovation speed. *IEEE Transactions on Engineering Management*, *49*(1), 2—12.
Kim, N., & Atuahene-Gima, K. (2010). Using exploratory and exploitative market learning for new product development. *Journal of Product Innovation Management*, *27*(4), 519—536.
Kyriakopoulos, K., & Moorman, C. (2004). Tradeoffs in marketing exploitation and exploration strategies: The overlooked role of market orientation. *International Journal of Research in Marketing*, *21*(3), 219—240.
Langerak, F., Hultink, E. J., & Griffin, A. (2008). Exploring mediating and moderating influences on the links among cycle time, proficiency in entry timing, and new product profitability. *Journal of Product Innovation Management*, *25*(4), 370—385.
Lavie, D., & Rosenkopf, L. (2006). Balancing exploration and exploitation in alliance formation. *Academy of Management Journal*, *49*(4), 797—818.
Lee, J., Lee, J. S., & Lee, H. (2003). Exploration and explotation in the presence of network externalities. *Management Science*, *49*(4), 553—570.
Lee, Y., & O´Connor, G. C. (2003). The impact of communication strategy on launching new products: The moderating role of product innovativeness. *Journal of Product Innovation Management*, *20*(1), 4—21.
Lindell, M., & Brandt, C. (2000). Climate quality and climate consensus as mediators of the relationship between organizational antecedents and outcomes. *Journal of Applied Psychology*, *85*(3), 331—348.
Lukas, B., & Menon, A. (2004). New product quality: Intended and unintended consequences of new product development speed. *Journal of Business Research*, *57*(11), 1258—1264.
Malhotra, N., Kim, S., & Patil, A. (2006). Common method variance in IS research: A comparison of alternative approaches and a reanalysis of past research. *Management Science*, *52*(12), 1865—1883.
March, J. G. (1991). Exploration and Exploitation in Organizational Learning. *Organization Science*, *2*(1), 71—87.
Menguc, B., & Auh, S. (2006). Creating a firm-level dynamic capability through capitalizing on market orientation and innovativeness. *Journal of the Academy of Marketing Science*, *34*(1), 63—73.
Menon, A., Chowdhury, J., & Lukas, B. (2002). Antecedents and outcomes of new product development speed. An interdisciplinary conceptual framework. *Industrial Marketing Management*, *31*(4), 317—328.
Miller, K., Zhao, M., & Calantone, R. (2006). Adding interpersonal learning and tacit knowledge to March's exploration–exploitation model. *Academy of Management Journal*, *49*(4), 709—722.
Molina-Castillo, F. J., & Munuera-Alemán, J. L. (2009). New product performance indicators: Time horizon and importance attributed by managers. *Technovation*, *29*(10), 714—724.
Nemanich, L. A., & Vera, D. (2009). Transformational leadership and ambidexterity in the context of an acquisition. *The Leadership Quarterly*, *20*(1), 13.
Peteraf, M. (1993). The cornerstones of competitive advantage: A resource-based view. *Strategic Management Journal*, *14*, 179—191.
Podsakoff, P. M., Mackenzie, S. B., Lee, J., & Podsakoff, N. P. (2003). Common method biases in behavioral research: A critical review of the literature and recommended remedies. *Journal of Applied Psychology*, *20*(5), 879—903.
Prahalad, C. K., & Hamel, G. (1990). The core competence of the corporation. *Harvard Business Review*, *90*(3), 79—91.
Rindfleisch, A., & Moorman, C. (2001). The acquisition and utilization of information in new product alliances: A strength-of-ties perspective. *Journal of Marketing*, *65*(2), 1—18.
Rosenkopf, L., & Nerkar, A. (2001). Beyond local search: Boundary-spanning, exploration, and impact in the optical disk industry. *Strategic Management Journal*, *22*(4), 287—306.
Rothaermel, F. T., & Deeds, D. L. (2004). Exploration and exploitation alliances in biotechnology: A system of new product development. *Strategic Management Journal*, *25*(3), 201—221.
Rust, R. T., Moorman, C., & Dickson, P. T. (2002). Getting return on quality: Revenue expansion, cost reduction, or both? *Journal of Marketing*, *66*(4), 7—24.
