

Achieving new product success via the synchronization of exploration and exploitation across multiple levels and functional areas

O'Cass, A; Heirati, N; Ngo, LV

© 2014 Published by Elsevier Inc.

For additional information about this publication click this link.

<http://qmro.qmul.ac.uk/xmlui/handle/123456789/12685>

Information about this research object was correct at the time of download; we occasionally make corrections to records, please therefore check the published record when citing. For more information contact scholarlycommunications@qmul.ac.uk

**Achieving new product success via the synchronization of exploration and exploitation
across multiple levels and functional areas**

Aron O’Cass, Professor of Marketing

Tasmanian School of Business & Economics, University of Tasmania

Private Bag 84 Hobart, TAS 7001, Australia

Tel. +61 4 1777 1360

Email: Aron.Ocass@utas.edu.au

Nima Heirati*, Lecturer in Marketing

Newcastle University Business School, Newcastle University

5 Barrak Road, Newcastle upon Tyne, NE1 4SE, United Kingdom

Tel. +44 (0) 191 208 1589

Email: Nima.Heirati@ncl.ac.uk

Liem Viet Ngo, Senior Lecturer of Marketing

Australian School of Business, University of New South Wales

UNSW Kingston Campus, Sydney, NSW 2052, Australia

Tel. + 61 2 9385 3605

Email: Liem.Ngo@unsw.edu.au

* Nima Heirati is the corresponding author.

Biography

Aron O'Cass is Professor of Marketing at the University of Tasmania, Australia. He holds a Bachelor of Commerce, majoring in Marketing, a Master of Business majoring in Marketing and a PhD in Marketing. Aron has published over 200 research papers on issues related to marketing strategy, branding, consumer behavior, political marketing, voter behavior, status branding and fashion, and numerous other issues. His publications appear in journals such as *Journal of Product Innovation Management*, *Industrial Marketing Management*, *British Journal of Management*, *Journal of Business Research*, *European Journal of Marketing*, *Journal of Economic Psychology*, *Journal of Advertising*, and others.

Nima Heirati is Lecturer in Marketing at the Newcastle University Business School, United Kingdom. His research relates predominantly to the field of strategic marketing, new product development, organizational ambidexterity, service innovation, and service solutions. Nima has had published in many journals such as *Journal of Business and Industrial Marketing*, *Journal of Strategic Marketing*, and *Australasian Marketing journal*, among others.

Liem Viet Ngo is Senior Lecturer in Marketing at the School of Marketing, University of New South Wales, Australia. His research has been published in *Journal of Product Innovation Management*, *Journal of Marketing Management*, *British Journal of Management*, *Industrial Marketing Management*, *European Journal of Marketing*, *Journal of Business Research*, and *European Business Review*, among others.

Research highlights

- Ambidexterity is not limited to a single organizational level or a specific functional area
- Firms should both create new and refine existing capabilities to implement ambidextrous strategies
- Integration of exploratory and exploitative product innovation and marketing is vital in NPD
- Positional advantages uncover distinct outcomes of exploratory and exploitative capabilities

**Achieving new product success via the synchronization of exploration and exploitation
across multiple levels and functional areas**

Abstract

While ambidexterity has been identified as a critical prerequisite for new product success, synchronizing exploration and exploitation in practice represents a multifaceted enigma. Ambidexterity is not in reality limited to a single organizational level, or a specific functional area. Firms become ambidextrous when corporate-level exploratory and exploitative strategies interact with operational-level exploratory and exploitative capabilities across multiple functional areas. Data from a sample of technology-intensive industrial firms using a multi-informant design shows that operational-level exploratory and exploitative product innovation and marketing capabilities allow firms to implement corporate-level exploratory and exploitative strategies in the context of new product development (NPD). Further, the findings reveal that the integration of exploratory product innovation-exploratory marketing and exploitative product innovation-exploitative marketing are significant for the implementation of exploratory and exploitative strategies over deploying each capability in isolation. Finally, we show that the implementation of exploratory and exploitative strategies drives new product success through creating distinct positional advantages to customers in the form of both differentiation and cost efficiency. These positional advantages help to better explain the effects of exploratory and exploitative capabilities on new product market performance.

Keywords: *Ambidexterity, Exploration, Exploitation, Strategy implementation, Capabilities, Positional advantage, Partial Least Squares*

Introduction

Successful new products are paramount for the success and even survival of firms (Harmancioglu, Droge, & Calantone, 2009; Lisboa, Skarmeas, & Lages, 2011). However, the evidence regarding significant new product failure rates creates a dilemma that manifests both practical and theoretical concerns about the best approach to develop and market successful new product efforts. In the pursuit of reconciling this dilemma, many show pursuing both exploration and exploitation is a critical prerequisite for new product success (Atuahene-Gima, 2005; Rubera, Ordanini, & Calantone, 2012). The concepts of exploration and exploitation are central to ambidexterity theory, which suggests that a firm can be ambidextrous when it synchronously exploits its existing capabilities as well as overcomes their dysfunctional rigidity by renewing and replacing them with entirely new ones (Benner & Tushman, 2003; McCarthy & Gordon, 2011). However, ambidexterity is difficult to manage and achieve, as it is not limited to a single organizational level or a specific functional area. Ambidexterity transcends the interactions between corporate-level exploratory and exploitative strategies and operational level exploratory and exploitative capabilities (Cantarello, Martini, & Nosella, 2012), as well as the interactions between different functional areas (Rubera et al., 2012). This ability to transcend is fundamentally what ambidexterity is about and represents a fuller delineation of the synchronicity required to develop and market successful new products.

Our focus on corporate-level strategies and operational-level capabilities is underpinned by the argument that firms pursue different strategies at corporate and operational hierarchical levels in an organization (Nandakumar, Ghobadian, & O'Regan, 2010). While senior managers at the corporate-level determine basic goals related to choices of product/market domain's, mid-level managers and employees in a business-unit or department takes an operational approach to implement corporate strategies using specific

organizational capabilities (Bodwell & Chermack, 2010; Nandakumar et al., 2010). This view is outlined within the literature on dynamic capabilities where it is argued that a firm may also create new capabilities to implement corporate-level strategies (Bowman & Ambrosini, 2003), especially the dynamic ones (Bodwell & Chermack, 2010).

This view indicates that corporate-level exploratory and exploitative strategies are effective when firms deploy, renew, and improve requisite capabilities at the operational-level. However, to the best of our knowledge no research at present has examined how firms manage exploration and exploitation across multiple hierarchical levels to develop and market successful new products. Our study aims to understand the extent that technology-intensive industrial firms implement corporate level exploratory and exploitative strategies at the operational-level through exploratory and exploitative capabilities in the context of NPD. We focus on technology-intensive industrial firms (e.g., automation, electronic equipment) as the exploration and exploitation of organizational strategies and capabilities is paramount for firms competing in such industries with the incidence of disruptive market and technological changes high (Newbert, Gopalakrishnan, & Kirchhoff, 2008; Molina-Castillo, Jimenez-Jimenez, & Munuera-Aleman, 2011).

Our study offers three contributions to the literature. First, we contribute to the literature by showing that the interactions between corporate-level exploratory and exploitative strategies and operational-level exploratory and exploitative capabilities enable a firm to truly synchronize exploration and exploitation. This contribution is embedded in the theoretical contention that achieving superior performance-outcomes depend on the effective implementation of exploratory and exploitative strategies through specific operational-level capabilities (Sarkees, Hulland, & Prescott, 2010; Cantarello et al., 2012). Given exploratory and exploitative strategies have different centers of attention; the congruence between these strategies and operational-level capabilities is critical for the effective implementation of

these strategies. As such, we suggest that the implementation of exploratory and exploitative strategies depends on distinctive capabilities that are exploratory and exploitative in nature. Exploratory and exploitative capabilities enable the generation and refinement of routines and processes directed toward implementing exploratory and exploitative strategies.

Second, we contribute to the literature by showing that the deployment of exploratory and exploitative capabilities within a single functional area is not sufficient to implement corporate-level exploratory and exploitative strategies and drive new product performance (NPP). It is generally accepted that firms cannot utilize a single capability in isolation to develop and market a new product successfully (Day, 1994). New product success to a large extent relies on the deployment and integration of product innovation and marketing capabilities (Danneels, 2002; Rubera et al., 2012). However, little is known about how the integration between exploratory and exploitative capabilities across multiple functional areas facilitates the effective development and marketing of new products. Adapting the notions of exploratory and exploitative capabilities to product innovation and marketing as functional areas within firms, we show that the deployment and cross-functional integration of exploratory and exploitative product innovation and marketing capabilities enable firms to implement exploratory and exploitative strategies.

