



UNIVERSITY
OF TASMANIA

Achieving Ambidexterity across Multiple
Organisational Levels and Functional Areas:
Synchronising the Development and Marketing of
Firms' New and Established Products

By

Nima Heirati

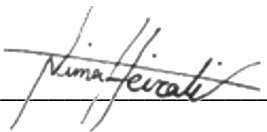
School of Management, Faculty of Business

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University of Tasmania August, 2012

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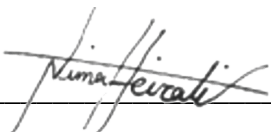
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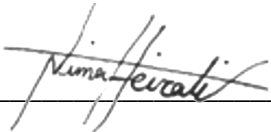
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Abstract

In the increasingly dynamic and turbulent world, synchronising exploration and exploitation is an important driver of the firm's success and survival. The examination of exploration, exploitation and their synchronicity has often been couched in the notion of organizational ambidexterity. While many benefits of ambidexterity have been identified, there exists a lack of clarity regarding the extent that a firm in practice becomes ambidextrous. Achieving organizational ambidexterity is a challenging task for managers, as they need to formulate appropriate strategies that support the pursuit of ambidexterity (or ambidextrous strategies), as well as deploy distinctive operational capabilities to successfully implement ambidextrous strategies. Without proper implementation at the operational level, the translation of ambidextrous strategies into superior performance-outcomes can be lost.

The primary objective of this study is to explore the extent that firms become ambidextrous when they have the capacity to pursue exploration and exploitation across multiple hierarchical levels, multiple functional areas, and multiple product development projects. The current study seeks to offer four important contributions to the current literature. First, this study contributes to the literature by arguing that organisational ambidexterity is not limited to a specific organisational level. This study shows that true ambidexterity transcends the interactions between corporate-level exploratory and exploitative strategies and business-unit level exploratory and exploitative capabilities. Second, this study contributes to the literature by arguing that organisational ambidexterity is not limited to a single product development project. This study shows that organisational ambidexterity can drive the firm's survival and success, when it provides the capacity to synchronise the development and marketing of new and established products. Such

synchronicity represents another important aspect of organisational ambidexterity, and explains how organisational ambidexterity drives the firm's survival and success.

Third, this study contributes to the literature by arguing that the deployment of exploratory and exploitative capabilities within a single functional area is not enough to implement corporate-level exploratory and exploitative strategies. This study shows that the exploration of new R&D and market routines and the exploitation of existing R&D and marketing routines in an integrative fashion provide the capacity to implement exploratory and exploitative strategies. Fourth, this study contributes to the literature by examining the role of organisational ambidexterity in the context of a Middle-Eastern emerging economy. Given the growing importance of the Middle-East in the global economy, scant attention has been paid to the role of ambidexterity in the Middle-East. Therefore, understanding the role of organisational ambidexterity in the Middle-East region and extending theory to new contexts is worthy of investigation.

Overall, the findings of this study reveal that organisational ambidexterity represents the paradox of synchronising exploration and exploitation across multiple hierarchical levels, multiple functional areas, and product development projects. This paradox can turn into synergy and secure the firm's success and survival, when senior managers, mid-level managers, and operational employees collaborate to resolve tensions created from the synchronicity of exploration and exploitation. The findings of this study contribute to the organisational ambidexterity literature providing a fuller understanding of the extent that firms truly become ambidextrous and delineation of the synchronicity required to resolve the innovator's dilemma.

Chapter One

Introduction

1.1. Introduction

Firms are being challenged by globalisation that brings growing competitive pressures, quicker technological changes, and changing customer preferences (Burgess & Steenkamp, 2006; Lisboa, Skarmeas, & Lages, 2011; Kyrgidou & Spyropoulou, 2012). As competition intensifies and environmental turbulence accelerates, firms are confronted with the challenge of excelling at innovation and efficiency at the same time (Andriopoulos & Lewis, 2009; Sarkees & Hulland, 2009). Specifically, firms are pressed to adapt to environmental changes through exploring new product-market opportunities and innovating new products, as well as strengthening existing product-market positions through improving the ongoing performance of established (i.e., current, existing) products (Benner & Tushman, 2003; Smith & Tushman, 2005; Sarkees & Hulland, 2009). However, excelling synchronously in both innovation (i.e., exploration) and efficiency (i.e., exploitation) is a challenge to theory and practice. This challenge exists because they are fundamentally different logics and rely on somewhat inconsistent strategies and processes (Lewis, 2000; Sarkees & Hulland, 2009; Turner, Swart, & Maylor, 2012). Therefore, excelling synchronously in both innovation and efficiency may increase organisational tensions (often couched as the contradictions and conflicts across managers and operational employees within a firm or a business unit) that result in negative outcomes (Andriopoulos & Lewis, 2009).

On this issue, organisational ambidexterity has been suggested as a possible solution to synchronise innovation and efficiency, face competitive challenges, and cope with environmental turbulence (Atuahene-Gima, 2005; Morgan & Berthon, 2008; O'Reilly & Tushman, 2008; Andriopoulos & Lewis, 2009; Hill & Birkinshaw, 2012; Turner et al., 2012). Organisational ambidexterity represents the synchronous pursuit of two distinctive activities, exploration and exploitation (He & Wong, 2004; Kyriakopoulos & Moorman, 2004; Gupta, Smith, & Shalley, 2006). Such synchronicity according to many refers to the firm's simultaneous symmetric emphasis on exploration and exploitation (March, 1991; Levinthal & March 1993; He & Wong, 2004; Smith & Tushman, 2005; Gupta et al. 2012). Exploration pertains to things characterised by search, discovery, generation, experimentation, and embracing variation, whereas exploitation denotes things characterised by improvement, refinement, control, and selection (March, 1991; He & Wong, 2004).

While significant attention has been given to the role of organisational ambidexterity, there still exists a lack of clarity according to some scholars regarding the extent to which a firm in practice becomes ambidextrous (Gibson & Birkinshaw, 2004; Andriopoulos & Lewis, 2009; Simsek, 2009; Fang, Lee, & Schilling, 2010; Sarkees, Hulland, & Prescott, 2010; Cantarello, Martini, & Nosella, 2012; Gassmann, Widenmayer, & Zeschky, 2012). The underlying reason for this lack of clarity is that achieving organisational ambidexterity in practice represents a multifaceted challenge, which is not limited to a single organisational level (Cantarello et al., 2012). The contention is raised here that to achieve organisational ambidexterity, managers need to formulate the appropriate corporate-level strategies that support the pursuit of ambidexterity (or ambidextrous strategies), as well as deploy distinctive business-level capabilities from different functional areas to successfully implement ambidextrous strategies.

Without proper congruence between corporate-level strategies and business-level capabilities, the translation of ambidextrous strategies into superior performance-outcomes (i.e., profitability, revenue, market share) can be lost (Sarkees et al., 2010; Cantarello et al., 2012). It is now generally accepted that corporate-level strategies are effective when implemented via appropriate business-level capabilities that create and offer superior advantages to customers (Vorhies, Morgan, & Autry, 2009; Hughes, Martin, Morgan, & Robson, 2010). However, the attention has not been significant devoted to understand the extent that the synchronicity of exploration and exploitation across corporate and business levels leads to superior performance-outcomes (Gupta et al., 2006; Cantarello et al., 2012).

In addition, it has been suggested that a firm's survival and success is grounded in its capacity to innovate new products and strengthen the ongoing performance of established products at the same time (Christensen, 1997; Tripsas, 1997; Sorescu, Chandy, & Prabhu, 2003; Smith & Tushman, 2005). However, new and established products stemmed from the pursuit of different strategies, and they are often in competition for possessing organisational resources (i.e., funds, equipment, employees) (Tripsas, 1997; Tripsas & Gavetti, 2000; Smith & Tushman, 2005). Therefore, synchronising the development and marketing of new and established products is a challenge to theory and practice. This challenge, fits the notion of the innovator's dilemma, which is the challenge of innovating new products and improving established products simultaneously (Smith & Tushman, 2005; O'Reilly & Tushman, 2008). On this issue, organisational ambidexterity has been suggested as a mechanism which provides the capacity to resolve the innovator's dilemma (Tushman, Anderson, & O'Reilly, 1997; Adler, Goldoftas, & Levine, 1999; Looy, Martens, & Debackere, 2005; Smith & Tushman, 2005; O'Reilly & Tushman, 2008). However, the literature on the role of organisational ambidexterity in facing the innovator's dilemma has been mostly furnished by conceptual and case studies (e.g., Tripsas, 1997; Adler et al., 1999; Smith & Tushman, 2005).

Therefore, the attention has not been significant towards the empirical validation of the extent that organisational ambidexterity enables a firm to synchronise the development and marketing of new and established products.

The current study seeks to extend the literature by investigating the role of organisational ambidexterity across multiple hierarchical levels (i.e., corporate and business levels) and multiple product development projects (i.e., new and established products). Using such multilevel analysis provides a fuller understanding of organisational ambidexterity in the context of product development and addresses calls for the multilevel analysis of organisational ambidexterity (e.g., Gupta et al., 2006; Simsek, 2009; Cantarello et al., 2012).

1.2. Theoretical contributions of the study

The current study seeks to provide four important contributions to the current literature. First, this study contributes to the literature by showing that organisational ambidexterity is not limited to a specific organisational level. Specifically, this study conceptualises ambidexterity across corporate and business levels of the firm and contends that the synchronised interactions between exploration and exploitation across these hierarchical levels enable a firm to become ambidextrous (see also Cantarello et al., 2012). This contribution is premised on the fact that the effective translation of ambidextrous strategies into superior performance-outcomes can be lost with poor implementation at the business-level of the firm (see the discussion on strategy implementation in Vorhies et al., 2009; Sarkees et al., 2010). This study conceptualises ambidexterity at the corporate-level of the firm as the synchronous pursuit of exploratory and exploitative strategies (He & Wong, 2004; Judge & Blocker, 2008). Exploratory strategy represents the firm's emphasis on new product-market opportunities, new and innovative products, and emerging customer needs, while exploitative strategy represents the firm's emphasis on the existing product-market opportunities,

automation and productivity of existing operations, and existing customer needs (He & Wong, 2004; Siren, Kohtamäki, & Kuckertz, 2012). Since exploratory and exploitative strategies are premised on different logics, the implementation of these strategies depends on distinctive capabilities at the business-level that are exploratory and exploitative in nature (see the discussion related to the extent that a specific strategic type determines the form of its respective capabilities in DeSarbo, Di Benedetto, Song, & Sinha, 2005, p. 58). In this sense, synchronising the implementation of exploratory and exploitative strategies is rooted in the synchronous deployment of exploratory and exploitative forms of business-level capabilities. In this study, exploratory capability presents the generation (i.e., creation) and deployment of new routines that provide the capacity to perform specific tasks (i.e., implement corporate strategies, develop a product), whereas exploitative capability presents the refinement (i.e., improvement, adaptation) and deployment of existing routines that provide the capacity to perform specific tasks (Atuahene-Gima, 2005; Peng, Schroeder, & Shah, 2008; Lisboa et al., 2011). To this end, the interactions between corporate-level exploratory and exploitative strategies and business-level exploratory and exploitative capabilities enable a firm to become ambidextrous.

Second, this study contributes to the literature by showing that organisational ambidexterity is not limited to a single product development project. This contribution is premised on the fact that a firm's survival and success are grounded in its capacity to innovate new products and strengthen the ongoing performance of established products simultaneously (Christensen, 1997; Tripsas, 1997; Smith & Tushman, 2005). Therefore, organisational ambidexterity can drive the firm's survival and success, when it provides the capacity to synchronise the development and marketing of new and established products (Smith & Tushman, 2005). Such synchronicity represents another important aspect of organisational ambidexterity. This contribution is important as a review of the literature

reveals no study that has investigated the performance implications of organisational ambidexterity with respect to multiple product development projects.

Third, this study contributes to the literature by showing that the deployment of exploratory and exploitative capabilities within a single functional area is not enough to implement corporate-level exploratory and exploitative strategies. This contribution is premised on the fact that firms cannot utilise a single capability in isolation to develop and market a product (i.e., new or established products) successfully (Day, 1994; Danneels, 2002), and the success of a product development project to a large extent relies on the deployment and integration of research-and-development (R&D) and marketing capabilities (Moorman & Slotegraaf, 1999; Brettel, Heinemann, Engelen, & Neubauer, 2011; Rubera, Ordanini, & Calantone, 2012). R&D capability represents a bundle of interrelated routines that provides the capacity to physically develop (i.e., create or upgrade) a product (Danneels, 2008; Krasnikov & Jayachandran, 2008; Peng et al., 2008). Marketing capability represents a bundle of interrelated routines that provides the capacity to link a product to customers (Day, 1994; Moorman & Rust, 1999; Vorhies & Morgan, 2005; Morgan, 2011). The literature shows that both R&D and marketing capabilities support a firm's effort to achieve its strategic objectives, attain its desired product-market positions, offer superior value to customers, and drive its products' performance (Song & Parry, 1996; Henard & Szymanski, 2001; Danneels, 2002; Song, Hanvanich, & Calantone, 2005). Adapting the notions of exploratory and exploitative capabilities to R&D and marketing as functional areas within a firm, this study shows the extent that the generation of new R&D and marketing routines and the refinement of existing R&D and marketing routines provide the capacity to implement exploratory and exploitative strategies in the context of product development.

Fourth, this study contributes to the literature by examining the role of organisational ambidexterity in the context of a Middle-Eastern emerging economy. Much of the work on

organisational ambidexterity has been undertaken in advanced Western (i.e., US, UK) (e.g., Jansen, Van den Bosch, & Volberda, 2005; Gupta et al., 2006) and emerging Asian economies (i.e., China, Taiwan) (e.g., Atuahene-Gima, 2005; Cao, Gedajlovic, & Zhang, 2009). However, the global business environment has changed dramatically over the past two decades, and emerging economies in the Middle-East (i.e., Iran, Qatar), South Asia (i.e., India, Vietnam), and South America (i.e., Brazil) now play important roles in the global economy (Burgess & Steenkamp, 2006; Mellahi, Demirbag, & Riddle, 2011; Sheng, Zhou, & Li, 2011; Bang & Joshi, 2012). Given the growing importance of the Middle-East in the global economy (Ralston et al., 2012; Soltani & Wilkinson, 2012) and the increasing level of investment and product launches by multinational companies in the Middle-East countries (Bozer, 2011), scant attention has been paid to the role of ambidexterity in the Middle-East. This study contends that understanding the role of organisational ambidexterity in the Middle-East region is worthy of investigation for three important reasons. First, many emerging economies are experiencing rapid economic development and are transitioning towards market-based systems (Gao, Zhou, & Yim, 2007). Second, competition in emerging economies has become more intense as firms within these economies not only compete with other domestic competitors, but also face growing competition from foreign firms entering their home markets (Mellahi et al., 2011). In this context, organisational ambidexterity has been suggested as a mechanism enabling a firm to effectively face competitive challenges and environmental turbulence to secure its survival and success (Atuahene-Gima, 2005). Third, understanding the role of organisational ambidexterity in the Middle-East region extends current theory to new contexts, especially when studied in the context the increasing competition in the Middle-East.

1.3. Research objectives of the study

The primary purpose of this study is to explore the extent that firms operating in emerging economies become ambidextrous using a multilevel analysis approach. The central argument is that organisational ambidexterity is not limited to a specific organisational level, a functional area, and a product development project. Specifically, this study contends that true organisational ambidexterity transcends the interactions between corporate-level exploratory and exploitative strategies and business-unit level exploratory and exploitative capabilities, as well as the interactions between different functional areas. The focus here is on the exploratory and exploitative forms of R&D and marketing capabilities and the integration between these capabilities as the means to implement exploratory and exploitative strategies at the business-level of the firm. In addition, true ambidexterity transcends the synchronicity of the development and marketing of new and established products. Such multi-level, multi-functional area, and multi-project analysis presents a fuller delineation of the organisational ambidexterity and how it matters to the firm's survival and success, which is underscored by the capacity to achieve market success with new and established products simultaneously. Finally, this study seeks to extend the organisational ambidexterity literature into new contexts investigating the role of organisational ambidexterity in the context of a Middle-Eastern emerging economy.

Based on these points and the theoretical contributions outlined in Section 1.2, this study seeks to answer four specific research questions:

- RQ1. To what extent does the congruence between exploratory strategy and business-level exploratory R&D and marketing capability deployment enhance new product performance?

- RQ2. To what extent does the congruence between exploitative strategy and business-level exploitative R&D and marketing capability deployment enhance established product performance?
- RQ3. To what extent does the synchronous pursuit of corporate-level exploratory and exploitative strategies and the synchronous deployment of business-level exploratory and exploitative capabilities contribute to both new product and established product performance?
- RQ4. To what extent does the synchronous development and marketing of new and established products enhance firm performance?

The review of organisational ambidexterity provided in Chapter Two helps to address these research questions and provides a theoretical setting for further investigation regarding the extent that firms become ambidextrous. Based on the review provided in Chapter Two, Chapter Three presents a theoretical framework (Figure 3.1, p. 69) comprising eleven constructs of interest and explains the underlying theory behind the interrelations among constructs of interest. Table 1.1 shows the definitions of constructs of interest of this study.

Table 1.1 – Constructs of interest

Construct	Definition
Ambidexterity at the corporate-level of the firm (Strategic Ambidexterity)	
Strategic ambidexterity represents the synchronous pursuit of exploratory and exploitative strategies (Gupta et al., 2006; Judge & Blocker, 2008).	
Exploratory strategy	represents the firm's emphasis on new product-market opportunities, new and innovative products, and emerging customer needs (He & Wong, 2004; Siren et al., 2012).
Exploitative strategy	represents the firm's emphasis on the existing product-market opportunities, automation and productivity of existing operations, and existing customer needs (He & Wong, 2004; Siren et al., 2012).
Ambidexterity at the business-level of the firm (Operational Ambidexterity)	
Operational ambidexterity represents the synchronous deployment of exploratory and exploitative capabilities (Gupta et al., 2006; Raisch, Birkinshaw, Probst, & Tushman, 2009).	
Exploratory R&D	represents the generation and deployment of new R&D routines to physically develop a product (He & Wong, 2004; Atuahene-Gima, 2005; Jansen et al., 2005; Danneels, 2008).
Exploitative R&D	represents the refinement and deployment of existing R&D routines to physically develop a product (Atuahene-Gima, 2005; Jansen et al., 2005; Peng et al., 2008; Lisboa et al. 2011).
Exploratory marketing	represents the generation and deployment of new marketing routines to link a product to customers (Kyriakopoulos & Moorman, 2004; Atuahene-Gima, 2005; Danneels, 2008).
Exploitative marketing	represents the refinement and deployment of existing marketing routines to link a product to customers (Kyriakopoulos & Moorman, 2004; Atuahene-Gima, 2005; Lisboa et al., 2011).
Product Performance	
New Product ^a Performance	represents the extent that a new product achieves market success compared to competing products over the past year. Market success is related to the goals set by the firm in terms of sales, sales growth, market share, return on investment, profitability, development costs, customer satisfaction, and customer loyalty (Griffin & Page, 1993; Langerak, Hultink, & Robben, 2004).
Established Product ^b Performance	represents the extent that an established product achieves market success compared to competing products over the past year. Market success is related to the goals set by the firm in terms of sales, sales growth, market share, return on investment, profitability, development costs, customer satisfaction, and customer loyalty (Griffin & Page, 1993; Langerak et al., 2004).
Ultimate performance outcome	
Firm Performance	represents the extent that a firm achieves its overall financial, market, and customer-based goals over the past year (Langerak et al., 2004; Richard, Devinney, Yip, & Johnson, 2009).
<i>a. A new product is the product that a firm has launched in the previous 12 months.</i>	
<i>b. An established product is the product that a firm has marketed for three or more years.</i>	

1.4. Justification and significance of the study

Given the theoretical contribution of this study to the organisational ambidexterity literature, there appears to be a number of practical grounds to justify the significance of this study. First, it has been suggested that organisational ambidexterity enables the synchronous development and successful marketing of a firm's new and established products, which in turn drive the firm's ultimate performance (Smith & Tushman, 2005; Sarkees & Hulland, 2009). What has received less attention in the current ambidexterity literature is the extent that a firm in practice becomes ambidextrous (Gibson & Birkinshaw, 2004; Cantarello et al., 2012). Without a multi-level understanding of organizational ambidexterity, managers are not likely to achieve a sufficient level of congruence between corporate-level strategies and business-level capabilities to translate ambidextrous strategies into specific performance-outcomes effectively. The firm's failure to become ambidextrous, in some ways reflects the firm's inability to face competitive challenges and environmental turbulence. Such an inability according to some scholars may hinder the firm's survival and success (Smith & Tushman, 2005; Sarkees & Hulland, 2009). In this sense, the findings of this study are significant as they will articulate the extent that the proper congruence between corporate-level strategies and business-level capabilities enables firms to become ambidextrous.

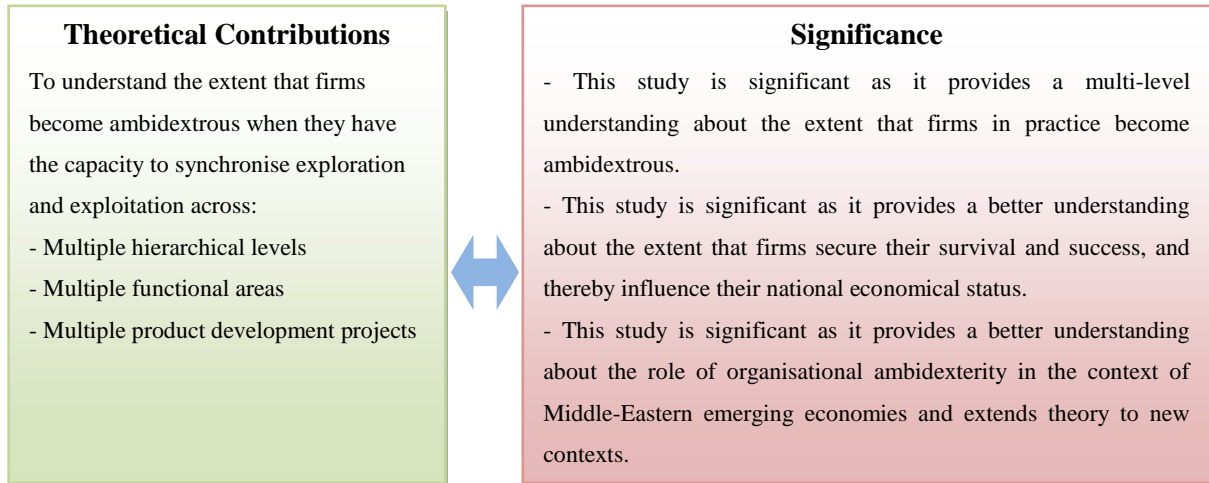
Second, this study underscores the role of organisational ambidexterity with respect to the firm's survival and success, because a number of successful firms seem as the initial source of a country's economic status. According to Holstein (2009), the revenue of some firms like General Motors with its suppliers represent 1% of the US economy. As such, General Motor's bankruptcy would be a major issue for the US economy. With increasing globalisation and the intensifying financial and economic concerns, assisting firms to secure their survival and success appears as the highest priority for governments. This issue is to some extent more challenging for governments within emerging economies than advanced

Western (i.e., US, UK) economies for several reason. First, emerging economies at present are experiencing rapid economic development and are transitioning towards market-based systems (Gao, Zhou, & Yim, 2007). Second, competition in emerging economies has now become more intense as firms within these economies not only compete with other domestic competitors, but also now face growing competition from foreign firms entering their home markets (Mellahi et al., 2011). Organisational ambidexterity has been suggested as a mechanism that may enable a firm to effectively face competitive challenges and environmental turbulence to secure its survival and success. Therefore, organisational ambidexterity is not only a fundamental concern for firms at the micro-economical level, but it also appears important at the macro-economic level, particularly in the context of emerging economies.

Third, this study examines the role of organisational ambidexterity in the context of Middle-Eastern emerging economies. Much of the work on organisational ambidexterity has been undertaken in advanced Western (i.e., US, UK) and Asian economies (i.e., China, Taiwan). Given the growing importance of Middle-Eastern emerging economies in the global economy (Ralston et al., 2012; Soltani & Wilkinson, 2012) and the increasing level of investment and product launches by multinational companies in the Middle-East countries (Bozer, 2011), understanding the extent that firms become ambidexterous within Middle-Eastern emerging economies remains limited. A review of the foreign direct investment growth in the Middle-East by Mellahi et al. (2011) highlights that multinationals firms have given significant attention to undertaking their operations in Middle-Eastern emerging economies and are attempting to penetrate these markets. This highlights a significant gap between academic and practical views, especially with respect to organisational ambidexterity. Therefore, understanding the role of organisational ambidexterity in the

Middle-East region and extending theory to new contexts is worthy of investigation. The significance and justification of the study are outlined in Figure 1.

Figure 1.1 – The significance and justification of the study



1.5. Research methodology and research methods

This study adopted the positivistic paradigm and a descriptive research approach. Specifically, the questionnaire approach was employed as the primary means for data collection. Following De Luca and Atuahene-Gima (2007) the primary data were collected via a drop-and-collect technique. This self-administered data collection technique is encouraged in emerging economies where interpersonal interactions are preferred as modes of information exchange (Ibeh & Brock, 2004; O'Cass & Ngo, 2011a), and the unreliable nature of postal systems is a problem (Ellis, 2005). Drawing on De Luca and Atuahene-Gima (2007) and Atuahene-Gima (2005), a multiple informant design was adopted to develop the questionnaires, because the focus of this study is to examine the extent that firms become ambidextrous when they have the capacity to pursue exploration and exploitation across multiple hierarchical levels, multiple functional areas, and multiple product development

projects. The focus was on a senior manager, who was the most knowledgeable person about the firm's corporate strategies, and two mid-level managers, who were the most knowledgeable persons about the firm's business-level routines with respect to a specific product development project (i.e., a new product and established product).

This study adopted a three-stage procedure suggested by Ngo and O'Cass (2009) and Hurtt (2010) to develop and refine measures for constructs of interest. The first stage focused on generating items, format and scale poles, and earlier development of definitions of constructs and self-assessment of their content validity are discussed. The second stage pertained to refining items by conducting expert-judgement evaluation of face validity. The third stage was concerned with finalising the measures by conducting a pre-test via interviews with 20 managers who had at least three years of business experience. Following this procedure, final questionnaires were prepared in English and then translated into Persian. They were checked for accuracy following the conventional back-translation process (Atuahene-Gima, 2005). The sample was drawn from a directory of large-size manufacturing firms across a variety of industry sectors provided by Industrial Management Institution in Iran.

1.6. Limitation of the study

There are several limitations concerning the extent to which the generalisation of findings from this study can be made. First, empirical data were collected from manufacturing firms across a variety of industry sectors, thus the generalisation of the findings to service sectors is recommended with care. Second, empirical data were collected from large-sized firms, thus the application of the findings to small- and medium-sized firms is not recommended. Third, the sample for this study comprises profit-oriented sectors, thus the generalisation of the findings to non-profit sectors is suggested with care. Four, the study is limited in regional

scope. The sample was generated from firms operating in Iran, an emerging economy in the Middle-East, thus the findings appear to be generalised to emerging economies. However, the application of the findings of this study to other contexts (i.e., developed countries) should be attempted with care.

Finally, this study is limited within the interaction between senior and mid-level managers across corporate and business levels of the firm. A review of the organisational ambidexterity literature shows the importance of third parties in the development and marketing of a firm's products (e.g., Rothaermel & Deeds, 2004; Rothaermel & Alexandre, 2009; Phene, Tallman, & Almeida, 2012). In fact, third parties (i.e., strategic alliances, suppliers, distributors, advertisers, and the like) are important as firms may outsource exploratory and exploitative activities within R&D and marketing areas to them. Although the importance of third parties in achieving ambidexterity is well documented, the focus of this study is on the extent that the interaction across corporate-level strategies and business-level capabilities enables a firm become ambidextrous.

1.7. Outline of the study

The outline of this study is premised upon the structure and guidelines provided in the doctoral thesis by Jansen (2005) and Ngo (2006). This study is organised into six chapters. Chapter One is the introduction chapter, which provides the background of the study, identifies the topic of interest and the research objectives of the study. It also offers justification of the study, identifies the methodological and analytical approaches adopted, outlines the structure of the study, introduces definitions and terms, and presents limitations of the study.

Chapter Two presents a detailed review of the extant literature related to the topic of interest, thus providing a backdrop for theory-building. Specifically, the literature related to

organisational ambidexterity is reviewed with emphasis placed on the research that adopted the realised perspective to investigate the nature and outcomes of organisational ambidexterity.

Chapter Three theoretically proposes the organisational ambidexterity model. It focuses on addressing and connecting essential constructs of interest noted in Table 1.1 into a theoretical framework. In doing so, specific hypotheses are developed to test the theory behind constructs' relationships.

Chapter Four describes the research design, which serves as a detailed blueprint that guides the implementation of the research. Specifically, it explains the logic underlying the adopted research paradigm, data collection method, and anticipated data analysis techniques. It also describes the process of measures development and sampling plan.

Chapter Five begins with an outline of the findings derived from the preliminary analysis undertaken to assess the measures' psychometric properties. Then, it presents the results of hypotheses testing.

Chapter Six discusses in detail the findings of the study, particularly focuses on the interpretation of the results and the emergent findings. Theoretical and practical implications are drawn from the discussion, along with limitations of the study and implications for future research in the domain. Finally, this study concludes with a list of appendices and a body of references.

1.8. Conclusion

An overview of this PhD study was presented in this chapter. This chapter began with the review of current literature on organisational ambidexterity and product development and the limitations in the current literature. Then, the contribution of the study to the current organisational ambidexterity literature and specific research questions this study seeks to

address were presented. Following the study background and research questions, the constructs of interest related to this study's theoretical framework were identified and the definition for each construct is provided. The significance of this study was justified with respect to both theoretical and practical perspectives. Discussions were provided on research methodology and research methods constituting a blueprint of conducting the study. Finally, this chapter covered limitations of the study and the outline of the study.

Chapter Two

Literature Review

2.1. Introduction

Chapter One provided an introduction and set the scene for this study. Specifically, Chapter One presented the research objectives, specific research questions, the theoretical contributions and outlined the importance of the study. This chapter reviews the literature, specifically on organisational ambidexterity. This review encompasses two main sections. Section 2.2 presents an analytical classification of the literature in the form of a content analysis of the organisational ambidexterity literature in terms of the research type, theoretical perspectives, research focus, and level of analysis. Section 2.3 presents the review and analysis of the constructs being used in the organisational ambidexterity literature, focusing particularly on studies that adopt the realised perspective as their theoretical foundation. Section 2.4 closes this chapter with the conclusion.

2.2. Content analysis of the ambidexterity literature

This section presents a content analysis of the current literature on organisational ambidexterity. Content analysis is a technique to review the literature by breaking the extant research into meaningful aggregate units or categories using a pre-determined set of rules (Hair, Bush, & Ortinau, 2002; Krippendorff, 2004). Content analysis enables researchers to better understand a particular phenomenon, provides a foundation to identify the theory and

research related to a specific topic, helps in identifying gaps in the current literature which need to be filled (Krippendorff, 2004; Ridley, 2012).

Theory on organisational ambidexterity is premised on the contention that the pursuit of organisational ambidexterity can assist a firm to survive, secure its future success and achieve superior financial performance (Tushman & O'Reilly, 1996; Raisch & Birkinshaw, 2008; Andriopoulos & Lewis, 2009; Lavie, Stettner, & Tushman, 2010). Recent reviews by Gupta et al. (2006); Raisch and Birkinshaw (2008), Li et al. (2008), Simsek et al. (2009), Raisch et al. (2009), Lavie et al. (2010), Cantarello (2012), and Turner et al. (2012) indicate that organisational ambidexterity has become a prominent research area, and different points of view have emerged on theorising its nature, antecedents and its outcomes. Although interest in organisational ambidexterity has increased, according to Gupta et al (2006), Sidhu et al. (2007) and Simsek (2009) significant ambiguity remains in the literature regarding the conceptualisation of organisational ambidexterity. As Simsek et al. (2009) note:

“While interest in the antecedents and consequences of ambidexterity has increased over the years, there is considerable ambiguity and disagreement regarding the theoretical nature of the construct.” (Simsek et al., 2009, p. 864)

Moreover, Gupta et al. (2006) state:

“...an examination of the literature indicates that the answers contained there to the central questions on this subject remain incomplete, at times contradictory, and at best ambiguous.” (Gupta et al., 2006, p. 693)

Given these identified concerns, it is therefore important to review and classify the current literature to identify the domain of the theoretical perspectives and associated issues

within the organisational ambidexterity literature. In doing so, this section presents an analytical classification of the literature in the form of a content analysis of the organisational ambidexterity literature in terms of the research type, theoretical perspectives, research focus, and level of analysis. This analytical classification is based on an extensive review of 56 articles from a number of A* and A journals¹. In this sense, journals such as the Academy of Management Journal, Journal of Management, Organisation Science, Journal of Management Studies, Strategic Management Journal, Journal of Product Innovation Management, and the Academy of Marketing Science are A*, and the International Journal of Research in Marketing and Industrial Marketing Management are A level. These articles were generated based on a four-step procedure. First, the list of articles was generated from “Wiley Inter Science”, “ABI/Inform” and “Ebsco Host Research” databases by searching for key words: ambidexterity, ambidextrous, exploration, and exploitation. Second, articles from B, C, and D ranked journals were removed, except those that are extensively cited in the organisational ambidexterity literature² such as Jansen et al. (2005), Prange and Schlegelmilch (2008), and Revilla et al. (2010). Third, as discussed in Chapter One (Section 1.6), the focus of this study is on the extent that the interaction across corporate-level strategies and business-level capabilities enables a firm to become ambidextrous. Therefore, this study is limited within the interaction between senior and mid-level managers across corporate and business levels of the firm. In this sense, articles that have focused on exploration and exploitation in the

1. An academic journal in Australia is ranked based on its overall quality compared to others journals. There are five tiers of quality rating: A*, A, B, C, and D. A* and A tiers represent the highest quality levels among the tiers. A* and A tiers are in many respects equivalent to 4* and 3* tiers in the UK academic journals ranking system. In terms of ISI impact factor, the impact factor of A* and A journals are generally over 1.50.

2. Jansen et al. (2005), Prange and Schlegelmilch (2008), and Revilla et al. (2010) have been cited extensively in some databases such as “ABI/Inform” and “Google Scholar”. For example, Jansen et al. (2005) has cited over 90 times in the Google Scholar.

context of inter-firm interactions such as the joint venture, acquisition, and alliances were removed from the list (e.g., Rothaermel & Deeds, 2004; Rothaermel & Alexandre, 2009; Phene et al., 2012). Fourth, of the selected articles, 8 articles that review the extant literature were removed from the list, because they did not suggest a new theoretical perspective or examine a specific theoretical framework (e.g., Gupta et al., 2006; Li et al., 2008; Raisch & Birkinshaw, 2008; Raisch et al., 2009; Simsek, 2009; Lavie et al., 2010; Cantarello et al., 2012). As Ridley (2012) notes, this analytical classification can provide a foundation to identify the theory and research which has influenced this study's focus and illustrate gaps in the current literature which need to be filled.

2.2.1. Research type and focus

As indicated in Table 2.1, research on organisational ambidexterity can be categorised into three major research streams, specifically research that focuses on the nature and outcomes, antecedents and outcomes, or outcomes of organisational ambidexterity. Of the 56 selected articles, 19 focus on the nature and outcomes, 27 focus on the antecedents and outcomes, and 10 focus specifically on outcomes of organisational ambidexterity. As shown in Table 2.1, the majority of articles that focus on the nature and outcomes of organisational ambidexterity are conceptual. In comparison, the majority of articles in Table 2.1 that focus on the antecedents and outcomes and on the outcomes of organisational ambidexterity are empirical. This implies that there is a growing interest among scholars in conducting empirical research which focuses on investigating the role of specific factors that enable a firm to become ambidextrous and the performance-outcomes of organisational ambidexterity. To gain further insight into the differences between these categories, Section 2.2.2 classifies the theoretical perspectives scholars have adopted to conceptualise and examine the antecedents, nature, and outcomes of organisational ambidexterity.

Table 2.1 – Review of research type and focus

No.	Research Type	Research Focus
11	Conceptual	Nature & Outcomes
3	Qualitative	
5	Quantitative	
4	Conceptual	Antecedents & Outcomes
3	Qualitative	
20	Quantitative	
10	Quantitative	Outcomes

2.2.2. Theoretical perspective and level of analysis

According to Raisch and Birkinshaw (2008), Duncan (1976) has been identified as the first researcher to use the term “organisational ambidexterity” to explain the extent that a firm adopts different organisational designs to engage in various innovation processes (i.e., incremental, radical). Over the past three decades, organisational ambidexterity has been increasingly used to explain the firm’s ability to engage in dual activities simultaneously (i.e., exploitation and exploration, distal search and proximal search, radical and incremental innovation, or alignment and adaptability) to achieve superior performance-outcomes (i.e., firm performance, business-unit performance, new product performance) (Gupta et al., 2006; Raisch & Birkinshaw, 2008; Raisch et al., 2009; Simsek, 2009; Lavie et al., 2010). Since, such dual activities are premised on the pursuit and deployment of inconsistent architecture, resources, and behaviours, the simultaneous engagement in these dual activities can create organisational tensions (Lewis, 2000; Smith & Tushman, 2005; Jansen, George, van den Bosch, & Volberda, 2008; Andriopoulos & Lewis, 2009). Such tensions are often couched in terms of the contradictions and conflicts across managers and/or operational employees within a firm or a business unit, which may result in negative outcomes (Andriopoulos & Lewis, 2009). A firm becomes ambidextrous when it has the ability to effectively manage

tensions created from such simultaneous engagement in two different activities (Smith & Tushman, 2005; Jansen et al., 2008; Andriopoulos & Lewis, 2009).

Researchers have suggested different theoretical perspectives to explain the extent that firms manage the tensions involved in their efforts to become ambidextrous. Drawing on Simsek (2009), these theoretical perspectives can be classified within three perspectives: structural, contextual, and realised. These perspectives are different in terms of their research focus and level of analysis. As shown in Table 2.2, the structural and contextual perspectives place more emphasis on investigating the antecedents and nature of organisational ambidexterity within their research focus, while the realised perspective focuses more on the nature and outcomes of organisational ambidexterity (see also Simsek, 2009). The level of analysis in the research type within the structural perspective is the corporate-level, in the contextual perspective it is the business-level, in the realised perspective it can be either the corporate-level or the business-level. This implies that researchers who adopt the structural perspective have focused on explaining the extent that a firm becomes ambidextrous at the corporate-level of the firm, while researchers who adopt the contextual perspective have devoted their attention to the extent that a business unit (i.e., department, project, or team) or several business units within a firm independently become ambidextrous (Gupta et al., 2006; Simsek, 2009). In contrast to the structural and contextual perspectives, the realised perspective appears to provide a more flexible foundation for researchers to investigate the extent that a firm become ambidextrous at either corporate-level of the business-level of the firm.