Santos-Vijande, M., & Álvarez-González, L. (2007). Innovativeness and organizational innovation in total quality oriented firms: The moderating role of market turbulence. *Technovation*, *27*(9), 514—532.
Sarin, S., & Mahajan, V. (2001). The effect od reward structures on the performance of cross-functional development teams. *Journal of Marketing*, *65*(2), 35—53.
Sethi, R., & Sethi, A. (2009). Can quality-oriented firms develop innovative new products? *Journal of Product Innovation Management*, *26*(2), 206—221.
Short, J. C., Ketchen, D. J., Shook, C. L., & Ireland, R. D. (2009). The concept of "opportunity" in entrepreneurship research: Past accomplishments and future challenges. *Journal of Management*, *36*(1), 40—65.
Sivadas, E., & Dwyer, F. R. (2000). An examination of organizational factors influencing new product success in internal and alliance-based processes. *Journal of Marketing*, *64*(1), 31—49.
Song, X. M., & Montoya-Weiss, M. M. (2001). The effect of perceived technological uncertainty on Japanese new product development. *Academy of Management Journal*, *44*(1), 61—80.
Soosay, C., & Hyland, P. (2008). Exploration and exploitation: the interplay between knowledge and continuous innovation. *International Journal of Technology Management*, *42*(1), 20—35.
Spector, P. (2006). Method variance in organizational research: Truth or urban legend? *Organizational Research Methods*, *9*(2), 221—231.
Teece, D. (2007). Explicating dynamic capabilities: The nature and microfoundations of (sustainable) enterprise performance. *Strategic Management Journal*, *28*(13), 1319—1350.
Teece, D., Pisano, G., & Shuen, A. (1997). Dynamic capabilities and strategic management. *Strategic Management Journal*, *18*(7), 509—533.
Vaaler, P., & McNamara, G. (2010). Are technology-intensive industries more dynamically competitive? No and yes. *Organization Science*, *21*(1), 271—289.
Voss, G. B., Sirdeshmukh, D., & Voss, Z. G. (2008). The effects of slack resources and environmental threat on product exploration and exploitation. *Academy of Management Journal*, *51*(1), 147—164.
Winter, S. (2003). Understanding dynamic capabilities. *Strategic Management Journal*, *24*(10), 991—995.
Yalcinkaya, G., Calantone, R., & Griffith, D. A. (2007). An examination of exploration and exploitation capabilities: Implications for product innovation and market performance. *Journal of International Marketing*, *15*(4), 63—93.
Zahra, S., Sapienza, H., & Davidsson, P. (2006). Entrepreneurship and dynamic capabilities: a review, model and research agenda*. *Journal of Management Studies*, *43*(4), 917—955.
Zeithaml, V. A. (1988). Consumer perceptions of price, quality and value: A means-end model and synthesis of evidence. *Journal of Marketing*, *52*(2), 2—22.
Zhou, K. (2006). Innovation, imitation, and new product performance: The case of China. *Industrial Marketing Management*, *35*(3), 394—402.

Francisco-Jose Molina-Castillo (Ph.D., University of Murcia) is an Assistant Professor of Marketing at the University of Murcia, Spain. His work has been published in the *Industrial Marketing Management, Journal of Product Innovation Management, Technovation, International Journal of Information Management, Information & Management and other journals.*

Daniel Jimenez-Jimenez (Ph.D., University of Murcia) is an Assistant Professor of Management at the University of Murcia, Spain. His work has been published in the *Industrial Marketing Management, Journal of Business Research, International Journal of Information Management, International Journal of Operations and Production Management and International Small Business Journal.*

Jose-Luis Munuera-Alemán (Ph.D., Universidad Autonoma of Madrid) is a Professor of Marketing at the University of Murcia, Spain. His work has been published in the *Industrial Marketing Management, Journal of Product Innovation Management, Technovation, Journal of Business Research, Marketing Letters, Journal of Advertising,* and in the *European Journal of Marketing.*