Third, we contribute to the literature by showing that new product positional advantages can assist in explaining the effects of exploratory and exploitative capabilities on NPP. Although several studies show that exploration and exploitation positively drive financial performance, some also reveal these capabilities have associated costs that lessen financial performance (Kim & Atuahene-Gima, 2010; Vorhies, Orr, & Bush, 2011). A possible reason for this inconsistency in the findings is that exploratory and exploitative capabilities have different outcomes and they affect financial performance through different paths, especially when researchers bring positional advantages into their research (Hughes,

Martin, Morgan, & Robson, 2010; Kim & Atuahene-Gima, 2010). To resolve the causal ambiguity regarding the performance implications of exploratory and exploitative product innovation and marketing capabilities, we use the source-position-performance principle (Day & Wensley, 1988). Within this principle, positional advantages reflect the firm's efforts to create superior or more advanced benefits for customers than those offered by competitive products in the market (Kim & Atuahene-Gima, 2010). We used new product differentiation and cost efficiency, arguably two key determinants of NPP, to distinguish the outcomes of exploratory and exploitative product innovation and marketing capabilities with respect to NPP.

Background

During the last two decades, continually shorter product life cycles and accelerating market changes have driven firms to simultaneously pursue two distinct corporate strategies, exploratory and exploitative strategies (Smith & Tushman, 2005; Siren, Kohtamäki, & Kuckertz, 2012). Exploratory strategy is pursued to proactively capitalize on emerging product-market opportunities and introduce new products that offer unique (e.g., differentiated, innovative) advantages beyond those provided by existing products in the market (Smith & Tushman, 2005; Siren et al., 2012). Exploitative strategy is pursued to respond to existing market needs and introduce new products that offer incremental improvements (e.g., higher quality) and cost efficient advantages to customers (Smith & Tushman, 2005; Siren et al., 2012). While exploratory strategy is associated with uncertain payoffs and a high risk of failure, exploitative strategy results in more secure, but short-term performance outcomes (Gupta, Smith, & Shalley, 2006; Siren et al., 2012). Given exploratory and exploitative strategies lead to different outcomes, it has been suggested that the synchronous pursuit of these two strategies leads to superior NPP more than overemphasizing one at the expense of the other (Smith & Tushman, 2005; Siren et al., 2012).

Although synchronizing the pursuit of exploratory and exploitative strategies is necessary, the literature shows that even firms with a sound corporate strategy are often unsuccessful due to poor strategy implementation at the operational-level (Love, Priem, & Lumpkin, 2002; DeSarbo, Di Benedetto, Song, & Sinha, 2005). Indeed, exploratory and exploitative strategies will only drive NPP, when appropriate capabilities are deployed at the operational-level (see Sarkees et al., 2010; Cantarello et al., 2012). Such capabilities represent the orchestration and application of employees knowledge and skills to perform specific tasks (e.g., develop a new product) (Day, 1994; Krasnikov & Jayachandran, 2008). Over time, capabilities become embedded in organizational routines and processes (Peng, Schroeder, & Shah, 2008; Lisboa et al., 2011). Past research positions product innovation and marketing capabilities as two primary capabilities that enable firms to develop and market new products to satisfy customers' existing and emerging needs (Danneels, 2002; Ngo & O'Cass, 2012). In this study, a firm's product innovation capability represents a bundle of technological routines that enable it to develop new products (Krasnikov & Jayachandran, 2008; Ngo & O'Cass, 2012). A firm's marketing capability represents a bundle of routines that enable it to link new products to customers (Moorman, 1995; Krasnikov & Jayachandran, 2008).

Prior research shows that a corporate strategy (e.g., a specific strategic type) determines the type of capabilities required to implement that strategy (DeSarbo et al., 2005). Furthermore, firms that continually orchestrate their employees, knowledge, and processes to renew and improve their organizational capabilities are better to pursue and implement new corporate strategies to respond to market changes (Lisboa et al., 2011). To this end, we posit that a firm successfully implements its corporate strategies when it deploys distinctive capabilities at the operational-level that are exploratory and exploitative in nature. In this pursuit, exploratory and exploitative capabilities are seen as the mean to generate new

routines and refine existing routines that a firms deploy to perform specific tasks (e.g., implement corporate strategies) (Greve, 2007; Peng et al., 2008). In particular, we focus on exploratory and exploitative capabilities pertaining to product innovation and marketing as the means to implement exploratory and exploitative strategies that underpin the development and marketing of new products.

Building on the work of Homburg et al. (2004) and Hughes et al. (2010), we develop a theoretical framework to examine the extent that corporate-level exploratory and exploitative strategies drive NPP through a strategy-capability-position-performance linkage. This linkage implies that exploratory and exploitative capabilities enable strategy implementation if they intervene (or mediates the link) between strategy-performance (Homburg et al., 2004). This mediational effect explains the effects exploratory and exploitative strategies on NPP (Hughes et al., 2010). We employ new product differentiation and cost efficiency as two positional advantages to explain the effects that exploratory and exploitative product innovation and marketing capabilities have on NPP. New product differentiation represents the distinctive characteristics of the new product that provides unique value to customers, whereas cost efficiency represents the lower delivered cost of the new product compared to that of comparable competing products (Kim & Atuahene-Gima, 2010).

Hypotheses and theory development

The mediating role of exploratory product innovation and marketing

Exploratory strategy drive firms to identify and open up new product-market opportunities and meet emerging customer needs by developing and marketing new products with differentiated advantages (Smith & Tushman, 2005; Siren et al., 2012). However, the development and marketing of new products with differentiated advantages (e.g., innovative features, new technologies) may not fit with existing technologies and marketing routines within firms (Harmancioglu et al., 2009). This mismatch leaves them with inability to

implement exploratory strategies, especially when such strategy emphasizes entering new product-market domains (Benner & Tushman, 2003; Smith & Tushman, 2005). Building on Bowman and Ambrosini (2003), we posit that the generation and deployment of exploratory product innovation and marketing helps firms to overcome deficiencies in existing routines in an effort to implement exploratory strategy.¹ In this study, exploratory product innovation refers to the generation of new routines (e.g., prototyping, production technologies and facilities) to develop new products (Greve, 2007; Peng et al., 2008). These new technical routines provide the capacity to deploy promising new technologies and learn new product development skills to create innovative and unique product features that satisfy emerging customer needs (Morgan & Berthon, 2008; Peng et al., 2008). Therefore, exploratory product innovation results in the development of new products that offer differentiated advantages to customers (e.g., new solutions, innovative features) (Jansen, Van Den Bosch, & Volberda, 2006; Lisboa et al., 2011). In this sense, the generation and deployment of new product development routines enable a firm to implement exploratory strategy and develop differentiated new products. Building on Homburg et al. (2004), we conclude that exploratory product innovation acts as an intervening mechanism that enables firms to implement exploratory strategy and drive new product differentiation. Thus,

H1a: Exploratory product innovation mediates the relationship between exploratory strategy and new product differentiation.

Exploratory marketing represents the generation of new marketing routines (e.g., sales, pricing, promotion, and distribution) to link a new product to customers (Kyriakopoulos & Moorman, 2004; Lisboa et al., 2011). New routines can offer superior advantages to the firm and customers by connecting a new product to customers through innovative promotion and sales methods that provide customers with innovative and unique purchasing experiences (e.g., see discussions on entertainment value in Kim & Forsythe, 2009). In addition, building

new marketing communications channels and new market research initiatives (e.g., a new call center) help to identify customer needs and target new customer segments (Lisboa et al., 2011). This helps to better predict the commercial potential of a new product within a market segment and create new promotion, sales, and distribution channels required to provide a unique purchasing experience for customers. As such, the generation and deployment of new marketing routines enable a firm to implement exploratory strategy and to market a new product using differentiated sales, pricing, promotion, and distribution methods. This indicates that exploratory marketing acts as an intervening mechanism that enables firms to implement exploratory strategy to drive new product differentiation. Thus,

H1b: Exploratory marketing mediates the relationship between exploratory strategy and new product differentiation.

Past research suggests that NPD is a spanning process that requires the integration of inside-out (e.g., product innovation) and outside-in (e.g., marketing) capabilities (Day, 1994). Drawing on Moorman and Slotegraaf (1999), a NPD project is most effective when firms pursue and integrate both product innovation and marketing capabilities. Such integration represents the extent that the benefits gained from the firms' product innovation capability increase with the contribution of marketing capability, and *vice versa* (Milogram & Roberts, 1995; Moorman & Slotegraaf, 1999). In focusing on arguments related to product innovation and marketing capability integration, we examine the extent that the integration of exploratory product innovation and exploratory marketing allows the implementation of exploratory strategy. Building on Milogram and Roberts (1995; Moorman & Slotegraaf, 1999), the integration of exploratory product innovation and exploratory marketing represents the extent that these capabilities mutually reinforce the impact of each other. Such integration is necessary for several reasons. First, it allows a firm to discover new knowledge regarding emerging customer needs as well as new technologies, which fosters creativity and the

novelty needed to create new products with differentiated advantages (Citrin, Lee, & McCullough, 2007; Brettel, Heinemann, Engelen, & Neubauer, 2011). Furthermore, the integration of market- and technology-related knowledge decreases the potential risk of a misfit between a new product's benefits and emerging customer needs (Brettel et al., 2011). Second, the integration of exploratory product innovation and exploratory marketing helps to better link the features of a new product to customers (Rubera et al., 2012). Where exploratory marketing seeks new methods to communicate with customers, employees of the product innovation department can help the marketing team to train customers about the novel and differentiated features provided by a new product. Therefore, we posit that the benefits gained from exploratory product innovation increase with the contribution of exploratory marketing, and *vice versa*. This indicates that the integration of exploratory product innovation - exploratory marketing provides a greater capacity than each capability in isolation to link exploratory strategy to new product differentiation. Thus,

H1c: The integration of exploratory product innovation – exploratory marketing mediates the relationship between exploratory strategy and new product differentiation.