Table 2.2 – Review of theoretical perspective and level of analysis

No.	Level of Analysis	Theoretical Perspective	Research Focus	Articles
11	Corporate	Structural	Antecedent & Nature & Outcomes	Duncan (1976); McDonough and Leifer (1983); Tushman and O'Reilly (1996); Adler et al. (2002); Benner and Tushman (2003); Siggelkow and Levinthal (2003); Smith and Tushman (2005); Simsek et al. (2009); Fang et al. (2010); Boumgarden et al. (2012)
8	Business unit	Contextual	Antecedent & Nature & Outcomes	Gibson and Birkinshaw (2004); Vera and Crossan (2004); Lubatkin et al. (2006); Beckman (2006); Mom et al. (2007); Mom et al. (2009a); Mom et al. (2009b); Carmeli and Halevi, (2009)
26	Corporate	Realised	Nature & Outcomes	March (1991); Levinthal and March (1993); Rosenkopf and Nerkar (2001); Katila and Ahuja (2002); He and Wong (2004); Kyriakopoulos and Moorman (2004); Nickerson and Zenger (2004); Atuahene-Gima (2005); Auh and Menguc (2005); Atuahene-Gima and Murray (2007); Sidhu et al. (2007); Yalcinkaya et al. (2007); Judge and Blocker (2008); Morgan and Berthon (2008); Li and Lin (2008); Voss et al. (2008); Cao et al. (2009); Sarkees et al. (2010); Hughes et al. (2010); Revilla et al. (2010); Zhou and Wu (2010); Lisboa et al. (2011); Molina-Castillo et al. (2011); Siren et al. (2012); Vorhies et al. (2011); Yannopoulos et al. (2012)
6	Business unit			Danneels (2002); Jansen et al. (2005); Jansen et al. (2006); Kim and Atuahene-Gima (2011); Jansen et al. (2012) ; Rubera et al. (2012)
5	Corporate & Business unit	Structural & Contextual	Antecedent & Nature & Outcomes	O'Reilly and Tushman (2008); Jansen et al. (2008); Jansen et al. (2009); Andriopoulos and Lewis (2009); Prange and Schlegelmilch (2009)

Note: An extensive outline and classification of the articles identified in this table is provided in Appendix I.

The analysis of the literature showed that the structural perspective is premised on the view that a firm can achieve organisational ambidexterity within separated subunits, where each subunit specialises in different competencies, systems, incentives, processes, and cultures (Adler et al., 1999; Benner & Tushman, 2003; Simsek, 2009). As Smith and Tushman (2005) note, “ambidextrous design is an organisational form that builds internally inconsistent architectures and cultures into business units so that the firm can both explore and exploit” (p. 524). Bosch et al. (2005) defines structural ambidexterity as the capacity to create separated business units within a firm, where each business unit focuses on exploratory

or exploitative practices. Such structural separation enables top management to make decisions about emphasising and integrating both practices simultaneously (Tushman & O'Reilly, 1996; Smith & Tushman, 2005). This implies that structural differentiation per se is not enough to explain the extent that a firm becomes ambidextrous (Smith & Tushman, 2005; Gilbert, 2006). In effect, organisational ambidexterity can be achieved when top management teams ensure integration across differentiated units (Bosch et al., 2005; Smith & Tushman, 2005; Andriopoulos & Lewis, 2009). Such integration reflects shifting levels of analysis from the business-level to the corporate-level of the analysis to identify possible synergies among business units (Adler et al., 1999; Benner & Tushman, 2003; Smith & Tushman, 2005; Simsek, 2009). As Jansen et al. (2008) note:

“Exploration and exploitation may require fundamentally different and inconsistent architectures and competencies that can create paradoxical challenges...combining exploration and exploitation within an organisation poses considerable challenges to senior teams...although structural differentiation can help overcome resource and routine rigidity, senior teams face tradeoffs in their decision-making...in this sense, they face considerable role conflicts and role ambiguities as senior teams in ambidextrous organisations are expected to resolve contradictions through joint information processing and tight integration.”(Jansen et al. 2008, p. 983)

Therefore, the focus of research adopting the structural perspective is on the extent that top management creates separated business units within a firm that specialise in exploratory or exploitative practices, and manage tensions between these business units through tight integration at the corporate-level of the firm (Smith & Tushman, 2005; Jansen et al., 2008).

The structural perspective is premised on the view that the behavioural mechanisms (i.e., discipline, support, trust, socialisation, and team-building) can enable a business unit (i.e., department, project, or team) or several business units within a firm to become independently ambidextrous (Gibson & Birkinshaw, 2004; Vera & Crossan, 2004; Raisch & Birkinshaw, 2008; Mom, Bosch, & Volberda, 2009b, 2009a). Scholars who adopt the contextual perspective argue that structural separation of business units is not the best approach to achieve ambidexterity, instead achieving ambidexterity depends on “building a business unit context that encourages individuals to make their own judgements as to how best divide their time between the conflicting demands for alignment and adaptability” (Gibson & Birkinshaw, 2004, p. 211). In this sense, alignment represents the capacity to build coherence among all patterns of activity, and adaptability is the capacity to reconfigure activities quickly to meet changing demands in the task environment (Gibson & Birkinshaw, 2004; Simsek, 2009). Since alignment and adaptability are fundamentally two different tasks, the possibility that individuals can take on both tasks creates a number of challenges that need to be reconciled (Gibson & Birkinshaw, 2004; Raisch et al., 2009). In addition, it has been suggested that individuals who focus on creative activities (i.e., adaptability) differ even in personality, from those who focus on implementation activities (i.e., alignment) (Amabile, 1996). In this sense, the business unit’s cultural and behavioural context provides the capacity to reconcile contradictions among individuals and supports them to engage in both alignment and adaptability (Gibson & Birkinshaw, 2004; Mom et al., 2009b). For instance, Ghoshal and Bartlett (1997) argue that socialisation, recognition, and team-building practices help individuals think and act ambidextrously. Further, Gibson and Birkinshaw (2004) show that the context of a business unit (characterised by discipline, support, and trust) allows managers to divide their time between alignment and adaptability more effectively.

Interestingly, some scholars have argued that the structural and contextual perspectives are not sufficient to explain the antecedents of organisational ambidexterity in isolation (Jansen et al., 2008; Andriopoulos & Lewis, 2009; Raisch et al., 2009). Following this argument, the cultural and behavioural context of top management teams provides the capacity to effectively integrate the structurally separated business units that specialise in exploratory or exploitative practices (Jansen et al., 2008). In particular, Jansen et al. (2008) show that the top management team attributes (i.e., shared vision and contingency rewards) and transformational leadership behaviour enable top managers to reconcile conflicting interests among themselves and manage the pursuit of ambidexterity at the corporate-level of the firm. Further, Jansen et al. (2009) show that structural differentiation enhances the firm's capacity to achieve organisational ambidexterity through informal top management teams (i.e., social integration) and formal organisational (i.e., cross-functional interface) integration mechanisms.

As indicated in Table 2.2, the third theoretical perspective is labelled as realised ambidexterity. In a similar fashion to the structural and contextual perspectives, scholars who adopt the realised perspective view organisational ambidexterity as the synchronicity of exploration (i.e., things characterised by search, discovery, and generation) and exploitation (i.e., things characterised by refinement, implementation, and increasing efficiency) (He & Wong, 2004; Gupta et al., 2006; Sidhu, Commandeur, & Volberda, 2007). What makes the realised perspective different from the structural and contextual perspectives is its greater emphasis on investigating the nature and outcomes of organisational ambidexterity (see also Simsek, 2009). Scholars who adopt the structural and contextual perspectives place more emphasis on the mechanisms by which a firm or a business unit becomes ambidextrous. However, scholars who adopt the realised perspective place greater emphasis on the extent that firms operationalise the synchronicity of exploration and exploitation to achieve a

specific performance outcome (i.e., firm performance, business-unit performance, or new product performance) (Simsek, 2009). For example, Cao et al. (2009) show that the relative balance and the combination of exploratory and exploitative forms of technological innovation enhance firm performance. In this sense, the structural and contextual perspectives can be considered as precursors to the realised perspective.

Importantly, it should be pointed out that there are several articles that investigate the antecedents of organisational ambidexterity using the realised perspective (e.g., Jansen et al., 2005; Li & Lin, 2008; Revilla, Prieto, & Prado, 2010; Zhou & Wu, 2010). However, these articles focus on specific organisational processes (i.e., strategic flexibility, market orientation) and/or environmental factors (i.e., competitiveness) as the antecedents of organisational ambidexterity rather than the structural and contextual mechanisms. In particular, these studies are fundamentally premised on the resource-based view of the firm and industrial organisation theory, which represent different theoretical foundations compared to the structural and contextual perspectives. For example, Jansen et al. (2005) show environmental competitiveness influences multi-unit firms to develop ambidextrous units that pursue exploratory and exploitative innovation simultaneously. Further, Li and Lin (2008) show that market oriented firms are better at pursuing radical and incremental innovation simultaneously.

An examination of the information presented in Table 2.2 indicates that the majority of the selected articles (32 of the 56) use the realised perspective as their foundation. A possible underlying reason for this is explained by Simsek (2009) who argues that the realised perspective provides a better theoretical foundation to examine the roles and outcomes of organisational ambidexterity than the structural and contextual perspectives. In addition, the realised perspective is applicable to both corporate and business levels of analysis (Simsek, 2009). Given that a large body of organisational ambidexterity adopt the realised perspective

to explain the role of organisational ambidexterity from different levels of analysis and functional areas, a more precise analysis of this body of work is warranted. Such an analysis provides a step forward in understanding the specific limitations of the current literature which needs to be addressed (see Ridley, 2012). In addition, the analysis of the literature adopting the realised perspective is important as the main objective of this thesis is to investigate the extent that firms synchronise exploration and exploitation at multiple organisational levels, multiple functional areas, and multiple product development projects to achieve superior firm performance (see Chapter 1, Section 1.3). In this sense, the realised perspective provides a sound foundation for doing this.

2.2.3. Content analysis of the literature on the realised perspective

To gain a deeper understanding about research adopting the realised perspective, 32 articles were identified from the master list outlined in Section 2.2. Table 2.3 presents a classification of these articles in terms of the level of analysis, research context, operationalisation, and performance indicators.

As shown in Table 2.3, of the 32 articles, 5 are conceptual and 27 are empirical. In terms of the level of analysis, 26 focus on the corporate-level and 6 focus on the business-level of the firm. In terms of research context, 7 identify different types of strategies as the components of organisational ambidexterity at the corporate-level of the firm (i.e., exploratory and exploitative technological innovation strategies), 19 focus on different types of capabilities or orientations at the corporate-level (i.e., exploratory and exploitative organisational learning capabilities, distal and proximal search), and 6 focus on different types of capabilities at the business-level (i.e., exploratory and exploitative technological innovation capabilities).

Table 2.3 – Review of literature on the contextual perspective

Research	Research Type	Level of Analysis	Research Context	Operationalisation Type(s)	Performance Indicator(s)
March (1991)	Conceptual	Corporate	Organisational Learning	Balanced	-
Levinthal and March (1993)	Conceptual	Corporate	Organisational Learning	Balanced	-
Rosenkopf and Nerkar (2001)	Quantitative	Corporate	Search Orientation	Combined	Innovation Performance
Danneels (2002)*	Qualitative	Business unit	Product Innovation & Marketing Capabilities	-	-
Katila and Ahuja (2002)	Quantitative	Corporate	Search Orientation	Combined	Firm Performance
He and Wong (2004)	Quantitative	Corporate	Technological Innovation Strategy	Balanced & Combined	Firm Performance
Kyriakopoulos and Moorman (2004)	Quantitative	Corporate	Marketing Strategy	Combined	New Product Performance
Nickerson and Zenger (2004)	Conceptual	Corporate	Search Orientation	Combined	-
Jansen et al. (2005)*	Quantitative	Business unit	Technological Innovation Capability	-	Levels of exploration and exploitation
Atuahene-Gima (2005)*	Quantitative	Corporate	Organisational Learning	-	Incremental & Radical innovation
Auh and Menguc (2005)	Quantitative	Corporate	Organisational Learning	Balanced	Firm performance
Jansen et al. (2006)*	Quantitative	Business unit	Technological Innovation Capability	-	Business Unit Performance
Atuahene-Gima and Murray (2007)	Quantitative	Corporate	Organisational Learning	Combined	New Product Performance
Sidhu et al. (2007)	Quantitative	Corporate	Search Orientation	-	Innovativeness
Yalcinkaya et al. (2007)*	Quantitative	Corporate	Product Innovation Capability	-	New Product Performance
Judge and Blocker (2008)	Conceptual	Corporate	Marketing Strategy	Balanced	-
Li and Lin (2008)	Quantitative	Corporate	Technological Innovation Capability	Balanced	Levels of exploration and exploitation
Morgan and Berthon (2008)	Quantitative	Corporate	Technological Innovation Strategy	Balanced	Firm Performance
Voss et al. (2008)*	Quantitative	Corporate	Product Innovation Capability	-	Firm Performance
Cao et al. (2009)	Quantitative	Corporate	Technological Innovation Strategy	Balanced & Combined	Firm Performance
Hughes et al. (2010)	Quantitative	Corporate	Technological Innovation Capability	Balanced	Export Venture Performance
Revilla et al. (2010)	Quantitative	Corporate	Generic Strategy	Combined	Levels of exploration and exploitation
Zhou and Wu (2010)*	Quantitative	Corporate	Organisational Learning	-	Levels of exploration and exploitation
Sarkees et al. (2009)	Quantitative	Corporate	Generic Strategy	Combined	Firm Performance
Lisboa et al. (2011)*	Quantitative	Corporate	Product Innovation & Marketing Capabilities	-	New Product Performance
Molina-Castillo et al. (2011)*	Quantitative	Corporate	Organisational Learning	-	New Product Performance
Kim and Atuahene-Gima (2011)*	Quantitative	Business unit	Market-Learning Capability	-	New Product Performance
Jansen et al. (2012)	Quantitative	Business unit	Technological Innovation Capability	Combined	Business Unit Performance
Siren et al. (2012)	Quantitative	Corporate	Entrepreneurship Strategy	Balanced	Firm Performance
Vorhies et al. (2011)	Quantitative	Corporate	Marketing Capability	Balanced	Firm Performance
Yannopoulos et al. (2012)*	Quantitative	Corporate	Organisational Learning	-	New Product Performance
Rubera et al. (2012)	Qualitative	Business unit	Product Innovation & Marketing Capabilities	-	-

* This study focus on the independent performance-outcomes of exploratory and exploitative constructs.

As shown in Table 2.3, there are no articles that adopt a multilevel analysis approach to investigate the role of organisational ambidexterity. In particular, Table 2.3 shows that there is a lack of clarity regarding the extent that the interaction between the exploration and exploitation of corporate-level strategies and the exploration and exploitation of business-level routines enable a firm to become ambidextrous. This finding is in line with previous reviews of the literature conducted by Gupta et al. (2006) and Cantarello et al. (2012) who argue that there is a lack of clarity regarding the extent that the interaction across different organisational levels enables a firm to become ambidextrous. For instance, Gupta et al. (2006) note that:

“...studies spanning multiple levels of analysis are also relatively scarce. Studies that address questions such as the following have the potential to fill important gaps in scholars’ knowledge base...How does exploration at one level interact with exploitation at a lower or higher level?”. (Gupta et al., 2006, pp. 703-704)

Further, Cantarello et al. (2012) raise the point that:

“Creating ambidextrous organisations has been suggested as one possible solution...what is not fully understood is how organisations become ambidextrous and how operational and managerial levels within an organisation interact in order to resolve the exploration/exploitation dilemma.” (Cantarello et al., 2012, p. 28)

Therefore, there is a need to investigate the extent that the interaction across multiple organisational levels (i.e., corporate-level strategies and business-level routines) enables a firm become ambidextrous.

In addition, Table 2.3 indicates that only Danneels (2002), Lisboa et al. (2011), and Rubera et al. (2012) investigate the role of exploratory and exploitative capabilities across multiple functional areas. Specifically, Danneels (2002) argues that product innovation is a boundary spanning process and the utilisation of a single capability (i.e., product innovation or marketing) in isolation is not enough to develop and market a product successfully. Based on a number of interviews with managers of five firms, Danneels (2002) classifies new product projects based on whether a new product draws on the exploitation of existing product innovation and marketing capabilities, or whether it requires the exploration of new product innovation and marketing capabilities. Rubera et al., (2012) extend the work of Danneels through research focusing on interviews with managers of 11 new product development projects, arguing that not all new product development projects need to achieve equal levels of integration between the exploration and exploitation of technological innovation and marketing capabilities. However, Danneels (2002) and Rubera et al., (2012) do not examine the extent that (a) firms engage in the exploration and exploitation of technological innovation and marketing capabilities and (b) the synchronicity of exploration and exploitation across multiple functional areas influences a product development project's performance.

As shown in Table 2.3, the work by Lisboa et al. (2011) is the only quantitatively-based study that investigates the extent that exploratory and exploitative forms of R&D and marketing capabilities provide the capacity to drive new product performance. However, their work is limited to the business level of the firm and focuses on the independent effects of exploratory and exploitative R&D and marketing capabilities rather than the extent that the synchronicity of these capabilities drives new product performance. In this sense, none of the identified articles investigate the performance-outcomes of the synchronicity of exploration and exploitation across multiple functional areas (i.e., R&D and marketing). This highlights a

lack of attention directed to understand the extent that firms become ambidextrous when they pursue exploration and exploitation across multiple functional areas and the extent that such ambidexterity results in superior performance outcomes (i.e., firm performance, new product performance).

In addition, Table 2.3 reveals that scholars adopt different theoretical approaches to operationalise the synchronicity of exploration and exploitation. Of the 20 articles that operationalise the synchronicity of exploration and exploitation, 10 adopt what is termed balanced ambidexterity, 8 adopt what is termed combined ambidexterity, and 2 adopt both balanced and combined ambidexterity approaches³. Balanced ambidexterity treats exploration and exploitation as competing forces at two ends of a continuum (Gupta et al., 2006). In this sense, “maintaining an appropriate balance between exploration and exploitation is a primary factor in system survival and prosperity” (March, 1991, p. 71). Combined ambidexterity characterises exploration and exploitation as “independent activities, orthogonal to each other, such that firms can choose to engage in high levels of both activities at the same time” (Cao et al., 2009, p. 781).

Despite extensive discussion on the merits of balanced and combined approaches of ambidexterity, only 15 of 32 articles identified in Table 2.3 empirically examine the performance implication of the balanced and/or combined ambidexterity. This highlights that the empirical body of work does not fully explore the performance implication of balanced and combined ambidexterity approaches. This result has been captured by the work of Raisch and Birkinshaw (2008) and Lavie et al. (2010) who argue that the performance implication of these approaches has been mostly furnished by conceptual and qualitative studies. In addition, examination of these 15 articles shows that the attention directed towards the extent

3. Cao et al. (2009) is the first research that uses the terms “balanced ambidexterity” and “combined ambidexterity” to classify different approaches to operationalise organisational ambidexterity.

that the balanced or combined approaches of ambidexterity is more beneficial has not been significant (see an extensive discussion about this issue in Section 2.3.1.3). The work of He and Wong (2004) is the first research, which adopts both balanced and combined approaches to operationalise the synchronicity of exploration and exploitation and compare the performance implications of these approaches. He and Wong (2004) shows that both balanced and combined approaches significantly influence firm performance. However, they did not theorise which approach is more beneficial under different conditions. Lubatkin et al. (2006) shows that balanced and combined approaches have less explanatory power compare to the summation of exploration and exploitation. However, the approach suggested by Lubatkin et al. (2006) to operationalise ambidexterity (namely the additive approach) suffers lack of clarity regarding the extent that (a) whether exploration and exploitation are competing or orthogonal forces and (b) why excelling at both exploration and exploitation may raise organisational tensions that result in negative outcomes. Cao et al. (2009) extend the works of He and Wong (2004) and Lubatkin et al. (2006) by adopting both balanced and combined approaches to operationalise the synchronicity of exploration and exploitation and compare the performance implications of these approaches. In particular, Cao et al. (2009) conceptualise and operationalise balanced and combined approaches of ambidexterity as the distinctive constructs and examine which approach is more beneficial based on firm size and environmental munificence.

In addition, Table 2.3 highlights that scholars have adopted balanced and combined approaches to operationalise ambidexterity at a single organisational level. In particular, the attention given toward understanding the extent that ambidextrous firms synchronise exploration and exploitation at the corporate-level and synchronise exploration and exploitation at the business-level of the firm at the same time has not been significant.

Finally, Table 2.3 shows that scholars adopt different performance indicators to measure the performance-outcomes of exploration, exploitation, and their synchronicity. Of the 26 quantitative-based articles, 9 adopt firm performance (i.e., financial and/or market-based performance), 7 adopt new product performance (i.e., financial and/or market-based performance), 2 adopt business unit performance (i.e., financial performance), 2 adopt innovation performance (i.e., the number of innovations), 1 adopts export venture performance (i.e., effectiveness, efficiency), and 4 focus on the antecedents of organisational ambidexterity and use the levels of exploration and exploitation as the outcome constructs (e.g., Jansen et al., 2005; Li & Lin, 2008; Revilla et al., 2010; Zhou & Wu, 2010). In this sense, no articles can be identified that adopts multiple performance indicators (i.e., business unit and firm performance, or new product and firm performance) to examine performance-outcomes of exploration, exploitation, and their synchronicity. This highlights that there is a lack of clarity about the extent that achieving ambidexterity at a business-unit drives the performance of both business-unit and firm across different hierarchical levels. On the other hand, there is causal ambiguity about the extent that the pursuit of exploration, exploitation, and their synchronicity within a single functional area (i.e., technological innovation) or a single product development project drive the ultimate firm's performance (i.e., profitability). The underlying reason is that firm performance is a complex and multifaceted construct (Richard et al., 2009; Shea, Cooper, De Cieri, & Sheehan, 2012) that might be affected by the performance of multiple functional activities, multiple business units, and multiple products at the same time (Devinney, Yip, & Johnson, 2010).

In conclusion, this section has provided an extensive review of studies that adopt the realised perspective as their theoretical foundation. The review of articles identified in Table 2.3 reveals four major limitations in the organisational ambidexterity literature. Specifically, there is a lack of clarity regarding (a) the extent that the interaction across multiple

organisational levels (i.e., corporate-level strategies and business-level routines) enables a firm to become ambidextrous (see also Gupta et al., 2006; Simsek, 2009; Cantarello et al., 2012), (b) the extent that firms become ambidextrous across multiple functional areas (i.e., R&D and marketing) and the extent that such ambidexterity results in superior performance outcomes (i.e., firm performance, new product performance), (c) the extent that the pursuit of the balanced and combined approaches to ambidexterity are more beneficial, (d) the extent that firms synchronise exploration and exploitation at the corporate-level and synchronise exploration and exploitation at the business-level of the firm at the same time, and (e) the extent that exploration, exploitation, and their synchronicity affect multiple performance indicators across multiple levels of analysis (i.e., business and corporate levels). To advance understanding about the extent that scholars adopt the realised perspective to investigate the antecedents, nature, and outcomes of organisational ambidexterity, the next section presents the review the constructs being used in the articles identified in Table 2.3.

2.3. Review of the constructs being in the organisational ambidexterity literature

This section presents the review of the constructs being used in the organisational ambidexterity literature, focusing particularly on studies that adopt the realised perspective as their theoretical foundation. The focus here is on the review of studies identified in Table 2.3. This section encompasses three subsections. Section 2.3.1 presents the review of the conceptualisations of exploration and exploitation as the firm's strategies and capabilities. Section 2.3.2 presents the review of the operationalisation of organisational ambidexterity. Section 2.3.3 presents the review of the outcomes of organisational ambidexterity.

2.3.1. Nature of exploration and exploitation

This section presents an extensive review and analysis of literature focusing on the conceptualisation of the exploration and exploitation as two dominant components of

organisational ambidexterity. Sections 2.3.1.1 and 2.3.1.2 review the conceptualisations of the exploration and exploitation as the firm's strategy and capability, respectively.

2.3.1.1. Exploration and exploitation as the strategy

A strategy represents the determination of basic goals of the firm and identification of actions necessary to reach those goals (Chandler, 1962; Vorhies, 1998; Hodgetts, 1999; Nandakumar, Ghobadian, & O'Regan, 2010). The literature classifies firm strategies into two categories, corporate- and business-level strategies. Business-level strategy deals with the ways in which a single-business firm or an individual business unit of a multiple-business firm competes in a particular market and positions itself among its competitors (Andrews, 1987; Bowman & Helfat, 2001). Corporate-level strategy deals with the ways in which a corporation manages a set of businesses together (Andrews, 1987; Bowman & Helfat, 2001). In particular, corporate-level strategy articulates a firm's overall direction in terms of its general attitude towards growth, the management of its various businesses and product lines, and how it makes choices about investing in different types of activities (Bowman & Helfat, 2001; Bodwell & Chermack, 2010). The review of articles identified in Table 2.3, especially those that view exploration and exploitation as the firm's strategies, indicates that scholars conceptualise exploratory and exploitative strategies at the corporate-level strategies. For instance, He and Wong (2004, pp. 483-484) define exploratory technological innovation strategy as the firm's emphasis on "entering new product-market domains", while exploitative technological innovation strategy is defined as the firm's emphasis on "improving existing product-market positions". Further, Kyriakopoulos and Moorman (2004, p. 221) conceptualise exploratory marketing strategy as "strategies that primarily involve challenging prior approaches to interfacing with the market", and exploitative marketing strategy as "strategies that primarily involve improving and refining current skills and

procedures associated with existing marketing strategies”. Articles that conceptualise exploration and exploitation as the firm’s strategies in Table 2.3 are outlined in Table 2.4.

Table 2.4 – Review of articles that conceptualise exploration and exploitation as the strategy

Research	Research Type	Level of Analysis	Research Context	Operationalisation Type(s)	Performance Indicator(s)
He and Wong (2004)	Quantitative	Corporate	Technological Innovation Strategy	Balanced & Combined	Firm Performance
Kyriakopoulos and Moorman (2004)	Quantitative	Corporate	Marketing Strategy	Combined	New Product Performance
Judge and Blocker (2008)	Conceptual	Corporate	Marketing Strategy	Balanced	-
Morgan and Berthon (2008)	Quantitative	Corporate	Technological Innovation Strategy	Balanced	Firm Performance
Cao et al. (2009)	Quantitative	Corporate	Technological Innovation Strategy	Balanced & Combined	Firm Performance
Revilla et al. (2010)	Quantitative	Corporate	Generic Strategy	Combined	Levels of exploration and exploitation
Sarkees et al. (2009)	Quantitative	Corporate	Generic Strategy	Combined	Firm Performance
Siren et al. (2012)	Quantitative	Corporate	Entrepreneurship Strategy	Balanced	Firm Performance

** This study focus on the independent performance-outcomes of exploratory and exploitative constructs.*

As shown in Table 2.4, the focus of identified articles is on exploratory and exploitative strategies at a single functional area (i.e., technological innovation or marketing), except Siren et al. (2012) who conceptualise exploration and exploitation as different forms of corporate-level entrepreneurship strategy. These forms of entrepreneurship strategy encompass both technological creativity- and market-focused strategies. According to Siren et al. (2012, p. 27), exploratory strategy represents a firm’s emphasis on exploring new technologies to create innovative products, searching for innovative ways to satisfy customer needs, and venturing into new markets or targeting new customer groups. They define exploitative strategy as a firm’s emphasis on the commitment to improving quality and reducing costs, continuous search to improve the quality of its products, effort to increase the automation of operations, and monitor the satisfaction of existing customers (p. 30). Given that only Siren et al. (2012) conceptualise exploratory and exploitative strategies as the dual focused strategies (i.e., technological- and market-focused strategies). The attention has not

been significant toward understanding the extent that firms become ambidextrous when they pursue dual focused strategies.

In addition, the majority of quantitative-based articles identified in Table 2.4 examine the direct effects of exploratory and exploitative strategies and their synchronicity on firm performance or new product performance. Given that the positive effects of exploratory and exploitative strategies on the performance of a firm or a product is well documented, such performance implications are however, subject to significant casual ambiguity. In particular, there is a lack of clarity about the extent that exploratory and exploitative strategies are translated into productive actions that drive the performance of a product or a firm (Sarkees et al., 2010; Cantarello et al., 2012). In this area, Sarkees (2010) and Siren et al. (2012) are the only ones who argue that exploratory and exploitative strategies will not influence firm performance, unless specific capabilities are developed and deployed that provide the capacity to implement these corporate strategies. This argument is premised on the literature on strategy implementation which argues that corporate strategies have an indirect effect on firm performance via the deployment of specific capabilities (Slater & Olson, 2001; Love, Priem, & Lumpkin, 2002; Homburg, Krohmer, & Workman, 2004; DeSarbo et al., 2005; Olson, Slater, & Hult, 2005a; Vorhies et al., 2009; Hughes et al., 2010). According to Sarkees et al. (2010), the synchronicity of exploratory and exploitative strategies affects the firm's revenue, profitability, and customer satisfaction through the deployment of marketing implementation capability. Further, Siren et al. (2012) show that exploratory and exploitative strategies influence firm performance (i.e., profitability) through the deployment of strategic learning capability. These studies use a single capability to explain the direct link between exploratory and exploitative strategies and the selected performance indicators. However, the current literature on strategy implementation shows that corporate strategies are path dependent in their respective capabilities (DeSarbo et al., 2005; Chen, Li, & Evans, 2012).

For instance, DeSarbo et al. (2005) show that different strategic types (i.e., prospectors, analysers, defenders) affect technological, marketing, management, and information technology capabilities differently. This highlights that there is a lack of clarity regarding the extent that exploratory and exploitative strategies and their synchronicity affect the performance of a firm, a business-unit, or a new product through affecting various types of functional capabilities.

Furthermore, given that the articles identified in Table 2.4 conceptualise exploitative strategy as the firm's emphasis on improving (i.e., enhancing quality, enhancing efficiency) established products (He & Wong, 2004; Siren et al., 2012), attention has been not significant regarding the performance implications of exploitative strategy with respect to established product performance. Given that the performance implications of exploratory and exploitative strategies and their synchronicity are only validated in the context of new product performance, there exists a lack of clarity about the extent that these strategies and their synchronicity drive both new and established products simultaneously. Since the performance of a firm is rooted in the market success of both new and established products, investigating the effects of exploratory and exploitative strategies and their synchronicity on both new product and established product performance appears to be worthy of investigation. This is consistent with Tripsas (1997), Tripsas and Gavetti (2000), and Smith and Tushman (2005) who suggest organisational ambidexterity as a theoretical solution to resolve the innovator's dilemma. The innovator's dilemma represents the challenge of developing and marketing new and established products at the same time (Christensen, 1997).

In conclusion, this section illustrates that there is a lack of clarity regarding (a) the extent that firms become ambidextrous when they pursue dual focused strategies (i.e., technological- and market-focused strategies), (b) the extent that exploratory and exploitative strategies and their synchronicity affect the performance of a firm, a business-unit, or a new

product through the deployment of specific capabilities across multiple functional areas, and (c) the extent that exploratory and exploitative strategies and their synchronicity resolve the innovator's dilemma. In addition to conceptualising exploration and exploitation as the firm's strategies, some scholars conceptualise these constructs as the firm's capabilities. The following section presents an extensive review of the studies that conceptualise exploration and exploitation as the firms' capabilities.

2.3.1.2. Exploration and exploitation as the capability

As shown in Table 2.3, 24 articles conceptualise exploration and exploitation as different types of firm capabilities ⁴ (or exploratory and exploitative capabilities). In addition to these articles, Benner and Tushman (2003) and Lubatkin et al. (2006), focus on the antecedents of organisational ambidexterity from the structural and contextual perspectives, conceptualise exploratory and exploitative capabilities as the firm's capabilities following the realised perspective. Table 2.5 classifies articles that adopt the realised perspective including the work of Benner and Tushman (2003) and Lubatkin et al. (2006) in terms of the research type, level of analysis, research context, operationalisation, and performance indicators. As shown in Table 2.5, the identified articles conceptualise exploratory and exploitative capabilities within various functional areas such organisational learning, technological innovation, marketing, and market learning. To gain further understanding about the different approaches scholars adopt to conceptualisation exploratory and exploitative capabilities, it is necessary to provide a backdrop regarding the origin and micro-foundation of organisational capabilities.

4. The current literature has used the terms "competency" and "capability" interchangeably (see Danneels 2002, Atuahene-Gima, 2005).

Table 2.5 – Review of articles that conceptualise exploration and exploitation as the capability

Research	Research Type	Level of Analysis	Research Context	Operationalisation Type(s)	Performance Indicator(s)
March (1991)	Conceptual	Corporate	Organisational Learning	Balanced	-
Levinthal and March (1993)	Conceptual	Corporate	Organisational Learning	Balanced	-
Rosenkopf and Nerkar (2001)	Quantitative	Corporate	Search Orientation	Combined	Innovation Performance
Danneels (2002)*	Qualitative	Business Unit	Product Innovation & Marketing Capabilities	-	-
Katila and Ahuja (2002)	Quantitative	Corporate	Search Orientation	Combined	Firm Performance
Benner and Tushman (2003)	Conceptual	Corporate	Technological Innovation and Marketing Capabilities	Balanced	-
Nickerson and Zenger (2004)	Conceptual	Corporate	Search Orientation	Combined	-
Jansen et al. (2005)*	Quantitative	Business Unit	Technological Innovation Capability	-	Levels of exploration and exploitation
Atuahene-Gima (2005)*	Quantitative	Corporate	Organisational Learning	-	Incremental & Radical innovation
Auh and Menguc (2005)	Quantitative	Corporate	Organisational Learning	Balanced	Firm performance
Lubatkin et al. (2006)	Quantitative	Corporate	Product Innovation Capability	Combined	Firm Performance
Jansen et al. (2006)*	Quantitative	Business Unit	Technological Innovation Capability	-	Business Unit Performance
Atuahene-Gima and Murray (2007)	Quantitative	Corporate	Organisational Learning	Combined	New Product Performance
Sidhu et al. (2007)	Quantitative	Corporate	Search Orientation	-	Innovativeness
Yalcinkaya et al. (2007)*	Quantitative	Corporate	Product Innovation Capability	-	New Product Performance
Li and Lin (2008)	Quantitative	Corporate	Technological Innovation Capability	Balanced	Levels of exploration and exploitation
Voss et al. (2008)*	Quantitative	Corporate	Product Innovation Capability	-	Firm Performance
Hughes et al. (2010)	Quantitative	Corporate	Technological Innovation Capability	Balanced	Export Venture Performance
Zhou and Wu (2010)*	Quantitative	Corporate	Organisational Learning	-	Levels of exploration and exploitation
Lisboa et al. (2011)*	Quantitative	Corporate	Product Innovation & Marketing Capabilities	-	New Product Performance
Molina-Castillo et al. (2011)*	Quantitative	Corporate	Organisational Learning	-	New Product Performance
Kim and Atuahene-Gima (2011)*	Quantitative	Business Unit	Market-Learning Capability	-	New Product Performance
Jansen et al. (2012)	Quantitative	Business Unit	Technological Innovation Capability	Combined	Business Unit Performance
Vorhies et al. (2011)	Quantitative	Corporate	Marketing Capability	Balanced	Firm Performance
Yannopoulos et al. (2012)*	Quantitative	Corporate	Organisational Learning	-	New Product Performance
Rubera et al. (2012)	Qualitative	Business Unit	Product Innovation & Marketing Capabilities	-	-

** This study focus on the independent performance-outcomes of exploratory and exploitative constructs.*

The conceptualisation of organisational capabilities is mainly premised on the resource-based view (RBV) of the firm (Newbert, 2007; Crook, Ketchen, Combs, & Todd, 2008;

Henard & McFadyen, 2012). RBV assumes that performance differences across firms results from resources, routines, and capabilities that are valuable, rare, and difficult to imitate or substitute by competitors (Barney, 1991; Crook et al., 2008; Peng et al., 2008; Henard & McFadyen, 2012; Miller, Pentland, & Choi, 2012). Resources are tangible and intangible assets (i.e., physical, financial, human, knowledge) that can be used as inputs to organisational activities (Peteraf, 1993; Crook et al., 2008; Kunc & Morecroft, 2010). Routines are recognisable and repetitive patterns of processes that provide the capacity to translate the firm's resources into specific actions (Zollo & Winter, 2002; Feldman & Pentland, 2003; Peng et al., 2008; Felin, Foss, Heimeriks, & Madsen, 2012). Actions here refer to steps in a process of accomplishing a specific task (i.e., solve a problem or respond to internal or external stimuli) (Zollo & Winter, 2002; Feldman & Pentland, 2003; Miller et al., 2012). Therefore, routines are formed where a group of individuals (i.e. a business unit or a department) attempts to perform a specific task (Zollo & Winter, 2002; Miller et al., 2012). While some tasks occur many times a day (i.e., the installation of a product for customers), some may occur on weekly, monthly, or annual cycle (i.e., high seasons in tourism industry). The frequency and kinds of tasks that a group of individual face reflect its unique operating environment (Miller et al., 2012). Performing a specific task generally requires diagnosing the task's nature and searching for potential actions required to fulfil the task (Nickerson & Zenger, 2004). Such diagnostic and responsive steps often require different people with different skills and experiences that collaborate to perform a task (Grant, 1996; Feldman & Pentland, 2003; Miller et al., 2012).

A capability represents a higher-order routine or a bundle of interrelated routines that provide the capacity to deploy resources to perform a specific task (Krasnikov & Jayachandran, 2008; Felin & Foss, 2009; Helfat & Winter, 2011; Felin et al., 2012). Compared to resources, routines and capabilities are embedded in the interaction of

knowledge and skills of multiple actors (i.e., employees, managers) and are more firm-specific, idiosyncratic, and less transferable (Barney, 1991; Amit & Schoemaker, 1993; Grant, 1996; Teece, Pisano, & Shuen, 1997; Atuahene-Gima, 2005; Schreyögg & Kliesch-Eberl, 2007; Peng et al., 2008; Morgan, Vorhies, & Mason, 2009). Therefore, routines and capabilities provide a better explanation for performance differences across firms (Atuahene-Gima, 2005; Krasnikov & Jayachandran, 2008; Vorhies et al., 2009; Ngo & O'Cass, 2012).

The review conducted of the RBV literature indicates that a capability should have five primary characteristics: (1) a capability has a specific purpose, (2) a capability is a bundle of interrelated routines, (3) a capability enables recognisable and repeated performance of a task (or an activity), (4) a capability is a collective rather than an individual-level phenomena, and (5) a capability has a specific performance outcome (see Barney, 1991; Amit & Schoemaker, 1993; Winter, 2000; Feldman & Pentland, 2003; Newbert, 2007; Felin & Foss, 2009; Helfat & Winter, 2011; Felin et al., 2012).