The mediating role of exploitative product innovation and marketing

Firms pursue an exploitative strategy, when they face high costs and failure risks associated with the pursuit of exploratory strategy (Gupta et al., 2006) or they are less sensitive to market changes or perceive a market as stable (Miller, Lant, Milliken, & Kom, 1996; Kim & Atuahene-Gima, 2010). Exploitative strategy is pursued to respond to existing market needs and introduce new products with minor modifications to the firm's previous products at lower cost compared to competitors (Smith & Tushman, 2005; Siren et al., 2012). In this sense, the necessity of creating new routines and technologies becomes negligible, as the refinement of existing routines can provide the capacity to develop and market a new product through the improvement (e.g., upgrade, update) of existing products to satisfy customer needs. As such,

when firms seek to implement exploitative strategy and obtain their cost-based goals they may deploy exploitative capabilities.² In this sense, exploitative product innovation represents the refinement of existing routines (e.g., prototyping, production technologies and facilities) to develop a new product (Peng et al., 2008; Lisboa et al., 2011). Exploitative product innovation seeks to improve automation and the productivity of existing product development technologies, machinery, and routines (Jansen et al., 2006; Peng et al., 2008). Such improvements result in the more efficient use of organizational resources and reductions in development time and costs (Jansen et al., 2006; Morgan & Berthon, 2008). Employing lean production techniques are an example of mechanisms that help many firms (e.g., Toyota) to reduce defects, costs, and time associated with product development processes. It is the efficiency improvements that deliver advantages to customers in the form of lower costs compared to competing products (Langerak, 2003; Kim & Atuahene-Gima, 2010). Therefore, the refinement and deployment of existing product development routines enable a firm to decrease the cost and failure risks associated with the development of new products and obtain cost-based goals set by its exploitative strategy. To this end, we conclude that exploitative product innovation acts as the mechanism within firms that links exploitative strategy to cost-efficient outcomes in product level attributes. Thus,

H2a: Exploitative product innovation mediates the relationship between exploitative strategy and new product cost efficiency.

Exploitative marketing represents the refinement of existing marketing routines to link a new product to customers (Kyriakopoulos & Moorman, 2004; Lisboa et al., 2011). The pivotal role of exploitative marketing is to listen to the voice of customers more efficiently, ensure a new product offers benefits that customers are seeking, and improve the efficiency of existing marketing activities (e.g., sales, pricing, distribution) (Kyriakopoulos & Moorman, 2004; Atuahene-Gima, Slater, & Olson, 2005; Lisboa et al., 2011). Such

efficiency improvements lead to enhancing the quality of existing marketing activities and decreasing operational costs (see the discussion related to exploitative market learning capability in Kim & Atuahene-Gima, 2010). For example, the efficient distribution system can enhance the customer accessibility, while reducing costs related to mistakes and defects in product delivery. Therefore, the refinement and deployment of existing marketing routines enable a firm to decrease the cost and defects associated with the marketing of new products and obtain cost-based goals set its exploitative strategy. This indicates that exploitative marketing acts as the mechanism within firms that links exploitative strategy to cost-efficient outcomes in product level attributes. Thus,

H2b: Exploitative marketing mediates the relationship between exploitative strategy and new product cost efficiency.

Beyond the independent role of exploitative product innovation and exploitative marketing, we examine the extent that the integration of exploitative product innovation and exploitative marketing enables the implementation of exploratory strategy by driving new product cost efficiency. Building on Moorman and Slotegraaf (1999), the integration of exploitative product innovation and exploitative marketing in our study represents the extent that these capabilities mutually reinforce the effect of each other. Such integration allows a firm to obtain a deeper understanding of the expressed needs of customers and the performance of its existing routines, which provide the capacity to unlock the interdependencies among the existing knowledge elements related to customer needs and firm's capabilities (De Luca & Atuahene-Gima, 2007). Consequently, tasks and objectives within the development and commercial phases can be sequenced in efficient order, unnecessary steps can be eliminated, and costly defects (e.g., production and distribution errors) will be minimized (Rubera et al., 2012). Therefore, we posit that the benefits gained from exploitative product innovation increase with the contribution of exploitative marketing,

and *vice versa*. This indicates that the integration of exploitative product innovation - exploitative marketing provides a greater capacity than each capability in isolation to link exploitative strategy to new product cost efficiency. Thus,

H2c: The integration between exploitative product innovation - marketing capabilities mediates the relationship between exploitative strategy and established product cost efficiency.

The effect of positional advantages on new product performance

Past research views new product differentiation and cost efficiency as two important determinants of NPP as they provide a compelling reason(s) for customers to buy a new product (Day & Wensley, 1988; Kim & Atuahene-Gima, 2010). New product differentiation and cost efficiency together represent a product's perceived superiority relative to competing products and captures the provision of differentiated (e.g., unique) value to customers and the achievement of lower relative cost, respectively (Kim & Atuahene-Gima, 2010). These new product positional advantages reflect the outcomes of different capabilities (e.g., exploratory and exploitative capabilities) within a firm and they are critical in explaining how a specific capability yields certain advantages to customers and drive NPP (Day & Wensley, 1988; Kim & Atuahene-Gima, 2010). Langerak (2003) suggests that firms that continually enhance the level of new product differentiation and cost efficiency to create additional value for customers should be rewarded with superior NPP relative to their competitors through higher levels of customer satisfaction and loyalty. Thus,

H3: NPP is positively related to (a) new product differentiation and (b) new product cost efficiency.

Method

We used questionnaire protocol as the primary means for data collection and administered questionnaires to a sample of senior and mid-level managers from large technology-intensive industrial firms in Iran. We focused on technology-intensive industrial firms as in many sectors they face shortening product life cycles, increasing competition, and accelerating environmental changes and consequently in their markets these firms pursue both exploratory and exploitative strategies (Newbert et al., 2008; Molina-Castillo et al., 2011). Furthermore, Iran as one of the most industrialized Middle-Eastern economies (Heirati, O'Cass, & Ngo, 2013; Financial Times, 2010) has been over the past couple of decades been transitioning from a centrally planned to market-based economy through liberalization and privatization (Soltani & Wilkinson, 2012). Transition, according to many, leads to rapid environmental changes and high levels of uncertainty (Gao, Zhou, & Yim, 2007; Malik & Korabe, 2009), which force firms to pursue both exploratory and exploitative strategies to adapt to environmental changes (see also Atuahene-Gima, 2005). As such, the technology-intensive industrial firms in Iran appear to be an appropriate context for this study.

We used a multiple informant design (e.g., two informants from each firm) to develop two questionnaires capturing data related to the corporate and operational level variables from two different informants per firm. Data from two hierarchical levels (e.g., senior and mid-level management levels) help to (a) understand the extent that interaction between corporate-level strategies and operational-level capabilities enable a firm to synchronously explore and exploit, and (b) minimize the common method bias raised in employing a single informant from one organizational level (Damanpour, Walker, & Avellaneda, 2009). Following a similar procedure to Slotegraaf and Atuahene-Gima (2011), Atuahene-Gima (2005), and Damanpour et al. (2009), we asked senior managers (e.g., CEO, managing director) to answer questions related to the corporate-level exploratory and exploitative strategies, and the control variables (Questionnaire A). Mid-level managers (e.g., marketing

manager, product manager) answered questions related to the operational-level exploratory and exploitative capabilities, positional advantages, and NPP (Questionnaire B). The questionnaires were prepared in English and then translated into Persian following the conventional back-translation process (Atuahene-Gima, 2005). We pre-tested the instruments using individual interviews with 20 managers to examine understanding of the questions and face validity of the constructs.

From a directory of 2000 technology-intensive industrial firms, we used a systematic sampling procedure to generate a master list of 800 firms in which firms were arranged in decreasing order of their size (e.g., number of employees) from the original directory. Building on Johnson, Martin, and Saini (2012b), the sample spanned multiple industries to increase generalizability including industrial machinery and process equipment, automotive, electronics and telecommunication equipment, chemical, and pharmaceutical. The selected firms were contacted by telephone and invited to participate in the study and 538 firms agreed to participate. During the first contact, we also ensured that selected firms had launched a new product within the previous one year.