March (1991) has been identified as the first researcher to conceptualise exploration and exploitation as the firm's capabilities. He conceptualises exploitation as the refinement and extension of existing capabilities and exploration as the experimentation with new alternatives (p. 85). March (1991) explains that exploration and exploitation represent two forms of learning activities that are originated from the interaction among individuals (i.e., employees and managers) within two distinctive groups, "one consisting of individuals who learn rapidly from the code" and "the other consisting of individuals who learn slowly" (March, 1991, p. 76). In line with RBV literature and organisational capability (e.g., Grant, 1996; Feldman & Pentland, 2003; Miller et al., 2012), March (1991) argues that collaboration among individuals across these two distinctive groups provides the capacity to refine existing routines and experiment new alternatives. According to March:

“As the beliefs of individuals and the code converge, the possibilities for improvement in either decline. Once a knowledge equilibrium is achieved, it is sustained indefinitely. The beliefs reflected in the code and those held by all individuals remain identical and unchanging, regardless of changes in reality. Even before equilibrium is achieved, the capabilities for change fall below the rate of change in the environment.” (March 1991, p. 80)

Building on March (1991), many researchers conceptualise exploratory and exploitative capabilities as different forms of organisational learning (e.g., Atuahene-Gima, 2005; Jansen, Van Den Bosch, & Volberda, 2006; Yalcinkaya, Calantone, & Griffin, 2007; Vorhies, Orr, & Bush, 2011; Yannopoulos, Auh, & Menguc, 2012). For instance, Benner and Tushman (2003, p. 679) define exploitative innovations as “improvements in existing components and build on the existing technological trajectory”, whereas exploratory innovation pertains to “a shift to a different technological trajectory”. According to Atuahene-Gima (2005, p. 62), exploration refers to “the tendency of a firm to invest resources to acquire entirely new knowledge, skills, and processes”, while exploitation is “the tendency of a firm to invest resources to refine and extend its existing product innovation knowledge, skills, and processes”. Although the conceptualisation of the exploratory and exploitative capabilities as different types of organisational learning are well documented, the causal effects of these capabilities with respect to the firm’s performance are subject to ambiguity. As March (1991, pp. 83-84) notes:

“Learning processes do not necessarily lead to increases in both average performance and variation, however. Increased knowledge seems often to reduce the variability of performance rather than to increase it. Knowledge makes performance more reliable. As work is standardised, as techniques are learned,

variability, both in the time required to accomplish tasks and in the quality of task performance, is reduced...but knowledge that simultaneously increases average performance and its reliability is not a guarantee of competitive advantage... for example...where time is particularly important, information technology has a major effect on the mean, less on the variance. Some problems in environmental scanning for surprises, changes, or opportunities probably fall into such a category. Under such conditions, appropriate use of information technology seems likely to improve competitive position. On the other hand, in many situations the main effect of information technology is to make outcomes more reliable. For example, additional data, or more detailed analyses, seem likely to increase reliability in decisions more rapidly than they will increase their average returns...the net effect of the improved technology on the chance of avoiding being the worst competitor will be positive, but the effect on the chance of finishing at the head of the pack may well be negative.”

In line with the focus on information technology suggested by March (1991), treating exploratory and exploitative capabilities as different types of organisational learning implies that these capabilities have an indirect effect on the firm's performance. In this sense, learning new knowledge and/or improving existing knowledge can only support other operational capabilities, which in turn help the firm to perform existing and new business activities. Therefore, it is necessary for firms to deploy other operational capabilities to reap the benefits of exploratory and exploitative capabilities (Helfat & Peteraf, 2003; Schreyögg & Kliesch-Eberl, 2007). For instance, Vorhies et al. (2011) use three customer-focused marketing capabilities to explain the links between exploratory and exploitative marketing capabilities and the firm's financial performance. Vorhies et al. (2011) show that exploratory

and exploitative marketing capabilities positively influence customer-focused marketing capabilities, and in turn customer-focused marketing capabilities drive the firm's financial performance. In this sense, exploratory and exploitative marketing capabilities indirectly affect the firm's financial performance through specific operational capabilities.

In contrast to March (1991), some scholars who adopt different underlying theory to conceptualise exploratory and exploitative capabilities as “the presence of learning” or “the absence of learning”, respectively (e.g., Rosenkopf & Nerkar, 2001; Vermeulen & Barkema, 2001; Zollo & Winter, 2002; Katila & Ahuja, 2002, Nerkar & Roberts, 2004; Danneels, 2008). In this sense, exploitative capability represents a first-order capability firms undertake to reuse existing knowledge and perform a specific task, whereas exploratory capability represents a second-order (or higher-order) capability that provides the capacity to learn new knowledge to refine existing first-order capabilities or generate new ones (Zollo & Winter, 2002; Danneels, 2008). For example, Vermeulen and Barkema (2001, p. 459) define exploration as the “search for new knowledge” and exploitation as the “ongoing use of a firm's knowledge base”. Further, Rosenkopf and Nerkar (2001, p. 288) treat exploration as “non-local knowledge search” and exploitation as “local knowledge search”.

Although conceptualising exploratory and exploitative capabilities as the “presence or absence of learning” is grounded in organisational learning theory, this approach is different to March's (1991) conceptualisations in two important ways. First, drawing on March (1991), exploratory and exploitative capabilities represent different types of organisational learning that may simultaneously occur in a domain activity. Given the development of exploratory and exploitative capabilities depend on different type of resources, they may compete for scarce organisational resources within a specific domain (March, 1991). However, treating exploratory and exploitative capabilities as the “presence of or absence of learning” implies that they are two orthogonal capabilities that may occur in different domains (Katila &

Ahuja, 2002, Nerkar & Roberts, 2004). Therefore, they will not compete for scarce organisational resources within a specific domain (Gupta et al., 2006). Second, treating exploratory and exploitative capabilities as the presence or absence of learning implies that these capabilities are orthogonal and occur in different domains of activities. In this sense, exploratory and exploitative capabilities can be complementary (Zollo & Winter, 2002; Nerkar & Roberts, 2004). Therefore, firms can become ambidexterous through managing the complementarity between exploratory and exploitative capabilities rather than managing the relative balance between these two (Zollo & Winter, 2002; Cao et al., 2009).

Although some scholars argue that exploratory and exploitative capabilities can be treated as the presence or absence of learning, researchers who adopt March's (1991) position argue that all capabilities contain a minimum level of learning. In this sense even individuals within a business unit by doing nothing more than replicating the existing routines accumulate experience and knowledge (Gupta et al., 2006). On the other hand, conceptualising exploratory and exploitative capabilities as different forms of organisational learning is subject to significant causal ambiguity with respect to their performance implication and additional capabilities required to reap the benefits of exploratory and exploitative capabilities (Schreyögg & Kliesch-Eberl, 2007). Therefore, the conceptualisation of exploratory and exploitative capabilities as either "different forms of organisational learning" or the "presence or absence of learning" does not provide a sound foundation to explain the role of these capabilities. In parallel to the organisational ambidexterity literature, scholars who adopt dynamic capability theory suggest a different theoretical foundation to conceptualise exploratory and exploitative capabilities. Dynamic capability theorists argue that organisational capabilities can be classified into specific categories: operational and dynamic capabilities. This view is important as the conceptualisation of operational and dynamic capabilities are in many respects similar to exploratory and exploitative capabilities.

Next section presents the review of dynamic capability theory and its similarities with literature on exploratory and exploitative capabilities.

2.3.1.3. Dynamic capability theory

According to dynamic capability theory, organisational capabilities can be classified into two categories: operational and dynamic capabilities. Operational capabilities represent the ongoing deployment of existing routines to perform a specific task (Zollo & Winter, 2002; Cepeda & Vera, 2007; Helfat & Winter, 2011). Dynamic capabilities represent the refinement of existing routines or generation of new routines in response to changes in the operating environment (Teece et al., 1997; Cepeda & Vera, 2007; Ambrosini, Bowman, & Collier, 2009; Dixon, Meyer, & Day, 2010; Helfat & Winter, 2011). Specifically, operational capabilities are those that enable a firm to make a living in the present, while dynamic capabilities involve learning activities that enable a firm to alter how it currently makes its living (Winter, 2000; Rosenkopf & Nerkar, 2001; Vermeulen & Barkema, 2001; Vassolo, Anand, & Folta, 2004; Helfat & Winter, 2011).

According to Eisenhardt and Martin (2000) and Teece (2007), dynamic capabilities are necessary when firms in a turbulent, fast-moving environments may face rigidity and inefficiency in their existing routines in their efforts to respond to environmental changes. In particular, the mere deployment of existing routines may not be enough in highly turbulent markets, “where the strategic challenge is maintaining competitive advantage when the duration of that advantage is inherently unpredictable and time is an essential aspect of strategy” (Eisenhardt & Martin, 2000, p. 1106). In this sense, dynamic capabilities are the means by which firms make new routine configurations as markets emerge, collide, split, evolve, and die (Eisenhardt & Martin, 2000; Luo, 2002; Helfat & Peteraf, 2003; Cepeda & Vera, 2007; Ambrosini et al., 2009; McKelvie & Davidsson, 2009). Therefore, operational

capabilities pertain to reusing existing knowledge to perform a specific task, whereas dynamic capabilities relate to learning new knowledge to refine existing routines or generate new routines (Helfat & Peteraf, 2003; Helfat & Winter, 2011). This view of operational and dynamic capabilities appears to be consistent with defining exploratory and exploitative capabilities as “the presence or the absence of learning”, where dynamic capabilities represent the presence of learning and operational capabilities reflect the absence of learning.

On the other hand, conceptualising dynamic capabilities as the refinement of existing routines or generation of new routines implies that they can be decomposed into two types: incremental dynamic capabilities and renewing dynamic capabilities (Ambrosini et al., 2009). Where incremental dynamic capabilities focus on the modification of existing routines, renewing dynamic capabilities pertain to the generation of new routines (Ambrosini et al., 2009). This view of dynamic capabilities appears to be consistent with defining exploratory and exploitative capabilities as “different types of learning”, where dynamic capabilities represent the exploratory form of learning and operational capabilities reflect the exploitative form of learning. Therefore, there is a lack of clarity in dynamic capability theory about whether operational and dynamic capabilities are “different forms of organisational learning” or the “presence or absence of learning”.

Recent advances in dynamic capability theory suggest that while dynamic and operational capabilities differ in their purposes and intended outcomes, it is impossible to distinguish them for several reasons (Zollo & Winter, 2002; Schreyögg & Kliesch-Eberl, 2007; Teece, 2007; Helfat & Winter, 2011). First, dynamic capabilities are often subject to significant causal ambiguity with respect to their performance implication (Zollo & Winter, 2002). “Dynamic capabilities do not directly affect output for the firm in which they reside, but indirectly contribute to the output of the firm through an impact on operational capabilities” (Helfat & Peteraf, 2003, p. 999). In this sense, dynamic and operational

capabilities should occur simultaneously to affect a firm's (or a business unit) performance. Second, operational capabilities contain a minimum level of learning, as even individuals within a business unit by doing nothing more than replicating the existing routines accumulate experience and knowledge (Gupta et al., 2006). Third, some capabilities can be used for both operational and dynamic purposes (Luo, 2002; Helfat & Winter, 2011).

In this sense, a capability can be (or possess a) dual-purpose (i.e., both operational and dynamic purposes), as a group of individuals (i.e., managers and employees within a firm or a business unit) may encompass different knowledge, skills, and experiences to diagnose environmental changes and search for potential solutions to respond to environmental changes. Zollo and Winter (2002, pp. 341-342) assert that "by sharing their individual experiences and comparing their opinions with those of their colleagues, organisation members can achieve an improved level of clarity between the actions required to execute a certain task and the performance outcomes produced". In effect, interactions among individuals provide the capacity to refine existing routines and/or to generate new routines to perform a specific task or respond to environmental changes (Zollo & Winter, 2002). Therefore, a capability can be dual-purpose, when it encompasses both learning and non-learning routines (Schreyögg & Kliesch-Eberl, 2007; Helfat & Winter, 2011). In other words, a capability can be characterised as operational and dynamic simultaneously, when it provides the capacity to perform a specific task through refinement of existing routines or generation of new routines (Schreyögg & Kliesch-Eberl, 2007). This position is consistent with research arguing that an operational capability can be dynamic, and it can be clearly seen in the work of Vorhies (1998), Luo (2002), Schreyögg and Kliesch-Eberl (2007), Morgan et al. (2009), and Helfat and Winter (2011).

In conclusion, this section reviewed the theoretical perspectives regarding the conceptualisation of the exploratory and exploitative capabilities using the organisational

ambidexterity and dynamic capability perspectives, respectively. These theoretical perspectives provide the foundation to conceptualise exploratory and exploitative capabilities in Chapter Three. The following section presents a review of the literature on the operationalisation of organisational ambidexterity.

2.3.2. Operationalisation of organisational ambidexterity

While the importance of organisational ambidexterity is now well accepted, achieving organisational ambidexterity is a challenging task (He & Wong, 2004; Gupta et al., 2006; Raisch & Birkinshaw, 2008; Andriopoulos & Lewis, 2009; Jansen, Tempelaar, Bosch, & Volberda, 2009). In practice, few firms may succeed at managing organisational ambidexterity, because exploration and exploitation are fundamentally different logics and rely on inconsistent and somewhat contradictory centres of attention. As March (1991, p. 73) notes:

“What is good in the long run is not always good in the short run. What is good at a particular historical moment is not always good at another time. What is good for one part of an organisation is not always good for another part. What is good for an organisation is not always good for a larger social system of which it is a part. As organisations learn from experience how to divide resources between exploitation and exploration, this distribution of consequences across time and space affects the lessons learned. The certainty, speed, proximity, and clarity of feedback ties exploitation to its consequences more quickly and more precisely than is the case with exploration. The story is told in many forms. Basic research has less certain outcomes, longer time horizons, and more diffuse effects than does product development. The search for new ideas, markets, or relations has

less certain outcomes, longer time horizons, and more diffuse effects than does further development of existing ones.”

The point raised by March (1991) indicates that exploration and exploitation are different in many important ways. To pick up on this point, an examination of the differences between exploration and exploitation is outlined in Table 2.5 based on the work of March (1991), Rosenkopf and Nerkar (2001), Benner and Tushman (2003), He and Wong (2004), Smith and Tushman (2005), Raisch and Birkinshaw (2008), and Siren et al. (2012). In particular, exploration encompasses things characterised by terms such as search, discovery, generation, experimentation, and embracing variation. Exploitation involves terms such as refinement, implementation, increasing efficiency, control, and selection. From the structural perspective, the pursuit of exploration relies on organic and decentralised organisation design, while exploitation depends on bureaucratic and centralised organisation design (Smith & Tushman, 2005). In terms of the performance implication, exploration results in enhancing the level of knowledge breadth, radical innovation, and long-term and unpredictable financial performance (He & Wong, 2004; Morgan & Berthon, 2008). Whereas, exploitation leads to improving the level of knowledge depth, incremental innovation, and short term and certain financial performance (He & Wong, 2004; Morgan & Berthon, 2008).

Table 2.5 – Differences between exploration and exploitation

Characteristic	Exploration	Exploitation
Centre of Attention	Search, discovery, generation, experimentation, and embracing variation	Refinement, implementation, increasing efficiency, control, and selection
Stimulus	Stresses discontinuous proactive changes	Stresses continuous reactive changes
Objective Scope	Long-term	Short-term
Structural Type	Organic and decentralised design	Bureaucratic and centralised design
Corporate-level Scope	Enter new product-market domains	Strengthen existing product-market positions
Business-level Scope	Generate new routines	Refine existing routines
Knowledge Outcome	Expand the breadth of knowledge beyond the extant learning boundaries	Expand the depth of knowledge within the existing learning boundaries
Innovation Outcome	Radical innovation	Incremental innovation
Financial Outcome	Long-term and unpredictable	Short-term and certain

Given the contradictory nature of exploration and exploitation, the synchronous pursuit of exploration and exploitation may raise critical organisational tensions such as the conflicts across managers and operational employees within a firm or a business unit that result in negative outcomes (March, 1991; Tushman, 1997; Gibson & Birkinshaw, 2004; He & Wong, 2004; Simsek, 2009). According to Andriopoulos and Lewis (2009), a firm becomes ambidextrous when these tensions are managed well. It has been suggested that managing these tensions depends on the extent that exploration and exploitation are treated as competing or complementary forces (Gupta et al., 2006; Cao et al., 2009).

The first approach pertains to treating exploration and exploitation as competing forces (e.g., March, 1991; Benner & Tushman, 2003; Siggelkow & Levinthal, 2003; Auh & Menguc, 2005; Morgan & Berthon, 2008; Hughes et al., 2010; Vorhies et al., 2011; Siren et al., 2012). In this approach, the trade-off between exploration and exploitation is seen as unavoidable for several reasons. First, exploration and exploitation compete for scarce organisational resources (i.e., funds, knowledge, employees, and machineries). Therefore,

over-investing in exploration implies fewer resources left for exploitation, and vice versa (Smith & Tushman, 2005; Gupta et al., 2006). Second, exploration and exploitation are iteratively self-reinforcing (He & Wong, 2004; Kyriakopoulos & Moorman, 2004; Gupta et al., 2006). In particular, exploration often leads to failure, which in turn promotes the search for even newer ideas and thus more exploration (or over-exploration). In this sense, overemphasis on exploration results in “failure trap”, failing to achieve appropriate returns from costly search and experimentation activities (Kyriakopoulos & Moorman, 2004; Gupta et al., 2006). On the other hand, exploitation often leads to early success, which in turn reinforces further exploitation (or over-exploitation). In this sense, overemphasis on exploration results in “core-rigidity”, the inability to adapt to environmental changes and stimulate organisational renewal (Zollo & Winter, 2002; Kyriakopoulos & Moorman, 2004). Overall, the trade-off between exploration and exploitation reflects an imbalance between these two, which increases the firm’s susceptibility to performance-impairing risks of failure-trap and core-rigidity (Gupta et al., 2006; Andriopoulos & Lewis, 2009; Cao et al., 2009). In this sense, March (1991) suggests that achieving a balance between exploration and exploitation enables a firm to better manage such performance-impairing risks. This theoretical contention captures the notion of balanced ambidexterity, which refers to the extent that a firm places equal emphasis on the pursuit of exploration and exploitation (March, 1991; Cao et al., 2009). According to Cao et al (2009), balanced ambidexterity is most appropriate for firms with limited available resources (i.e., tangible resources such as fund, employees, machineries, and lands) (see also Gupta et al., 2006).

The second approach characterises exploration and exploitation as complementary forces (e.g., Adler et al., 1999; Katila & Ahuja, 2002; Nickerson & Zenger, 2004; Lubatkin, Simsek, Ling, & Veiga, 2006; Atuahene-Gima & Murray, 2007; Sarkees et al., 2010; Jansen, Simsek, & Cao, 2012). In this approach, exploration and exploitation are seen as inherently

two orthogonal (or independent) phenomena that occur in different domains. When exploration and exploitation are built of orthogonal resources and routines (i.e., resources and routines from different domains of activities such as creating a product versus marketing that product), the conflicts coming from scarcity of resources and routines become negligible (Gupta et al., 2006; Cao et al., 2009). Therefore, achieving a balance between exploration and exploitation is not necessary to minimise performance-impairing risks. Instead, exploration and exploitation complement each other as the benefits gained from exploration increases with the contribution of exploitation and *vice versa* (Boumgarden, Nickerson, & Zenger, 2012). Specifically, pursuing exploitation can enhance the effectiveness of exploration, because the repeated deployment of existing routine results in a deeper understanding of the functionality of those routines. Such a deeper understanding enables reconfiguration of existing routines which results in the generation of new routines (Cao et al., 2009; Boumgarden et al., 2012). Alternatively, pursuing exploration complements exploitation as it leads to a higher level of absorptive capacity, which provides a greater foundation to exploit the new absorbed knowledge (Cohen & Levinthal, 1990; Boumgarden et al., 2012). When exploration and exploitation are orthogonal and complementary, ambidexterity can be achieved through the management of their complementarity, rather than the management of the balance between the two (see Katila & Ahuja, 2002; Cao et al., 2009). This captures the notion of combined ambidexterity, which represents the extent that a firm maximises the attainment of both exploration and exploitation and combines these two forces together. According to Cao et al (2009), combined ambidexterity is most appropriate for firms with strong asset bases and available external resources (i.e., bank loans, partners, and suppliers).

Although the issue and outcomes of both balanced and combined ambidexterity are well documented, the examination of Table 2.3 indicates that He and Wong (2004), Lubatkin et al. (2206), and Cao et al (2009) empirically test and compare the performance implications

of these two approaches. He and Wong (2004) suggest two statistical approaches to operationalise balanced (or fit as matching) and combined (or fit as moderating) ambidexterity. However, they do not examine the performance implications of balanced and combined ambidexterity based on different contingencies (i.e., organisational or environmental characteristics). Lubatkin et al. (2006) show that balanced and combined approaches have less explanatory power compared to the summation of exploration and exploitation. However, the approach suggested by Lubatkin et al. (2006) to operationalise ambidexterity (namely the additive approach) suffers lack of clarity regarding the extent that (a) whether exploration and exploitation are competing or orthogonal forces and (b) why excelling at both exploration and exploitation may raise organisational tensions that result in negative outcomes. Cao et al. (2009) extend the work of He and Wong (2004) showing that the balanced ambidexterity is more beneficial than the combined ambidexterity, where organisational resources (i.e., tangible resources such as fund, employees, machineries, lands) are limited and external resources (i.e., environmental munificence) are not available. Beyond this point, there exists a lack of clarity regarding the appropriate organisational paths that support pursuing balanced and combined ambidexterity (see Gassmann et al., 2012), as well as validating the performance implication of these approaches based on different contingencies (i.e., high vs. low environmental turbulence, market-driver vs. market-driven firms).

In conclusion, the balanced and combined ambidexterity represents two different approaches to operationalise the extent that firms synchronously (or simultaneously) engage in both exploration and exploitation (He & Wong, 2004; Gupta et al., 2006; Cao et al., 2009). Although it has been argued these approaches might be beneficial for different organisational and environmental conditions (Gupta et al., 2006; Cao et al., 2009), this argument has not been fully explored and empirically validated within the organisational ambidexterity

literature yet. After an extensive review and analysis of literature regarding the nature and operationalisation of organisational ambidexterity in Sections 2.2 and 2.3, the next section presents the extensive review and analysis of literature regarding the outcomes of organisational ambidexterity.

2.3.3. Outcomes of organisational ambidexterity

Theoretically, it is possible to identify a number of consequences for achieving organisational ambidexterity. In particular, scholars who adopt the realised theoretical view commonly use market-based and financial performance indicators as the outcomes of organisational ambidexterity (Gupta et al., 2006; Raisch & Birkinshaw, 2008; Sarkees et al., 2010). The general agreement among this body of work is that firms capable of synchronising exploitation and exploration are more likely to achieve superior performance compared to firms emphasising one at the expense of the other (Gibson & Birkinshaw, 2004; He & Wong, 2004; Lubatkin et al., 2006; Cao et al., 2009; Raisch et al., 2009). For example, Cao et al. (2009) find that the relative balance between exploitative and exploratory innovation strategies is positively related to firm performance (couched in terms of sales growth, profit growth, market share growth, operational efficiency, revenue, and market reputation). He and Wong (2004) show that the relative imbalance between exploitative and exploratory innovation strategies is negatively related to sales growth rate.

As shown in Tables 2.4 and 2.5, the selected articles employ different performance indicators to measure outcomes of exploration, exploitation, and their synchronicity such as firm performance (e.g., He & Wong, 2004; Morgan & Berthon, 2008; Vorhies et al., 2011; Siren et al., 2012), new product performance (e.g., Kyriakopoulos & Moorman, 2004; Kim & Atuahene-Gima, 2010; Lisboa et al., 2011; Yannopoulos et al., 2012), business unit performance (e.g., Jansen et al., 2009), and innovation performance (i.e., the number of

innovations) (Sarkees et al., 2010). An examination of Table 2.4 and 2.5 indicates that no research uses multiple performance indicators (i.e., both business unit and firm performance) to measure the outcomes of exploration, exploitation, and their synchronicity. As discussed in Section 2.2.3, using multiple performance indicators may advance understanding about the outcomes of organisational ambidexterity at multiple levels of analysis (i.e., business-unit and corporate levels). Importantly, there is still a lack of clarity about the extent that exploration, exploitation, and their synchronicity affect multiple performance indicators across multiple levels of analysis (i.e., business-unit and corporate levels). To gain further insight about different performance indicators, Sections 2.4.1 and 2.4.2 review the literature on firm performance and new product performance as two prominent outcomes of organisational ambidexterity.

2.3.4. Firm performance

The term “firm” represents a black box with specific boundaries that receives specific inputs (i.e., raw materials, human) to produce specific outcomes (i.e., goods and/or services) (Coase, 1937; Jensen & Meckling, 1976). The production of goods and/or services that create value for customers is the primary pursuit of a firm (Sirmon, Hitt, & Ireland, 2007; O'Cass & Ngo, 2011a). Such value creation occurs when a firm exceeds its competitors' ability to meet customer needs (Spanos & Lioukas, 2001; Othman & Sheehan, 2011). In this sense, firm performance reflects a firm's efforts to create and deliver superior value to customers (Slater & Narver, 1994; Langerak et al., 2004; Murray, Gao, & Kotabe, 2011). According to Richard et al. (2008), firm performance is the ultimate dependent variable of interest for researchers and practitioners concerned with evaluating a firm's strategies, resources, capabilities, and actions.

Although firm performance dominates the broad areas of research in areas such as marketing and management, it is considered as one of the indicators of organisational effectiveness in economics, finance, and accounting. Organisational effectiveness is broader and captures: “firm performance plus the plethora of internal performance outcomes...and other external measures that relate to considerations that are broader than those simply associated with economic valuation, such as corporate social responsibility” (Richard et al., 2009, p. 722). Marketing and management have taken a more limited focus and typically measure firm performance using five groups of indicators: (1) financial (i.e., profitability, return on investment), (2) market-based (i.e., sales, market share), (3) shareholder return (i.e., total shareholder return), (4) customer-based (i.e., customer satisfaction), and (5) innovation-based (i.e., number of patents) (Langerak et al., 2004; Richard et al., 2009; Rothaermel & Alexandre, 2009; Sarkees et al., 2010).

Researchers typically adopt three approaches to measure firm performance. The first approach is to use a single performance indicator to examine the impact of a specific construct (e.g., He & Wong, 2004). The second approach utilises orthogonal indicators by conducting separate analyses with an identical construct and different performance indicators (e.g., Sarkees et al., 2010). The third approach recommends an aggregation of multiple performance indicators to examine the impact of a specific construct (e.g., Rothaermel & Alexandre, 2009). Among these approaches, using the second and third approaches is recommended for studies investigating the effect of different factors (i.e., exploration and exploitation) on firm performance, where each construct may affect firm performance through different paths (Richard et al., 2009; Devinney et al., 2010).

Performance indicators can be measured using objective data (i.e., amount of sales, profitability, and return on investment) and subjective managerial perceptions (Rindfleisch & Moorman, 2001; Richard et al., 2009; Blindenbach-Driessen, van Dalen, & van den Ende,

2010; Vorhies et al., 2011). While objective measures may be preferable, they are difficult to acquire because: (a) objective measures are often not possible to obtain because of confidentiality and (b) objective measures are hard to interpret (Rindfleisch & Moorman, 2001; Blindenbach-Driessen et al., 2010). Therefore, asking for objective measures may decrease response rates and the quality of responses (Blindenbach-Driessen et al., 2010). Subjective measures are generally easier to acquire and it has been acknowledged that managerial perceptions are generally consistent with objective measures of performance (Rindfleisch & Moorman, 2001; Sarkees et al., 2010).

2.3.5. Product performance

The term “product” in the Product Development Management Association’s (PDMA) glossary represents “a bundle of attributes (i.e., features, functions, benefits, and uses) and can be either tangible, as in the case of a physical good, or intangible, as in the case of those associated with service benefits, or can be a combination of the two” (Kahn, 2004; Crawford & Di Benedetto, 2006). The term “new product” represents a product that encompasses minimum levels of newness to the firm and/or customers (Atuahene-Gima, 1995; Griffin & Page, 1996; Crawford & Di Benedetto, 2006). This definition implies that a product can be considered as “new” from two perspectives, firm and customer (Atuahene-Gima, 1996; Danneels, 2002; Calantone, Chan, & Cui, 2006; Zhou & Nakamoto, 2007). Product newness from the firm perspective refers to the degree of difference between routines and resources required to develop and market a product and those already employed by the firm to develop and market its existing products (Atuahene-Gima, 1995; Calantone et al., 2006). Product newness from the customer perspective refers to the extent to which a product is different with the customer’s experiences and consumption patterns (Atuahene-Gima, 1995; Calantone et al., 2006).

Premised on a product's newness from the firm and customer perspectives, Griffin and Page (1996) classify new products into six categories: new to the world, new to the firm, product improvement, line extension, cost reduction, repositioning. As shown in Figure 2.1, new to the world and new to the firm categories encompass the maximum level of newness to the firm, product improvement and line extension categories contain the medium level of newness to the firm, and cost reduction and repositioning categories encompass the minimum level of newness to the firm. According to Griffin and Page (1996), new to the world products are new to both the firm and customers (i.e., Apple iPod in 2001); new to the firm products are ones that allow a firm to enter an established market (i.e., Amazon Kindle Fire in 2011); line extension products are ones that supplement the established product lines (i.e., BMW Series 3 Coupe in 2007); product improvement category pertains to existing products with improved performance or updated features (i.e., Apple iPhone 4 in 2010); cost reduction products are existing product with the same performance and features at a lower price (i.e., lean production systems in Toyota); and, repositioning products are existing products that allow a firm to enter new markets or market-segments (i.e., the introduction of iPhone in New Zealand in 2008).

Figure 2.1 – New product categories

		Newness to Customers		
		Low		High
Newness to the Firm	High	New to the firm		New to the world
		Product Improvement	Line extension	
	Low	Cost Reduction	Repositioning	

Adopted from Griffin and Page (1996)

As noted in Section 2.3.4, the primary pursuit of a firm is to create value for customers (Conner, 1991; Sirmon et al., 2007; O'Cass & Ngo, 2011a). This pursuit according to some scholars depends on the firms' ability to develop and market new products successfully (Calantone, Schmidt, & Song, 1996; Henard & Szymanski, 2001; Sorescu et al., 2003; Langerak et al., 2004; Leenders & Wierenga, 2008; Rodríguez-Pinto, Carbonell, & Rodríguez-Escudero, 2011). In this sense, product performance represents the ultimate outcome of a firm's efforts to develop and market a new product successfully (Griffin & Page, 1993; Griffin, 1997; Blindenbach-Driessen et al., 2010), and it has been considered as one of the main determinants of firm performance (Montoya-Weiss & Calantone, 1994; Griffin, 1997; Hultink, Griffin, Robben, & Hart, 1998; Frambach, Prabhu, & Verhallen, 2003; Langerak et al., 2004; Rodríguez-Pinto, Carbonell, & Rodríguez-Escudero, 2011). The current conceptualisation of new product performance in the literature is largely premised on the work of Griffin and Page (1993), Griffin (1997), and Langerak et al. (2004). Drawing on Langerak et al. (2004), new product performance presents the extent that a new product achieves market success compared to competing products. This conceptualisation appears to be applicable to all forms of new products (i.e., new to the world, new to the firm, product improvement, line extension, cost reduction, repositioning). For instance, Calantone et al. (2006) employ the same definition and measurement to examine the performance of 451 new product development projects comprising different levels of newness to the firm and customers.

2.4. Conclusion

This chapter presented an extensive review and analysis of the literature on organisational ambidexterity. This provides a theoretical setting for further investigation regarding the

extent that firms become ambidextrous and the extent that the organisational ambidexterity drives the performance of a firm, a business unit, and/or a product.

In particular, Section 2.2 presented an analytical classification of the literature on organisational ambidexterity in terms of the research type, theoretical perspectives, research focus, and level of analysis. This analytical classification was based on an extensive review of 56 articles. In addition, Section 2.2.3 presented an extensive review of studies that adopt the realised perspective as their theoretical foundation. This section reveals that there is a lack of clarity in the literature about:

- a) The extent that the interaction across multiple organisational levels enables a firm become ambidextrous;
- b) The extent that firms become ambidextrous across multiple functional areas and the extent that such ambidexterity results in superior performance outcomes (i.e., firm performance, new product performance);
- c) The extent that the pursuit of balanced and combined approaches to ambidexterity are more beneficial; and,
- d) The extent that exploration, exploitation, and their synchronicity affect multiple performance indicators across multiple levels of analysis (i.e., business-unit and corporate levels).

To advance understanding about the extent that scholars adopt the realised perspective to investigate the antecedents, nature, and outcomes of organisational ambidexterity, Section 2.3 presented the review of constructs being used in the articles identified in Table 2.3. This section encompassed three subsections. Section 2.3.1 presented the review of the conceptualisation of the exploration and exploitation as the firm's strategies and capabilities. Section 2.3.2 presented the review of the operationalisation of organisational ambidexterity. In particular, Section 2.3.2 reviewed studies that adopt the balanced ambidexterity and/or the

combined ambidexterity as their approach to operationalise the synchronicity of exploration and exploitation. Section 2.3.3 presented the review of the outcomes of organisational ambidexterity. This section placed a specific attention on firm performance and product performance as two dominant performance indicators of organisational ambidexterity at the corporate and business levels of the firm, respectively.

Premised on the review of literature provided in this chapter, Chapter Three advances a theoretical framework, and theorises about the interrelations among exploratory and exploitative strategies, exploratory and exploitative capabilities, new product performance, established product performance, and firm performance as the constructs of interests.

Chapter Three

Theory Development & Hypotheses

3.1. Introduction

The literature review undertaken in Chapter Two provides the background for theory building and hypotheses development. The primary purpose of Chapter Three is to develop a theoretical framework and hypotheses that address the research questions posed in Chapter One by using the literature presented in Chapter Two. This chapter draws on the literature on the realised perspective of organisational ambidexterity, strategy implementation, and dynamic capability and places the work within the context of product development. In particular, the theoretical framework developed for this study focuses on the extent to which firms can achieve organisational ambidexterity when they have the capacity to synchronise exploration and exploitation across multiple organisational levels, multiple functional areas, and multiple product development projects.

Chapter Three is structured as follows. First, Section 3.2 articulates the relationships between corporate-level strategies, business-level capabilities, and product performance using an ambidexterity lens. Section 3.3 explains the extent to which the implementation of exploratory and exploitative strategies enhance new product and established product⁵ performance. Section 3.4 articulates the extent to which the interaction between ambidexterity across corporate and business levels of the firm enhances new product,

5. In this study, a new product is the product that a firm has launched in the previous 12 months. Further, an established product is the product that a firm has marketed for three or more years.

established product performance, leading to the firm's ultimate performance. Finally, Section 3.5 concludes this chapter.

3.2. Model development

The central logic of the theoretical framework development is that organisational ambidexterity is not limited to a single organisational level (Simsek, 2009; Cantarello et al., 2012), or a specific functional area (Lisboa et al., 2011; Rubera et al., 2012), or a single product (Tripsas & Gavetti, 2000; Smith & Tushman, 2005; Sarkees & Hulland, 2009). Instead, organisational ambidexterity transcends the interactions between corporate-level exploratory and exploitative strategies and business-level exploratory and exploitative capabilities (Cantarello et al., 2012), as well as the interactions between different functional areas such as research-and-development (R&D) and marketing (Lisboa et al., 2011; Rubera et al., 2012). This transcendence enables firms to become truly ambidextrous and represents a fuller delineation of the synchronicity required to develop and market a product. In addition, ambidextrous firms can achieve superior financial performance when they manage the continuous generation of new products, as well as improving the ongoing performance of their established products (Smith & Tushman, 2005; Sarkees et al., 2010).

Following this line of reasoning, corporate-level exploratory and exploitative strategies, business-level exploratory and exploitative R&D and marketing capabilities, new product and established product performance, and firm performance are considered as the basic components (or constructs of interest) to develop the theoretical framework for this study. Table 3.1 presents the definition of constructs of interest used in this study.

As shown in Table 3.1, firm performance and product performance are two prominent performance indicators of organisational ambidexterity at the corporate- and business-level of the firm, respectively. According to Richard et al. (2009), firm performance is the ultimate

dependent variable of interest for scholars to evaluate the outcomes of a firm's strategies and capabilities. In this study, firm performance reflects a firm's effort to develop and market products (i.e., new and established product) that create and deliver superior value to customers and achieve its overall financial, market, and customer-based goals (Langerak et al., 2004; Richard et al., 2009; Shea et al., 2012).

Product performance represents a micro-level (i.e., project or business level) performance indicator of the effects of a firm's strategies and capabilities with respect to a specific product development project. In this sense, new product and established product performance are the performance indicators of different product development projects. In this study, the term new product(s) is set within the context of a product that has been launched in the previous 12 months (1 year old) and encompasses "new to the world" and "new to the firm" categories in the Griffin and Page's (1996) new product category matrix (Chapter Two, Section 2.3.5, Figure 2.1, p. 62). The term established product(s) is a product that has been marketed for three or more years and encompasses "product improvement", "line extension", "cost reduction", and "repositioning" categories in the Griffin and Page's (1996) new product category matrix. Given that new and established products represent different forms of new product category matrix suggested by Griffin and Page's (1996), this study adopts the same performance indicators to measure new product and established product performance. In this sense, new product and established product performance reflect a firm's efforts to achieve specific goals set by the firm in terms of sales, sales growth, market share, return on investment, profitability, development costs, customer satisfaction, and customer loyalty (Griffin & Page, 1993; Langerak et al., 2004) those respective products.

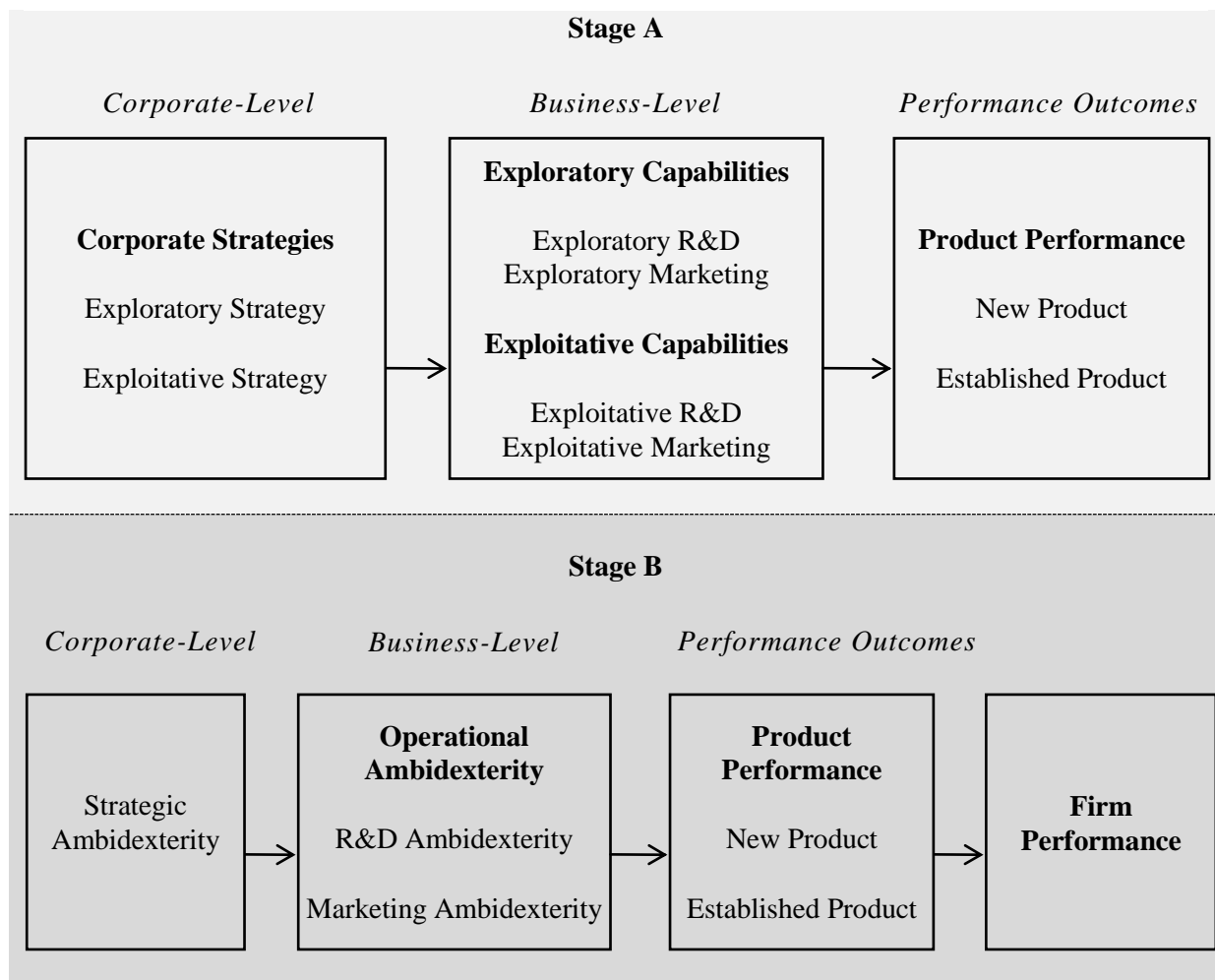
Table 3.1 – Differences between exploration and exploitation

Construct	Definition
Ambidexterity at the corporate-level of the firm (Strategic Ambidexterity)	
Strategic ambidexterity represents the synchronous pursuit of exploratory and exploitative strategies (Gupta et al., 2006; Judge & Blocker, 2008).	
Exploratory strategy	represents the firm's emphasis on new product-market opportunities, new and innovative products, and emerging customer needs (He & Wong, 2004; Siren et al., 2012).
Exploitative strategy	represents the firm's emphasis on the existing product-market opportunities, automation and productivity of existing operations, and existing customer needs (He & Wong, 2004; Siren et al., 2012).
Ambidexterity at the business-level of the firm (Operational Ambidexterity)	
Operational ambidexterity represents the synchronous deployment of exploratory and exploitative capabilities (Gupta et al., 2006; Raisch et al., 2009).	
Exploratory R&D	represents the generation and deployment of new R&D routines to physically develop a product (He & Wong, 2004; Atuahene-Gima, 2005; Jansen et al., 2005; Danneels, 2008).
Exploitative R&D	represents the refinement and deployment of existing R&D routines to physically develop a product (Atuahene-Gima, 2005; Jansen et al., 2005; Peng et al., 2008; Lisboa et al., 2011).
Exploratory marketing	represents the generation and deployment of new marketing routines to link a product to customers (Kyriakopoulos & Moorman, 2004; Atuahene-Gima, 2005; Danneels, 2008).
Exploitative marketing	represents the refinement and deployment of existing marketing routines to link a product to customers (Kyriakopoulos & Moorman, 2004; Atuahene-Gima, 2005; Lisboa et al., 2011).
Product Performance	
New Product Performance	represents the extent that a new product achieves market success compared to competing products over the past year. Market success is related to the goals set by the firm in terms of sales, sales growth, market share, return on investment, profitability, development costs, customer satisfaction, and customer loyalty (Griffin & Page, 1993; Langerak et al., 2004).
Established Product Performance	represents the extent that an established product achieves market success compared to competing products over the past year. Market success is related to the goals set by the firm in terms of sales, sales growth, market share, return on investment, profitability, development costs, customer satisfaction, and customer loyalty (Griffin & Page, 1993; Langerak et al., 2004).
Ultimate performance outcome	
Firm Performance	represents the extent that a firm achieves its overall financial, market, and customer-based goals over the past year (Langerak et al., 2004; Richard et al., 2009).

Premised on constructs of interest shown in Table 3.1, Figure 3.1 presents the theoretical framework developed for this study, namely the “Synchronised Multi-level - Multi-unit Ambidexterity framework”. As shown in Figure 3.1, this theoretical framework

encompasses two distinctive stages, Stage A and B. Stage A pertains to the extent that the implementation of corporate-level exploratory and exploitative strategies influence a firm's new product and established product performance, respectively. This stage underscores the implementation roles of exploratory and exploitative R&D and marketing capabilities at the business-level of the firms. Stage B pertains to the extent that synchronising the pursuit and implementation of exploratory and exploitative strategies drive a firm's new product performance, established product performance, and ultimate performance. This stage underscores the implementation roles of two forms of operational ambidexterity (i.e., R&D and marketing ambidexterity) at the business-level of the firm. Specifically, Stage A emphasises the independent performance-outcomes of exploratory and exploitative strategies, whereas Stage B focuses the extent that a firm synchronously pursues and implements exploratory and exploitative strategies.

Figure 3.1– The synchronised multi-level - multi-unit ambidexterity framework



The following sections articulate the theory development leading to the hypotheses related to Stage A (Section 3.3, hypotheses 1 to 4) and Stage B (Section 3.4, hypotheses 5 to 8).

3.3. The implementation of exploratory and exploitative strategies

Understanding what produces heterogeneity in firm performance is a central theme in the research of many scholars in fields such as management and marketing. The literature on this research theme argues that the extent to which firms form and implement their strategies can explain performance differences among firms (Porter, 1985; Slater & Olson, 2001; Homburg et al., 2004; Olson et al., 2005a; Olson, Slater, & Hult, 2005b; Vorhies et al., 2009). Recently,

some scholars have argued that even with a sound strategy, firms are often unsuccessful due to poor strategy implementation (Love et al., 2002; Vorhies & Morgan, 2003; Olson et al., 2005b). Indeed, corporate strategies may not drive firm performance unless appropriate capabilities are developed and deployed at the business-level of the firm (see DeSarbo et al., 2005; Vorhies et al., 2009). Drawing on Homburg et al. (2004), a capability provides the capacity to implement a specific corporate-level strategy, when it intervenes between strategy and performance. In this sense, that capability plays a mediational role in the relationship between strategy and performance (see also the discussion related to "fit-as-mediation" in Venkatraman, 1989). This mediation effect implies that the relationship between strategy and performance is more complex than a simple bivariate relationship (see Fairchild & MacKinnon, 2009; Siren et al., 2012). Instead of demonstrating the existence of a relationship between the independent variable (i.e., a corporate strategy) and outcome variable (i.e., a product performance), the mediation effect explains the mechanism(s) by which an effect between two variable operates (Hayes, 2012). Hence, focusing on the mediational effects of business-level exploratory and exploitative R&D and marketing capabilities can articulate the extent that corporate-level exploratory and exploitative strategies influence a product's performance (see also Homburg et al., 2004; Siren et al., 2012).

As noted in Table 3.1, exploratory strategy represents the firm's emphasis on new product-market opportunities, new and innovative products, and emerging customer needs. Exploitative strategy emphasise the existing product-market opportunities, automation and productivity of existing operations, and existing customer needs (He & Wong, 2004; Kyriakopoulos & Moorman, 2004; Morgan & Berthon, 2008; Cao et al., 2009; Siren et al., 2012). Firms pursue exploratory strategy to pro-actively capitalise on emerging market opportunities and the need for new solutions and benefits beyond those provided by existing products in the market (He & Wong, 2004; Morgan & Berthon, 2008). However, exploratory

strategy is associated with higher costs and the risk of failure in the experimentation of new product-market opportunities and their payoff being uncertain (Gupta et al., 2006). Alternatively, firms may emphasise the pursuit of exploitative strategy that results in secure, but short-term performance effects (Gupta et al., 2006). Exploitative strategy focuses more on cost-based goals, optimum (i.e., efficient) use of the resources and capabilities, and upgrading (i.e., efficiency improvement) of established products rather than developing new products (He & Wong, 2004; Morgan & Berthon, 2008).

Since exploratory and exploitative strategies possess fundamentally different logics (He & Wong, 2004; Morgan & Berthon, 2008), the implementation of these strategies depends on distinctive capabilities at the business-level that are exploratory and exploitative in nature (see the discussion related to the extent that a specific strategic type determines the type its respective capabilities in Section 2.3.1.1, pp. 39-40). In this sense, consideration is given to exploratory and exploitative capabilities as the means of strategy implementation. As noted in Table 3.1, exploratory capability represents the generation of new routines to perform a specific task (i.e., implementing a strategy), and exploitative capability represents the refinement of existing routines to perform a specific task (Benner & Tushman, 2003; Schreyögg & Kliesch-Eberl, 2007; Peng et al., 2008; Helfat & Winter, 2011). These definitions are premised on the dynamic capability theory reviewed in Section 2.3.1.3, which argues that organisational capabilities (i.e., exploratory and exploitative capabilities) can be dual-purpose (Schreyögg & Kliesch-Eberl, 2007; Helfat & Winter, 2011). In this sense, the first purpose of exploratory and exploitative capabilities is to generate new routines or refine existing routines, whereas their second purpose is to perform a specific task (i.e., implementing a strategy, developing a product, or distributing a product). In the context of product development, an exploratory capability is the means to implement an exploratory strategy by generating new routines to develop and market a new product, and an exploitative

capability is the means to implement an exploitative strategy by refining existing routines to upgrade and market an established product.

Since product development is a boundary spanning process (Day, 1994), firms will not (and cannot) be able to utilise a single capability (i.e., R&D capability) in isolation to develop and market a product successfully (see Moorman & Slotegraaf, 1999; Danneels, 2002; Rubera et al., 2012). Drawing on Danneels (2002), product development encompasses making a connection between specific technology and a potential market. Therefore, product development processes comprise two primary tasks, R&D and marketing (Moorman & Slotegraaf, 1999; Danneels, 2002; Narver, Slater, & MacLachlan, 2004; Song et al., 2005). According to the Product Development Management Association (PDMA), R&D represents a set of routines by which a firm repetitively converts embryonic ideas into saleable products (Kahn, 2004). In the marketing literature, this set of routines provide the capacity to physically develop (i.e., create or upgrade) a product and is seen as R&D capability (Danneels, 2008; Krasnikov & Jayachandran, 2008; Peng et al., 2008).

The American Marketing Association (AMA) defines marketing as the set of routines for creating, communicating, delivering, and exchanging offerings (i.e., a product) that have value for customers (AMA, 2007). In the marketing literature, this set of routines provides the capacity to link a product to customers and is seen as marketing capability (Day, 1994; Moorman & Rust, 1999; Vorhies & Morgan, 2005; Morgan, 2011). The literature shows that both R&D and marketing capabilities support a firm's efforts to achieve its strategic objectives, attain its desired product-market positions, offer superior value to customers, and drive its products' performance (Day, 1994; Calantone, Schmidt, & Song, 1996; Song & Parry, 1996; Henard & Szymanski, 2001; Danneels, 2002; Song et al., 2005; Di Benedetto, DeSarbo, & Song, 2008; Krasnikov & Jayachandran, 2008).

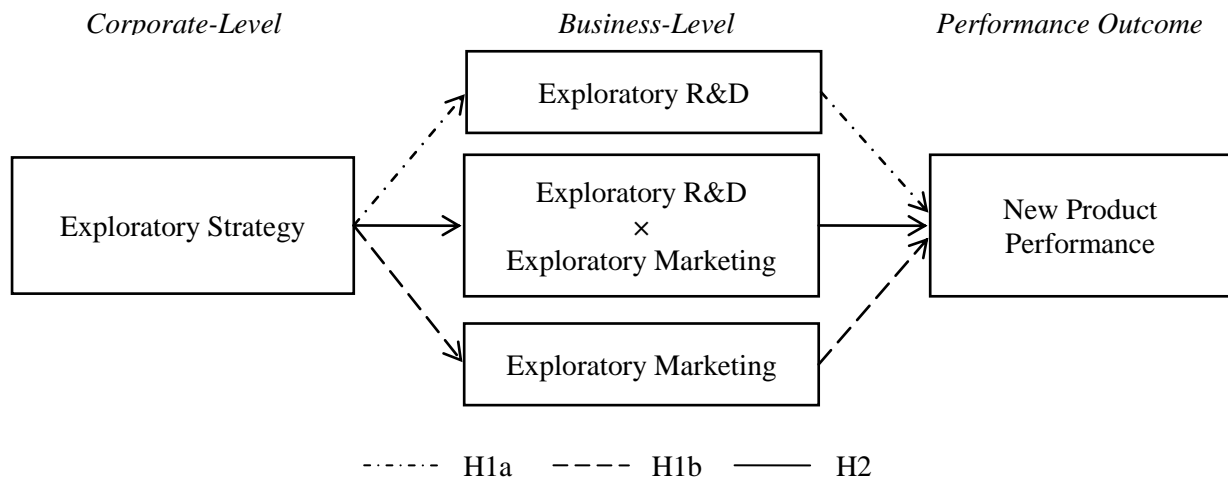
Applying this position to the organisational ambidexterity theory, the contention is raised here that a firm can implement exploratory and exploitative strategies and drive its products' performance, when it deploys and integrates exploratory and exploitative capabilities from within the R&D and marketing areas. In particular, the focus here is on exploratory R&D, exploitative R&D, exploratory marketing, and exploitative marketing as four distinctive forms of business-level capabilities that enable the implementation of exploratory and exploitative strategies and the development and marketing of the firms' products. The following sections (3.3.1 and 3.3.2) articulate the extent that these capabilities enable a firm to implement exploratory and exploitative strategy and drive its new product and established product performance.

3.3.1. The implementation of exploratory strategy through exploratory capabilities to enhance new product performance

This section discusses the extent to which exploratory R&D and exploratory marketing enable a firm to implement its exploratory strategy and enhance its new product performance. Figure 3.2 illustrates the relationships between exploratory strategy, exploratory R&D and marketing capabilities, and new product performance. As noted in Section 3.3, exploratory strategy represents the firm's emphasis on new product-market opportunities, new and innovative products, and emerging customer needs (He & Wong, 2004; Siren et al., 2012). Therefore, exploratory strategy emphasises offering new products and solutions to the market rather than upgrading (i.e., updating, improving) the firms' established products (He & Wong, 2004; Smith & Tushman, 2005). According to Harmancioglu et al. (2009), the development and marketing of highly innovative products may have a poor fit with prior technologies and marketing routines within firms. Therefore, the implementation of exploratory strategy is challenging, as firms may face deficiencies in existing routines in their

efforts to enter new product-market domains (see He & Wong, 2004; Atuahene-Gima, 2005). In this sense, exploratory R&D and exploratory marketing can assist in overcoming deficiencies in existing routines in their efforts to implement exploratory strategy (McCarthy & Gordon, 2011).⁶

Figure 3.2 – Hypotheses 1 and 2



In particular, exploratory R&D represents the generation and deployment of new R&D routines to physically develop (i.e., create) a new product (He & Wong, 2004; Atuahene-Gima, 2005; Jansen et al., 2005; Danneels, 2008). Specifically, exploratory R&D results in the generation of new routines that provide the capacity to generate new solutions for emerging customer problems, identify promising new technologies, learn new product development skills, and create innovative features that have not been offered by competitors before (Jansen et al., 2006; Danneels, 2008; Peng et al., 2008). Therefore, exploratory R&D allows the implementation of exploratory strategy by employing new technologies and routines required to create new products that offer unique benefits to customers (i.e., new

6. This study does not develop hypotheses related to the relationships between exploratory strategy, exploitative R&D and marketing capabilities, and new product performance. The underlying reasons are discussed in Appendix II.

solutions, innovative features). Such benefits provide a compelling reason for customers to buy and use a new product (Langerak, 2003; Langerak et al., 2004). Customers are more willing to buy a new product that offers superior and unique benefits over existing products offered by others (Veldhuizen, Hultink, & Griffin, 2006; Kim & Atuahene-Gima, 2010). According to Langerak et al. (2004), the sales potential, market share, and profitability of a new product depends on the unique benefits that the product offers to customers (see also Cooper, 1985; Li & Calantone, 1998; Henard & Szymanski, 2001). To this end, exploratory R&D results in the generation of new R&D routines required to implement exploratory strategy and enhance new product performance. This implies that exploratory R&D acts as an intervening mechanism between exploratory strategy and new product performance (see the discussion related to the strategy implementation role of market orientation in Homburg et al., 2004, p. 1332). Therefore,

H1a: Exploratory R&D mediates the relationship between exploratory strategy and new product performance.

Given the identified role of exploratory R&D in the implementation of exploratory strategy, it may not be sufficient in isolation to enable a firm to enter into new product-market domains. As noted before, marketing capability enables firms to communicate with customers and link its products with customers (Moorman & Rust, 1999; Vorhies, Harker, & Rao, 1999). Therefore, marketing capability supports a firm's effort to achieve its strategic objectives and enter new product-market domains. As the marketing of highly innovative products may have a poor fit with prior marketing routines within firms (Harmancioglu et al., 2009), the deployment of exploratory marketing can assist in overcoming deficiencies in existing routines to implement exploratory strategy. Exploratory marketing represents the

generation and deployment of new marketing routines to link a new product to customers (Kyriakopoulos & Moorman, 2004; Atuahene-Gima, 2005; Danneels, 2008). Specifically, exploratory marketing provides the capacity to link a new product with customers using new sales methods, new pricing systems, new promotion methods, marketing communication methods, and new distribution channels (Kyriakopoulos & Moorman, 2004; Danneels, 2008). Such new methods can also assist in increasing customer awareness regarding the benefits of a new product's features and encourage customers to purchase a new product. In addition, exploratory marketing can offer superior (i.e., unique, differentiated) benefits to customers and persuade them to buy a new product through advanced sales and distribution routines. For example, the virtual groceries in subways (i.e., Tesco in South Korea) help customers to enjoy the benefits of an innovative and unique purchasing and delivery system.

In addition, exploratory marketing results in the generation of new marketing communications and new market research routines that allow a firm to interact with customers and identify their emerging needs using new methods (i.e., social networks such as Facebook) (Voola & O'Cass, 2010; Lisboa et al., 2011). In this sense, exploratory marketing provides market knowledge that supports efforts (i.e., prototyping) to create new products with differentiated advantages (Citrin, Lee, & McCullough, 2007; Brettel et al., 2011). Therefore, exploratory marketing allows the implementation of exploratory strategy by supporting the firm's effort to offer differentiated advantages to customers. This implies that exploratory marketing acts as an intervening mechanism between exploratory strategy and new product differentiation. To this end, exploratory marketing results in the generation of new marketing routines required to implement exploratory strategy and enhance new product performance. This implies that exploratory marketing acts as an intervening mechanism between exploratory strategy and new product performance. Therefore,

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

As noted before, new product development is a boundary spanning process that integrates inside-out (i.e., R&D) and outside-in (i.e., marketing) capabilities together (Day, 1994; Danneels, 2002). Specifically, a new product development project pertains to making a connection between a specific technology embedded within a firm and a potential market, and cannot be understood as one or the other separately (Danneels, 2002). It is the integration of R&D and marketing that helps to link a particular technology to customers (see also Li & Calantone, 1998). Drawing on Moorman and Slotegraaf (1999), a new product development project is most effective when firms exhibit both R&D and marketing capabilities where new product development can benefit from the integration of the two capabilities. The literature conceptualises the integration of two capabilities (i.e. R&D and marketing) in term of complementarity, combination, and configuration (Moorman & Slotegraaf, 1999; Vorhies et al., 2009). In this study, the integration of R&D and marketing represents the extent that the benefits gained from R&D capability increase with the contribution or increasing level of marketing capability and *vice versa* (Milogram & Roberts, 1995; Teece et al., 1997; Moorman & Slotegraaf, 1999).

The integration of R&D and marketing leads to the development of a combinative capability that promotes the firm's effectiveness and/or efficiency to develop and market a new product and limits the rivals' imitation ability (Walker & Ruekert, 1987; Moorman & Slotegraaf, 1999; Morgan, Slotegraaf, & Vorhies, 2009). In particular, at the pre-development stage of a new product development project, the integration of R&D and marketing enables firms to identify market opportunities and assess the market potential of a specific technology (Sherman, Berkowitz, & Souder, 2005; Brettel et al., 2011). At the development stage, it

helps to determine what features are required to meet customer needs, realise what routines and technologies should be deployed to create the product features, and minimise the need for costly redesigns through market-testing (Sherman et al., 2005; Brettel et al., 2011). At the commercialisation stage, staff in the marketing department can train customers and enhance their awareness about the benefits of a new product's features based on technical information provided by the R&D department (Brettel et al., 2011). Empirical work also shows that the integration of R&D and marketing capabilities leads to superior new product performance (Song & Parry, 1993; Moorman & Slotegraaf, 1999; Song et al., 2005; Leenders & Wierenga, 2008).

Combining arguments related to the integration of R&D and marketing with the organisational ambidexterity theory, this study is interested in the extent to which the integration of exploratory R&D and exploratory marketing enables a firm to implement exploratory strategy and enhance new product performance. Drawing on Milogram and Roberts (1995), the integration of exploratory R&D and exploratory marketing represents the extent that these capabilities mutually reinforce each others impact. Such integration is necessary for several reasons. First, exploratory R&D and exploratory marketing allow a firm to discover new knowledge regarding latent customer needs, emerging product-market opportunities, and new technologies. The integration of new market- and technological-related knowledge can foster the creativity and novelty needed to create innovative (i.e., new, differentiated) products (Citrin et al., 2007; Brettel et al., 2011). However, a firm's existing market knowledge makes it more likely to develop new products that meet existing customer needs rather than emerging customer needs (see Christensen, 1997; Tripsas & Gavetti, 2000). Furthermore, the integration of market- and technological-related knowledge decreases the potential risk of misfit between a new product's benefits and emerging customer needs (see Danneels, 2002; Brettel et al., 2011).

Second, exploratory R&D is related to the generation of new ideas and innovative technologies, while exploratory marketing allows the evaluation and prediction of the market potential of a specific technology. For example, touch-screen technology can be used to develop a wide range of products (i.e., satellite navigation devices, ATMs, tablet computers, mobile phones, and video game devices), which can be marketed to a variety of customers, from survey engineers to taxi drivers. Third, the integration of exploratory R&D and exploratory marketing empowers customers to comprehend the benefits of a new product's features (see Brettel et al., 2011). While exploratory marketing seeks new methods to communicate with customers, employees of the R&D department can help the marketing team to train customers and increase customer awareness about the benefits of a new product and thereby increase customer acceptance of the new product. To this end, the integration of exploratory R&D and exploratory marketing enables a firm to generate, deploy, and integrate new routines to implement exploratory strategy and enhance new product performance. This implies that the integration of exploratory R&D and exploratory marketing acts as an intervening mechanism between exploratory strategy and new product performance. Therefore,

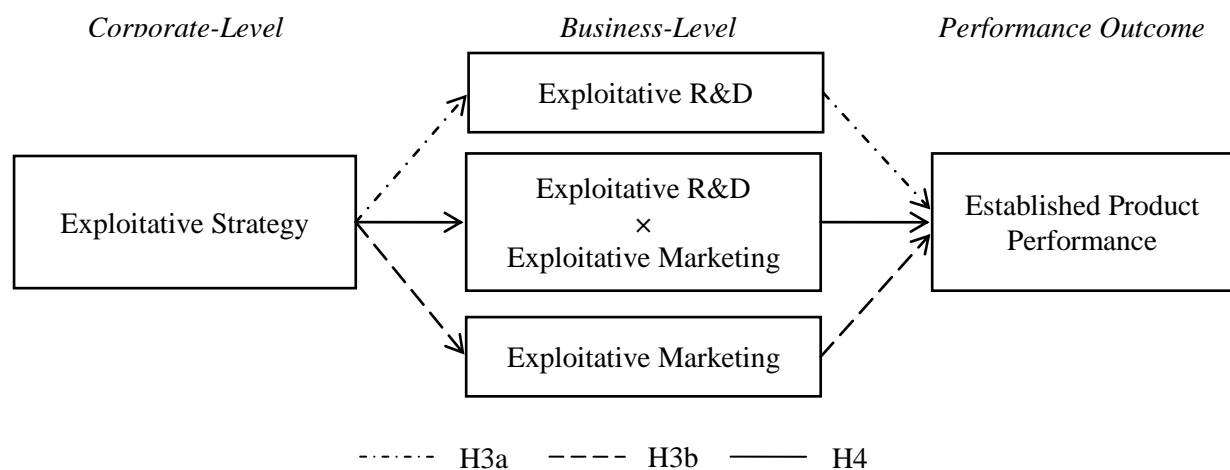
H2: The integration of exploratory R&D and marketing capabilities mediates the relationship between exploratory strategy and new product performance.

3.3.2. The implementation of exploitative strategy through exploitative capabilities to enhance established product performance

This section discusses the extent to which exploitative R&D and exploitative marketing enable a firm to implement exploitative strategy and enhance established product performance. Figure 3.4 illustrates the relationships between exploitative strategy, exploitative R&D and marketing capabilities, and established product performance. As

discussed above (Section 3.3), exploitative strategy represents the firm's emphasis on the existing product-market opportunities, automation and productivity of existing operations, and existing customer needs (He & Wong, 2004; Siren et al., 2012). Firms pursue exploitative strategy when they face (a) high costs and failure risks associated with the pursuit of exploratory strategy (Gupta et al., 2006), (b) resource (i.e., knowledge, financial, human) scarcity to invest in highly innovative NPD projects (Voss, Sirdeshmukh, & Voss, 2008), and (c) a low level of market and technological changes in a market (Jansen et al., 2006). According to Morgan and Burton (2008), exploitative strategy involves a reaction to basic (i.e., existing) knowledge and leads to refinement (i.e., improvement) of existing routines. In this sense, a firm may place more emphasis on the refinement and deployment of its exiting routines rather than generate new routines to implement exploitative strategy (see Atuahene-Gima, 2005; Voss et al., 2008). Therefore, exploitative R&D and exploitative marketing can assist in implementing exploitative strategy, achieving cost-based goals, and enhance established product performance ⁷.

Figure 3.4 – Hypotheses 3 and 4



7. This study does not develop hypotheses related to the relationships between exploitative strategy, exploratory capabilities, and established product performance. The underlying reasons are discussed in Appendix III.

In particular, exploitative R&D represents the refinement and deployment of existing R&D routines to physically upgrade (i.e., update, reform, improve) an established product (Atuahene-Gima, 2005; Jansen et al., 2005; Peng et al., 2008; Lisboa et al., 2011). Specifically, exploitative R&D provides the capacity to improve the efficiency of existing product development routines, existing manufacturing technologies, and current production machinery (Jansen et al., 2006; Peng et al., 2008). Such improvements result in the more efficient use of organisational resources and reductions in development time and costs (He & Wong, 2004; Jansen et al., 2006). 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). When customers perceive that an established product offers more benefits than other competing products at lower cost, they are more likely to repurchase and become loyal to that product (Day & Wensley, 1988; Langerak, 2003; Narver et al., 2004). The frequent updates of PC software (i.e., operation systems, anti-viruses) can be considered an example of the extent that firms continually improve the efficiency and performance of their established products to meet existing customer needs.

While customer retention (i.e. repurchase) results in specific outcomes in terms of sales volumes and market share (see Langerak, 2003; Morgan, Anderson, & Mittal, 2005), exploitative R&D enhances return-on-investment by increasing the cost efficiency of existing product development activities (see the discussion related to the association between exploitative market learning capability and new product cost efficiency in Kim & Atuahene-Gima, 2010). To this end, exploitative R&D results in the implementation of exploitative strategy and enhancement of established product performance. This implies that exploitative R&D acts as an intervening mechanism between exploitative strategy and established product performance. Therefore,

H3a: Exploitative R&D mediates the relationship between exploitative strategy and established product performance.

In addition to exploitative R&D, firms also need to deploy exploitative marketing to strengthen the existing product-market positions and enhance established product performance. Exploitative marketing represents the refinement and deployment of existing marketing routines to link a product to customers (Kyriakopoulos & Moorman, 2004; Atuahene-Gima, 2005; Lisboa et al., 2011). Specifically, exploitative marketing provides the capacity to improve the efficiency of the existing sales methods, pricing systems, marketing communication methods, and distribution channels (Kyriakopoulos & Moorman, 2004; Lisboa et al., 2011). These improvements help a firm to reduce expenditure associated with marketing activities while customers receive superior benefits at a lower price. For example, an efficient distribution system can enhance the customer accessibility, while reducing costs related to mistakes and defects in product delivery. In addition, the pursuit of exploitative marketing improves the efficiency of marketing communication and market research routines. Such improvements allow a firm to refine its knowledge about the expressed (or existing) needs of customers, existing competitors' actions and current market trends (Kim & Atuahene-Gima, 2010; Lisboa et al., 2011). These knowledge refinements result in a deeper understanding about key issues related to customers and competitors that reduces the potential risk of a mismatch between an established product's characteristic (i.e., quality, price) and existing market needs (see Li & Calantone, 1998).

Overall, the pivotal role of exploitative marketing is to listen to the voice of customers more efficiently, ensure the established products offer benefits that customers expressed, and promote the efficiency of existing marketing activities (i.e., sales, pricing, distribution) (Kyriakopoulos & Moorman, 2004; Narver et al., 2004; Voola & O'Cass, 2010). It is the fit

between an established product's benefits and customers' expressed needs that encourages customers to purchase (or repurchase) that product and increases customer retention (see Kirca, Jayachandran, & Bearden, 2005). On the other hand, exploitative marketing also enhances return-on-investment by increasing the cost efficiency of existing marketing activities. To this end, exploitative marketing results in the efficient implementation of exploitative strategy and enhancement of established product performance. This implies that exploitative marketing acts as an intervening mechanism between exploitative strategy and established product performance. Therefore,

H3b: Exploitative marketing mediates the relationship between exploitative strategy and established product performance.

Beyond the independent role of exploitative R&D and exploitative marketing, this study is interested in the extent that the integration of exploitative R&D and exploitative marketing provide the capacity to implement exploitative strategy and enhance new product cost efficiency. Drawing on Milogram and Roberts (1995; Teece et al., 1997; Moorman & Slotegraaf, 1999), the integration of exploitative R&D and exploitative marketing represents the extent that these capabilities mutually reinforce the impact of each other. Such integration is necessary to implement exploitative strategy and enhance established product performance for several reasons. First, exploitative R&D and exploitative marketing allow a firm to obtain a deeper understanding of expressed customer needs and the performance of existing routines. This helps to unlock the interdependencies among the knowledge elements related to customer needs and the firm's capabilities (De Luca & Atuahene-Gima, 2007) and minimise mismatch between an established product's benefits and existing customer needs. Second, a deeper understanding of market potential for an established product enables a firm

to estimate the production volume and respond to the market demands more efficiently (see Brettel et al., 2011). Finally, the integration of exploitative R&D and exploitative marketing provides a better knowledge about the firm's production capacity to produce a specific product, thus marketing personnel can plan their marketing activities and sales targets more efficiently (see Brettel et al., 2011). To this end, the integration of exploitative R&D and exploitative marketing enables a firm to refine, deploy, and integrate existing routines to implement exploitative strategy and enhance established product performance. This implies that the integration of exploitative R&D and exploitative marketing acts as an intervening mechanism between exploitative strategy and established product performance. Therefore,

H4: The integration between exploitative R&D and marketing capabilities mediates the relationship between exploitative strategy and established product performance.

3.4. Achieving organisational ambidexterity at corporate and business levels

In dynamic markets, securing both short- and long-term financial and market performance is rooted in the extent that a firm synchronously upgrades its established products' market position and enters new product-market domains (Christensen, 1997; Smith & Tushman, 2005). The underlying reason is that new and established products can mutually enhance their performance outcomes within a firm. In particular, established products provide knowledge and asset bases (i.e., organisational slack) to support entering new product-market domains (Sorescu et al., 2003; Smith & Tushman, 2005). Whereas, new products result in generating new knowledge, accessing to new markets, and increasing customer awareness, all of which enhance established product performance (Sorescu et al., 2003; Smith & Tushman, 2005; Sarkees et al., 2010). However, many firms experience problems in dealing with the synchronous development and marketing of new and established products. This problem is

seen in the current literature as the “Innovator's Dilemma”. The literature discusses the innovator’s dilemma through two perspectives.

The first perspective pertains to the firm’s failure because of technological shifts in the market. Christensen (1997) explains that innovative products may result in negative outcomes because they do not initially satisfy existing customer needs. Indeed, new products focus on emerging (or latent) customer needs that do not yet exist. “Discovering markets for emerging technologies inherently involves failure, and most individual decision makers find it very difficult to risk backing a project that might fail because the market is not there” (Christensen, 1997, p. 156). In this context, many firms choose to overlook the development of innovative products until they become more attractive profit-wise. However, successful innovative products in practice surpass established products in offering new benefits and solutions that satisfy market needs (Tripsas, 1997; Tripsas & Gavetti, 2000). The “Radial Tires” and “Digital Photography” technologies are examples of innovative products, which cannibalise the market of “Ply Tires” and “Analogue Photography”. When innovative products cannibalise the market of established products, firms who only invested in the improvements of their established products are left behind (see Tripsas & Gavetti, 2000).

The second perspective pertains to the extent that firms face problems related to product range extension. Product range extension refers to the introduction of new products under the same brand, while they target different customer segments (Wilson & Norton, 1989; Reddy, Holak, & Bhat, 1994; Kadiyali, Vilcassim, & Chintagunta, 1999). Introduction of new products in many industries such as healthcare (i.e., Pantene’s shampoo and conditioners as two hair care products), automobile (i.e., BMW series 3 and series 5 as two sedan models), and news broadcast (i.e., BBC’s television programs and website as two broadcasting services) are examples of product range extension. According to Cooper (2011), creating highly innovative products (i.e., breakthrough, differentiated, disruptive) is rare these

days, as the development and marketing of a highly innovative product is challenging, risky, and sometimes unrealistic. In addition, the scarcity of breakthrough innovations is an ordinary theme in many mature industries such as the food industry (Cooper, 2011). The central purpose of product range extension is to develop and market new products that target different customer segments compared to that of established products (Kadiyali et al., 1999). In this sense, new products can be marketed in line with established products and they will not cannibalise the market of established products. “Big Mac” and “McChicken” are examples of two products that have been served by McDonald for a long time. While the McChicken was introduced almost a decade after the Big Mac, they targeted different customer segments. The product range extension is a challenging task for several reasons. First, new and established products are often in competition with one another for organisational resources (i.e., equipment, employees, and promotions) (Smith & Tushman, 2005). Second, the development and marketing of new and established products stem from the pursuit of distinctive strategies, capabilities, and structures. Therefore, synchronising the development and marketing of new and established products can be challenging and raise fundamental performance impairing risks and tensions (Smith & Tushman, 2005).

The focus of this study is on the extent that organisational ambidexterity provides the capacity to resolve tensions involved in the process of product range extension. This position is consistent with extant research arguing organisational ambidexterity as a possible solution enabling a firm to synchronously develop and market new and established products (e.g., Tushman et al., 1997; Adler et al., 1999; Looy et al., 2005; Smith & Tushman, 2005; Sarkees & Hülland, 2009).

As noted in Chapter Two (Section 2.3.2), ambidexterity can be operationalised following two approaches identified as balanced and combined ambidexterity. Drawing on March (1991), Benner and Tushman (2003), and Cao et al. (2009), this study adopts the

balanced ambidexterity approach to operationalise ambidexterity. The adoption of balanced ambidexterity is based on the fact that potentially firms may not invest all or significantly large enough amounts of their available resources in a specific product development project. In this sense, the firm's product development projects are likely to have limited resources, thus they are pressed to balance rather than maximise the pursuit of exploration or exploitation (Smith & Tushman, 2005).

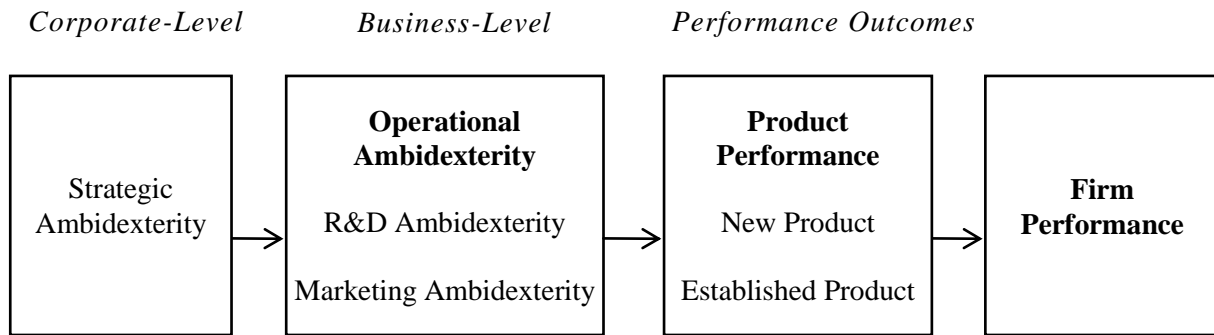
The notion of balance here presents the extent that a firm places equal emphasis on the pursuit of exploratory and exploitative strategies (He & Wong, 2004). According to Cao et al. (2009), such equal emphasis relates to the synchronous pursuit of medium-to-high levels of both exploratory and exploitative strategies. Therefore, the overemphasis on one strategy over another reflects an imbalance between exploratory and exploitative strategies (He & Wong, 2004; Wang & Li, 2008). Building on the discussions presented in Chapter Two, Section 2.3.2, an imbalance can impede either new product or established product performance by leaving a firm susceptible to the risks of core-rigidity and failure-trap (March, 1991; Gupta et al., 2006; Cao et al., 2009). Core-rigidity negatively affects product performance in the long-term by decreasing the firm's ability to adapt to significant market changes and learn new skills (Kyriakopoulos & Moorman, 2004; Atuahene-Gima, 2005). On the other hand, the failure trap negatively influences product performance by preventing the firm from achieving appropriate returns from costly search and development activities (He & Wong, 2004; Gupta et al., 2006). Therefore, managing a balance between exploratory and exploitative strategies minimises risks of the core-rigidity and failure-trap and drives both new product and established product performance within a firm.

As discussed in Section 3.3, the implementation of exploratory strategy depends on the deployment of exploratory capabilities, whereas the implementation of exploitative strategy relies on the deployment of exploitative capabilities. Therefore, the implementation of both

corporate-level exploratory and exploitative strategies at the same time forces firms to synchronise the deployment of exploratory and exploitative capabilities at the business-level. This suggests that achieving organisational ambidexterity is not limited to a single organisational level. Instead, true ambidexterity transcends levels through synchronising the pursuit of exploratory and exploitative strategies at the corporate-level, as well as synchronising the deployment of exploratory and exploitative capabilities at the business-level of the firm (Cantarello et al., 2012). Such multiple level synchronicities enable a firm to become truly ambidextrous. Specifically, the focus here is on the firm's effort to achieve ambidexterity across two hierarchical levels, corporate and business levels.

The central argument is that ambidexterity at the corporate-level (hereafter strategic ambidexterity) can affect the performance of a firm's new and established products, when it implemented through the synchronous deployment of exploratory and exploitative R&D and marketing capabilities at the business-level (hereafter operational ambidexterity). Such implementation can drive both new product and established product performance and thereby contributes to the ultimate firm performance. In this sense, operational ambidexterity represents the means to implement strategic ambidexterity. Such implementation can drive both new product and established product performance and thereby contributes to the ultimate firm performance. As shown in Figure 3.6, this study contends that operational ambidexterity and product performance sequentially mediate the effects of strategic ambidexterity on firm performance. This contention is consistent with the literature on strategy implementation (e.g., Homburg et al., 2004; DeSarbo et al., 2005; Olson et al., 2005a; Vorhies et al., 2009) and strategy-ambidexterity-position-performance model suggested by Hughes et al. (2010). The following sections (3.4.1 and 3.4.2) articulate the extent that operational ambidexterity, new product performance, and established product performance mediate the effect of strategic ambidexterity on firm performance.