We employed a drop-and-collect data collection technique recommended by Coviello et al. (2002) and Ngo and O’Cass (2009). Building on Johnson, Clark, & Barczak (2012a), we examined the quality of completed questionnaires by assessing the competence of informants through asking them to indicate their knowledge about the issues embedded in the questions asked and their confidence in their ability to answer the questions on a seven-point Likert-type scale with anchors of “1 = not at all” to “7 = very much so”. We removed informants who scored below four on any of these two questions (Johnson et al., 2012a; Boso, Story, & Cadogan, 2013).

Finally, we received 132 usable survey packages (each including Questionnaires A and B). Non-response bias did not appear to be a major concern as no significant differences were

found between the sample of participating and non-participating firms with respect to their size, age, and industry type (Armstrong & Overton, 1977; Lisboa et al., 2011). The average firm size included in the sample, measured by the number of full-time employees, was 684 and the average age of firms included was 26 years. Of the firms studied, 71% firms had European (e.g., Germany, France) and Asian (e.g., South Korea) partners. Further, 61% of the firms studied exported their products to other countries. The mean scores of the first and second informants' knowledge about the questions asked were over 5.6 out of 7. The mean scores of the first and second informants' confidence in the ability to answer were over 5.7 out of 7. Therefore, we conclude that informants were knowledgeable about the issue being studied and confident they could answer (Johnson et al., 2012a; Boso et al., 2013).

Common-method bias

To assess the threat of common-method bias, two tests were conducted following the recommendations of Malhorta et al. (2006) and Ngo and O'Cass (Ngo & O'Cass, 2012). First, a Harmon's single factor test (Malhotra et al., 2006) was conducted by performing a factor analysis of all constructs simultaneously. The results show that four factors with eigenvalues greater than one were extracted and no single factor accounted for the majority of the variance (the first factor accounted for 30.7% of the 65.2% explained variance). Second, the marker-variable technique (Lindell & Whitney, 2001) was undertaken in which government turbulence (respondents' perception of the legal turbulence in advertising policies) was selected as a marker variable and it was not significantly related to any of the constructs in the model. To this end, we are confident that common method bias did not pose a significant threat to this study.

Measures of constructs

We used existing measures that suit the purpose of the study wherever possible. As noted before, following a similar procedure to Slotegraaf and Atuahene-Gima (2011), Atuahene-Gima (2005), and Damanpour et al. (2009), we asked the first and second informant questions related to the corporate-level and operational-level variables, respectively. In particular, we asked the first informant (e.g., senior managers completing questionnaire A) to answer questions related to exploratory and exploitative strategies and the control variables. Exploratory and exploitative strategies were measured using four items each adopted from Siren et al. (2012) and Benner and Tushman (2003) representing a firm's product and market-related strategies to enter new product-market domains and strengthen its position in its existing product market domains.

We asked the second informants (e.g., mid-level managers completing questionnaire B) to answer questions related to exploratory and exploitative capabilities, positional advantages, and NPP. Exploratory and exploitative product innovation were measured using four items each adopted from Morgan and Berthon (2008) and Jansen et al. (2006) representing the generation and refinement of routines directed toward the development of new products. We measured new product differentiation and cost efficiency using four items each adopted from Kim and Atuahene-Gima (2010). NPP was measured using four items adopted from Langerak et al. (2004) by asking informants to rate the performance of a new product, which has been launched within the previous one year, in relation to the goals set by the firm over the past year in terms of revenue, sales growth, market share, return on investment and profitability. All items were measured on a seven-point scales ranging from "1 = not at all" to "7 = very much so".

We developed new measures for exploratory marketing and exploitative marketing, because existing measures did not fit with our conceptualization of these constructs. In developing new measures, we followed a three-stage procedure suggested by Ngo and

O’Cass (2009). First, a large pool of items for the new scales was created from the relevant existing literature. Second, the items were sent to academic experts who judged their precision and representativeness. In doing so, we used the expertise of highly reputed scholars in management and marketing to examine the parsimony of the item pool. Third, a group of 20 managers revised the new items during pre-test to enhance the measures’ clarity. To reduce the potential for social desirability bias, informants were given explicit instruction to reflect the actual situation in their firm. We developed six new items for exploratory marketing and six new items exploitative marketing premised on the work of Danneels (2008), Vorhies et al. (2009), and Kyriakopoulos and Moorman (2004). We used factor analysis to separate the items related to each of the exploratory marketing and exploitative marketing, with acceptable Cronbach alphas (0.90 and 0.88 respectively). All items were measured using a seven-point scales ranging from “1 = not at all” to “2 = very much so”.

We considered structural differentiation, cross-functional integration, environmental turbulence, and firm size as control variables. Structural differentiation refers to the extent in which the firms’ organizational activities are segmented into spatially dispersed units and it was measured using four items adopted from Jansen et al. (2009). Cross-functional integration represents the degree to which various subunits (e.g. departments) interact, share information, and work together and it was measured using three items adopted from Atuahene-Gima (2005). Environmental turbulence represents the speed of change in a market and it was measured using four items adopted form De Luca and Atuahene-Gima (2007). All items related to control variables were answered on a seven-point scales ranging from “1 = not at all” to “7 = very much so”. Finally, firm size was measured in terms of the logarithm of the number of full-time employees. All constructs’ items are outlined in the Appendix 1.

Analysis and results

We employed partial least squares (PLS) as the estimation approach. PLS is suggested for predictive (e.g., theory development) research rather than confirmatory studies (Hair, Ringle, & Sarstedt, 2011). PLS is recommended for complex models incorporating a large number of constructs and relationships with smaller sample sizes (Hair et al., 2011). Finally, PLS has been used extensively in analyzing mediational effects (Ngo & O'Cass, 2012; Siren et al., 2012), as well as being used in multi-informant research with similar sample sizes that obtained in this study (Ernst, Hoyer, & RübSaamen, 2010). Given the predictive nature, complexity of the model, presence of mediational effects, and sample size, PLS is appropriate.

As shown in Appendix I, indicators of all constructs indicators had acceptable loading (> 0.50) and bootstrap critical ratios (> 1.96) (Hulland, 1999). All constructs had acceptable composite reliability (> 0.70) ranged from 0.81 and 0.95 (Hair et al., 2011). As shown in Table 1, the average variance extracted (AVE) values for all constructs were uniformly acceptable (> 0.50), ranging from 0.52 and 0.88, indicating satisfactory convergent validity (Fornell & Larcker, 1981). Discriminant validity of the key constructs is satisfactory as the square root of the AVE (the off-diagonal elements in Table 1) were greater than all individual correlations (Fornell & Larcker, 1981; Hair et al., 2011). We also assessed the possibility of multicollinearity among all constructs. Multicollinearity was not evident as the maximum variance of inflation factor score was 1.41 lower than the cut-off value of 5 (O'Brien, 2007).

--- Insert Table 1 here ---

Structural Results

We followed James and Brett (1984) and Siren et al. (2012) to test the mediational effects of exploratory capabilities, exploitative capabilities, and positional advantages in the relationships between exploratory strategy, exploitative strategy, and NPP. In doing so, we

develop two separated structural models, basic and interaction models. The results of the structural model are outlined in Table 2 and Figure 1.

Hypotheses 1a, 1b, and 1c explain the extent that exploratory product innovation, exploratory marketing, and their integration mediate the link between a firms' exploratory strategy and its new product differentiation (ND). As shown in Table 2, exploratory strategy significantly affected exploratory product innovation ($\beta = 0.48$, $t\text{-value} = 4.15$), exploratory marketing ($\beta = 0.39$, $t\text{-value} = 4.39$), and their integration ($\beta = 0.52$, $t\text{-value} = 5.93$). Further, ND was significantly predicted by exploratory product innovation ($\beta = 0.48$, $t\text{-value} = 3.44$), exploratory marketing ($\beta = 0.26$, $t\text{-value} = 1.99$), and their integration ($\beta = 0.46$, $t\text{-value} = 2.07$). Therefore, the results indicate that exploratory product innovation, exploratory marketing, and their integration mediate the link between exploratory strategy-ND. Sobel's test also supports the significance of these mediational effects, supporting hypotheses 1a, and 1b. As shown in Table 2, the level of integration between exploratory product innovation – exploratory marketing (Effect = 0.31, $p < 0.01$) as an intervening mechanism in the relationship between exploratory strategy and new product differentiation is greater than each capability in isolation, supporting hypothesis 1c.