Figure 3.6 – Organisational ambidexterity at the corporate and business levels



3.4.1. The mediational effect of operational ambidexterity

As discussed before, product development is a boundary spanning process, and involves the deployment of capabilities from R&D and marketing areas (Day, 1994; Danneels, 2002). Following this theoretical contention, operational ambidexterity in R&D and marketing areas represent the mechanisms that enable a firm to implement strategic ambidexterity to enhance its new product and established product performance. In particular, operational ambidexterity in R&D (hereafter R&D ambidexterity) represents the management of a balance between the deployment of exploratory and exploitative R&D. A balance between exploratory and exploitative R&D protects the firm from the failure-trap and core-rigidity risks associated with overemphasising on a capability over another. In particular, R&D ambidexterity aims to synchronously generate new R&D routines and capture the ongoing benefits of existing R&D routines to implement strategic ambidexterity.

R&D ambidexterity may contribute to new product performance using new routines and advanced technologies to create new features and solutions, as well as improving existing R&D routines to develop and produce new products more efficiently. On the other hand, R&D ambidexterity may drive established product performance by discovering new technologies to upgrade the existing features of an established product. R&D ambidexterity may also lead to a deeper understanding of the application of existing routines to enhance the

cost-efficiency of an established product. Therefore, R&D ambidexterity helps a firm to enhance both new product and established product performance. The success of Apple with its established laptops and new released tablets can be considered as an example of R&D ambidexterity. Where using new technologies allows Apple to create the “iPad” and lighter laptops (i.e., Mac Book Air), the efficient deployment of newly generated and existing technologies results in the production of these new products with superior quality and performance at a reasonable price for customers.

To this end, R&D ambidexterity enables a firm to equally place the emphasis on the generation of new R&D routines and improvement of existing R&D routines to implement strategic ambidexterity and enhance new product and established performance. In other words, strategic ambidexterity can influence both new product and established product performance at the same time, only when a firm has the capacity to achieve R&D ambidexterity at the business-level of the firm. This implies that R&D ambidexterity acts as an intervening mechanism between strategic ambidexterity, new product performance, and established product performance. Therefore,

H5: R&D ambidexterity mediates the relationships between (a) strategic ambidexterity and new product performance, and (b) strategic ambidexterity and established product performance.

Alternatively, operational ambidexterity in marketing (hereafter marketing ambidexterity) can facilitate the implementation of strategic ambidexterity. Marketing ambidexterity represents the management of a balance between the deployment of exploratory and exploitative marketing. Marketing ambidexterity allows firms to avoid the failure-trap and core-rigidity risks associated with overemphasising one capability over

another. Marketing ambidexterity may contribute to new product performance by communicating with new customers, as well as through the discovery of emerging product-market opportunities using new methods. Furthermore, marketing ambidexterity allows a firm to deliver its new products to customers through more efficient sales and distribution routines. Marketing ambidexterity may also drive established product performance by linking new customers to established products and improving the efficiency of newly generated and ongoing marketing routines to commercialise established products. The ongoing success of many firms with their established products, such as Mattel with its Barbie models, is an example of a firm that synchronously improves its existing marketing routines, seeks new ways to communicate with customers (i.e., Barbie application for smart-phones and tablet computers), and generates new brand extensions (i.e., Twilight Bella Barbie) to link its products to customers.

To this end, marketing ambidexterity enables a firm to place equal emphasis on the generation of new marketing routines and the improvement of existing marketing routines to implement strategic ambidexterity and enhance new product and established product performance. In other words, strategic ambidexterity can influence both new product and established performance at the same time, only when a firm has the capacity to achieve marketing ambidexterity at the business-level of the firm. This implies that marketing ambidexterity acts as an intervening mechanism between strategic ambidexterity, new product performance, and established product performance. Therefore,

H6: Marketing ambidexterity mediates the relationships between (a) strategic ambidexterity and new product performance, and (b) strategic ambidexterity and established product performance.

3.4.2. The mediational effect of new product and established product performance

Firm performance represents the extent that a firm achieves its goals over the past year in terms of revenue, sales growth, market share, return on investment and profitability (Langerak et al., 2004). According to Damanpour et al. (2009), firms seeking to achieve superior performance need to be capable of performing “organisational-adapting” functions (i.e., exploration) to respond to market changes as well as being able to perform “organisation-maintaining” functions (i.e., exploitation) to carry out existing business activities efficiently. This implies that the development and marketing of both new products and established products are essential to achieve superior firm performance. Specifically, new products enable firms to secure their market position when they confront increased levels of competition, rapidly changing customer preferences, and or shorter product life cycles (Pentina & Strutton, 2007; Kotabe, Jiang, & Murray, 2011). Further, established products drive existing firm performance by securing ongoing market- and financial-based performance (Sorescu et al., 2003; Smith & Tushman, 2005).

In this sense, achieving superior firm performance is premised on the extent that corporate-level exploratory and exploitative strategies interact with business-level exploratory and exploitative R&D and marketing capabilities to synchronously develop and market both new and established products. As noted in Section 3.4.1, organisational ambidexterity can be achieved through the pursuit of strategic ambidexterity and operational ambidexterity at both corporate and business levels of the firm. Operational ambidexterity facilitates the implementation of strategic ambidexterity and drives both new product and established product performance. The focus here is on R&D ambidexterity and marketing ambidexterity as the drivers of both new product and established product performance, which in turn contribute to firm performance. As shown in Figure 3.6, new product performance and

established product performance act as intervening mechanisms between R&D ambidexterity, marketing ambidexterity, and firm performance.

In particular, R&D and marketing ambidexterity results in the generation of new routines and refinement of existing routines that provide the capacity to implement strategic ambidexterity to develop and market new products. Adobe's new applications (i.e., Photoshop Touch, Proto) for tablet computers is an example of capturing both ongoing benefits of previous innovations and new technologies to create new products that offer similar advantages compared to what Adobe previously produced for PCs. Therefore, the balance between exploratory and exploitative R&D is what provides the capacity to innovate new product premised on the existing accumulated knowledge and routines within a firm and to enter new product-market domains. Further, the employment of social networks as a new marketing communication channel in line with the previous promotion, market research, and customer relationship management systems in many firms (i.e., Ford, Heineken, HTC) represents an example of using both new and existing marketing routines to link new products to customers. Therefore, the balance between exploratory and exploitative marketing provides the capacity to link new products with customers innovatively and efficiently. The successful development and marketing of new products helps firms to offer unique value (or benefits) to customers compared to competing products, and helps them to respond to emerging market changes. Such unique benefits attract new customers and retain existing customers, enhance sales growth, and thereby increasing financial performance. Consequently, achieving market success with a new product enhances firm performance. To this end, new product performance mediates the relationship between R&D ambidexterity-firm performance and marketing ambidexterity-firm performance. Therefore,

H7: New product performance mediates the relationship between (a) R&D ambidexterity and firm performance and (b) marketing ambidexterity and firm performance.

Further, R&D and marketing ambidexterity results in the generation of new routines and refinement of existing routines that provide the capacity to implement strategic ambidexterity to upgrade and market established products. For instance, the cars of twenty or thirty years ago could be thought of as quite basic when compared to the cars of today. The frequent improvements and upgrades over time leads to the generation of new car models with advanced technologies such as ABS brakes, air bags, and hybrid engines. Such technologies and features result from the deployment of both new and existing R&D routines. Where the generation of new R&D routines provides the capacity to create new technologies and features, the refinement of existing R&D routines provides the capacity to improve the performance of earlier created technologies and features. Therefore, the balance between exploratory and exploitative R&D enables a firm to excel at both innovation and efficiency. Furthermore, the ongoing success of many firms with their established products like Coca-Cola, Zippo, Levis, and Heineken are cases of how these firms employ both new and existing marketing methods to secure their market share with their established products for decades. Where the generation of new marketing routines provides the capacity to link established product to customers through new channels such as social networks, the refinement of existing marketing routines provides the capacity to improve and extend current sales and distribution channel. Therefore, the balance between exploratory and exploitative marketing enables a firm link established products with its customers innovatively and efficiently. The literature indicates that established products have significant contributions to firm performance and generating organisational slack required for new projects and new business

activities (Christensen, 1997; Sorescu et al., 2003; Sarkees & Hulland, 2009). To this end, established product performance mediates the relationship between R&D ambidexterity-firm performance and marketing ambidexterity-firm performance. Therefore,

H8: Established product performance mediates the relationship between (a) R&D ambidexterity and firm performance and (b) marketing ambidexterity and firm performance.

3.5. Conclusion

The purpose of this chapter was to develop the “Synchronised multi-level - multi-unit ambidexterity framework” and hypotheses for this study. The central argument of this framework is that firms become ambidextrous when they have the capacity to pursue and synchronise exploration and exploitation across multiple organisational levels, multiple functional areas, and multiple product development projects. This theoretical framework consists of two stages, Stages A and B. Stage A pertains to the extent that the implementation of corporate-level exploratory and exploitative strategies influence a firm’s new product and established product performance, respectively. This stage underscores the implementation roles of exploratory and exploitative R&D and marketing capabilities at the business-level of the firms. Stage B pertains to the extent that synchronising the pursuit and implementation of exploratory and exploitative strategies drive a firm’s new product performance, established product performance, and ultimate performance. This stage underscores the implementation role of operational ambidexterity (i.e., R&D and marketing ambidexterity) at the business-level of the firm in the relationships between strategic ambidexterity, new product performance, and established product performance. In addition, Stage B emphasises the

mediational roles of new and established product performance in the relationships between R&D ambidexterity, marketing ambidexterity, and firm performance.

To articulate the link between the components of the theoretical framework developed for this study, this chapter presented eight hypotheses and provided the theory leading to these hypotheses. These hypotheses provide guidance for the methodological decision concerning the research design discussed in Chapter Four, while the theoretical framework will provide a means by which to proceed with the ensuing analysis in Chapter Five.

Chapter Four

Research Design

4.1. Introduction

The central concern of Chapter Three was to develop the synchronised multi-level - multi-unit ambidexterity framework and hypotheses to address and explain the theory that underpins this theoretical framework. The central theory of this framework is that firms become ambidextrous when they have the capacity to pursue exploration and exploitation at multiple organisational levels, multiple functional areas, and multiple product development projects. Figure 3.1 illustrates the relationships underpinning the extent that firms manage the pursuit of corporate-level exploratory and exploitative strategies, the deployment of business-level exploratory and exploitative capabilities across multiple functional areas, and the development and marketing of new and established products at the same time.

As noted in Chapter 3 (Section 3.2), this study's theoretical framework includes two distinct stages (Stage A and Stage B) and eight hypotheses. The underlying theory for these stages and hypotheses were presented in Section 3.3 (Stage A, Hypotheses 1 to 4) and Section 3.4 (Stage B, Hypotheses 5 to 8). To connect the research questions underpinning the study and hypotheses to data, it is important to develop and deploy an appropriate research design. The research design represents a detailed blueprint that guides the implementation of the research. The central focus of Chapter Four is to detail the procedures developed and utilised in the research to implement this study.

This chapter starts with Section 4.2 explaining the research paradigm that underpins the study. Sections 4.3 to 4.6 explain the research design process depicted in Figure 4.1, including the preliminary planning, the research design, and implementation stages. Each stage involves a number of steps and encompasses specific procedures. Finally, the chapter closes with the conclusion (Section 4.7) about the research paradigm, data collection method, measurement instruments, sampling procedure, anticipated data analysis techniques, and budgeting and timing of data collection.

4.2. Research paradigms

The design of any empirical research begins by placing the research within an appropriate paradigm which underpins every part of the research process from research design and data collection to data analysis methods (Cavana, Delahaye, & Sekaran, 2001). The research paradigm provides guidelines and principles concerning the way research should be conducted. Selection of the research paradigm is dependent upon the objectives of the research to be undertaken. Research paradigms can be divided into two prominent classes: positivism and interpretivism (Cavana et al., 2001; Aaker et al., 2004). The positivism paradigm asserts that reality is stable and can be observed and described from an objective viewpoint (Proctor, 2005; Aaker et al., 2004). Positivists believe that real events can be observed empirically and explained with logical analysis (Proctor, 2005). They contend that phenomena should be isolated and that observations should be repeatable. This often involves manipulation of reality with variations in only a single independent variable so as to identify regularities in, and to form relationships between, some of the constituent elements of the social world (Proctor, 2005; Cavana et al., 2001). In contrast, the interpretivism paradigm asserts that only through the subjective interpretation of and intervention in reality can that reality be fully understood (Proctor, 2005; Aaker et al., 2004). In particular, interpretivists

contend that humans interpret their environment and themselves in ways that are shaped by the particular cultures in which they live (Proctor, 2005). The study of phenomena in their natural environment is the key to the interpretivism paradigm, together with the acknowledgement that researchers cannot avoid affecting those phenomena they study (Proctor, 2005). Positivism is associated with quantitative research, whereas interpretivism is related to qualitative research. Quantitative research is seen as an objective and hypothetical-deductive approach, which starts with theoretical conjectures and attempts to provide evidence for and against pre-specified hypotheses (Smith, 1983; Cavana et al., 2001). On the other hand, qualitative research is a subjective and inductive approach, which starts with observations and attempts to search for patterns and processes (Smith, 1983; Morse & Mitcham, 2002).

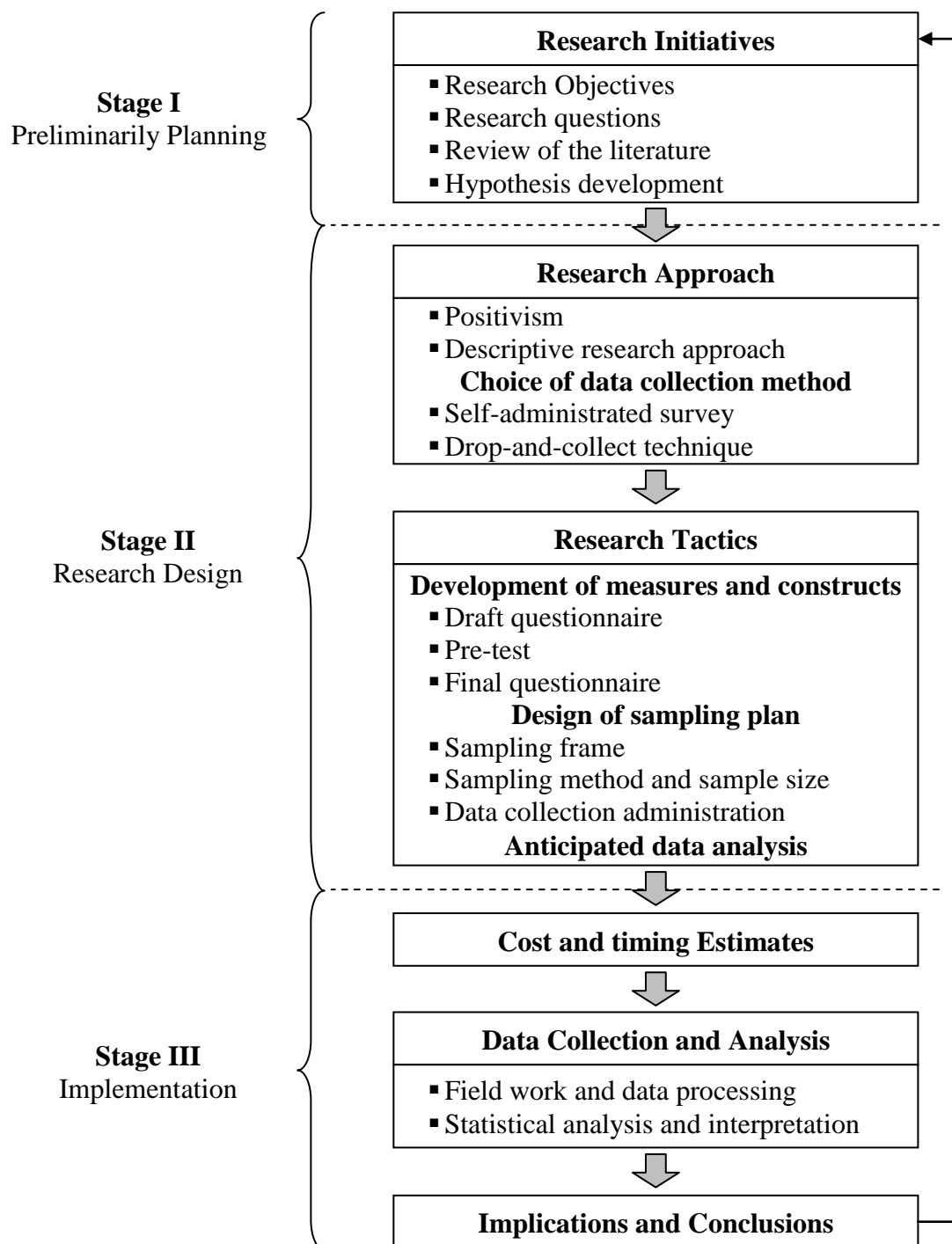
The review of literature conducted in Chapter Two identified a number of studies related to organisational ambidexterity (He & Wong, 2004; Kyriakopoulos & Moorman, 2004; Danneels, 2008; Morgan & Berthon, 2008; Cao et al., 2009; Jansen et al., 2009; Hughes et al., 2010; Vorhies et al., 2011) that have adopted a positivistic approaches and quantitative methods to examine the interrelationships between constructs. As the primary purpose of this study is to examine a set of pre-specified hypotheses that signify multiple interrelationships among the constructs of interest depicted in Figure 3.1, the positivism paradigm is deemed appropriate.

After the research paradigm was selected, the research design was developed to connect the research question to data by addressing four questions:

- What is the strategy for the data collection and analysis?
- Following which framework will data be collected and analysed?
- From whom will the data be collected?
- How will the data be collected and analysed?

Previous research suggests different approaches to address these questions and develop a research design. The framework suggested by Aaker et al. (2004) and Hair et al. (2002) were adopted to develop the research design. As shown in Figure 4.1, this framework involves three stages. The preliminary planning stage (Stage I) pertains to problem identification, the development of research questions and conceptual framework. The research design stage (Stage II) articulates the research approach, data collection method, development of measures of constructs, sampling plan, and anticipated data analysis methods. The implementation stage (Stage III) pertains to the budgeting and timing, the data collection, analysis, implications and conclusions. These stages and the issues associated with them are detailed in the Sections 4.3 to 4.6.

Figure 4.1 – The research design process



Source: Adopted from Aaker et al. (2004) and Hair et al. (2002)

4.3. Stage I: The preliminary planning stage

Drawing on Aaker et al. (2004), the preliminary planning stage encompasses a number of tasks including problem identification, development of research questions and hypotheses,

and justification of the proposed research in terms of its contribution. The information presented in Chapter One identified the research objectives and the justification for the research in this area. In addition, the literature review presented in Chapters Two and Three provide the theoretical foundation for the systematic development of the theoretical arguments, the proposed theoretical framework (Figure 3.1). Given these initiatives, the tasks in the preliminary planning stage have been completed. This section details how these initiatives were developed with respect to research methodology.

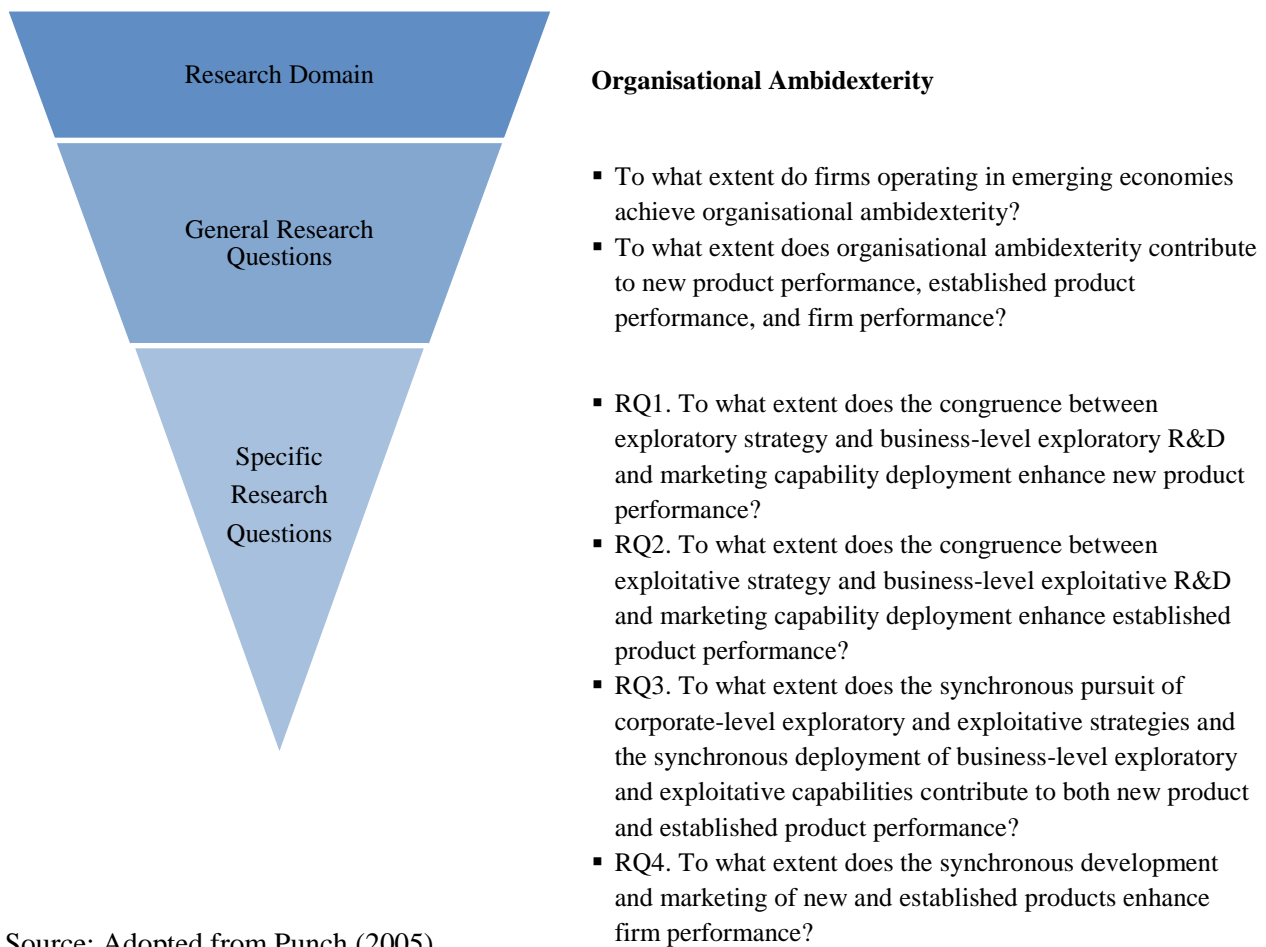
4.3.1. Problem identification and the development of research questions

This study follows the hierarchical approach suggested by Punch (2005), identifying the research domain and developed general and specific questions within that domain. Following this approach, the separation between general questions and specific questions helped to guide thinking, organise the research (general objectives), and direct the empirical procedures (specific questions). As shown in Figure 4.2, the research domain specifies corporate strategies, business-level capabilities, product performance, and firm performance in the context of organisational ambidexterity. The research domain was the starting point for generating the two general questions. Then, four specific questions were developed to capture the two general research questions. The first general research question was to what extent do firms operating in emerging economies achieve organisational ambidexterity? The second question was to what extent does organisational ambidexterity contribute to new product performance, established product performance, and ultimate firm performance? Therefore, the current study aims to answer the following research (specific) questions:

- RQ1. To what extent does the congruence between exploratory strategy and business-level exploratory R&D and marketing capability deployment enhance new product performance?

- RQ2. To what extent does the congruence between exploitative strategy and business-level exploitative R&D and marketing capability deployment enhance established product performance?
- RQ3. To what extent does the synchronous pursuit of corporate-level exploratory and exploitative strategies and the synchronous deployment of business-level exploratory and exploitative capabilities contribute to both new product and established product performance?
- RQ4. To what extent does the synchronous development and marketing of new and established products enhance firm performance?

Figure 4.2 – Deductive process of research question development



Source: Adopted from Punch (2005)

4.3.2. Conceptual framework development

The four research questions identified in Section 4.3.1 provided the foundation and logic for providing answers or support for the hypotheses. As discussed in Chapter Three (Sections 3.2, 3.3 and 3.4), eight hypotheses were developed to articulate the possible relationships among the constructs of interest in the theoretical framework developed for this study (Figure 3.1). These hypotheses enable the connection between the theory and empirical data.

4.4. Stage II: Research design stage

The research design stage represents a master plan of the methods that are used for the collection, measurement, and analysis of data (Hair et al., 2002). As shown in Figure 4.1, the research design stage involves two main issues, the research paradigm and the research tactics. In particular, the research paradigm pertains to issues related to the choices of the research approach and data collection method. Research tactics pertain to issues related to the development of measures for constructs, the design of the sampling plan, and data analysis.

4.4.1. The research approach

As shown in the Figure 4.1 (Stage II), the purpose of the research approach is to determine how information should be obtained. As noted in Section 4.2, this study adopted the positivist paradigm (or quantitative research methodology). Quantitative research can be categorised into three prominent approaches: exploratory, causal, and descriptive (Cavana et al., 2001; Hair et al., 2002; Aaker et al., 2004). The exploratory research approach is used to classify the problems or opportunities and does not intend to provide conclusive information from which a particular course of action can be determined (Hair et al., 2002). Causal research attempts to infer causation of previously identified relationships (Cavana et al., 2001). Causal research is most appropriate when the research objectives include the need to understand the

reasons why certain market phenomena happen as they do (Hair et al., 2002). Descriptive research is used when the research objectives include determination of the extent to which a specific variable (or construct) is related to actual phenomena (Hair et al., 2002). Specifically, descriptive research attempts to address the extent that a formulated hypothesis occurs (Cavana et al., 2001). Given the hypotheses presented in Chapter Three were proposed to describe the underlying relationships between the constructs of interest in the theoretical framework developed for this study (Figure 3.1), descriptive research best describes this study.

4.4.2. Data collection method

As shown in Figure 4.1 (Stage II), determining the research approach and selecting an appropriate data collection method occur concurrently. The selection of an appropriate data collection method is a critical decision in the research process design (Aaker et al., 2004). Due to the nature of the study, primary data (or firsthand raw data) were required to test the hypotheses. There are three general ways of obtaining primary data for descriptive research which are commonly identified in the marketing literature: surveys (or questionnaire), observation, and experimentation (Cavana et al., 2001; Groves et al., 2011). This study adopted a questionnaire approach for several reasons. First, a questionnaire approach appears to be a suitable approach when researchers know exactly what is required and how to measure the constructs of interest (Cavana et al., 2001; Hargie & Tourish, 2009). Second, using a questionnaire helps in accommodating large sample sizes at a relatively low cost, facilitating the administration of questions and answers, employing advanced statistical analysis, and tapping into factors and relationships not directly measurable (latent variables) (Cavana et al., 2001; Groves et al., 2011). Third, as discussed in the literature review presented in Chapter Two, a number of studies related to organisational ambidexterity have

been conducted using questionnaires as the means of data collection (e.g., Gibson & Birkinshaw, 2004; He & Wong, 2004; Kyriakopoulos & Moorman, 2004; Atuahene-Gima, 2005; Jansen et al., 2006; Li & Lin, 2008; Hughes et al., 2010; Lisboa et al., 2011; Vorhies et al., 2011; Siren et al., 2012).

Questionnaire data collection can be conducted through three main approaches: person-administrated, computer-administrated, and self-administrated (Groves et al., 2011). A person-administrated approach requires the presence of the researcher(s) and respondent(s) when data is collected, however computer- and self-administrated methods can be conducted without the presence of the researcher(s) (Kaplan, Sieber, & Ganiats, 1997; Moutinho & Chien, 2007; Groves et al., 2011). While each approach has advantages, each involves its own challenges and disadvantages. The person-administrated approach enables the researcher(s) to (possibly) obtain a high response rate, but it can be considered as a high cost and time-consuming approach. In addition, a person-administrated approach may involve interviewer bias (Kaplan et al., 1997; Robson, 2011). Employing a computer-administrated approach increases the speed of administration, and reduces interviewer biases. However, computer-administrated approach includes high set-up costs and confidentiality problems (Moutinho & Chien, 2007). The self-administrated approach is argued to be the most cost effective and enables researcher(s) to obtain large amounts of data and helps reduce interviewer biases (Groves et al., 2011). However, the response rate for the self-administrated approach can be low, when the questionnaire is long (Kaplan et al., 1997).

Considering the advantages and disadvantages of the three survey administration methods, this study adopted the self-administrated approach. Researchers have mainly adopted two data collection techniques within the self-administrated approach, mail survey and drop-and-collect (Walker, 1976; Ibeh, Brock, & Zhou, 2004). The mail survey technique pertains to administering data collection employing postal systems (i.e., paper-based, fax,

email), whereas in the drop-and-collect technique researchers (or research assistants) distribute and collect questionnaires personally (Walker, 1976; Ibeh et al., 2004). Importantly, while there are advantages to the mail survey technique including low cost and the ability to reach a widely dispersed sample, its response rate is generally less than the drop-and-collect technique (Walker, 1976; Ibeh & Brock, 2004; Ibeh et al., 2004; De Luca & Atuahene-Gima, 2007). In addition, the drop-and-collect technique is encouraged in emerging countries where interpersonal interactions are preferred as modes of information exchange (Ibeh & Brock, 2004; O'Cass & Ngo, 2011a), and where the unreliable nature of postal systems is a problem (Ellis, 2005). As outlined in Chapter One, this study focuses on Iran, which is an emerging economy in the Middle-East, comprising a collectivist culture where interpersonal interactions are preferred as modes of information exchange (Hofstede, 1980; Mellahi et al., 2011; Soltani & Wilkinson, 2012). In addition, the drop and collect technique can yield a response rate similar to person-administrated approach at a cost equivalent to mail surveys (Walker, 1976).

4.5. The research tactics

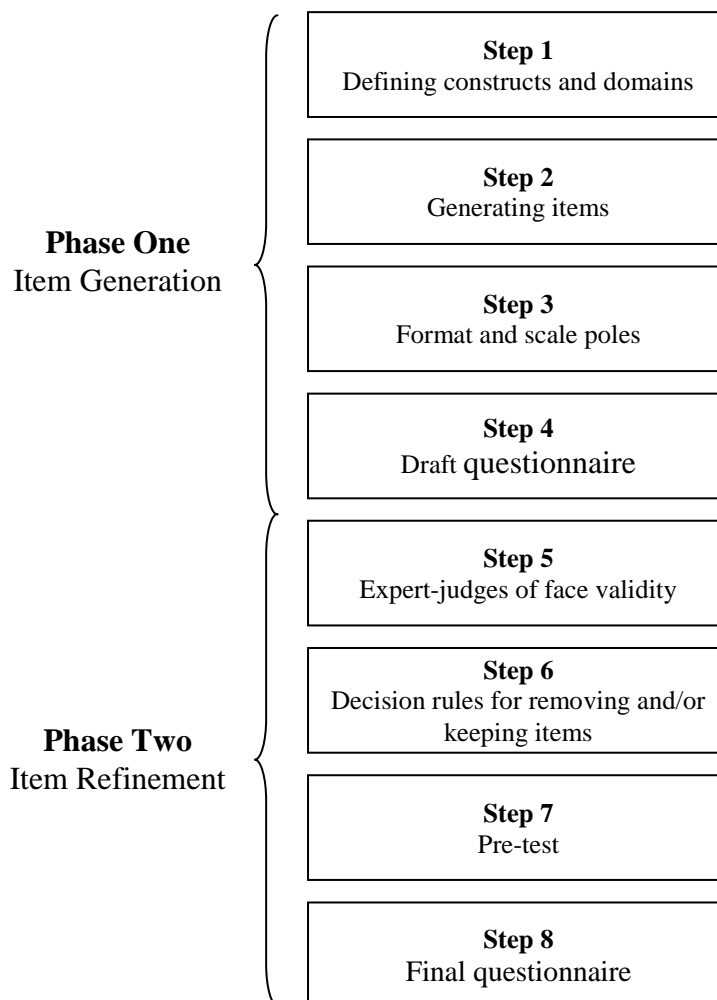
As discussed in the Section 4.4, this study adopted a descriptive research approach, and a self-administrated questionnaire using the drop-and-collect technique. As shown in Figure 4.1 (Stage II), the next task focused on selecting appropriate research tactics including the (1) developing measures of the constructs, (2) the sampling plan consisting of the sampling frame, sample size, sampling method, and data collection administration, and (3) anticipated data analysis. These issues are discussed in the Sections 4.5.1 to 4.5.3.

4.5.1. Development of the measures of constructs

As shown in Figure 4.1, the development of measures is one of the two essential activities pertaining to the research tactics. The purpose of measurement in theory testing is to provide

an empirical estimation of each theoretical construct. In particular, constructs (or latent variables) must be measured before their interrelations can be tested (Nunnally & Bernstein, 1994). Therefore, the measurement instrument is the significant bridge to integrate theory construction and theory testing. The measurement development processes represent a set of procedures used to generate measures for a specific construct. This study followed Churchill (1999) and adopted a two-stage procedure (Figure 4.3) to develop the measures of the constructs in the synchronised multi-level - multi-unit ambidexterity framework.

Figure 4.3 – Measurement development procedure



Source: Adopted from Churchill (1999)

As shown in Figure 4.3, Phase One involved generating items and consists of four steps: defining constructs and domains, principles of generating items, format and scale poles, and draft questionnaire (DeSarbo et al., 2005; Hurtt, 2010). Phase Two pertains to the refinement of items by conducting expert-judges evaluation of face validity, pre-test, and finalising the questionnaire (Churchill, 1999; DeSarbo et al., 2005; Hurtt, 2010). The questionnaire was finalised after developing and applying decision rules for removing and/or keeping representative items (Hardesty & Bearden, 2004; Ngo, 2006). To this end, the two-stage procedure of measurement development involves eight steps.

4.5.1.1. Phase One: Item generation

Step 1: Defining constructs and domain

As shown in Figure 4.3, Step 1 of the measurement development process pertains to defining constructs and their domains (Churchill, 1999). As discussed before, definitions of the eleven constructs constituting strategic ambidexterity, operational ambidexterity, exploratory strategy, exploitative strategy, exploratory R&D, exploitative R&D, exploratory marketing, exploitative marketing, new product performance, established product performance and firm performance were developed based on an extensive review of the literature presented in Chapters Two and Three. As noted in Chapter Three (Section 3.2), this study adopted the same conceptualisation for new product and established product performance (except that the timeframe varies for new versus established product). In this sense, new product and established product performance represent the performance indicators of different product development projects. Definitions of these eleven constructs are presented in Table 4.1 to provide a foundation for Step 2 of the measurement development process.

Table 4.1 – Definition of constructs

Construct	Definition
Ambidexterity at the corporate-level of the firm (Strategic Ambidexterity)	
Strategic ambidexterity represents the synchronous pursuit of exploratory and exploitative strategies (Gupta et al., 2006; Judge & Blocker, 2008).	
Exploratory strategy	represents the firm's emphasis on new product-market opportunities, new and innovative products, and emerging customer needs (He & Wong, 2004; Siren et al., 2012).
Exploitative strategy	represents the firm's emphasis on the existing product-market opportunities, automation and productivity of existing operations, and existing customer needs (He & Wong, 2004; Siren et al., 2012).
Ambidexterity at the business-level of the firm (Operational Ambidexterity)	
Operational ambidexterity represents the synchronous deployment of exploratory and exploitative capabilities (Gupta et al., 2006; Raisch et al., 2009).	
Exploratory R&D	represents the generation and deployment of new R&D routines to physically develop a product (He & Wong, 2004; Atuahene-Gima, 2005; Jansen et al., 2005; Danneels, 2008).
Exploitative R&D	represents the refinement and deployment of existing R&D routines to physically develop a product (Atuahene-Gima, 2005; Jansen et al., 2005; Peng et al., 2008; Lisboa et al., 2011).
Exploratory marketing	represents the generation and deployment of new marketing routines to link a product to customers (Kyriakopoulos & Moorman, 2004; Atuahene-Gima, 2005; Danneels, 2008).
Exploitative marketing	represents the refinement and deployment of existing marketing routines to link a product to customers (Kyriakopoulos & Moorman, 2004; Atuahene-Gima, 2005; Lisboa et al., 2011).
Product Performance	
New Product Performance	represents the extent that a new product achieves market success compared to competing products over the past year. Market success is related to the goals set by the firm in terms of sales, sales growth, market share, return on investment, profitability, development costs, customer satisfaction, and customer loyalty (Griffin & Page, 1993; Langerak et al., 2004).
Established Product Performance	represents the extent that an established product achieves market success compared to competing products over the past year. Market success is related to the goals set by the firm in terms of sales, sales growth, market share, return on investment, profitability, development costs, customer satisfaction, and customer loyalty (Griffin & Page, 1993; Langerak et al., 2004).
Ultimate performance outcome	
Firm Performance	represents the extent that a firm achieves its overall financial, market, and customer-based goals over the past year (Langerak et al., 2004; Richard et al., 2009).

Step 2: Generating items

As indicated in Figure 4.3, Step 2 pertains to item generation for measuring the constructs.

Since many constructs (i.e., corporate strategies and business-level capabilities) cannot be

directly observed or measured, researchers attempt to indirectly measure them through generating a set of items (or indicators) (Hair et al., 2002). These items describe a construct's meaning by specifying different aspects of the construct (Hair et al., 2002). Drawing on Churchill (1999), this study adopted a deductive item generation approach to create an item pool for each of the constructs of interest. Following the deductive approach, reviewing the extant literature and established (i.e., existing, prior developed) items is the primary means of item generation (Clark & Watson, 1995; Hurtt, 2010). The literature review undertaken in Chapter Two provided the backdrop upon which to develop the measures (items) for the constructs of interest depicted in Table 4.1. When there are no appropriate established items to measure a construct, research expertise as an approach to item generation can be used as the secondary means of item generation (Churchill, 1999). In this sense, items were generated directly from the conceptual definition of their respective construct. In particular, items were generated in a manner that they must properly capture the specific domain of interest as specified in the conceptual definition (Churchill, 1999). The rest of this section explains the item generation process undertaken to generate the item pool for constructs.

Measuring exploratory and exploitative strategy

Exploratory and exploitative strategies were considered in this study as two forms of corporate-level strategy. As noted in Table 4.1, exploratory strategy represents the pursuit of search, discovery, autonomy, and embracing variation, whereas exploitative strategy focuses on the pursuit of efficiency, increasing productivity, control, certainty, and variance reduction (March, 1991; Gupta et al., 2006; Raisch et al., 2009). Based on the literature review provided in Chapter Two (Section 2.3.1.1), a diverse range of conceptualisation for exploratory and exploitative strategies have been suggested within the literature. These have focused on the scope of search (Katila & Ahuja, 2002), radicalness of innovation (Bierly &

Chakrabarti, 1996), technological innovation strategies (He & Wong, 2004; Morgan & Berthon, 2008), and marketing strategies (Kyriakopoulos & Moorman, 2004). However, exploratory and exploitative strategies in this study encompass market- and technological-focused strategies. This position is consistent with Benner and Tushman (2003), Lubatkin et al. (2006), and Siren et al. (2012).¹ Since no study to date has measured exploratory and exploitative strategies using the combination of both technological- and market-focused strategies, the existing measures did not fit this study's conceptualisation of these constructs. In addition, as Gupta et al. (2006) and Simsek et al. (2009) note, the established measures for exploratory and exploitative strategies, in many studies, did not fit well with their conceptualisation either. Therefore, this study generated new measures for exploratory and exploitative strategies to overcome the weaknesses of the established items found in the literature.