Hypotheses 2a, 2b, and 2c explain the extent that exploitative product innovation, exploitative marketing, and their integration mediate the link between exploitative strategy-new product cost efficiency (NC). As shown in Table 2, exploitative strategy significantly affected exploitative product innovation ($\beta = 0.28$, $t\text{-value} = 2.09$) and the integration of exploitative product innovation-exploitative marketing ($\beta = 0.39$, $t\text{-value} = 3.74$). Further, NC was significantly predicted by exploitative product innovation ($\beta = 0.25$, $t\text{-value} = 2.51$), exploitative marketing ($\beta = 0.19$, $t\text{-value} = 1.97$), and their integration ($\beta = 0.36$, $t\text{-value} = 2.12$). Therefore, the results indicate that exploitative marketing does not mediate the link between exploitative strategy-NC, rejecting hypothesis 2b. Conversely, exploitative product

innovation and the integration of exploitative product innovation-exploitative marketing mediate the link between exploitative strategy-NC. Sobel's test also supports the significance of these mediational effects, supporting hypothesis 2a. The level of integration between exploitative product innovation - marketing capabilities (Effect = 0.07, $p < 0.01$) as an intervening mechanism in the relationship between exploitative strategy and new product cost efficiency is greater than each capability in isolation, supporting hypothesis 2c.

The results also show that ND ($\beta = 0.25$, $t\text{-value} = 2.25$) and NC ($\beta = 0.27$, $t\text{-value} = 3.08$) significantly influenced NPP, supporting hypothesis 3. We also examined the goodness of fit (GoF) for basic and interaction models following the approach suggested by Wetzels et al. (2009). The GoF for basic and interaction models were 0.40 and 0.41, respectively, indicating a good fit for these models (Wetzels et al., 2009). Finally, the results indicate that none of control variables significantly affect NPP.

--- Insert Figure 1 here ---

--- Insert Table 2 here ---

Discussion

Our study shows the technology-intensive industrial firm's ability to manage exploration and exploitation across multiple organizational levels and functional areas is the key to successful development and marketing of new products. Our analysis of data from senior and mid-level managers across corporate and operational hierarchical levels suggests two main findings. First, ambidexterity transcends the interactions between corporate-level exploratory and exploitative strategies and operational-level exploratory and exploitative capabilities, as well as the interactions between different functional areas. Second, such synchronicity drives NPP when specific advantages are created and delivered through the new product to customers. These findings advance the literature in three important ways.

First, we show that corporate-level exploratory and exploitative strategies has a strong effect on NPP, only when firms deploy exploratory and exploitative product innovation and marketing capabilities that allow them to develop and market new products that offer superior advantages to customers. Effectively the translation of a sound strategy into superior performance-outcomes (e.g. new product performance) can be lost with poor implementation at the operational-level of the firm (Love et al., 2002; Bowman & Ambrosini, 2003; DeSarbo et al., 2005). Our theory and analysis extend the literature and address the need to investigate the roles and outcomes of exploration and exploitation using multilevel theory and analysis (e.g., Sarkees et al., 2010; Cantarello et al., 2012; Siren et al., 2012). The results indicate that exploratory product innovation, exploratory marketing, and exploitative product innovation mediate the effects of the firms' exploratory and exploitative strategies on the respective positional advantages it achieves. However, exploitative strategy does not significantly influence exploitative marketing, indicating that exploitative marketing does not mediate the link between exploitative strategy and new product cost efficiency. This indicates that firms may place more emphasis on refining existing product development routines than improving existing marketing routines when they pursue exploitative strategy and focus on meeting existing customer needs by developing new products with minor modifications from previous products.

Second, we show that the integration of exploratory and exploitative capabilities across product innovation and marketing areas is significant for the successful implementation of exploratory and exploitative strategies related to the development and marketing of new products. Although it is generally accepted that the integration between product innovation and marketing capabilities is critical for the successful development market of new products (Moorman & Slotegraaf, 1999; Danneels, 2002; Brettel et al., 2011; Ngo & O'Cass, 2012), less attention is paid to the roles and outcomes of the integration between exploratory and

exploitative capabilities across product innovation and marketing capabilities. We posit that the integration between product innovation and marketing departments makes firms able to create new and/or refine product development routines that are more market oriented, while it helps marketer to create new and/or refine marketing routines that effectively link a new product to customers to successfully commercialize the product. The results show that the integration between product innovation-exploratory marketing and exploitative product innovation-exploitative marketing enhances the firm's capacity to implement exploratory and exploitative strategies. Our findings provide a step forward in understanding the role of integrative capabilities (Newbert, 2007; Vorhies et al., 2009) in the implementation of different types of corporate strategies.

Third, we show that the implementation of exploratory and exploitative strategies influence distinctive aspects (differentiation and cost efficiency) of new product positional advantage, which in turn drive NPP. The results indicate that both new product differentiation and cost efficiency significantly drive NPP, indicating that offering both positional advantages to customers provides compelling reasons for customers to buy a new product. In addition, using positional advantages in the relationships between exploratory and exploitative product innovation and marketing capabilities and NPP advances theory and helps to overcome causal ambiguity regarding the performance implications of these capabilities (Zollo & Winter, 2002; Kim & Atuahene-Gima, 2010). This highlights that the source-position-performance framework suggested by Day and Wensley (1988) can be seen as a remedy to resolve some of the inconsistencies in the existing literature regarding the performance-outcomes of exploratory and exploitative capabilities.

Managerial implications

Our study provides three important implications for managers. First, our study suggests managers that the pursuit of exploratory and exploitative strategies can lead to superior new

product performance when a firm achieves congruence (e.g., fit) between the pursued strategies and the capabilities required to implement those strategies. Without proper implementation at the operational-level, the translation of exploratory and exploitative strategies into effective actions can be lost, severely hindering the chance of achieving superior new product performance. For example, a firm's strategy to enter a new product-market segment can be failed when existing product innovation (e.g., prototyping technologies and processes) and marketing (e.g., sale, and pricing methods) routines are incapable to develop and market products that meet the new customer segment's needs. Therefore, both senior and mid-level managers should be involved in the formulation and implementations of exploratory and exploitative strategies. The interaction between senior and mid-level managers (e.g., via frequent-meetings and circulated documents) facilitates achieving a congruence between corporate-level strategies and operational-level capabilities. This congruence is significant for achieving the goals set in corporate-level strategies and the successful development and marketing of new products.

Second, we show that the translation of exploratory and exploitative strategies into effective actions and superior performance is most effective when a firm deploys and integrates exploratory and exploitative capabilities from multiple functional areas (e.g., product innovation and marketing). We advise managers to set up cross-functional meetings, liaison teams, and to promote teamwork to facilitate the interactions between product innovation and marketing departments to effectively integrate exploratory and exploitative product innovation and marketing capabilities (see also discussions on facilitating cross-functional collaboration in De Clercq, Thongpapanl, & Dimov, 2011).

Third, we advise managers that enhancing the level of new product advantages represents an important managerial decision. In particular, both new product differentiation and cost efficiency are significant drivers of new product market success, but their

antecedents and outcomes are different. While a differentiated advantage in a new product (e.g., touchscreen laptops) can be a key success factor in a market, it may be less effective in a different market that favors cost efficient new products. This decision also determines how much emphasis is required to pursue exploratory strategy over exploitative strategy, and *vice versa*. Accordingly, this decision determines which capabilities are required to implement corporate strategies. As such, achieving fit between the preferred positional advantage(s), corporate strategies, and operational-level capabilities represents a critical antecedents of new product success.

Limitation and direction for future research

Confidence in the results is increased by several aspects of the research design such as employing a multiple informant design, which reduces the possibility for common method bias in research findings. While this study has several distinctive strengths, limitations resulting from trade-off decisions required in all empirical research are present. First, this study is limited, to a certain extent by using cross-sectional data, which leads to issues of causal inference. Second, we examined the intervening role of exploratory and exploitative product innovation and marketing capabilities in the strategy–NPP link. Future research can consider additional types of capabilities (e.g., manufacturing, exporting).

Footnotes

1. It is conceivable that exploitative product innovation and marketing can enable a firm to implement exploratory strategy and drive new product differentiation. However, the repeated deployment of exploitative capabilities may result in selection-induced inertia, which stifles the firm's ability to innovate new ideas and routines to develop and market new products. Consequently, the lack of product innovation in new marketing routines diminishes the capacity to provide differentiated advantages to customers (Atuahene-Gima, 2005; Kim & Atuahene-Gima, 2010). To this end, we did not hypothesize the effect of exploratory strategy on new product differentiation through exploitative product innovation and marketing, but these effects are examined and reported in the results section.

2. It is possible that exploratory product innovation and marketing can enable a firm to implement exploitative strategy and drive new product cost efficiency. While new product development and marketing routines may help firms to decrease product development, operation, and marketing costs (e.g., using new technologies), this effect can be offset by the high costs associated with creation and experimentation of those new routines (Greve, 2007; Kim & Atuahene-Gima, 2010). To this end, we did not hypothesize the effect of exploitative strategy on new cost efficiency through exploratory product innovation and marketing, but these effects are examined and reported in the results section.