The item pool for exploratory and exploitative strategies was generated based on the work of Atuahene-Gima (2005), He and Wong (2004), Jansen et al. (2006), Morgan and Berthon (2008), and Benner and Tushman (2003). The selected items were adapted to fit (a) the conceptualisation of exploratory and exploitative strategies developed in this study and (b) the product development context. Drawing on He and Wong (2004), exploratory and exploitative strategies were measured with reference to a firm itself and its strategies rather than with reference to a competitor or the industry level. The underlying reason is that an exploratory strategy adopted by one firm might be an exploitative strategy by another firm, and *vice versa*.

1. The suggestions by Siren et al. (2012) on measurement are notable, however as the study was designed and implemented across 2010-2011 the approach of Siren et al. (2012) could not be adopted. Further, their suggestions were not premised on the product development context.

In particular, eight items were generated based on the work of Atuahene-Gima (2005), He and Wong (2004), and Jansen et al. (2006) to measure exploratory strategy. Examples of the generated items for exploratory strategy are shown below:

Our firm's emphasises:

...identifying opportunities for new products.

...utilising new opportunities in new markets.

In the same vein, eight items were generated based on the work of Atuahene-Gima (2005), Jansen et al. (2006), and Morgan and Berthon (2008) to measure exploitative strategy. Examples of the generated items for exploitative strategy are shown below:

Our firm's emphasises:

...identifying opportunities for its existing products.

...improving the efficiency of its current products.

Measuring exploratory and exploitative R&D capabilities

Based on literature discussed in Chapter Two (Section 2.3.1.2), the existing literature has conceptualised exploratory and exploitative R&D in two ways: (a) different types of learning (Atuahene-Gima, 2005; Jansen et al., 2006; Lisboa et al., 2011), (b) and presence and absence of learning (Zollo & Winter, 2002; Danneels, 2008). Based on discussions in Chapter Two (Section 2.3.1.2) and Chapter Three (Section 3.3), exploratory and exploitative R&D following dynamic capability theory were conceptualised as the bundle of both learning and non-learning routines that enable a firm to generate new R&D routines and refine existing R&D routines to physically develop a product. This position implies that exploratory and exploitative R&D are dual-purpose capabilities, where their first purpose is to generate new routines or refine existing R&D routines and the second purpose is to perform specific tasks (i.e., implement exploratory strategy and develop a product). As noted in Section 2.3.1.2, this conceptualisation provides an advanced understanding of the extent that exploratory and

exploitative R&D help a firm to implement its exploratory and exploitative strategies, as well as their role in resolving inefficiency in existing routines to realise exploratory and exploitative strategies. In this sense, existing items from the literature did not fit the conceptualisation of exploratory and exploitative R&D adopted in this study, and thus new items were generated to measure these capabilities.

Based on definitions of exploratory and exploitative R&D in Table 4.1, the item pool for these constructs was generated based on the work of Atuahene-Gima (2005), Danneels (2008), Jansen et al. (2006), and Peng et al. (2009). The selected items were adapted to fit (a) the conceptualisation of exploratory and exploitative R&D developed in this study, (b) and the product development context. Drawing on He and Wong (2004) and Felin and Foss (2009), exploratory and exploitative R&D were measured with reference to a business unit (or department, project, team) itself rather than with reference to the industry level, because exploratory R&D in one business unit of a firm might be exploitative R&D in another firm and *vice versa*.

In particular, six items were generated based on the work of Atuahene-Gima (2005), Danneels (2008), Jansen et al. (2006), and Peng et al. (2009) to measure exploratory R&D. Examples of the generated items for exploratory R&D are shown below:

In this product development project, our firm:

...acquired entirely new product development processes that had not been used before by the firm.

...acquired completely new manufacturing technologies and processes that had not been used before by the firm.

Further, six items were generated based on the work of Atuahene-Gima (2005), Jansen et al. (2006), and Peng et al. (2009) to measure exploitative R&D. Examples of the generated items for exploitative R&D are shown below:

In this product development project, our firm:

...exploited mature, existing technologies to enhance the efficiency of our current products.

...refined current (existing, well-established) processes to reduce production time (i.e., improved the efficiency of our existing production processes).

Measuring exploratory and exploitative marketing

In a similar fashion to exploratory and exploitative R&D and based on discussions provided in Chapter Two (Section 2.3.1.2) and Chapter Three (Section 3.3), exploratory and exploitative marketing following dynamic capability theory were conceptualised as the bundle of both learning and non-learning routines to generate new marketing routines and refine existing marketing routines to link a product to customers. In addition, the extant research has measured exploratory and exploitative marketing focusing on marketing mix activities (i.e., product, pricing, promotion, distribution) (e.g., Kyriakopoulos & Moorman, 2004; Lisboa et al., 2011). Thus, the previous body of work had paid less attention to marketing planning and marketing implementation activities in measuring exploratory and exploitative marketing. However, exploratory and exploitative marketing in this study being based on Vorhies and Morgan (2005) and Vorhies et al. (2009) encompasses routines pertaining to marketing mix and marketing planning and implementation activities. In this sense, existing items from extant research did not fit the conceptualisation of exploratory and exploitative marketing adopted in this study, and thus new items were developed to measure these capabilities.

Based on definitions of exploratory and exploitative marketing in Table 4.1, the item pool for these constructs was generated on the basis of the adaptation and combination established items from the work of Vorhies and Morgan (2005), Vorhies et al. (2009), Slotegraaf and Dickson (2004), Kyriakopoulos and Moorman (2004), Danneels (2008), and Vorhies et al. (2011). The selected items were adapted to fit (a) the conceptualisation of exploratory and exploitative marketing developed in this study and (b) the product

development context. Similar to exploratory and exploitative R&D, exploratory and exploitative marketing were measured with reference to a business unit itself rather than with reference to the industry level; because, exploratory marketing in one business unit of a firm might be exploitative marketing in another firm or *vice versa* (see He & Wong, 2004; Felin & Foss, 2009).

In particular, 16 items were generated based on the work of Danneels (2008), Vorhies et al. (2011), Kyriakopoulos and Moorman (2004), Vorhies et al. (2009), Vorhies and Morgan (2005), and Slotegraaf and Dickson (2004) to measure exploratory marketing. Examples of the generated items for exploratory marketing are shown below:

In this product development project, our firm:

- ...developed completely new pricing processes.*
- ...set up entirely new sales and distribution channels.*
- ...developed entirely new advertising and/or promotion processes.*

In particular, 16 items were generated based on the work of Vorhies et al. (2011), Kyriakopoulos and Moorman (2004), Vorhies et al. (2009), Vorhies and Morgan (2005), and Slotegraaf and Dickson (2004) to measure exploitative marketing. Examples of the generated items for exploitative marketing are shown below:

In this product development project, our firm:

- ...refined current methods of marketing communication with customers.*
- ...refined current market research processes.*
- ...implemented current marketing strategies more efficiently.*

Measuring product performance

Product performance represents the extent that a product achieves market success compared to competing products over the past year (Griffin & Page, 1993; Langerak et al., 2004). Such market success is related to goals set by the firm in terms of sales, sales growth, market share, return on investment, profitability, development cost, customer satisfaction, and customer

loyalty (Langerak et al., 2004). To measure product performance, this study adopted eight items from Langerak et al. (2004) including three market-based, three financial, and two customer-based subjective performance indicators. Langerak et al. (2004) reports satisfactory average variance explained (AVE) (> 0.50) and Cronbach alpha (> 0.70) for these items. This study adopted subjective measures because (a) objective measures are often not possible to obtain because of confidentiality, and (b) subjective measures have been shown to be correlated to objective measures of performance (Langerak et al., 2004; Blindenbach-Driessen et al., 2010). As noted in Chapter Three (Section 3.2), new product and established product performance in this study represent the performance indicators of different product development projects. Given that new and established products represent different forms of new product category matrix suggested by Griffin and Page's (1996) presented in Figure 2.1 (Chapter Two, Section 2.3.5), this study adopts the same measure items to measure new product and established product performance. In this sense, the instruction for new product performance asked respondents to indicate how well the new product that their firm has been launched in the previous 12 months achieved the goals set by the firm over the past year. The instruction for established product performance asked respondents to indicate how well the established product that their firm has been marketed for three or more years achieved the goals set by the firm over the past year. Examples of the items used to measure product performance are shown below:

Indicate the extent to which the selected product achieved goals set by your firm over the previous year in the following statements:

...met sales growth goals.

...met market share goals.

...met return on investment goals.

Measuring firm performance

As noted in Table 4.1, firm performance represents the extent that a firm achieves its financial-, market-, and customer-based goals over the past year in terms of revenue, sales growth, market share, return on investment, profitability, customer satisfaction, and customer loyalty (Langerak et al., 2004; Richard et al., 2009). Similar to product performance, this study adopted seven items from Langerak et al. (2004). Further, Langerak et al. (2004) reports satisfactory AVE (> 0.50) and Cronbach alpha (> 0.70) for these items. Examples of the generated items for firm performance are shown below:

In relation to the goals set for the previous year, our firm has:

...met sales growth goals.

...met market share goals.

...met return on investment goals.

Measuring control variables

Control variables are factors (or constructs) that researchers include in their work to rule out alternative explanations for their findings (Becker, 2005). Specifically, control variables enable researchers to measure relevant variables that may affect the interrelationships between constructs of interest in a theoretical framework. This study considered market turbulence, technological turbulence, and organisational slack as control variables.

Market turbulence represents the speed of change and instability of customer preferences and competitors' actions in a specific market (De Luca & Atuahene-Gima, 2007). Technological turbulence represents the level of uncertainty of technological environment and speed of technological changes in a specific market (De Luca & Atuahene-Gima, 2007). This study adopted three items to measure market turbulence and four items to measure technological turbulence from De Luca and Atuahene-Gima (2007). De Luca and Atuahene-Gima (2007) reports satisfactory AVE (> 0.50) and Cronbach alpha (> 0.70) for these items.

Examples of the generated items for market turbulence and technological turbulence appear below:

Market Turbulence

In our firm's business environment:

...customer needs and product preferences changed rapidly.

...customer product demands and preferences were uncertain.

Technological Turbulence

In our firm's business environment:

...it was difficult to forecast technology developments.

...technology environment was uncertain.

Organisational slack represents the level of reserve resources (i.e., raw materials, knowledge, financial capital, human resources, and suppliers) over that which is needed for the immediate continuation of the firm's operations (Atuahene-Gima, 2005; Danneels, 2008). This study adopted three items from Danneels (2008) to measure organisational slack. Danneels (2008) reports satisfactory AVE (> 0.50) and Cronbach alpha (> 0.70) for these items. Examples of the generated items for organisational slack are shown below:

Our firm has:

...available resources for future projects.

...discretionary financial resources.

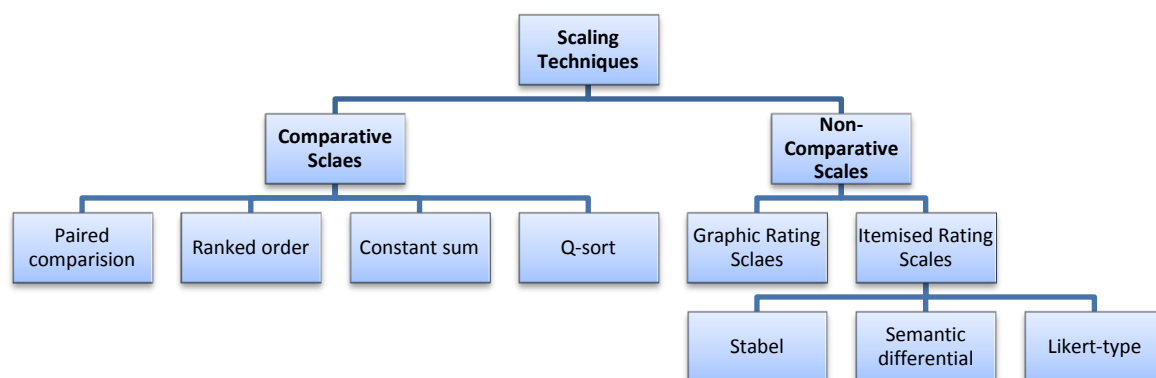
...manpower (i.e., employees) to work on special projects.

Step 3: Format and scales poles

According to Figure 4.3 (Phase One), Step 3 pertains to the selection of scale poles. The selection of a scaling technique depends upon the information that is being sought, respondent characteristics, and the proposed means of administration (Cavana et al., 2001; Malhotra, 2006). The various types of scaling techniques used in research can be classified into two categories: (a) comparative scales, and (b) non-comparative scales. In comparative

scaling, the respondent is asked to compare one object with another. On the other hand, in non-comparative scaling respondents need to evaluate a single object (Cavana et al., 2001; Wiid & Diggines, 2009). Their evaluation is independent of the other object that researchers are studying. Figure 4.4 illustrates different types of comparative and non-comparative techniques. Of these types, Likert-type scales are a common scaling technique used in the marketing literature (Aaker et al., 2004). The Likert-type scale is used when research aims to obtain a respondents' opinion on a given issue. In Likert-type scale respondents are asked to indicate how strongly they agree or disagree with an issue through a series of statements (Cavana et al., 2001). Therefore, Likert-type scales attempts to measure the direction and intensity of attitude (Wiid & Diggines, 2009). Beyond using the “strongly agree-strongly disagree” Likert scale, some scholars have used different scale poles such as “not at all-very much so”, “never-very often”, and “no extent-to a great extent” (Atuahene-Gima, 2005; Ngo & O'Cass, 2009; Hughes et al., 2010; Zhou & Wu, 2010; Murray et al., 2011; Chen et al., 2012).

Figure 4.4 – Scaling techniques



Source: Adopted from Wiid and Diggines (2009)

This study adopted Likert-type scaling technique for measuring constructs of interest noted in Table 4.1 and control variables, because of being easy to construct, administer, and

interpret, as well as being simple for respondents to understand (Cavana et al., 2001; Malhotra, 2006; Wiid & Diggines, 2009; Robson, 2011). In addition, this study used a seven point Likert-type scale, because it has been considered the most suitable approach to effectively capture the direction and intensity of response (Albaum, 1997). In addition, a seven point Likert-type scale had used widely in marketing literature (i.e., Jaworski & Kohli, 1993; Langerak et al., 2004; Vorhies & Morgan, 2005). Table 4.2 presents scale poles of constructs of interests in this study:

Table 4.2 – Scales poles

Corporate Strategies						
Exploratory Strategy and Exploitative Strategy, Market Turbulence, Technological Turbulence, Organisational Slack, Product Innovativeness						
Strongly disagree						Strongly agree
1	2	3	4	5	6	7
Business-level Capabilities						
Exploratory R&D, Exploitative R&D, Exploratory Marketing, Exploitative Marketing, Product Performance, Firm Performance						
Not at all						Very much so
1	2	3	4	5	6	7

Step 4: Draft questionnaire

At the completion of Phase One, Step 4 pertaining to the development of a draft questionnaire containing 85 items was complete. As shown in Table 4.3, these items were used to measure the eight main constructs (exploratory strategy, exploitative strategy, exploratory R&D, exploitative R&D, exploratory marketing, exploitative marketing, product performance, and firm performance) and three control variables (market turbulence, technological turbulence, and organisational slack).

Table 4.3 – Initial item pool: Constructs and numbers of corresponding items

Constructs	Number of Items
Exploratory strategy	8
Exploitative strategy	8
Exploratory R&D	6
Exploitative R&D	6
Exploratory marketing	16
Exploitative marketing	16
Product performance	8
Firm performance	7
Market turbulence	3
Technological turbulence	4
Organisational slack	3
Total	85

4.5.1.2. Phase Two: Item refinement

Step 5: Expert-judges of face validity

As shown in Figure 4.3 (Phase Two), Step 5 pertains to expert judges and face validity. Face validity refers to the extent to which a measure/item/indicator reflects what it is intended to measure (Rubio, Berg-Weger, Tebb, Lee, & Rauch, 2003). This study employed an expert judgement procedure as suggested by Ngo and O’Cass (2009), DeSarbo et al. (2005), and Hurtt (2010) to examine face validity. This study used the expertise of twelve highly reputed scholars who work in the marketing, product development, and ambidexterity areas to examine the validity and parsimony of the item pool for exploratory strategy, exploitative strategy, exploratory R&D, exploitative R&D, exploratory marketing, and exploitative marketing. This study did not examine face validity for product performance, firm performance, market turbulence, technological turbulence, and organisational slack, as they were adopted from established items with no changes.

The expert judges were given the conceptual definitions of the constructs with corresponding items and a set of instructions for judging. Within this procedure, four sub-questionnaires were created from the initial draft questionnaire and each sub-group

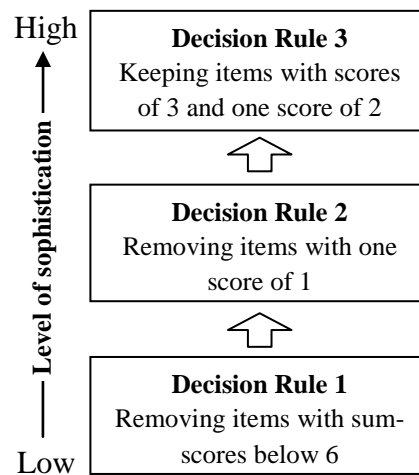
questionnaire was given to a group of three judges. The expert judges were asked to rate each item as either “not representative”, “somewhat representative”, or “very representative” of the construct definition (Ngo & O’Cass, 2009). Within this approach of assessing face validity, there are three methods of using decision rules for keeping or removing items, namely sum-score, complete, and not-representative (Hardesty & Bearden, 2004). According to the sum-score rule, an item is kept when at least 80% of expert judges rate it as “somewhat representative”, or “very representative” (Netemeyer, Burton, & Lichtenstein, 1995). Following the complete rule, an item is retained when at least 50% of expert judges rate it as “somewhat representative”, or “very representative” (Obermiller & Spangenberg, 1998). The not-representative rule indicates that an item is deleted if one judge rates it as “not representative” (Netemeyer et al., 1995).

Step 6: Decision rules for removing and/or keeping preventative items

As depicted in Figure 4.3 (Phase Two), once the expert judges’ feedback was received, decisions about which items to keep or delete in Step 6 were undertaken. As illustrated in Figure 4.5, this study followed the three-stage procedure suggested by Ngo and O’Cass (2009) to make decisions about keeping or deleting items. This procedure was developed as a synthesis of the sum-score and complete rules (Ngo & O’Cass, 2009; O’Cass & Ngo, 2011a). First, within each group of expert judges, the sum-score for an item across three judges was calculated. As noted before, every expert judge was asked to rate an item as either “not representative”, “somewhat representative”, or “very representative”. These judgements were scored as 1, 2, and 3 points respectively. To this end, an item may receive a sum-score ranging from 3 to 9. As shown in Figure 4.5, decision rule 1 focuses on an item being removed if its sum-score was below 6. Following decision rule 2, an item being removed that did not receive a score of 1 (not representative) from one of the three judgements. Subsequent

to the decision rule 2, decision rule 3 focuses on an item being kept if it received two scores of 3 (very representative) and one score of 2 (somewhat representative). Following this three-stage procedure, 2 items from exploratory strategy, 2 items from exploitative strategy, 2 items from exploratory marketing, 2 items from exploitative marketing, 1 items from exploratory R&D, and 1 item from exploitative R&D. In total, 10 items were deleted and 75 items were kept in the refined item pool.

Figure 4.5 – Decision rules for keeping and/or removing items



Source: Adopted from Ngo (2006)

In addition to the refined item pool of constructs noted in Table 4.3, eleven items pertaining to demographic characteristics of the firm were added including: types of business the firm is operating (i.e., service provider or manufacturing); types of business model (i.e., B2B or B2C); types of industry the firm is operating within (i.e., IT/telecommunication, construction, industrial automation); the ownership types (state-owned and private); the number of full-time employees; the number of years since the firm was founded; the number of new products the firm has introduced in 2008, 2009, and 2010; respondent's designated title; and respondent's education level (i.e., undergraduate, graduate). In terms of the selected product's characteristics, three items were added to identify product newness (i.e., new to the

firm and new to the market); branding mode (i.e., launched using a new brand versus an existing brand); and innovation mode (i.e., developed and marketed using the firm's internal know-how, manufactured and marketed under license of another firm).

Finally, to ensure the integrity and reliability of the responses obtained, this study adopted a similar procedure to Atuahene-Gima (2005) and De Luca and Atuahene-Gima (2007) in which two specific questions were developed to assess respondents' knowledge and confidence. First, the respondents were asked to clarify that they were knowledgeable about their firms' strategies, routines, characteristics, performance and business environment (at the beginning of the questionnaire) using 7-point scale (1= "Not at all" to 7= "Very much so"). Second, they were asked to identify their confidence in possessing the necessary knowledge to complete the statements asked throughout the questionnaire (at the end of the questionnaire) using 7-point scale (1= "Not at all" to 7= "Very much so"). Adopting this procedure requires a judgement about keeping and removing respondents and it was decided to drop any respondents who answered below 5 on these two questions. As shown in Table 4.4, the final questionnaire encompasses 91 items.

Table 4.4 – Refined item pool and demographic items

Constructs	Number of Items
Exploratory strategy	6
Exploitative strategy	6
Exploratory R&D	5
Exploitative R&D	5
Exploratory marketing	14
Exploitative marketing	14
Product Performance	8
Firm Performance	7
Control Variables	10
Demographic items	11
Selected Product's Characteristics	3
Respondent's knowledge quality	2
Total	91

Step 7: Pre-test

According to Figure 4.3 (Phase Two), after purifying the measures through face validity assessments, pre-testing was conducted before launching the full-scale questionnaire. Pre-testing can be conducted quantitatively or qualitatively (Presser et al., 2004). This study adopted a qualitative approach of pre-testing which has been widely used in the marketing literature (e.g., Jaworski & Kohli, 1993; Zhou, Yim, & Tse, 2005). To do so, in-depth interviews were conducted with twenty marketing and management senior managers following the procedure suggested by Presser et al. (2004) and DeSarbo et al. (2005). Before conducting interviews the questionnaires were translated into Persian in Iran following the conventional back-translation process suggested by Atuahene-Gima (2005) (see Section 4.5.2.3). Senior managers were asked to complete and discuss the items of the questionnaire. In particular, they were asked whether they think of more than one way to interpret what each item was asking and to report these interpretations. Findings from the in-depth interviews with senior managers revealed that in general the items of the questionnaire were understandable and meaningful. In summary, having completed all items on the questionnaire and the in-depth interviews with senior managers, no problems were reported on any of the items, indicating that the questionnaire was clear of serious flaws. In addition, the feedback obtained from the pre-test allowed researchers to make minor formatting changes in terms of layout (i.e., highlight, bold) to enhance the readability of the survey.

Step 8: Final questionnaire

According to Figure 4.3 (Phase Two), the development of the final questionnaire is the last step of the measure development procedure. As shown in Table 4.4, 91 items were used to make the final questionnaire. This study followed De Luca and Atuahene-Gima (2007) and employed a multiple informant approach to design the final questionnaire(s). In particular,

this study developed three separated questionnaires and asked three respondents from each firm to answer the questionnaires. The development of the three questionnaires was adopted for two reasons.

First, as noted in Chapter Three (Section 3.3), this study seeks to articulate the extent that exploratory and exploitative capabilities (i.e., R&D and marketing) enable a firm to implement its exploratory and exploitative strategies to enhance its performance through enhancing the performance of its new and established products. Drawing on Chapter Three (Sections 3.2, 3.3., 3.4 and 3.5), the interaction between exploratory and exploitative capabilities at the business-level and exploratory and exploitative strategies at the corporate-level of the firm is what enables a firm to implement its corporate strategies. At the business-level, the pursuit of exploratory and exploitative capabilities affects new product and established product performance, which in turn drive the ultimate firm performance at the corporate-level of the firm. To this end, exploratory strategy, exploitative strategy, and firm performance were related to the corporate-level of the firm, and exploratory capabilities, exploitative capabilities, and product performance were related to the business-level of the firm. Therefore, at least two respondents at different organisational levels (i.e., CEO or a senior manager at the corporate-level and marketing manager or a mid-level manager at the business-level) were required to answer questions related to corporate-level and business-level constructs.

Second, the development and marketing of new products rely on different types of resources (i.e., financial, time, and human) and routines (i.e., production process, pricing method) compared to those needed to develop and market established products. Therefore, firms may dedicate a specific group of employees to develop and market a new product, while another group of employees focuses on the development and marketing of an established product. These two groups can be structurally differentiated as separate

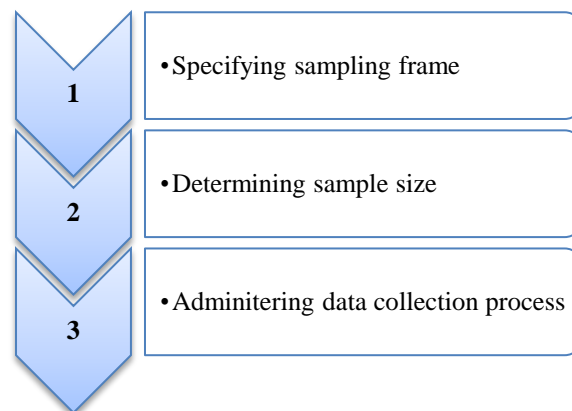
departments or can be established as separate teams within a department. Since business-level capabilities are the result of the integration of employees' knowledge and skills related to performing a specific task, different types of capabilities might be created to develop and market new products compared to those created for the development and marketing of established products (see Day, 1994; Grant, 1996; Vorhies, 1998; Orr, Bush, & Vorhies, 2011). Based on this logic, the nature of exploratory and exploitative capabilities associated with the development and marketing of a new product can be different to those that are associated with an established product. To this end, it is necessary to investigate roles and outcomes of exploratory and exploitative capabilities with respect to new and established products separately. Therefore, at least two independent respondents were required to answer questions related to roles and outcomes of exploratory and exploitative capabilities with respect to new and established products (i.e., two mid-level managers such as marketing managers and product managers).

Based on these two reasons, this study required three respondents from each firm to answer three separated questionnaires (Questionnaires A, B, and C). As shown in appendix IV, the first informant answered questions related to corporate strategies, firm performance, control variables, and firm demographic characteristics (Questionnaire A including 43 items). Second informant answered questions related to exploratory R&D, exploitative R&D, exploratory marketing, exploitative marketing, product characteristics, and product performance with respect to a new product (Questionnaire B including 53 items). The third informant answered questions related to exploratory R&D, exploitative R&D, exploratory marketing, exploitative marketing, product characteristics, and product performance with respect to an established product (Questionnaire C including 53 items). The selection criterion for each respondent is explained in Section 4.5.2.3.

4.5.2. Design of sampling plan

As shown in Figure 4.1 (Stage II), the design of the sampling plan describes how the group of target participants in the study was selected and data collection process was administrated. As shown in Figure 4.6, the sampling process consists of a number of steps including specifying the sampling frame, determining the relevant sample size, and administering the data collection process (Burns & Bush, 2006).

Figure 4.6 – The proposed sampling process



Source: Adopted from Burn and Bush (2006)

4.5.2.1. Specifying sampling frame

The sampling frame (or working population) is a list of elements of the population which the sample is drawn. Specifying the sampling frame involved the selection of empirical setting, the sampling frame, and the key informants (Cavana et al., 2001). Regarding the selection of empirical setting, Iran was selected as the empirical setting of this study for several reasons.

First, much of the work investigating organisational ambidexterity and product performance has been conducted in advanced Western economies (i.e., US, Europe, Japan) and Asian emerging economies (i.e. China, Taiwan) (e.g., Atuahene-Gima, 2005; Morgan & Berthon, 2008; Cao et al., 2009; Jansen et al., 2009). Given the growing importance of the

Middle-East in the global economy, scant attention has been given to emerging economies in the Middle-East (Ralston et al., 2011; Soltani & Wilkinson, 2012). Hence, emerging economies in the Middle-East present a meaningful departure from the theories premised on Western and Asian economies (see Burgess & Steenkamp, 2006; Ozer, 2006; O'Cass & Ngo, 2011b). Therefore, focusing on the Middle-East presents an opportunity to extend theory to new contexts and understand the extent that firms operating in Middle-Eastern emerging economies achieve organisational ambidexterity to enhance their product's performance.

Second, Iran as a Middle-Eastern emerging economy has been changing from a centrally planned to market-based economy through liberalisation and privatisation, and therefore is experiencing significant political and market changes (Soltani & Wilkinson, 2012). Such changes lead to the rapid environmental changes and high levels of uncertainty (Gao et al., 2007) which has the capacity to force firms to continually renew and improve their organisational strategies and capabilities to respond to environmental changes (Atuahene-Gima, 2005). In this sense, organisational ambidexterity represents a possible approach for firms operating in emerging economies to face rapid environmental changes and high levels of uncertainty (see discussion related to China in Atuahene-Gima, 2005; Atuahene-Gima & Murray, 2007).

Third, given firms in emerging economies are experiencing rapid economic development and transition toward market-based systems, the ability to develop and market successful products for these firms is to some extent more critical than firms operating in developed economies (Li, Liu, & Zhao, 2006). The underlying reason is that competition in emerging economies has now become more intense as firms within these economies not only compete with other domestic competitors, but also they face growing competition with foreign firms entering their home markets (see Iyer, LaPlaca, & Sharma, 2006).

Fourth, Iran's economy over recent years like others in the Middle-East has attempted to diversify from exporting oil to producing industrial products (WorldBank, 2010). Currently, Iran has over 40 major industry sectors (i.e. automotive, chemical, consumer durable), which makes it unique in the Middle-East (FinancialTimes, 2010). In addition, Iran as one of the largest economies in the Middle-East has predicted to become the 12th largest in the world by purchasing power parity by 2015 (IMF, 2010; WorldBank, 2010).

Regarding the sampling frame, a master list of 800 large-sized firms was drawn from the directory of 2000 firms provided by Industrial Management Institution in Iran. On the basis of firm size targeting, the master list of 800 firms was generated utilising systematic sampling in which firms were arranged in decreasing order of number of employees from the original directory. The systematic sampling technique has been considered as an effective sampling technique when sampling frames are available such as professional database and business directories (Malhotra, Hall, Shaw, & Oppenheim, 2006). Firms are categorised in Iran based on their number of employees, where firms with over 200 employees are classified as large firms (SCI, 2007). The rationale for overlooking small- and medium-sized firms is that they are too small in terms of the scope of their firm's activities, whereby the organisational ambidexterity model is not applicable to them. In particular, selected firms should encompass at least two organisational hierarchical levels (i.e., corporate and business). In addition, firms who had no record of launching a new product within the previous one year, as well as the development and marketing of a product for three years were excluded from the sample list.

As noted in Section 4.5.1 (Step 8), three managers (one senior manager and two mid-level managers) were selected as the key informants in this study, because of their specific knowledge about the organisational strategies and capabilities. According to Zahra and Covin (1994), data provided by managers is argued to be reliable and accurate. In addition, the use

of managerial perception within organisational ambidexterity and strategy implementation theories has been extensively adopted by a very large part of published research (e.g., He & Wong, 2004; Homburg et al., 2004; Olson et al., 2005b; Atuahene-Gima & Murray, 2007; Danneels, 2008; Jansen et al., 2008; Vorhies et al., 2009; Hughes et al., 2010; Slater, Hult, & Olson, 2010; Vorhies et al., 2011).

4.5.2.2. Determining sample size

As noted in the preceding section (4.5.2.1), the sample of the study encompassed 800 large-sized firms who had a record of introducing different products within the previous one year and the past three years. The number of participants or the estimated sample size depends on data collection method, response rate, and data analysis technique. Drawing from De Luca and Atuahene-Gima (2007), the drop-and-collect technique was employed as the data collection method. Using drop-and-collect technique is encouraged in developing countries where interpersonal interactions are preferred as modes of information exchange (Ibeh & Brock, 2004; O'Cass & Ngo, 2011a), and the unreliable nature of postal systems is a problem (Ellis, 2005). In addition, the extant research that utilised the drop-and-collect technique has acknowledged a relatively high response rate ranging from 40 to 90 percent (e.g., Coviello, Brodie, Danaher, & Wesley, 2002; O'Cass & Pecotich, 2005; De Luca & Atuahene-Gima, 2007).

The sample size plays an important role in the estimation, reliability, and interpretation of analysis result (Cavana et al., 2001). In particular, a sample size of 200 has been recommended in marketing literature for studies that utilise Covariance-Based Structural Equation Modelling (CB-SEM) as the primary data analysis technique (Fornell & Bookstein, 1982; Hair, Ringle, & Sarstedt, 2011b). On the other hand, it has advocated that a sample size of less than 200 is suitable for studies that utilise Partial Least Square SEM (PLS-SEM)

technique (Chin, Marcolin, & Newsted, 2003; Hair, Sarstedt, Ringle, & Mena, 2011a; Hair et al., 2011b). The review of the published research in the top marketing journals (such as Journal of Marketing, Academy of Management Journal, Journal of Product Innovation Management, Industrial Marketing Management) indicates that a sample of 120 to 200 respondents is suitable for research that utilise PLS-SEM technique (e.g., Cording, Christmann, & King, 2008; Akgun, Keskin, & Byrne, 2010; De Luca, Verona, & Vicari, 2010; Nakata, Zhu, & Isberk-Bligin, 2010; Navarro, Acedo, Robson, Ruzo, & Losada, 2010; Brettel et al., 2011; Slotegraaf & Atuahene-Gima, 2011). Given the advantages of PLS-SEM over CB-SEM (see discussions on advantages of PLS-SEM in Chapter Five, Section 5.3), this study employed SEM-PLS as the means of data analysis. Drawing on the empirical evidence that a response rate ranging between 40 and 90 percent is often considered achievable in drop-and-collect questionnaires and the required useable sample size of 120, over 300 questionnaires were needed to be delivered to achieve a useable sample size of 120 plus.

4.5.2.3. Administrating data collection process

The questionnaires were prepared in English and then translated into Persian in Iran. They were checked for accuracy following the conventional back-translation process suggested by Atuahene-Gima (2005). As noted in Sections 4.5.1.2 and 4.5.2.2, this study employed multiple informant design and drop-and-collect techniques to conduct data collection process. Drawing from De Luca and Atuahene-Gima (2007), the selected firms were telephoned as the initial contact. An explanation of the study was provided and how their contact details were obtained and the purposes of the contact given. To ensure they met the selection criteria, verification were sought on firm size, a record of introducing different products within the previous one year and the past three years. Then, the eligible firms were invited to participate in this study. Finally, 558 firms accepted to participate in this study.

As noted in Section 4.5.1 (Step 8), three managers (one senior manager and two mid-level managers) were selected as the key informants in this study. After an appointment with the first respondent (CEO or a senior manager who is knowledgeable about the corporate-level strategies) was made via telephone, the researcher(s) personally dropped off the information sheet and survey packages (including Questionnaires A, B, and C). The information sheet assured the first respondent's confidentiality and offered a summary of the research results. It explained that their participation in the research is voluntary and entirely their choice and if they decide to participate, they can still withdraw at any time without having to give a reason and their decision will not disadvantage them in any way.

Drawing from Zhou et al. (2008), the information sheet requested the first respondent to select two products/brands of the firm and nominate the second and third respondents (i.e., marketing manager or product manager) to complete questionnaires B and C. The first product/brand (new product) had to be a new product that the firm had launched in the previous 12 months. The second product/brand (established product) had to be an established product that the firm had marketed for three and more than years. This study restricted the recall time frame to three years to minimise problems associated with retrospective data collection (see Slotegraaf & Atuahene-Gima, 2011).

The instruction sheet recommended to the first respondent, that the second and third respondents should be the most knowledgeable persons regarding the development and marketing of the identified new and established products, respectively (i.e., product manager, project manager, marketing manager). As noted in Section 4.5.1 (Step 8), the first respondent answered questions related to corporate strategies, firm performance, control variables, and firm demographic characteristics (Questionnaire A including 42 items). The second informant answered questions related to exploratory R&D, exploitative R&D, exploratory marketing, exploitative marketing, product characteristics, and product performance with

respect to a new product (Questionnaire B including 53 items). The third informant answered questions related to exploratory R&D, exploitative R&D, exploratory marketing, exploitative marketing, product characteristics, and product performance with respect to an established product (Questionnaire C including 53 items). Finally, the researcher arranged a return time for collecting completed questionnaires. Before collecting the questionnaires, pre-notification was given to the respondent about the visit, 1-3 days before the pick-up date.

4.5.3. Anticipated data analysis techniques

Choice of methods and techniques to analyse data depends on whether the collected data is quantitative or qualitative (Cavana et al., 2001). This study adopted a descriptive, quantitative-based research design, thus quantitative analysis methods are appropriate to analyse collected data. Given the nature of the study as theorising and testing hypothesised relationships between the constructs, Structural Equation Modelling (SEM) was a suitable method of data analysis and model evaluation for this study (see Fornell & Larcker, 1981; Chin & Newsted, 1999; Calantone et al., 2006; Reinartz, Haenlein, & Henseler, 2009). There appear two SEM techniques within the marketing literature, covariance-based (CB-SEM) and partial least square (PLS-SEM) (Fornell & Bookstein, 1982; Hair et al., 2011b). As noted in Section 4.5.2.2, this study employed PLS-SEM as the means of data analysis. The underlying reasons for selecting of PLS-SEM are provided in Chapter Five, Section 5.3.

4.6. Stage III: The implementations stage

As shown in Figure 4.1, the final stage in the planning of research is the implementation stage (Stage III). Before doing the field work in Iran, budgeting and timing were estimated. It helped to identify foreseeable expenses and to ensure that the research was financially viable. The budgeting included costs related to the back-translation process, printing and packaging

cost, transportation, and living expenses in Iran. The budget for the current research is presented in Table 4.5.

Table 4.5 – Budgeting for data collection

Items	Description	Cost (AUD)
Telephone Arrangement	This study selected 800 firms utilising systematic sampling from the Iranian Industrial Managers Association and Industrial Management Institution in Iran. Each firm requires at least an invitation call to participate in this study and arrangement to drop the questionnaires, and a follow up call to collect the questionnaire.	205.00
Survey Package Preparation and Print	588 survey packages (including three questionnaires and an information sheet) were printed and distributed.	560.00
Transportation	Two transportation methods were used during data gathering. The first method was dropping and collecting 350 survey packages using public transportation. The second method was dropping and collecting 200 survey packages using hired car due to spatial distance of the firms around different suburbs.	1,175.00
Translation	Since the respondents were Iranian managers and due to their lack of knowledge of English, the questionnaires were translated into the dominant language of Iran. The study adopted a back-translation approach in order to check translation validity. All items first were translated from English into Persian by a certified translator, then they were back-translated into English by another certified translator. Any conflicts were discussed by researchers and translators until they reach an agreement.	282.00
Flight	Since this study was implemented in Iran, the researcher went to Iran using Virgin-Blue Airline (Hobart-Melbourne) and Emirates Airline (Melbourne-Tehran).	2,360.00
Total		4,582.00

4.7. Conclusion

In this chapter, the description of the methodology employed to undertake the study was presented. The methodology and research design were described following framework suggested by Aaker et al. (2004) and Hair et al. (2002). Adopting the positivism paradigm, this study was designed as a quantitative-based descriptive study. Among three discussed quantitative research approaches in Section 4.2.2, self-administered questionnaire utilising the drop-and-collect technique was chosen as the means of data collection. Eight main

constructs and four control variables depicted in Table 4.4 were measured using 91 items by which a questionnaire was constructed and refined. Following a multiple informant approach, three questionnaires (Questionnaires A, B, and C) were developed. Regarding sampling frame, 800 large-sized firms from a directory of firms provided by Industrial Management Institution in Iran were selected. Finally, the anticipated data analysis technique was also discussed. Next chapter (Chapter 5) will describe data analysis techniques and data analysis results.

Chapter Five

Data Analysis & Findings

5.1. Introduction

The central concern of Chapter Three was to develop the theoretical framework, and hypotheses focusing on the interrelationships among the constructs. Specifically, Chapter Three presented eight hypotheses to address and explain the interrelationships among constructs presented in the synchronised multi-level - multi-unit ambidexterity framework (Figure 3.1). This framework and more specifically the hypotheses articulate the interrelations on the effects of the extent that firms manage the pursuit of corporate-level exploratory and exploitative strategies, and this is related to the deployment of business-level exploratory and exploitative capabilities across multiple functional areas and multiple product development projects. In Chapter Four, the research design was outlined to show how the data were collected and how this allows the connection of the theory (or hypotheses) to empirical data.

This chapter outlines the data analysis strategy and procedure employed to analyse the data, examine the adequacy, validity, and predictive relevance of the measures of the focal constructs in the synchronised multi-level - multi-unit ambidexterity framework to test the hypotheses. This chapter starts with the preliminary data analysis (Section 5.2) outlining the results of the descriptive analysis. Sections 5.3 and 5.4 explain the data analysis techniques used to assess the adequacy and validity of the measurement models. Sections 5.5 to 5.7 provide the results of the assessment of the predictive relevance of inner-structural models,

results of the hypotheses testing, and the model fit of inner-structural models, respectively. Finally, the chapter closes with a section outlining additional analysis (Section 5.8) and the conclusion of results is presented (Section 5.9).

5.2. Preliminary data analysis

As noted in Chapter Four (Section 4.5.2.3), 558 firms from a sample of 800 firms agreed to participate in this study. The survey packages (including one information sheet and Questionnaires A, B and C) were distributed using a drop-and-collect technique and 186 completed survey packages were received with a response rate of 23.25 per cent.

Once the data were gathered and entered, preliminary analysis was undertaken. The preliminary analysis encompasses two important tasks: examining and reporting the profile of the sample based on demographic items of firms and individual respondents and computing the descriptive statistics of the measures of the constructs (Anderson, Sweeney, & Williams, 2010). These two tasks are detailed in the sections 5.2.1 and 5.2.2, respectively.

5.2.1. Profiles of the sample

The profile of the sample is characterised by eleven demographic items including types of business the firm is operating (i.e., service provider or manufacturing), types of business model (i.e., B2B, B2C, or both), types of industry the firm is operating within (i.e., IT/telecommunication, construction, industrial automation), the ownership types (state-owned and private), the number of full-time employees, the number of years since the firm was founded, the number of new products the firm has introduced in 2008, 2009, and 2010, and respondent's designated title, and respondent's education level (i.e., undergraduate, postgraduate).

As presented in Table 5.1, the sample profile indicates that 87.6% of firms were manufacturers and 12.4% were service providers. The business model for 30.8% of the

sample was business to business (B2B), 42.6% was business to customers (B2C), and 26.6% was both B2B and B2C. Drawing on the business descriptions in Hoover's and Disclosure Industry Sector Categories (HDISC, 2011), industry sectors were divided into nine main sectors: IT and telecommunication, food, chemical, automotive, industrial machinery and process equipment, healthcare, pharmaceutical, consumer durable, textile, and electronic equipment. Specifically, IT and telecommunication sector accounted for 5.3% of the sample, food 10.7%, chemical 4.7%, automotive 13.6%, industrial machinery and process equipment 19.5%, healthcare 3.6%, pharmaceutical 4.1%, consumer durable 9.5%, textile 4.7%, electronic equipment 4.1%, and others 20.1%. In terms of ownership, only 3.6% of firms were state-owned and the rest of the sample encompassed private firms.

The results of the analysis also indicate that 59% of firms had 200 to 500 full-time employees, 24.3% had 500 to 1000 full-time employees, and 16.5% had over 1000 full-time employees. In addition, 46.7% of the firms were founded less than 20 years ago, 34.3% were founded between 20 and 40 years ago, and 19.0% were founded over 40 years ago. The analysis also shows that within the respondent firms, the number of new products introduced varied, with 75.8% of firms introduced 1 to 5 new products in 2008, 76.3% in 2009, and 72.7% in 2010. 20.1% of firms introduced 5 to 10 new products in 2008, 14.7% in 2009, and 17.1% in 2010. 4.1% of firms introduced over 10 new products in 2008, 9.0% in 2009, and 11.2% in 2010.

Table 5.1 – Profiles of the sample

Variable	Category	Observed Frequency	Percentage		
Industry Type	Manufacturer	148	87.6 %		
	Service Provider	21	12.4 %		
Market Type	Business to Business	52	30.8 %		
	Business to Customer	72	42.6 %		
	Both	45	26.6 %		
Industry Sector	IT & Telecommunication	9	5.3 %		
	Food	18	10.7 %		
	Chemical	8	4.7 %		
	Automotive	23	13.6 %		
	Industrial Machinery	33	19.5 %		
	Healthcare	6	3.6 %		
	Pharmaceutical	7	4.1 %		
	Consumer Durable	16	9.5 %		
	Textile	8	4.7 %		
	Electronic Equipment	7	4.1 %		
	Others	34	20.1 %		
	Ownership Type	State-owned	6	3.6 %	
Private		163	96.4 %		
Firm Size	200 to 500 Employees	100	59.2 %		
	500 to 1000 Employees	41	24.3 %		
	Over 1000 Employees	28	16.5 %		
Firm Age	1 to 20 Years	79	46.7 %		
	20-40 Years	58	34.3 %		
	Over 40 Years	32	19.0 %		
Number of New Products		Year			
		2010	2009	2008	
	1 to 5	123 (72.7 %)	129 (76.3 %)	128 (75.8 %)	
	5 to 10	29 (17.1 %)	25 (14.7 %)	34 (20.1 %)	
	Over 10	19 (11.2 %)	15 (9.0 %)	7 (4.1 %)	
Respondent Type		Respondents			
		1 (Questionnaire A)	2 (Questionnaire B)	3 (Questionnaire C)	
	CEO / Vice CEO	146 (86.4 %)	16 (9.5 %)	4 (2.4 %)	
	Product Manager	3 (1.8 %)	40 (23.7 %)	69 (40.8 %)	
	Marketing Manager	4 (2.4 %)	37 (21.9 %)	20 (11.8 %)	
	R&D Manager	-	18 (10.7 %)	20 (11.8 %)	
	Consultants	2 (1.2 %)	17 (10.1 %)	13 (7.7 %)	
	Others	9 (5.3 %)	25 (14.8 %)	27 (16.0 %)	
	Respondent Education Level				
		Undergraduate	79 (46.7 %)	78 (46.1 %)	65 (38.5 %)
Postgraduate		79 (46.7 %)	86 (50.9%)	94 (55.6 %)	
Others (i.e., PhD)		11 (6.6 %)	5 (3.0 %)	10 (5.9 %)	

As noted in Chapter Four (Section 4.5.2.3), three separate respondents from each firm were asked to complete Questionnaires A, B, and C. As shown in Table 5.1, 86.4% of respondents to Questionnaire A were in positions such as CEOs, managing directors, or Vice-CEOs, 1.8% product manager, 2.4% marketing manager, and 1.2% consultants. The respondents to Questionnaire B included 9.5% of respondents CEO, managing director, or Vice-CEO, 23.7% product manager, 21.9% marketing manager, 10.7% R&D manager, and 10.1% consultants. The respondents to Questionnaire C included 2.4% CEO, managing director, or Vice-CEO, 40.8% product manager, 11.8% marketing manager, 11.8% R&D manager, and 7.7% consultants. In terms of respondents' educational level, 46.7%, 46.7%, and 6.6% of the first respondents were undergraduate (i.e., Bachelor degree), postgraduate (i.e., Master degree) and others (i.e., PhD or higher degrees), respectively. Within Questionnaire B, 46.1%, 50.9%, and 3.0% were undergraduate, postgraduate and others, respectively. For Questionnaire C, 38.5%, 55.6%, and 5.9% of respondents were undergraduate, postgraduate and others, respectively.

As discussed in Chapter Four (Section 4.5.2.3), each firm was asked to nominate one new product (launched within the previous 1 year) and an established product (3 or older than 3 years). As shown in Table 5.2, the profile of the selected new products indicates that 16.6% of new products were new to the firm and target customers, 79.3% were new to the firm, and 4.1% were the extension of previous products. In terms of branding mode, 16.6% of new products were launched using a new brand and 83.4 were launched using the existing brand. In terms of innovation mode, 34.9% of new products were developed and marketed using the firm's internal know-how, 50.3% were developed and marketed through partnership or joint venture with other firms, and 13.6% were manufactured and marketed under license from another firm.

Table 5.2 also shows that 5.3% of established products were upgraded (i.e., improved, updated) by adding radical (i.e., innovative, new) features to the basic (i.e., previous) version of the product over last three years, 68.0% were upgraded using incremental (i.e., slight changes) adaptations, and 26.6% were not changed or upgraded over last three years. In terms of branding mode, 11.2% of established products were launched using a new brand and 88.8% were launched using the existing brand. In terms of innovation mode, 43.8% of established products were developed and marketed using the firm's internal know-how, 44.4% were developed and marketed through partnership or joint venture with other firms, and 11.8% were manufactured and marketed under license from another firm.

Table 5.2 - Profiles of the selected new and established products

Variable	Category	Observed Frequency	Percentage
Product A (New Product)			
Product Newness	New to the Firm – New to the Market	28	16.6 %
	New to the Firm – Familiar to the Market	134	79.3 %
	Familiar to the Firm – Familiar to the Market	7	4.1 %
Branding Mode	Launched Using a New Brand	28	16.6 %
	Launched Using the Existing Brand	141	83.4 %
Innovation Mode	Developed and Market Using the Firm's Internal Know-How	59	34.9 %
	Developed and Marketed through Partnership or Joint Venture with other Firms	85	50.3 %
	Manufactured and Marketed under License of another Firm	23	13.6 %
Product B (Established Product)			
Adaptation (Upgrade) Mode	Radical	9	5.3 %
	Incremental	115	68.0 %
	No Changes	45	26.6 %
Branding Mode	Launched Using a New Brand	19	11.2 %
	Launched Using the Existing Brand	150	88.8 %
Innovation Mode	Developed and Market Using the Firm's Internal Know-How	74	43.8 %
	Developed and Marketed through Partnership or Joint Venture with other Firms	75	44.4 %
	Manufactured and Marketed under License of another Firm	20	11.8 %

5.2.2. Descriptive statistics results

As shown in Table 4.4 in Chapter Four (p. 127), eleven multi-item constructs were measured including exploratory strategy, exploitative strategy, exploratory R&D, exploitative R&D,

exploratory marketing, exploitative marketing, product performance, firm performance, market turbulence, technological turbulence, and organisational slack. As noted in Section 5.2, this study received 186 completed survey packages (including Questionnaires A, B, and C). From this sample, 17 cases were deleted due to a large portion (greater than 10%) of missing responses (Hair, Anderson, Tatham, & Black, 1998). Of the remaining 169 cases, 61 cases contained a small number of missing responses randomly distributed throughout the questionnaires. As recommended by Hair et al. (1998), these cases were examined to determine whether patterns existed in the missing data. As there were no apparent patterns in the missing data, this study imputed (or replaced) missing values using the mean for the entire series (Roth, 1994). After all missing data were imputed, preliminary data analysis to evaluate the psychometric properties of items via evaluation of central tendency (i.e., mean) and dispersion (i.e., standard deviation, skewness, and kurtosis) was undertaken. The summary of means, standard deviation (SD), skewness, and kurtosis for each of the constructs' items related to Questionnaires A, B, and C are presented in Tables 5.3, 5.4, and 5.5, respectively.

As shown in Table 5.4, Questionnaire A includes items related to exploratory strategy (RS1 to RS6), exploitative strategy (IS1 to IS6), firm performance (FP1 to FP5), market turbulence (MT1 to MT3), technological turbulence (TT1 to TT3), and organisational slack (OS1 to OS3). The results of the descriptive statistics of these items indicate that means ranged from 2.79 to 4.81 and SD ranged from 0.84 to 1.86. This study used skewness and Kurtosis as two numerical items to examine normality of items. Skewness is a third standardised moment that measures the degree of symmetry of a probability distribution. Kurtosis measures the thinness of tails of a probability distribution (Park, 2008). Table 5.4 shows that scores of skewness ranged from -1.84 to .41 and kurtosis ranged from -1.22 to

5.98. Specifically, the kurtosis score of IS1, IS3, IS4, IS6, and FP1 demonstrated that the distribution of these items departed from normal distribution range of ± 2 (DeVellis, 1991).

Table 5.3 – Descriptive statistics results of Questionnaire A

Construct	Mean	SD	Skewness	Kurtosis
Exploratory Strategy				
RS1 ...identifying opportunities for new products.	3.34	1.02	-.43	-.96
RS2 ...utilising new opportunities in new markets.	3.28	.97	-.52	-.10
RS3 ...inventing new products with unique features not available in competing products.	2.79	1.00	.20	-1.10
RS4 ...expanding its product range (e.g. add new product line(s)).	2.98	1.10	-.23	-.71
RS5 ...discovering new ways to meet customer needs.	3.6	1.08	-.85	1.96
RS6 ...acquiring product development skills and processes entirely new in the firm.	3.28	1.04	-.63	.25
Exploitative strategy				
IS1 ...identifying opportunities for its existing products.	3.66	1.21	-1.24	4.52
IS2 ...strengthening its existing position in its current markets.	3.78	1.12	-.12	-.64
IS3 ...improving efficiency of its current products.	3.75	1.02	-1.34	3.36
IS4 ...focusing on a stable (e.g. specific, limited) range of products.	3.50	1.12	-1.46	3.46
IS5 ...introducing improved, but existing products for its existing markets.	3.26	1.09	-.09	-.44
IS6 ...improving its current product development processes and skills for its existing products.	3.42	1.05	-1.84	5.98
Firm Performance				
FP1 ...met revenue goals.	4.29	.84	-1.31	3.62
FP2 ...met sales growth goals.	4.25	1.07	-.66	.06
FP3 ...met market share goals.	4.12	1.19	-.34	-.58
FP4 ...met return on investment goals.	4.12	.98	-1.00	.71
FP5 ...met profitability goals.	4.26	1.05	-1.05	.79
FP6 ...achieved customer satisfaction goals.	4.68	.98	-.87	1.54
FP7 ...achieved customer loyalty goals.	4.53	1.13	-.88	1.32
Market Turbulence				
MT1 ...customer needs and product preferences changed rapidly.	4.09	1.86	.13	-1.22
MT2 ...customer product demands and preferences were uncertain.	4.27	1.83	-.02	-1.12
MT3 ...it was difficult to predict changes in customer needs and preferences.	4.06	1.77	.16	-1.20
Technological Turbulence				
TT1 ...it was difficult to forecast technology developments.	3.65	1.53	.26	-.82
TT2 ...technology environment was uncertain.	3.73	1.67	.41	-.93
TT3 ...technological developments were unpredictable.	3.61	1.71	.37	-.91
TT4 ...technology environment was complex.	3.94	1.75	.18	-1.10
Organisational Slack				
OS1 ...available resources for future projects.	4.81	1.21	-.77	.21
OS2 ...discretionary financial resources.	4.49	1.53	-.44	-.39
OS3 ...manpower to work on special projects.	4.63	1.39	-.53	-.34

As shown in Table 5.4, Questionnaire B includes items related to exploratory R&D (RI21 to RI25), exploitative R&D (II21 to II25), exploratory marketing (RM21 to RM214),

exploitative marketing (IM21 to IM214), and product performance (S21 to S28) with respect to the selected new product. The results of the descriptive statistics of these items indicate that means ranged from 3.20 to 4.99, SD ranged from 0.86 to 1.60, skewness ranged from -1.02 to 2.09 and kurtosis ranged from -1.10 to 3.38. Specifically, the skewness score RM24 of and the kurtosis score of RM24, S27, and S28 demonstrated that the distribution of these items departed from normal distribution range of ± 2 (DeVellis, 1991).

Table 5.4 – Descriptive statistics results of Questionnaire B

Construct		Mean	SD	Skewness	Kurtosis
Exploratory R&D					
RI21	...acquired entirely new product development processes that had not been used before by the firm.	4.13	1.19	-.06	-.91
RI22	...acquired completely new manufacturing technologies and processes that had not been used before by the firm.	3.78	1.19	.39	-1.08
RI23	...acquired entirely new managerial and organisational skills related to new product development process (e.g. set up new liaison teams to integrate R&D, marketing, manufacturing, and other functions).	4.20	1.29	.38	-.42
RI24	...acquired entirely new technology and R&D training skills for personnel development.	3.77	1.12	-.84	.01
RI25	...set up completely new types of manufacturing facilities and operations.	4.08	1.18	-.37	-.94
Exploitative R&D					
II21	...improved its current (existing, well-established) processes aimed at quality improvement of our current products.	4.39	1.27	-.38	-.75
II22	...exploited mature, existing technologies to enhance the efficiency of our current products.	4.24	1.32	-.15	-.78
II23	...strengthened current managerial and organisational skills that improve the efficiency of the existing product development process (e.g. improve existing coordination between R&D, marketing, manufacturing and other functions).	4.50	1.18	-.02	-.31
II24	...improved current processes to reduce the cost of our current products.	4.03	1.09	-.25	-.83
II25	...refined current processes to reduce production time.	4.64	1.25	-.78	.11
Exploratory Marketing					
RM21	...developed completely new pricing processes.	3.81	1.26	.75	-.71
RM22	...set up entirely new sales and distribution channels.	3.31	1.35	1.16	.30
RM23	...developed entirely new advertising and/or promotion processes.	3.33	1.29	.99	-.12
RM24	...created a completely new brand for the new product.	3.85	1.33	2.09	3.38
RM25	...researched about new customers.	3.78	1.47	.24	-.61
RM26	...researched about new competitors.	3.57	1.60	.14	-.96
RM27	...segmented the market in a completely new way.	3.47	1.36	1.26	.67
RM28	...developed completely new customer relationship management methods.	3.48	1.34	.60	-.71
RM29	...developed entirely new methods of marketing communication with customers.	3.49	1.23	.85	.13
RM210	...set up completely new public relations methods.	3.53	1.17	.62	-.61
RM211	...set up entirely new marketing research processes.	3.53	1.39	.62	-.48
RM212	...developed completely new market testing processes.	2.89	1.19	.49	-.41
RM213	...developed completely new pricing processes.	3.49	1.47	.38	-.66
RM214	...set up entirely new sales and distribution channels.	3.44	1.45	.47	-.23

Table 5.4 – Descriptive statistics results of Questionnaire B (Cont'd)

Construct		Mean	SD	Skewness	Kurtosis
Exploitative Marketing					
IM21	...refined current (existing, well-established) pricing processes.	4.05	.98	-.21	-.24
IM22	...improved current sales and distribution channels.	3.99	1.11	-.18	-.89
IM23	...refined current advertising and/or promotion processes.	3.65	1.08	-.01	-.93
IM24	...strengthened the brand image for current product.	4.01	.98	-.23	-.39
IM25	...researched about current customers.	3.79	1.49	.16	-1.01
IM26	...researched about current competitors.	3.61	1.51	.30	-1.10
IM27	...segmented the market in a completely new way.	3.82	1.05	-.10	-.59
IM28	...improved current customer relationship management methods.	3.76	1.08	-.08	-.69
IM29	...refined current methods of marketing communication with customers.	3.60	1.03	.13	-.35
IM210	...improved current public relations methods.	3.83	.99	-.05	-.07
IM211	...refined current market research processes.	3.33	.98	.51	-.50
IM212	...improved current market testing processes.	3.20	1.39	.44	-.63
IM213	...implemented current marketing strategies more efficiently.	4.01	1.14	-.10	-.40
IM214	...improved current marketing strategies.	4.06	1.17	-.06	-.53
New Product Performance					
S21	...met revenue goals.	4.60	1.01	-.68	.72
S22	...met sales growth goals.	4.47	1.04	-.55	.55
S23	...met market share goals.	4.99	1.04	-.45	-.10
S24	...met return on investment goals.	4.38	.90	-.26	-.06
S25	...met profitability goals.	4.43	.96	-.16	-.34
S26	...met development cost goals.	4.46	1.01	-.35	-.26
S27	...achieved customer acceptance goals.	4.56	.86	-.72	2.24
S28	...achieved customer satisfaction goals.	4.60	.89	-1.02	2.52

As shown in Table 5.5, Questionnaire C includes items related to exploratory R&D (RI31 to RI35), exploitative R&D (II31 to II35), exploratory marketing (RM31 to RM314), exploitative marketing (IM31 to IM314), and product performance (S31 to S38) with respect to the selected established product. The results of the descriptive statistics of these items indicate that means ranged from 2.85 to 4.71, SD ranged from 0.92 to 2.08, skewness ranged from -1.07 to 1.20 and kurtosis ranged from -1.08 to 1.53, demonstrating normality of these items.

Table 5.5 – Descriptive statistics results of Questionnaire C

Construct		Mean	SD	Skewness	Kurtosis
Exploratory R&D					
RI31	...acquired entirely new product development processes that had not been used before by the firm.	3.34	1.49	.65	-.59
RI32	...acquired completely new manufacturing technologies and processes that had not been used before by the firm.	2.98	1.43	1.20	.50
RI33	...acquired entirely new managerial and organisational skills related to new product development process (e.g. set up new liaison teams to integrate R&D, marketing, manufacturing, and other functions).	3.27	1.28	.98	.18
RI34	...acquired entirely new technology and R&D training skills for personnel development.	3.10	1.46	-.03	-1.08
RI35	...set up completely new types of manufacturing facilities and operations.	3.18	1.51	.75	-.43
Exploitative R&D					
II31	...improved its current (existing, well-established) processes aimed at quality improvement of our current products.	4.05	.92	-.38	-.75
II32	...exploited mature, existing technologies to enhance the efficiency of our current products.	3.90	1.01	-.15	-.78
II33	...strengthened current managerial and organisational skills that improve the efficiency of the existing product development process (e.g. improve existing coordination between R&D, marketing, manufacturing and other functions).	3.57	.93	-.02	-.31
II34	...improved current processes to reduce the cost of our current products.	4.01	1.00	-.25	-.83
II35	...refined current processes to reduce production time.	4.17	1.10	-.78	.11
Exploratory Marketing					
RM31	...developed completely new pricing processes.	3.25	1.98	.03	-.83
RM32	...set up entirely new sales and distribution channels.	2.84	1.95	.14	-1.00
RM33	...developed entirely new advertising and/or promotion processes.	2.85	1.84	.43	-.14
RM34	...created a completely new brand for the new product.	2.41	2.04	-.09	-.82
RM35	...researched about new customers.	3.36	1.68	.36	-.85
RM36	...researched about new competitors.	3.26	1.96	.46	-.99
RM37	...segmented the market in a completely new way.	2.85	1.93	.05	-.78
RM38	...developed completely new customer relationship management methods.	3.29	1.83	.07	-.80
RM39	...developed entirely new methods of marketing communication with customers.	3.01	1.69	.49	-.20
RM310	...set up completely new public relations methods.	3.01	1.74	-.08	-.87
RM311	...set up entirely new marketing research processes.	3.11	1.68	.66	-.49
RM312	...developed completely new market testing processes.	2.40	1.57	1.08	.29
RM313	...developed completely new pricing processes.	3.02	1.90	.68	-.82
RM314	...set up entirely new sales and distribution channels.	3.03	2.08	.67	-.96
Exploitative Marketing					
IM31	...refined current (existing, well-established) pricing processes.	4.00	1.29	.01	-.41
IM32	...improved current sales and distribution channels.	3.85	1.59	.12	-.89
IM33	...refined current advertising and/or promotion processes.	3.56	1.48	.57	-.26
IM34	...strengthened the brand image for current product.	4.15	1.66	-.19	-.93
IM35	...researched about current customers.	3.38	1.81	.47	-.76
IM36	...researched about current competitors.	3.38	1.91	.32	-1.06
IM37	...segmented the market in a completely new way.	3.77	1.48	.10	-.69
IM38	...improved current customer relationship management methods.	3.75	1.57	-.06	-.73
IM39	...refined current methods of marketing communication with customers.	3.71	1.42	.53	-.08
IM310	...improved current public relations methods.	4.02	1.60	-.06	-.93
IM311	...refined current market research processes.	3.31	1.74	.48	-.58
IM312	...improved current market testing processes.	3.15	1.75	.55	-.67
IM313	...implemented current marketing strategies more efficiently.	4.12	1.52	.03	-.57
IM314	...improved current marketing strategies.	4.05	1.50	.09	-.67

Table 5.5 – Descriptive statistics results of Questionnaire C (Cont'd)

Construct		Mean	SD	Skewness	Kurtosis
Established Product Performance					
S31	...met revenue goals.	4.71	.95	-.40	-.16
S32	...met sales growth goals.	4.31	1.24	-.81	1.04
S33	...met market share goals.	4.02	1.27	-.47	.11
S34	...met return on investment goals.	4.38	1.05	-.85	.96
S35	...met profitability goals.	4.48	1.09	-.47	-.38
S36	...met development cost goals.	4.55	1.09	-.58	-.06
S37	...achieved customer acceptance goals.	4.44	1.13	-1.07	1.53
S38	...achieved customer satisfaction goals.	4.43	1.01	-.87	1.04

As noted in Chapter Four (Section 4.5.1.1, Phase 6), Questionnaires A, B and C include one item pertaining to the respondent's knowledge and one item regarding the respondent's confidence in responding to the items in the questionnaire. As shown in Table 5.6, descriptive statistics of these items indicate that means ranged from 5.56 to 6.33, SD ranged from 0.79 to 1.30, skewness ranged from -1.23 to -0.36 and kurtosis ranged from 0.09 to 1.82, demonstrating normality of these items.

Table 5.6 – Descriptive statistics results of respondent's knowledge and confidence

Construct		Mean	SD	Skewness	Kurtosis
Questionnaire A					
GQ11	Knowledgeable Quality	6.21	1.30	-1.08	1.22
GQ19	Confidence	6.33	.96	-1.23	1.38
Questionnaire B					
GQ21	Knowledgeable Quality	5.62	.79	-.64	1.51
GQ29	Confidence	5.77	.88	-.87	1.07
Questionnaire C					
GQ31	Knowledgeable Quality	5.56	.89	-1.02	1.82
GQ39	Confidence	5.82	.81	-.36	.09

In summary, the results of the preliminary analysis indicate that some items departed from normality.

5.3. Partial least squares

As noted before (Section 4.5.3), this study employs PLS-SEM to assess the adequacy and validity of measurement models, examine the predictive relevance of the synchronised multi-level - multi-unit ambidexterity framework (Figure 3.1), and test the eight hypotheses. PLS-SEM allows simultaneous examination of measures and hypotheses (i.e., the outer and inner models) (Chin et al., 2003; Hair et al., 2011b). In particular, the PLS-SEM estimation process continuously oscillates between estimating case values for block variables and model parameters that depend on these case values (Reinartz et al., 2009). Block variables are the weighted average of all items that belong to the same construct. As all block variables are linear combinations of their items, PLS-SEM does not suffer from improper solutions and factor indeterminacy which sometimes occurs when using CB-SEM techniques (Reinartz et al., 2009). By continuously oscillating between estimating case values for the block variables and model parameters PLS-SEM allows simultaneous analysis of (1) how well the measures relate to each construct and (2) whether the hypothesised relationships at the theoretical level are empirically true (Limayem, Hirt, & Cheung, 2007; Reinartz et al., 2009; Hair et al., 2011b).

PLS-SEM has for some time now been increasingly applied in the marketing and management literature to test the theory (e.g., Bontis & Booker, 2007; Cording et al., 2008; Henseler, Ringle, & Sinkovics, 2009; Ngo & O'Cass, 2009; Akgun et al., 2010; De Luca et al., 2010; Nakata et al., 2010; Navarro et al., 2010; Brettel et al., 2011; Hair et al., 2011a; Kumar, Heide, & Wathne, 2011; Slotegraaf & Atuahene-Gima, 2011; O'Cass, Ngo, & Heirati, 2012). PLS-SEM has been used to overcome some of the identified limitations of covariance-based (CB-SEM) techniques (i.e., employed via software such LISREL and Amos) (Wold, 1985; Hulland, 1999; Chin et al., 2003; Reinartz et al., 2009; Hair et al.,

2011b). The consideration given to use PLS-SEM over CB-SEM techniques is premised on several benefits.

First, PLS-SEM is distribution free approach (Hulland, 1999; Hair et al., 2011a; Kumar et al., 2011). Specifically, PLS-SEM is recommended in the presence of three conditions: (1) high skewness (beyond the range of ± 2) instead of symmetric distribution for items (or manifest variables), (2) multicollinearity within blocks of manifest and between constructs (or latent variables), and (3) misspecified measurement models and incorrect structural relations (Cassel, Hackl, & Westlund, 1999). Second, PLS-SEM focuses on maximising the variance explained for all endogenous constructs in a model, whereas CE-SEM techniques determine model parameters to reproduce an empirically observed covariance matrix (Reinartz et al., 2009; Hair et al., 2011a). Therefore, PLS-SEM is more advantageous for predictive research rather than confirmatory studies (Fornell & Bookstein, 1982; Wold, 1985; Hair et al., 2011b). In addition, PLS-SEM is more advantageous than covariance based approaches when measures are not well established (Fornell & Bookstein, 1982; Slotegraaf & Atuahene-Gima, 2011). Third, some CB-SEM discrepancy indices (i.e., GFI and AGFI) decline as model complexity increases (i.e. more items or more constructs), and they may be inappropriate for more complex models (Henseler et al., 2009; Hair et al., 2011b). In contrast, PLS-SEM path models can be very complex without leading to estimation problems (Fornell & Bookstein, 1982; Wold, 1985; Chin & Newsted, 1999; Henseler et al., 2009; Reinartz et al., 2009; Hair et al., 2011a; Hair et al., 2011b). Fourth, since PLS-SEM has minimum demands regarding sample size to achieve acceptable levels of statistical power (Reinartz et al., 2009; Hair et al., 2011b). Conversely, CB-SEM involves constraints regarding the number of observations and small sample sizes, often lead to biased test statistics, inadmissible solutions, and identification problems (Chin & Newsted, 1999; Henseler et al., 2009). According to the rule of thumb suggested by Barclay et al. (1995), the minimum

sample size for PLS-SEM is equal to the larger of the following: (1) ten times the number of items of the scale with the largest number of formative items in the outer-measurement model, or (2) ten times the largest number of structural paths directed at a particular construct in the inner-structural model (see also Henseler et al., 2009).

Based on the outlined benefits of PLS-SEM, this study employed PLS-SEM, specifically Smart-PLS (Ringle, Wende, & Will, 2005), for several reasons. First, as noted in section 5.2, a number of the measurement item distributions departed from normal distribution. Second, the primary purpose of this study is to predict the extent that the synchronous pursuit of ambidexterity at both corporate and business levels drives new product performance, established product performance, and ultimate firm performance. Third, this study developed ostensibly new measures for some constructs of interest such as exploratory strategy, exploitative strategy, exploratory R&D, exploitative R&D, exploratory marketing, and exploitative marketing. Fourth, given the number of constructs and items (18 constructs and 103 items including control variables) and indirect effects among constructs within the synchronised multi-level - multi-unit ambidexterity framework, this theoretical framework is considered as complex. Fifth, based on Barclay et al.'s (1995) rule of thumb, 120 cases is the minimum sample size for this study, which is less than the final number of completed survey packages obtained (169). Therefore, this study achieved a satisfactory number of respondents to utilise PLS-SEM. Finally, PLS-SEM has been used extensively in analysing interaction effects (Chin et al., 2003; Slotegraaf & Dickson, 2004; Slotegraaf & Atuahene-Gima, 2011) and mediational effects (Bontis & Booker, 2007; Giebelhausen, Robinson, & Cronin, 2010; Sattler, Völckner, Riediger, & Ringle, 2010; Ngo & O'Cass, 2012; Siren et al., 2012). Given, mediational effects of business-level capabilities (hypotheses 1 to 4), operational ambidexterity (hypotheses 5 and 6), and product performance (hypotheses 7 and 8) depicted in Figure 3.1, PLS-SEM is appropriate for this study.

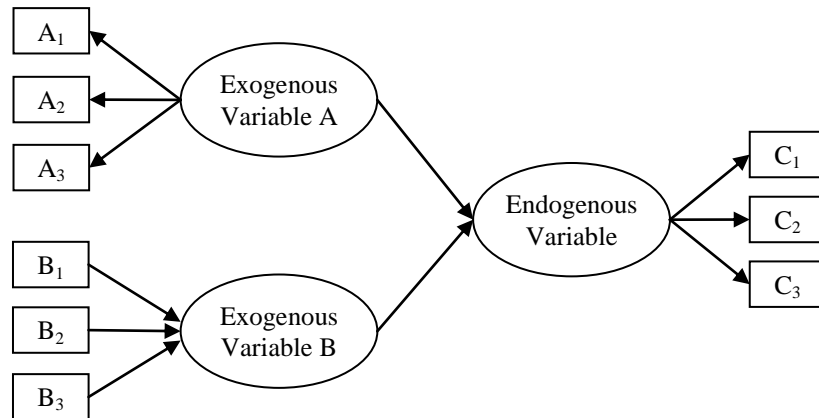
The PLS-SEM analysis typically follows a two-step processes including separate assessment of two models, namely outer-measurement model and the inner-structural model (Cassel et al., 1999; Henseler et al., 2009; Hair et al., 2011b). The outer-measurement model includes the unidirectional predictive relationships between each construct and its respective items (Figure 5.1) (Cassel et al., 1999). In a structural model, multiple relations are not permitted and each item should be only associated with a single construct (Hair et al., 2011b). The inner-structural model shows the relationships (paths) between the constructs. As shown in Figure 5.1, constructs in the structural model are classified as exogenous and endogenous variables (Hair et al., 2011b). Exogenous variables are constructs that do not have any structural path relationships pointing at them. Endogenous variables are constructs that are explained by other exogenous variables via structural model relationships (Jarvis, Mackenzie, & Podsakoff, 2003; Hair et al., 2011b). The assessments of outer- and inner-structural models for this study's theoretical framework are detailed in Section 5.4 and 5.5.

5.4. Outer-measurement model results

The assessment of adequacy and validity of the outer-measurement model for the constructs within theoretical framework depends on the nature of the links between the construct and its respective items (Henseler et al., 2009; Hair et al., 2011a). Specifically, the outer-measurement model of a construct can be classified as reflective or formative (Diamantopoulos & Winklhofer, 2001; Pavlou & Sawy, 2011). As shown in Figure 5.1, reflective modelling assumes that the construct factor “causes” the items (Exogenous Variable A), whereas formative modelling assumes that the construct is “caused” by each of the items, where each item represents a unique input (Exogenous Variable B) (Hulland, 1999; Jarvis et al., 2003). Based on the conceptualisation of constructs of interest provided in

Chapters Two, Three, and Four, reflective modelling is used for all constructs depicted in Table 4.4.

Figure 5.1 – Path model example



Source: Adopted from Hair et al. (2011b) and Jarvis et al. (2003)

5.4.1. Reflective outer-measurement model's assessment indices

The adequacy and validity of a reflective outer-measurement model is assessed through an examination of a range of indices including individual item loadings, composite reliability, average variance explained, bootstrapped t-statistic, convergent validity, and discriminant validity (Fornell & Larcker, 1981; Diamantopoulos & Winklhofer, 2001; Hair et al., 2011b). Specifically, individual item loadings, composite reliability and AVE are used to assess the adequacy of a reflective outer-measurement model. Individual item loadings represent the share variance between the construct and a respective item (Hulland, 1999; Chin et al., 2003). Composite reliability is an estimate of the internal consistency of items predicted to measure a single construct (Nunnally & Bernstein, 1994; Hair et al., 2011b). Unlike Cronbach alpha, composite reliability does not assume that all items are equally reliable and prioritises items according to their reliability during model estimation (Hair et al., 2011b). The average

variance explained (AVE) represents the average variance shared between items and their respective construct (Fornell & Larcker, 1981).

Bootstrapped t-values, convergent validity, and discriminant validity are used to assess the validity of a reflective outer-measurement model (Fornell & Larcker, 1981; Hair et al., 2011a). Bootstrapping is a technique to conduct repeated random sampling with replacement from the original sample to create a bootstrap sample to estimate the precision of the reflective outer-measurement model (Hulland, 1999; Hair et al., 2011b). This study computed bootstrapped t-values on the basis of 5000 bootstrapping runs suggested by Hair et al. (2011a). Convergent validity represents the degree to which an item is associated with its respective construct (Hulland, 1999; Hair et al., 2011b). Discriminant validity refers to the extent to which items of a constructs are different from items of other constructs within a model (Fornell & Bookstein, 1982; Hair et al., 2011b). Convergent and discriminant validity were assessed based on the computed loading and bootstrapped t-values for all items and computed AVE and composite reliability for all constructs generated by Smart-PLS software. The assessment results of the adequacy and validity outer-measurement models for constructs of interest are presented in Sections 5.4.2 to 5.4.8.

5.4.2. Exploratory and exploitative strategies

The first respondent answered questions regarding exploratory and exploitative strategies (Questionnaire A). Each construct was measured using six items in the reflective fashion. As shown in Table 5.7, the loadings for all items were greater than the cut-off value of 0.50 recommended by Hulland (1999), ranging from 0.67 to 0.86. The bootstrapped t-values for all items were greater than the cut-off value of ± 1.96 recommended by Hair et al. (2011b), ranging from 2.72 to 23.71. Therefore, the results indicate that all items had satisfactory explanatory power (Hair et al., 2011a). In addition, the composite reliability (CR) for both

exploratory strategy (CR= 0.88) and exploitative strategy (CR= 0.91) were greater than the cut-off value of 0.70 recommended by Nunnally (1978). Also, AVE for both exploratory strategy (AVE= 0.54) and exploitative strategy (AVE= 0.63) were greater than cut-off value of 0.50 recommended by Hair et al. (2011b).