References

- Armstrong, S. J., & Overton, T. S. (1977). Estimating non-response bias in mail surveys. *Journal of Marketing Research*, 14, 396–402.
- Atuahene-Gima, K. (2005). Resolving the capability-rigidity paradox in new product innovation. *Journal of Marketing*, 69(4), 61-83.
- Atuahene-Gima, K., Slater, S. F., & Olson, E. M. (2005). The contingent value of responsive and proactive market orientations for new product program performance. *Journal of Product Innovation Management*, 22(6), 464–482.
- Benner, M. J., & Tushman, M. L. (2003). Exploitation, exploration, and process management: The productivity dilemma revisited. *Academy of Management Review*, 28(9), 238-256.
- Bodwell, W., & Chermack, T. J. (2010). Organizational ambidexterity: Integrating deliberate and emergent strategy with scenario planning. *Technological Forecasting & Social Change*, 77(2), 193–202.
- Boso, N., Story, V. M., & Cadogan, J. W. (2013). Entrepreneurial orientation, market orientation, network ties, and performance: Study of entrepreneurial firms in a developing economy. *Journal of Business Venturing*, 28(6), 708–727.
- Bowman, C., & Ambrosini, V. (2003). How the Resource-based and the Dynamic Capability Views of the Firm Inform Corporate-level Strategy. *British Journal of Management*, 14(4), 289-303.
- Brettel, M., Heinemann, F., Engelen, A., & Neubauer, S. (2011). Cross-functional integration of R&D, marketing, and manufacturing in radical and incremental product innovations and its effects on project effectiveness and efficiency. *Journal of Product Innovation Management*, 28(2), 251–269.
- Cantarello, S., Martini, A., & Nosella, A. (2012). A multi-level model for organizational ambidexterity in the search phase of the innovation process. *Creativity and innovation management*, 21(1), 28-48.
- Citrin, A. V., Lee, R. P., & McCullough, J. (2007). Information use and new product outcomes: The contingent role of strategy type. *Journal of Product Innovation Management*, 24(3), 259-273.
- Coviello, N. E., Brodie, R. J., Danaher, P. J., & Wesley, J. J. (2002). How firms relate to their markets: an empirical examination of contemporary marketing practices. *Journal of Marketing*, 66(3), 33-46.

- Damanpour, F., Walker, R. M., & Avellaneda, C. N. (2009). Combinative effects of innovation types and organizational performance: A longitudinal study of service organizations. *Journal of Management Studies*, 46(4), 650-675.
- Danneels, E. (2002). The dynamics of product innovation and firm competences. *Strategic Management Journal*, 23(12), 1095-1121.
- Day, G. S. (1994). The capabilities of market-driven organization. *Journal of Marketing*, 58(4), 37-61.
- Day, G. S., & Wensley, R. (1988). Assessing Advantage: A Framework For Diagnosing Competitive Superiority. *Journal of Marketing*, 52(2), 1-20.
- De Clercq, D., Thongpapanl, N., & Dimov, D. (2011). A closer look at cross-functional collaboration and product innovativeness: Contingency effects of structural and relational context *Journal of Product Innovation Management*, 28(5), 680–697.
- De Luca, L. M., & Atuahene-Gima, K. (2007). Market knowledge dimensions and cross-functional collaboration: Examining the different routes to product innovation performance. *Journal of Marketing*, 71(1), 95-112.
- DeSarbo, W. S., Di Benedetto, C. A., Song, M., & Sinha, I. (2005). Revisiting the Miles and Snow strategic framework: Uncovering interrelationships between strategic types, capabilities. *Strategic Management Journal*, 26(1), 47–74.
- Ernst, H., Hoyer, W. D., & Rübsaamen, C. (2010). Sales, marketing, and research-and-development cooperation across new product development stages: Implications for success. *Journal of Marketing*, 74(5), 80–92.
- Financial Times. (2010). Tehran exchange extends advance Retrieved November 2010, from <http://www.ft.com/cms/s/0/99a1b6dc-b06d-11df-8c04-00144feabdc0.html>
- Fornell, C., & Larcker, D. F. (1981). Evaluating structural equation models with unobservable variables and measurement error. *Journal of Marketing Research*, 18(1), 39-50.
- Gao, G. Y., Zhou, K. Z., & Yim, C. K. (2007). On what should firms focus in transitional economies? A study of the contingent value of strategic orientations in China. *International Journal of Research in Marketing*, 24(1), 3-15.
- Greve, H. R. (2007). Exploration and exploitation in product innovation. *Industrial and Corporate Change*, 16(5), 945-975.
- Gupta, A. K., Smith, K. G., & Shalley, C. E. (2006). The interplay between exploration and exploitation. *Academy of Management Journal*, 49(4), 693-706.

- Hair, J. F., Ringle, C. M., & Sarstedt, M. (2011). PLS-SEM: Indeed a silver bullet. *Journal of Marketing Theory and Practice*, 19(2), 193-151.
- Harmancioglu, N., Droge, C., & Calantone, R. (2009). Strategic fit to resources versus NPD execution proficiencies: what are their roles in determining success? *Journal of the Academy of Marketing Science*, 37(3), 266- 282.
- Heirati, N., O'Cass, A., & Ngo, L. V. (2013). The contingent value of marketing and social networking capabilities in firm performance. *Journal of Strategic Marketing*, 21(1), 82-98.
- Homburg, C., Krohmera, H., & Workman, J. (2004). A strategy implementation perspective of market orientation. *Journal of Business Research*, 57(12), 1331– 1340.
- Hughes, M., Martin, S. L., Morgan, R. E., & Robson, M. J. (2010). Realizing product-market advantage in high-technology international new ventures: The mediating role of ambidextrous innovation. *Journal of International Marketing*, 18(4), 1-21.
- Hulland, J. (1999). Use of partial least squares (PLS) in strategic management research: A review of four recent studies. *Strategic Management Journal*, 20(2), 195-204.
- James, L. R., & Brett, J. M. (1984). Mediators, moderators, and tests for mediation. *Journal of Applied Psychology*, 69(2), 307–321.
- Jansen, J. J. P., Tempelaar, M. P., Bosch, F. A. J., & Volberda, H. W. (2009). Structural differentiation and ambidexterity: The mediating role of integration mechanisms. *Organization Science*, 20(4), 797–811.
- Jansen, J. J. P., Van Den Bosch, F. A. J., & Volberda, H. W. (2006). Exploratory innovation, exploitative innovation, and performance: Effects of organizational antecedents and environmental moderators. *Management Science*, 52(11), 1661-1674.
- Johnson, D. S., Clark, B. H., & Barczak, G. (2012a). Customer relationship management processes: How faithful are business-to-business firms to customer profitability? *Industrial Marketing Management*, 41(7), 1094-1105.
- Johnson, J. L., Martin, K. D., & Saini, A. (2012b). The role of a firm's strategic orientation dimensions in determining market orientation. *Industrial Marketing Management*, 41(4), 715-724.
- Kim, J., & Forsythe, S. (2009). Adoption of sensory enabling technology for online apparel shopping. *European Journal of Marketing*, 43(9/10), 1101-1120.
- 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.

- Krasnikov, A., & Jayachandran, S. (2008). The relative impact of marketing, research-and-development, and operations capabilities on firm performance. *Journal of Marketing*, 72(4), 1–11.
- 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. (2003). The effect of market orientation on positional advantage and organizational performance. *Journal of Strategic Marketing*, 11(2), 93-115.
- Langerak, F., Hultink, E. J., & Robben, H. S. J. (2004). The Role of Predevelopment Activities in the Relationship Between Market Orientation and Performance. *R&D Management*, 34(3), 295-309.
- Lindell, M. K., & Whitney, D. J. (2001). Accounting for common method variance in cross-sectional research designs. *Journal of Applied Psychology*, 86(1), 114-121.
- Lisboa, A., Skarmeas, D., & Lages, C. (2011). Entrepreneurial orientation, exploitative and explorative capabilities, and performance outcomes in export markets: A resource-based approach. *Industrial Marketing Management*, 40(8), 1274–1284.
- Love, L. G., Priem, R. L., & Lumpkin, G. T. (2002). Explicitly articulated strategy and firm performance under alternative levels of centralization. *Journal of Management*, 28(5), 611-627.
- Malhotra, N. K., Kim, S. 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.
- Malik, O. R., & Korabe, M. (2009). Dynamic capabilities, government policies, and performance in firms from emerging economies: Evidence from India and Pakistan. *Journal of Management Studies*, 46(3), 421-450.
- McCarthy, I. P., & Gordon, B. R. (2011). Achieving contextual ambidexterity in R&D organizations: a management control system approach. *R&D Management*, 41(3), 240-258.
- Miller, D., Lant, T. K., Milliken, F. J., & Kom, H. J. (1996). The evolution of strategic simplicity: Exploring two models of organizational adaption. *Journal of Management*, 22(6), 863-887.
- Milogram, P., & Roberts, J. (1995). Complementaries and fit: Strategy, structure, and organizational change in manufacturing. *Journal of Accounting and Economics*, 80(2/3), 511-528.

- Molina-Castillo, F.-J., Jimenez-Jimenez, D., & Munuera-Aleman, J.-L. (2011). Product competence exploitation and exploration strategies: The impact on new product performance through quality and innovativeness. *Industrial Marketing Management*, 40(7), 1172–1182.
- Moorman, C. (1995). Organizational market information processes: Cultural antecedents and new product outcomes. *Journal of Marketing Research*, 32(3), 318-335.
- Moorman, C., & Slotegraaf, R. J. (1999). The contingency value of complementary capabilities in product development. *Journal of Marketing Research*, 36(2), 239-257.
- Morgan, R. E., & Berthon, P. (2008). Market orientation, generative learning, innovation strategy and business performance inter-relationships in bioscience firms. *Journal of Management Studies*, 45(8), 1329-1353.
- Nandakumar, M. K., Ghobadian, A., & O'Regan, N. (2010). Business-level strategy and performance: The moderating effects of environment and structure. *Management Decision*, 48(6), 907-939.
- Newbert, S. L. (2007). Empirical research on the resource-based view of the firm: An assessment and suggestions for future research. *Strategic Management Journal*, 28(2), 121-146.
- Newbert, S. L., Gopalakrishnan, S., & Kirchoff, B. A. (2008). Looking beyond resources: exploring the importance of entrepreneurship to firm-level competitive advantage in technologically intensive industries. *Technovation*, 28(1), 6-19.
- Ngo, L. V., & O'Cass, A. (2009). Creating value offerings via operant resource-based capabilities. *Industrial Marketing Management*, 38(1), 45-58.
- Ngo, L. V., & O'Cass, A. (2012). In search of innovation and customer-related performance superiority: The role of market orientation, marketing capability, and innovation capability interactions. *Journal of Product Innovation Management*, 29(5), 861–877.
- O'Brien, R. M. (2007). A caution regarding rules of thumb for variance inflation factor. *Quality and Quantity*, 41(5), 673-690.
- Peng, D. X., Schroeder, R. G., & Shah, R. (2008). Linking routines to operations capabilities: A new perspective. *Journal of Operations Management*, 26(6), 730–748.
- Rubera, G., Ordanini, A., & Calantone, R. J. (2012). Whether to integrate R&D and marketing: The effect of firm competence. *Journal of Product Innovation Management*, 29(5), 766–783.

- Sarkees, M., Hulland, J., & Prescott, J. (2010). Ambidextrous organizations and firm performance: the role of marketing function implementation. *Journal of Strategic Marketing, 18*(2), 165-184.
- Siren, C. A., Kohtamäki, M., & Kuckertz, A. (2012). Exploration and exploitation strategies, profit performance, and the mediating role of strategic learning: Escaping the exploitation trap. *Strategic Entrepreneurship Journal, 6*(1), 18-41.
- Slotegraaf, R., & Atuahene-Gima, K. (2011). Product development team stability and new product advantage: The role of decision-making processes. *Journal of Marketing, 75*(1), 96-108.
- Smith, W. K., & Tushman, M. L. (2005). Managing strategic contradictions: A top management model for managing innovation streams. *Organization Science, 16*(5), 522-536.
- Soltani, E., & Wilkinson, A. (2012). The Razor's edge: Managing MNC affiliates in Iran. *Journal of World Business, 46*(4), 462-475.
- Vorhies, D. W., Morgan, R. E., & Autry, C. W. (2009). Product-market strategy and the marketing capabilities of the firm: Impact on market effectiveness and cash flow performance. *Strategic Management Journal, 30*(12), 1310-1334.
- Vorhies, D. W., Orr, L. M., & Bush, V. D. (2011). Improving customer-focused marketing capabilities and firm financial performance via marketing exploration and exploitation. *Journal of the Academy of Marketing Science, 39*(5), 736-756.
- Wetzels, M., Odekerken-Schröder, G., & van Oppen, C. (2009). Using PLS path modeling for assessing hierarchical construct models: Guidelines and empirical illustration. *MIS Quarterly, 33*(1), 177-195.
- Zollo, M., & Winter, S. G. (2002). Deliberate learning and the evolution of dynamic capabilities. *Organization Science, 13*(3), 339-351.

Figure 1: Structural Model Results

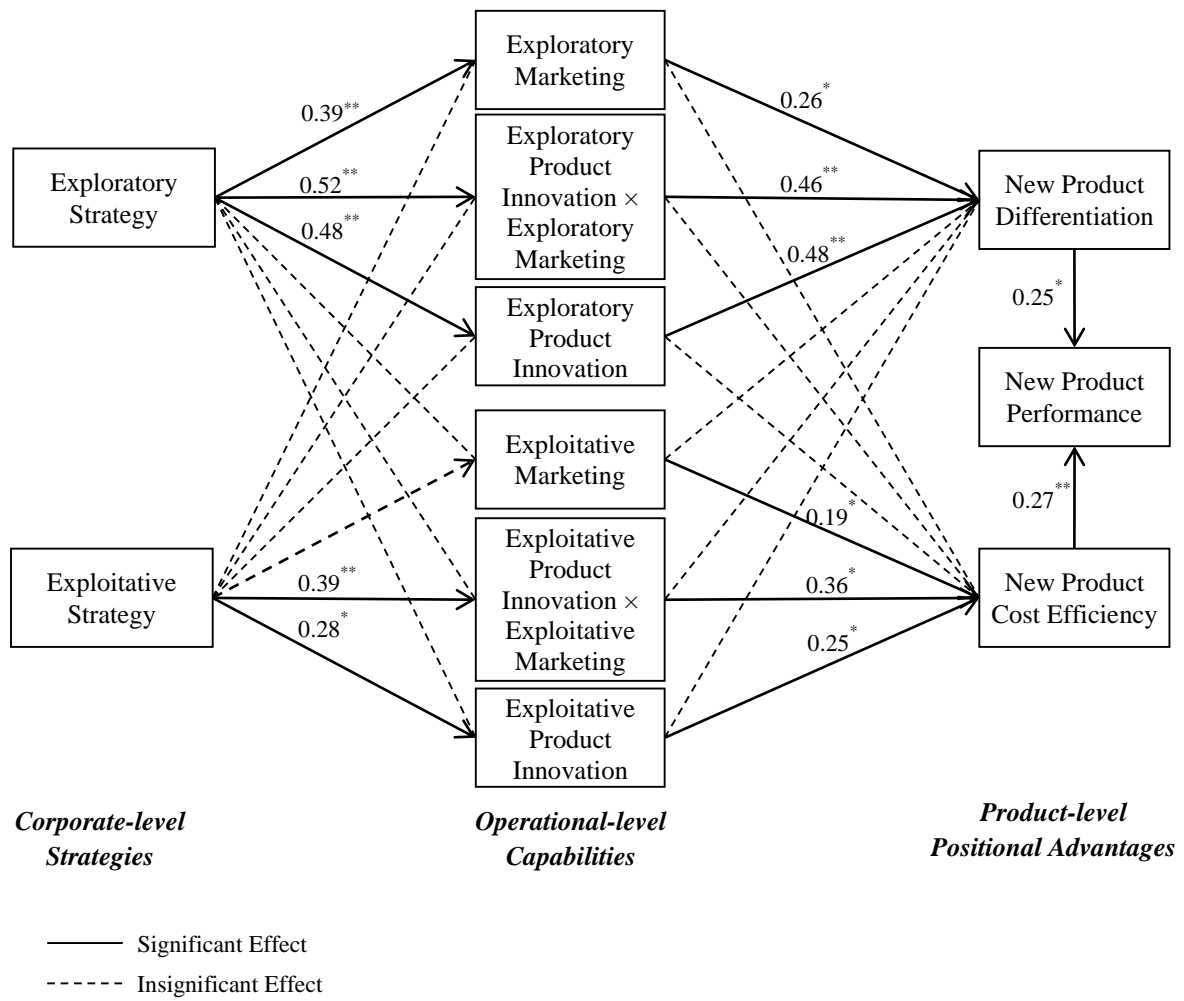


Table 1: Construct-Level Measurement Statistics and Correlation Matrix

	AVE	CR	1	2	3	4	5	6	7	8	9
1 Exploratory strategy	.54	.87	.73								
2 Exploitative strategy	.63	.87	.13	.79							
3 Exploratory marketing	.60	.93	.43	.01	.77						
4 Exploitative marketing	.52	.90	.17	.16	.48	.72					
5 Exploratory product innovation	.72	.93	.51	.10	.20	.32	.85				
6 Exploitative product innovation	.63	.90	.20	.27	.04	.24	.49	.80			
7 Differentiation	.52	.81	.34	.07	.34	.14	.47	.16	.72		
8 Cost efficiency	.67	.89	.12	.27	-.08	.15	.21	.34	.18	.82	
9 New product performance	.68	.89	.19	.07	.07	.12	.25	.31	.34	.37	.76

Note: Diagonal entries show the square roots of average variance extracted, others represent correlation coefficients.

Table 2: PLS Path Coefficients

Independent Variables	Dependent Variables	Model 1			Model 2		
		β	t-Value	R ²	β	t-Value	R ²
Exploratory strategy →	Differentiation	.24	.26	.28	.24	.26	.34
	Cost efficiency	.09	.01	.29	.09	.06	.36
	Exploratory marketing	.39**	4.39	.26	.40**	4.81	.26
	Exploitative marketing	.16	1.54	.2	.15	1.58	.20
	Exploratory product innovation	.48**	4.15	.17	.47**	5.57	.18
	Exploitative product innovation	.14	1.68	.18	.14	1.40	.19
	Exr M × Exr PI				.52**	5.93	.19
	Exi M × Exi PI				.09	1.08	.22
Exploitative strategy →	Differentiation	.02	.15		.02	.17	
	Cost efficiency	.16	1.66		.16*	2.60	
	Exploratory marketing	-.01	.18		-.15	1.78	
	Exploitative marketing	.17	1.72		.18	1.60	
	Exploratory product innovation	.04	.42		.04	.36	
	Exploitative product innovation	.28*	2.09		.28*	2.59	
	Exr M × Exr PI				-.08	.91	
	Exi M × Exi PI				.39**	3.74	
Exploratory marketing	→ Differentiation	.26*	1.99		.22	1.93	
Exploitative marketing		.05	.49		-.04	.13	
Exploratory product innovation		.48**	3.44		.44*	2.35	
Exploitative product innovation		.12	1.60		.10	1.41	
Exr M × Exr PI					.46*	2.07	
Exi M × Exi PI					-.01	.03	
Exploratory marketing	→ Cost efficiency	-.10	.58		.04	.15	
Exploitative marketing		.19*	1.97		.14	.46	
Exploratory product innovation		.04	.41		.02	.26	
Exploitative product innovation		.25*	2.51		.22	1.61	
Exr M × Exr PI					-.32	.84	
Exi M × Exi PI					.36*	2.12	
Differentiation	→ NPP	.25*	2.25	.35	.26*	2.46	.35
Cost efficiency		.27**	3.08		.28**	2.87	
Environmental turbulence		.08	.94		.12	1.31	
Structural differentiation		-.10	1.08		-.08	.88	
Cross-functional integration		-.03	.21		-.03	.23	
Firm size		.03	.45		.03	.43	
Sobel's Test				Effect	SE	t-value	ρ
H1a: Exr S→Exr PI→ND				.29**	.06	4.44	.00
H1b: Exr S→Exr M→ND				.11*	.04	2.36	.03
H1c: Exr S→Exr M×Exr PI→ND				.31**	.07	5.07	.00
H2a: Exi S→Exi PI→NC				.06*	.03	1.98	.05
H2b: Exi S→Exi M→NC				.01	.01	.46	.64
H2c: Exi S→Exi M×Exi PI→NC				.07*	.03	2.05	.05

Note: Exr M= Exploratory marketing, Exi M= Exploitative marketing, Exr PI= Exploratory innovation, Exi PI= Exploitative innovation, NPP= New product performance, * $\rho < 0.05$, ** $\rho < 0.01$.

Appendix I: Measurement Model Results

Constructs and Manifest Variables	Loading	T-value
First Informant		
Exploratory Strategy (AVE=0.54, CR= 0.87): <i>Please indicate the extent to which your firm places its strategic emphasis on each of following statements.</i>		
1. ...discovering new opportunities in new markets and target new customers.	.86	36.69
2. ...inventing new products with unique features not available in competing products.	.84	28.11
3. ...discovering new ways to meet customer needs.	.78	19.97
4. ...acquiring product development skills and processes entirely new in the firm.	.77	21.13
Exploitative Strategy (AVE=0.63, CR= 0.87): <i>Please indicate the extent to which your firm places its strategic emphasis on each of following statements.</i>		
1. ...strengthening its existing position in its current markets.	.59	6.64
2. ...improving efficiency of its current products.	.81	22.09
3. ...improving the quality of current products.	.67	9.11
4. ...improving its current product development processes and skills (e.g., increase the level of automation in operations).	.72	10.68
Structural Differentiation (AVE=0.69, CR= 0.93): <i>In our firm:</i>		
1. ...marketing and product development activities are separated into different departments.	.79	4.27
2. ...we have a separate department(s) that focuses on new product-market opportunities (e.g. identifying new products and new target customers for a specific product).	.87	4.78
3. ...we have a separate department(s) whose function it is to acquire new skills and develop new processes (e.g. new technologies, administrative processes, marketing skills).	.84	4.32
4. ...we have separate department(s) that undertakes the current business activities (e.g. production, marketing, sales).	.84	9.36
Cross-Functional Integration (AVE=0.82, CR= 0.95): <i>In our firm:</i>		
1. ...the level of contact between the technical departments and commercial departments is high.	.87	5.81
2. ...the level of information flow between the commercial departments and technical departments is high.	.89	5.11
3. ...different departments cooperate fully in generating and screening new ideas for the products' projects.	.93	4.88
Environmental Turbulence (AVE=0.76, CR= 0.93): <i>In our firm's business environment:</i>		
1. ...customer needs and product preferences changed rapidly.	.84	5.88
2. ...customer product demands and preferences were uncertain.	.78	8.38
3. ...it was difficult to forecast technology developments.	.78	3.52
4. ...technology environment was uncertain.	.64	3.39
Second Informant		
Exploratory Product Innovation (AVE=0.72, CR= 0.93): <i>To develop this new product, our firm:</i>		
1. ...acquired entirely new product development processes that had not been used before by the firm.	.79	28.19
2. ...acquired completely new manufacturing technologies and processes that had not been used before by the firm.	.79	23.19
3. ...acquired entirely new technology and innovation training skills for personnel development.	.75	4.26
4. ...set up completely new types of manufacturing facilities and operations.	.77	7.68
Exploitative Product Innovation (AVE=0.63, CR= 0.90): <i>To develop this new product, our firm:</i>		
1. ...improved its existing processes aimed at quality improvement of our new products.	.76	15.01
2. ...exploited mature, existing technologies to enhance the efficiency of product development.	.76	12.70
3. ...improved existing processes to reduce the cost of product development.	.90	23.31
4. ...refined existing processes to reduce production time.	.80	17.90
Exploratory Marketing (AVE=0.60, CR= 0.93): <i>To market this new product, our firm:</i>		
1. ...developed completely new pricing processes.	.68	13.35
2. ...set up entirely new sales and distribution channels.	.75	19.29
3. ...developed entirely new advertising and/or promotion processes.	.78	22.06
4. ...developed entirely new methods of marketing communication with customers.	.72	15.18
5. ...set up entirely new marketing research processes.	.82	31.41
6. ...implemented completely new types of marketing processes.	.82	22.08
Exploitative Marketing (AVE=0.52, CR= 0.90): <i>To market this new product, our firm:</i>		
1. ...refined existing pricing processes.	.67	10.17
2. ...improved existing sales and distribution channels.	.74	12.40
3. ...refined existing advertising and/or promotion processes.	.73	19.94
4. ...refined existing methods of marketing communication with customers.	.69	8.57
5. ...refined existing market research processes.	.76	21.33
6. ...improved existing marketing processes.	.79	17.47

Appendix 1: Measurement Model Results (contd.)

Constructs and Manifest Variables	Loading T-value	
New Product Differentiation (AVE=0.52, CR= 0.81): <i>Please rate your new product, relative to competing products over the past year in the following statements.</i>		
1. ...offered unique benefits for customers.	.80	18.29
2. ...provided higher quality.	.55	5.14
3. ...was radically different from competing products.	.84	28.41
4. ...offered solutions not available with existing products in the marketplace.	.84	21.11
New Product Cost Efficiency (AVE=0.67, CR= 0.89): <i>Please rate your new product, relative to competing products over the past year in the following statements.</i>		
1. ...operating efficiencies (e.g., manufacturing modernization).	.76	14.57
2. ...cost advantages in raw material procurement.	.73	12.86
3. ...benefits from economies of scale.	.87	25.96
4. ...minimum manufacturing costs.	.89	41.04
New Product Performance (AVE=0.68, CR= 0.89): <i>Please indicate the extent to which the selected new product achieved the goal set by your firm over previous year in the following statements.</i>		
1. ...met revenue goals.	.82	22.33
2. ...met sales growth goals.	.67	10.53
3. ...met market share goals.	.57	6.39
4. ...met profitability goals.	.79	25.36