Table 5.7 – Result of outer-measurement model of exploratory and exploitative strategies

Constructs		Loading	t-Value
Exploratory Strategy (CR= .88, AVE= .54)			
<i>In our firm:</i>			
RS1	...identifying opportunities for new products.	.75	13.09
RS2	...utilising new opportunities in new markets.	.74	14.98
RS3	...inventing new products with unique features not available in competing products.	.79	23.71
RS4	...expanding its product range (e.g. add new product line(s)).	.71	13.74
RS5	...discovering new ways to meet customer needs.	.76	18.36
RS6	...acquiring product development skills and processes entirely new in the firm.	.67	9.77
Exploitative Strategy (CR= .91, AVE= .63)			
<i>In our firm:</i>			
IS1	...identifying opportunities for its existing products.	.86	3.53
IS2	...strengthening its existing position in its current markets.	.83	3.63
IS3	...improving efficiency of its current products.	.77	2.89
IS4	...focusing on a stable (e.g. specific, limited) range of products.	.81	2.72
IS5	...introducing improved, but existing products for its existing markets.	.73	3.14
IS6	...improving its current product development processes and skills for its existing products.	.76	2.94

5.4.3. Exploratory and exploitative R&D

The second and third respondents answered questions regarding exploratory and exploitative R&D with respect to the selected new product (Questionnaire B) and established product (Questionnaire C), respectively. Each construct was measured using five items in the reflective fashion.

The assessment of outer-measurement model of exploratory and exploitative R&D in Questionnaire B, Table 5.8 shows that the loadings for all items were greater than the recommended cut-off value (> 0.50), ranging from 0.70 to 0.88. The bootstrapped t-values

for all items were greater than the recommended cut-off value ($> \pm 1.96$), ranging from 2.49 to 38.68. Therefore, the results indicate that all items had satisfactory explanatory power. In addition, composite reliability and AVE for both exploratory R&D (CR= 0.93, AVE= 0.73) and exploitative R&D (CR= 0.90, AVE= 0.63) were greater than the recommended cut-off values.

Table 5.8 – Result of outer-measurement model of exploratory and exploitative R&D with respect to the selected new product

Constructs		Loading	t-Value
Exploratory R&D (CR= .93, AVE= .73)			
<i>In this product development project, our firm:</i>			
RI21	...acquired entirely new product development processes that had not been used before by the firm.	.84	32.09
RI22	...acquired completely new manufacturing technologies and processes that had not been used before by the firm.	.86	31.99
RI23	...acquired entirely new managerial and organisational skills related to new product development process (e.g. set up new liaison teams to integrate R&D, marketing, manufacturing, and other functions).	.84	26.55
RI24	...acquired entirely new technology and R&D training skills for personnel development.	.88	38.68
RI25	...set up completely new types of manufacturing facilities and operations.	.86	32.06
Exploitative R&D (CR= .90, AVE= .63)			
<i>In this product development project, our firm:</i>			
II21	...improved its current (existing, well-established) processes aimed at quality improvement of our current products.	.84	3.76
II22	...exploited mature, existing technologies to enhance the efficiency of our current products.	.82	3.75
II23	...strengthened current (existing, well-established) managerial and organisational skills that improve the efficiency of the existing product development process (e.g. improve existing coordination between R&D, marketing, manufacturing, and other functions).	.84	3.09
II24	...improved current (existing, well-established) processes to reduce the cost of our current products.	.77	2.82
II25	...refined current (existing, well-established) processes to reduce production time (i.e., improved the efficiency of our existing production processes).	.70	2.49

The assessment of outer-measurement model of exploratory and exploitative R&D in Questionnaire C, Table 5.9 shows that the loadings for all items were greater than the recommended cut-off value (> 0.50), ranging from 0.65 to 0.90. The bootstrapped t-values for all items were greater than the recommended cut-off value ($> \pm 1.96$), ranging from 22.77

to 42.85. Therefore, the results indicate that all items had satisfactory explanatory power. In addition, composite reliability and AVE for both exploratory R&D (CR= 0.95, AVE= 0.78) and exploitative R&D (CR= 0.87, AVE= 0.58) were greater than the recommended cut-off values.

Table 5.9 – Result of outer-measurement model of exploratory and exploitative R&D with respect to the selected established product

Constructs		Loading	t-Value
Exploratory R&D (CR= .93, AVE= .73)			
<i>In this product development project, our firm:</i>			
RI31	...acquired entirely new product development processes that had not been used before by the firm.	.87	22.77
RI32	...acquired completely new manufacturing technologies and processes that had not been used before by the firm.	.88	30.85
RI33	...acquired entirely new managerial and organisational skills related to new product development process (e.g. set up new liaison teams to integrate R&D, marketing, manufacturing, and other functions).	.88	28.33
RI34	...acquired entirely new technology and R&D training skills for personnel development.	.90	42.85
RI35	...set up completely new types of manufacturing facilities and operations.	.88	37.44
Exploitative R&D (CR= .90, AVE= .63)			
<i>In this product development project, our firm:</i>			
II31	...improved its current (existing, well-established) processes aimed at quality improvement of our current products.	.80	22.77
II32	...exploited mature, existing technologies to enhance the efficiency of our current products.	.80	30.85
II33	...strengthened current (existing, well-established) managerial and organisational skills that improve the efficiency of the existing product development process (e.g. improve existing coordination between R&D, marketing, manufacturing, and other functions).	.65	28.33
II34	...improved current (existing, well-established) processes to reduce the cost of our current products.	.77	42.85
II35	...refined current (existing, well-established) processes to reduce production time (i.e., improved the efficiency of our existing production processes).	.77	37.44

5.4.4. Exploratory and exploitative marketing

The second and third respondents answered questions regarding exploratory and exploitative Marketing with respect to the selected new product (Questionnaire B) and established product (Questionnaire C), respectively. Each construct was measured using 14 items in the reflective fashion.

The assessment of outer-measurement models for exploratory and exploitative marketing indicated that item loadings for IM25, IM26, IM212, IM213, IM214 related to exploitative marketing in Questionnaire A, items RM35, RM312, RM312 related to exploratory marketing in Questionnaire B, and items IM35, IM36, IM312, IM313, IM314 related to exploitative marketing in Questionnaire B were less than recommended cut-off value (0.50) (Hulland, 1999). In addition, the bootstrapped t-values for these items were less than satisfactory t-value benchmark (± 1.96) (Hair et al., 2011b). Therefore, items 5, 6, 12, 13 and 14 related to exploratory marketing and exploitative marketing in the Questionnaires A and B were removed.

From a conceptual perspective, all items except item 5 and 6 pertained to the extent that a firm generates new routines or refines its existing processes. However, items 5 and 6 related to exploratory marketing (RM25, RM26, RM35, and RM36) described the extent that a firm researches about new customers and competitors with respect to the selected new product. Items 5 and 6 related to exploitative marketing (IM25, IM26, IM35, and IM36) described the extent that a firm researches about current customers and competitors with respect to the selected established product. Therefore, items 5 and 6 statistically and conceptually were subsequently seen as inconsistent from other items. In addition, item 12 described the extent that a firm generates new market-testing processes (RM212 and RM312) or improves the existing market-testing processes (IM212 and IM312). In parallel to these items, RM211 and RM311 measured the extent that a firm generate new market research routines, and IM211 and IM311 measured the extent that a firm refines its existing market research routines. From conceptual perspective, market research routines conceptually may involve different processes such as market testing, gathering information about customers and competitors, and analysing our market information (Vorhies & Morgan, 2005; Citrin et al., 2007). Therefore, items 5, 6, and 12 represent different aspects of market research activities. Items 13 and 14

describe the extent that a firm develops and implements new marketing strategies (RM213, RM214, RM313, and RM314) or refines and implements its current marketing strategies (IM213, IM214, IM313, and IM314). Compared to other items that were related to marketing mix activities, items 13 and 14 pertained to marketing planning and implementation activities. Therefore, items 13 and 14 statistically and conceptually were subsequently considered inconsistent with the other items.

After items 5, 6, 11, 12, and 13 related to exploratory marketing and exploitative marketing in Questionnaires A and B were removed, outer-measurement models for remaining 9 items were examined. The assessment of outer-measurement models of exploratory and exploitative marketing in Questionnaire B, Table 5.10 shows that the loadings for all items were greater than the recommended cut-off value (> 0.50), ranging from 0.69 to 0.82. The bootstrapped t-values for all items were greater than the recommended cut-off value ($> \pm 1.96$), ranging from 12.59 to 31.14. Therefore, the results indicate that all items had satisfactory explanatory power. In addition, composite reliability and AVE for both exploratory marketing (CR= 0.93, AVE= 0.59) and exploitative marketing (CR= 0.92, AVE= 0.55) were greater than the recommended cut-off values.

Table 5.10 – Result of outer-measurement model of exploratory and exploitative marketing with respect to the selected new product

Constructs	Loading	t-Value
Exploratory Marketing (CR= .93, AVE= .59)		
<i>In this product development project, our firm:</i>		
RM21 ...developed completely new pricing processes.	.73	14.31
RM22 ...set up entirely new sales and distribution channels.	.75	16.08
RM23 ...developed entirely new advertising and/or promotion processes.	.80	23.53
RM24 ...created a completely new brand for the new product.	.80	18.49
RM27 ...segmented the market in a completely new way.	.81	25.38
RM28 ...developed entirely new methods of marketing communication with customers.	.77	19.55
RM28 ...set up entirely new marketing research processes.	.75	12.64
RM210 ...developed entirely new marketing strategies.	.69	12.59
RM211 ...implemented completely new types of marketing strategies.	.82	31.14
Exploitative Marketing (CR= .92, AVE= .55)		
<i>In this product development project, our firm:</i>		
IM21 ...refined current (existing, well-established) pricing processes.	.74	14.19
IM22 ...improved current sales and distribution channels.	.78	16.66
IM23 ...refined current advertising and/or promotion processes.	.76	18.21
IM24 ...strengthened the brand image for current product.	.73	17.49
IM27 ...segmented the market in a completely new way.	.77	20.45
IM28 ...improved current customer relationship management methods.	.74	14.87
IM29 ...refined current methods of marketing communication with customers.	.70	14.32
IM210 ...improved current public relations methods.	.74	14.59
IM211 ...refined current market research processes.	.74	12.38

The assessment of outer-measurement models of exploratory and exploitative marketing as measured in Questionnaire C, Table 5.11 shows that the loadings for all items were greater than the recommended cut-off value (> 0.50), ranging from 0.66 to 0.90. The bootstrapped t-values for all items were greater than the recommended cut-off value ($> \pm 1.96$), ranging from 8.99 to 43.92. Therefore, the results indicate that all items had satisfactory explanatory power. In addition, composite reliability and AVE for both exploratory marketing (CR= 0.95, AVE= 0.67) and exploitative marketing (CR= 0.94, AVE= 0.62) were greater than the recommended cut-off values.

Table 5.11 – Result of outer-measurement model of exploratory and exploitative marketing with respect to the selected established product

Constructs	Loading	t-Value
Exploratory Marketing (CR= .95, AVE= .67)		
<i>In this product development project, our firm:</i>		
RM31 ...developed completely new pricing processes.	.80	16.42
RM32 ...set up entirely new sales and distribution channels.	.88	43.92
RM33 ...developed entirely new advertising and/or promotion processes.	.85	27.13
RM34 ...created a completely new brand for the new product.	.66	8.99
RM37 ...segmented the market in a completely new way.	.90	43.10
RM38 ...developed entirely new methods of marketing communication with customers.	.84	29.34
RM39 ...set up entirely new marketing research processes.	.85	22.66
RM310 ...developed entirely new marketing strategies.	.76	15.33
RM311 ...implemented completely new types of marketing strategies.	.80	22.14
Exploitative Marketing (CR= .94, AVE= .62)		
<i>In this product development project, our firm:</i>		
IM31 ...refined current (existing, well-established) pricing processes.	.72	11.73
IM32 ...improved current sales and distribution channels.	.83	35.64
IM33 ...refined current advertising and/or promotion processes.	.77	15.44
IM34 ...strengthened the brand image for current product.	.71	12.17
IM37 ...segmented the market in a completely new way.	.84	25.20
IM38 ...improved current customer relationship management methods.	.82	21.87
IM39 ...refined current methods of marketing communication with customers.	.80	17.85
IM310 ...improved current public relations methods.	.75	12.92
IM311 ...refined current market research processes.	.82	24.69

5.4.5. Product performance

The second and third respondents answered questions regarding new product performance (Questionnaire B) and established product performance (Questionnaire C). New product performance was measured using eight items in the reflective fashion. As shown in Table 5.12, the loadings for all items were greater than the recommended cut-off value (> 0.50), ranging from 0.70 to 0.85. The bootstrapped t-values for all items were greater than the recommended cut-off value ($> \pm 1.96$), ranging from 2.49 to 38.68. Therefore, the results indicate that all items had satisfactory explanatory power. In addition, composite reliability and AVE of new product performance were greater than the recommended cut-off values (CR= 0.91, AVE= 0.61).

Table 5.12 – Result of outer-measurement model of new product performance

Constructs		Loading	t-Value
New Product Performance (CR= .91, AVE= .61)			
<i>Regarding this specific product, our firm achieved the following goal over previous year:</i>			
S21	...met revenue goals.	.85	26.41
S22	...met sales growth goals.	.75	13.68
S23	...met market share goals.	.70	11.92
S24	...met return on investment goals.	.83	22.35
S25	...met profitability goals.	.81	33.46
S26	...met development cost goals.	.75	16.48
S27	...achieved customer acceptance goals.	.74	15.48
S28	...achieved customer satisfaction goals.	.74	14.49

Established product performance was measured using eight items in the reflective fashion. As shown in Table 5.13, the loadings for all items were greater than the recommended cut-off value (> 0.50), ranging from 0.74 to 0.90. The bootstrapped t-values for all items were greater than the recommended cut-off value ($> \pm 1.96$), ranging from 9.80 to 51.76. Therefore, the results indicate that all items had satisfactory explanatory power. In addition, composite reliability and AVE of established product performance were greater than the recommended cut-off values (CR= 0.94, AVE= 0.71).

Table 5.13 – Result of outer-measurement model of established product performance

Constructs		Loading	t-Value
Established Product Performance (CR= .94, AVE= .71)			
<i>Regarding this specific product, our firm achieved the following goal over previous year:</i>			
S31	...met revenue goals.	.90	51.76
S32	...met sales growth goals.	.78	16.45
S33	...met market share goals.	.74	9.80
S34	...met return on investment goals.	.89	37.74
S35	...met profitability goals.	.86	34.34
S36	...met development cost goals.	.83	19.06
S37	...achieved customer acceptance goals.	.85	21.07
S38	...achieved customer satisfaction goals.	.78	11.80

5.4.6. Firm performance

As noted in Chapter Three, firm performance is the ultimate dependent variable of interest for scholars to evaluate the outcomes of a firm's strategies and capabilities. In this sense, firm performance reflects a firm's effort to achieve its overall financial, market, and customer-based goals. Therefore, the first respondent answered questions regarding firm performance (Questionnaire A). Firm performance was measured using seven items in the reflective fashion. As shown in Table 5.14, the loadings for all items were greater than the recommended cut-off value (> 0.50), ranging from 0.79 to 0.82. The bootstrapped t-values for all items were greater than the recommended cut-off value ($> \pm 1.96$), ranging from 4.55 to 15.59. Therefore, the results indicate that all items had satisfactory explanatory power. In addition, composite reliability and AVE of firm performance were greater than the recommended cut-off values (CR= 0.90, AVE= 0.65).

Table 5.14 – Result of outer-measurement model of firm performance

Constructs		Loading	t-Value
Firm Performance (CR= .90, AVE= .65)			
<i>In relation to goals set for previous year, our firm has:</i>			
FP1	...met revenue goals.	.81	15.59
FP2	...met sales growth goals.	.82	15.65
FP3	...met market share goals.	.82	14.55
FP4	...met return on investment goals.	.79	10.32
FP5	...met profitability goals.	.79	8.90
FP6	...achieved customer satisfaction goals.	.80	9.91
FP7	...achieved customer loyalty goals.	.80	10.11

5.4.7. Control variables

As discussed in Chapter Four (Section 4.5.2.3), this study used three multi-item control variables: market truculence, technological turbulence, and organisational slack. The first respondent answered questions regarding these control variables (Questionnaire A). Specifically, market turbulence was measured using three items in the reflective fashion. As

shown in Table 5.15, the loadings for all items were greater than the recommended cut-off value (> 0.50), ranging from 0.85 to 0.95. The bootstrapped t-values for all items were greater than the recommended cut-off value ($> \pm 1.96$), ranging from 3.56 to 4.97. Therefore, the results indicate that all items had satisfactory explanatory power. In addition, composite reliability and AVE of market turbulence were greater than the recommended cut-off values (CR= 0.93, AVE= 0.82).

Technological turbulence was measured using four items in the reflective fashion. As shown in Table 5.15, the loadings for all items were greater than the recommended cut-off value (> 0.50), ranging from 0.63 to 0.96. The bootstrapped t-values for all items were greater than the recommended cut-off value ($> \pm 1.96$), ranging from 4.00 to 4.83. Therefore, the results indicate that all items had satisfactory explanatory power. In addition, composite reliability and AVE of technological turbulence were greater than the recommended cut-off values (CR= 0.90, AVE= 0.70).

Organisational slack was measured using three items in the reflective fashion. As shown in Table 5.15, the loadings for all items were greater than the recommended cut-off value (> 0.50), ranging from 0.71 to 0.96. The bootstrapped t-values for all items were greater than the recommended cut-off value ($> \pm 1.96$), ranging from 4.11 to 4.60. Therefore, the results indicate that all items had satisfactory explanatory power. In addition, composite reliability and AVE of organisational slack were greater than the recommended cut-off values (CR= 0.89, AVE= 0.73).

Table 5.15 – Result of outer-measurement model of multi-item control variables

Constructs		Loading	t-Value
Market Turbulence (CR= .93, AVE= .82)			
<i>In our firm's business environment:</i>			
MT1	...customer needs and product preferences changed rapidly.	.93	4.88
MT2	...customer product demands and preferences were uncertain.	.85	3.56
MT3	...it was difficult to predict changes in customer needs and preferences.	.95	4.97
Technological Turbulence (CR= .90, AVE= .70)			
<i>In our firm's business environment:</i>			
TT1	...it was difficult to forecast technology developments.	.63	4.49
TT2	...technology environment was uncertain.	.96	4.00
TT3	...technological developments were unpredictable.	.75	4.83
TT4	...technology environment was complex.	.95	4.32
Organisational Slack (CR= .89, AVE= .73)			
<i>Our firm has:</i>			
OS1	...available resources for future projects.	.88	4.60
OS2	...discretionary financial resources.	.96	4.33
OS3	...manpower to work on special projects.	.71	4.11

5.4.8. Convergent and discriminant validity

Convergent validity

As discussed in Section 5.4.1, convergent validity and discriminant validity are used to examine the validity of a reflective outer-measurement model. Convergent validity represents the degree to which an item is associated with its respective construct (Hulland, 1999). The assessment of convergent validity is based on two criteria. First, Nunnally (1978) suggests that convergent validity of an outer-measurement model is satisfactory when composite reliability of all constructs within a model exceed 0.70 threshold (see also Henseler et al., 2009; Hair et al., 2011b). Second, Fornell and Larcker (1981) suggest that convergent validity of an outer-measurement model is satisfactory when AVE of all constructs within a model exceed 0.50 thresholds, meaning that the construct explains more than half of its items' variance (see also Henseler et al., 2009; Hair et al., 2011b). As shown in Tables 5.7 to 5.15, the results of composite reliability (ranging from 0.87 to 0.95) and AVE (ranging from 0.54 to 0.52) of all constructs of interest (exploratory strategy, exploitative strategy, exploratory R&D, exploitative R&D, exploratory marketing, exploitative marketing, and new

product performance, established product performance, firm performance, market turbulence, technological turbulence, and organisational slack) were greater than the recommended thresholds. Therefore, the results indicate satisfactory convergent validity for all constructs of interest.

Discriminant validity

Discriminant validity represents the extent to which items of a construct are different from items of other constructs within a model (Hulland, 1999). Discriminant validity of an outer-measurement model is satisfactory when the variance shared between a construct and its items is higher than the variance shared between any two constructs (Fornell & Larcker, 1981). Drawing on Patterson and Smith (2003), O'Cass & Ngo (2007), and O'Cass, Ngo, and Heirati (2012), this study assessed discriminant validity using two criteria, the Fornell and Larcker's (1981) criterion and Gaski and Nevin's (1985) criterion. The Fornell and Larcker (1981) criterion suggests that when a construct shares more variance with its assigned items than with other constructs in the structural model discriminant validity exists. In statistical terms, the AVE of each construct should be greater than the construct's highest squared correlation with any other constructs. The Gaski and Nevin's (1985) criterion suggests that the discriminant validity among constructs can be satisfactory when the correlation between two constructs is not higher than their respective composite reliabilities (see also O'Cass, 2002).

As noted in Chapter Three (Section 3.3), this study seeks to articulate the extent that exploratory and exploitative capabilities enable a firm to implement its exploratory and exploitative strategies to enhance new product and established product performance. In addition, Chapter Four (Section 4.5.2.3) explained that this study employed three respondents from each firm to answer three separated questionnaires. Specifically, Questionnaire A

includes items related to exploratory strategy, exploitative strategy, firm performance, and control variables. Whereas, Questionnaires B and C are related to constructs (i.e., exploratory R&D, exploitative R&D, exploratory marketing, exploitative marketing) that enable a firm to implement its exploratory and exploitative strategies with respect to the selected new product and established product, respectively. Given hypotheses suggested in Chapter Three (Section 3.3), questions in Questionnaires A and B are related to hypotheses 1a, 1b, 2, 5a, 6a, 7a, and 7b, whereas questions in Questionnaires A and C are related to hypotheses 3a, 3b, 4, 5b, 6b, 8a, and 8b. To this end, this study merged Questionnaire A with Questionnaire B and Questionnaire A with Questionnaire C to develop two independent data sets.

The first data set (Data Set I) is related to the extent that a firm deploys its business-level capabilities to implement exploratory and exploitative strategies to enhance new product performance and firm performance. The second data set (Data Set II) is related to the extent that a firm deploys its business-level capabilities to implement exploratory and exploitative strategies to enhance established product performance and firm performance. Analyses of variance (ANOVA) indicated no significant differences between the respondents in Questionnaire A and B on their designated title ($F= 1.21$) and education level ($F= 0.89$), indicating the appropriateness of merging Questionnaire A with Questionnaire B (see De Luca & Atuahene-Gima, 2007). In the same vein, there are no significant differences between the respondents in Questionnaire A and C on their designated title ($F= 1.01$) and education level ($F= 0.69$), indicating the appropriateness of merging Questionnaire A with Questionnaire C. Drawing on De Luca and Atuahene-Gima (2007), this study assessed the convergent validity of these two data sets separately by assessment of two independent outer-measurement models.

As shown in Table 5.16, the first outer-measurement model encompassed constructs of interest measured in Questionnaires A and B (Data Set I). In this outer-measurement model,

the square root of the AVEs (the off-diagonal elements which ranging from 0.73 to 0.90) were greater than all individual correlations (ranging from -0.09 to 0.50) (Fornell & Larcker, 1981). In addition, no individual correlation (which ranging from -0.09 to 0.50) was higher than its respective composite reliabilities (ranging from 0.88 to 0.93) (O’Cass, 2002). Following Fornell and Larcker’s (1981) criterion and Gaski and Nevin’s (1985) criterion, the results indicate satisfactory discriminant validity of all constructs in the first outer-measurement model. In addition, the possibility of multicollinearity among all constructs was assessed following Cohen et al. (2002). The maximum variance of inflation factor score was 1.93 lower than the cut-off value of 5 recommended by O’Brien (2007). Therefore, it can be concluded that multicollinearity was not evident.

Table 5.16 – Evidence of discriminant validity for the constructs in Data Set I

	CR	01	02	03	04	05	06	07	08	09	10	11
01 Exploratory Strategy	.88	.74										
02 Exploitative Strategy	.91	0.09	.80									
03 Exploratory R&D	.93	0.49	0.11	.73								
04 Exploitative R&D	.90	0.31	0.05	0.47	.86							
05 Exploratory Marketing	.93	0.42	0.06	0.16	0.11	.77						
06 Exploitative Marketing	.92	0.42	0.12	0.37	0.22	0.42	.74					
07 New Product Performance	.91	0.15	0.16	0.48	0.09	0.22	0.41	.79				
08 Firm Performance	.90	0.12	0.12	0.30	-0.06	0.11	0.20	0.45	.81			
09 Market Turbulence	.93	0.38	0.11	0.17	0.13	0.24	0.28	-0.01	-0.06	.90		
10 Technological Turbulence	.90	0.20	0.01	0.19	0.18	0.06	0.01	-0.09	-0.09	0.30	.84	
11 Organisational Slack	.89	0.08	0.08	0.32	0.18	0.09	0.14	0.34	0.18	0.13	.06	.77

As shown in Table 5.17, the second outer-measurement model encompassed constructs of interest measured in Questionnaires A and C (Data Set II). In this outer-measurement model, the square root of the AVEs (the off-diagonal elements which ranging from 0.74 to 0.91) were greater than all individual correlations (which ranging from -0.13 to 0.47) (Fornell & Larcker, 1981). In addition, no individual correlation (ranging from -0.13 to 0.47) was higher than its respective composite reliabilities (ranging from 0.88 to 0.95) (O’Cass, 2002).

Thus, the results indicate satisfactory discriminant validity of all constructs in the second outer-measurement model. Finally, the possibility of multicollinearity among all constructs was assessed. The maximum variance of inflation factor score was 1.76 lower than the cut-off value of 5 (O'Brien, 2007). Therefore, multicollinearity was not evident.

Table 5.17 – Evidence of discriminant validity for the constructs in Data Set II

	CR	01	02	03	04	05	06	07	08	09	10	11
01 Exploratory Strategy	.88	.74										
02 Exploitative Strategy	.91	0.10	.80									
03 Exploratory R&D	.95	0.28	0.10	.89								
04 Exploitative R&D	.87	0.23	0.30	0.22	.77							
05 Exploratory Marketing	.95	0.22	0.39	0.35	0.09	.82						
06 Exploitative Marketing	.94	0.22	0.47	0.23	0.19	0.47	.79					
07 Established Product Performance	.94	0.02	0.17	0.12	0.46	0.10	0.26	.85				
08 Firm Performance	.90	0.13	0.11	0.15	0.22	0.11	0.25	0.42	.91			
09 Market Turbulence	.93	0.39	0.12	0.05	0.07	0.07	0.13	-0.13	-0.06	.81		
10 Technological Turbulence	.90	0.22	-0.02	0.19	0.08	0.04	0.01	0.11	-0.06	0.35	.90	
11 Organisational Slack	.89	0.09	0.09	0.02	0.15	0.02	0.07	0.26	0.19	0.15	0.09	.77

5.5. Inner-structural model results

Once the adequacy and validity of the outer-measurement models meet the assessment indices (individual loadings, CR, t-value, AVE, convergent validity, and discriminant validity), the assessment of inner-structural model starts. In the inner-structural model, the predicted (or hypothesised) relationships between the constructs of interest are specified. As noted in Chapter Three (Section 3.2), the synchronised multi-level - multi-unit ambidexterity framework involves two stages. As shown in Figure 3.1 (Panel A), Stage A pertains to the extent that exploratory and exploitative strategies influence a firm's product (i.e., new product and established product) performance through deployment of specific capabilities at the business-level of the firm. Stage B (Figure 3.1, Panel B) pertains to the extent that achieving ambidexterity at both corporate and business levels contribute to firm performance by affecting the performance of both new and established products. This highlights that each

stage encompasses different sets of relationships among constructs of interest (or hypotheses). To this end, this study assessed inner-structural model related to Stage A and Stage B depicted in Figure 3.1 separately.

The examination of the structural model involves the predictive relevance of individual paths and the predictive relevance of the structural model (Cassel et al., 1999; Hair et al., 2011b). The predictive relevance of individual paths indicates the strength and significance of associations between constructs. The path strength is measured via calculating the path weight (β coefficient) (Henseler et al., 2009; Reinartz et al., 2009). The path significance is measured by computing the ratio between estimates and standard errors (t-value), on the basis of a sampling with replacement (i.e., bootstrapping) (Chin et al., 2003; Hair et al., 2011a). In addition, the R^2 value of the endogenous construct is used to assess the percentage of variance in the endogenous constructs explained by exogenous constructs directly connected to it (Hair et al., 2011b). The following sections (5.5.1 and 5.5.2) present the results of inner-structural models related to Stage A and Stage B, respectively.

5.5.1. Stage A: The inner-structural models

As noted in Section 5.4.8, this study developed two data sets (Data Set I and II) to examine the associations between exploratory and exploitative strategies, exploratory and exploitative R&D and marketing capabilities, and product performance with respect to a new product and an established product. Tables 5.18 and 5.19 indicate the results for the inner-structural structural models related to the selected new product (Data Set I) and established product (Data Set II), respectively. Drawing on Moorman and Slotegraaf (1999), Baron and Kenny (1986), and Vorhies et al. (2009), each table encompasses two models, the basic model and the integration model. Basic model includes the exogenous constructs, endogenous variables, and control variables. In addition to these variables, the interaction model contains

integrations of exploratory R&D-exploratory marketing and exploitative R&D-exploitative marketing. Statistically, the integration between these capabilities was operationalised by multiplying the magnitude of respective capabilities together (Baron & Kenny, 1986; Moorman & Slotegraaf, 1999).

As shown in Table 5.18 (the inner-structural model for the selected new product), exploratory strategy significantly influenced exploratory marketing (ExrM, $\beta = 0.41$, t-value= 5.05), exploratory R&D (ExrR&D, $\beta = 0.51$, t-value= 6.33), and their integration (ExrM \times ExrR&D, $\beta = 0.60$, t-value= 8.89). Exploratory strategy also significantly affected exploitative marketing (ExiM, $\beta = 0.42$, t-value= 4.48), exploitative R&D (ExiR&D, $\beta = 0.31$, t-value= 3.34), and their integration (ExiM \times ExiR&D, $\beta = 0.47$, t-value= 5.47). New product performance (NPP) was predicted by exploratory R&D ($\beta = 0.26$, t-value= 2.31), exploratory marketing ($\beta = 0.50$, t-value= 5.11), and their integration ($\beta = 0.60$, t-value= 1.96). Finally, new product performance significantly influenced firm performance ($\beta = 0.46$, t-value= 7.04). Regarding the control variables, only organisational slack in the interaction model significantly affected new product performance ($\beta = 0.15$, t-value= 2.05).

As shown in Table 5.19 (the inner-structural model for the selected established product), exploratory strategy significantly influenced exploratory R&D ($\beta = 0.26$, t-value= 2.81), exploratory marketing ($\beta = 0.18$, t-value= 2.01), and their integration ($\beta = 0.35$, t-value= 3.87). Exploratory strategy also significantly affected the integration of exploitative R&D-exploitative R&D ($\beta = 0.26$, t-value= 3.80). Exploitative strategy significantly affected exploratory marketing ($\beta = 0.37$, t-value= 4.65) and the integration of exploratory R&D-exploratory marketing ($\beta = 0.31$, t-value= 8.86). Exploitative strategy also significantly influenced exploitative R&D ($\beta = 0.28$, t-value= 3.57), exploitative R&D ($\beta = 0.45$, t-value= 7.92), and their integration ($\beta = 0.57$, t-value= 3.93). Established product performance (EPP) was predicted by exploitative R&D ($\beta = 0.45$, t-value= 5.69) and exploitative marketing ($\beta =$

0.35, t-value= 2.72). Finally, established product performance significantly influenced firm performance ($\beta = 0.44$, t-value= 9.01). Regarding the control variables, only organisational slack significantly affected firm performance in the basic model ($\beta = 0.19$, t-value= 2.06) and interaction model ($\beta = 0.19$, t-value= 2.02).

Table 5.18- Stage A: Inner-structural model for the selected new product

Exogenous Variables	Endogenous Variables	Basic Model			Interaction Model		
		β	t-Value	R ²	β	t-Value	R ²
Exploratory Strategy	New Product Performance	-.24	1.73		.23	1.90	
	ExrM	.41**	5.05	.18	.41**	5.19	.18
	ExrR&D	.51**	6.33	.27	.51**	6.73	.27
	ExiM	.42**	4.48	.19	.41**	5.07	.18
	ExiR&D	.31**	3.34	.10	.31**	3.96	.10
	ExrM \times ExrR&D				.60**	8.89	.38
	ExiM \times ExiR&D				.47**	5.47	.24
Exploitative Strategy	New Product Performance	.11	1.27		.10	1.59	
	ExrM	.04	.42		.04*	2.29	
	ExrR&D	.07	.70		.07	.97	
	ExiM	.08	.93		.08	1.02	
	ExiR&D	.03	.22		.03	.21	
	ExrM \times ExrR&D				.11	1.67	
	ExiM \times ExiR&D				.09	1.04	
ExrM	New Product Performance	.26*	2.31	.44	.64*	2.62	.45
ExrR&D		.50**	5.11		.34	1.61	
ExiM		.09	.77		-.31	1.34	
ExiR&D		-.13	1.23		.32	1.15	
ExrM \times ExrR&D					.60*	1.96	
ExiM \times ExiR&D					-.73	1.79	
Market Turbulence		-.02	.15		-.01	.11	
Technological Turbulence		-.15	1.06		-.13	1.11	
Organisational Slack		.16	1.68		.15*	2.05	
Firm Size		-.06	.76		-.06	.92	
Firm Age		-.02	.15		-.03	.30	
New Product Performance	Firm Performance	.46**	7.04	.34	.46**	9.46	.34
Market Turbulence		-.09	1.14		-.09	.93	
Technological Turbulence		-.02	.18		-.02	.18	
Organisational Slack		.16	1.67		.16	1.89	
Firm Size		.01	.08		.01	.07	
Firm Age		.03	.28		.03	.36	
GoF			.40			.42	
q ²			.35			.36	

Notes: ExrR&D= Exploratory R&D, ExrM= Exploratory marketing, ExiR&D= Exploitative R&D, ExiM= Exploitative marketing, * $p < .05$, ** $p < .01$.

Table 5.19- Stage A: Inner-structural model for the selected established product

Exogenous Variables	Endogenous Variables	Basic Model			Interaction Model		
		β	t-Value	R ²	β	t-Value	R ²
Exploratory Strategy	EPP	-.05	.49		-.07	.73	
	ExrM	.18*	2.01	.19	.18*	2.31	.19
	ExrR&D	.26**	2.81	.09	.26**	3.38	.09
	ExiM	.17	1.91	.36	.16*	2.26	.36
	ExiR&D	.23	1.11	.15	.22**	6.35	.14
	ExrM \times ExrR&D				.35**	3.87	.21
	ExiM \times ExiR&D				.26**	3.80	.40
Exploitative Strategy	EPP	-.10	.95		-.10	1.11	
	ExrM	.37**	4.65		.37**	6.35	
	ExrR&D	.09	1.11		.09	1.23	
	ExiM	.45**	7.92		.45**	8.61	
	ExiR&D	.28**	3.57		.28**	3.64	
	ExrM \times ExrR&D				.31**	8.86	
	ExiM \times ExiR&D				.57**	3.93	
ExrM	EPP	-.13	1.29	.33	-.26	1.16	.33
ExrR&D		.04	.52		-.04	.32	
ExiM		.35**	2.72		.26	.64	
ExiR&D		.46**	5.69		.39	1.64	
ExrM \times ExrR&D					.18	.84	
ExiM \times ExiR&D					.14	.74	
Market Turbulence		-.11	1.09		-.11	1.43	
Technological Turbulence		-.10	.69		-.10	.86	
Organisational Slack		.14	1.65		.14	1.59	
Firm Size		.02	.12		.01	.06	
Firm Age		.04	.42		.05	.53	
EPP	Firm Performance	.44**	9.01	.42	.44**	9.73	.42
Market Turbulence		-.01	.03		-.01	.04	
Technological Turbulence		-.01	.03		-.01	.03	
Organisational Slack		.19*	2.06		.19*	2.02	
Firm Size		-.01	.12		-.01	.13	
Firm Age		-.03	.38		-.03	.36	
GoF			.42			.43	
q²			.36			.37	

Notes: ExrR&D= Exploratory R&D, ExrM= Exploratory marketing, ExiR&D= Exploitative R&D, ExiM= Exploitative marketing, EPP= Established product performance, * $p < .05$, ** $p < .01$.

5.5.2. Stage B: The inner-structural models

As explained in Chapter Three (Section 3.4), Stage B pertains to the extent that achieving ambidexterity at both corporate and business levels contribute to firm performance by affecting the performance of both new and established products. Specifically, Stage B illustrates the extent that R&D and marketing ambidexterity at the business-level of the firm assist a firm to implement corporate-level strategic ambidexterity and enhances its new product performance, established product performance, and ultimate firm performance.

As discussed in Chapter Two (Section 2.3) and Chapter Three (Section 3.4), this study adopted the balanced ambidexterity approach to operationalise ambidexterity. This approach views ambidexterity as the management of the balance between the pursuit of exploratory and exploitative constructs (i.e., exploratory strategy-exploitative strategy, exploratory R&D-exploitative R&D, exploratory marketing-exploitative marketing) (March, 1991; He & Wong, 2004; Raisch et al., 2009). Specifically, at the corporate-level, strategic ambidexterity represents the management of the balance between the pursuit of exploratory and exploitative strategies. At the business-level, R&D ambidexterity is the management of the balance between the pursuit of exploratory and exploitative R&D capabilities. Further, marketing ambidexterity is the management of the balance between exploratory and exploitative marketing capabilities.

To operationalise balanced ambidexterity, a two-step reversed-absolute difference approach suggested by Cao et al. (2009) was adopted. In the first step, the absolute difference of exploratory and exploitative constructs was calculated. The exploratory and exploitative constructs were mean-centred before obtaining their absolute difference to mitigate the potential for multicollinearity. In this sense, the higher scores for the absolute difference between exploratory and exploitative constructs represent the imbalance between these constructs and should negatively influence the endogenous variable (i.e., product

performance) (He & Wong, 2004). In the second step, the scores of the absolute difference between exploratory and exploitative constructs were reversed by subtracting the difference score from 6. In this sense, higher scores indicate a greater level of balance between exploratory and exploitative constructs and should positively influence the outcome variable. As Cao et al. (2009) note, the reversed-absolute difference approach facilitates the interpretation of outcomes of balanced ambidexterity

In Stage B, the inner-structural models were developed following a two-step procedure suggested by He and Wong (2004). In step 1, the effects of exogenous variables (including control variables) on endogenous variables were tested (Basic Model). Therefore, the Basic Models in Stage A and Stage B were the same. In step 2, strategic ambidexterity, marketing ambidexterity, and R&D ambidexterity were added to the Basic Model (Ambidexterity Model). Similar to Stage A, the inner-structural models were developed for data sets related to the selected new product (Data Set I) and established product (Data Set II), separately. Since analysis results of the Basic Model in Stage A (Table 5.18 and 5.19) and Stage B (Table 5.20 and 5.21) were same, this section reports results of the analysis related to Ambidexterity Model in Tables 5.20 and 5.21.

As shown in Table 5.20 (the inner-structural model for the selected new product - Ambidexterity Model), exploratory strategy significantly influenced exploratory R&D ($\beta = 0.49$, $t\text{-value} = 5.18$), exploratory marketing ($\beta = 0.40$, $t\text{-value} = 5.94$), exploitative R&D ($\beta = 0.31$, $t\text{-value} = 2.91$), and exploitative marketing ($\beta = 0.41$, $t\text{-value} = 4.62$). Strategic ambidexterity significantly affected marketing ambidexterity ($\beta = 0.36$, $t\text{-value} = 3.83$) and R&D ambidexterity ($\beta = 0.40$, $t\text{-value} = 4.82$). New product performance was predicted by exploratory R&D ($\beta = 0.22$, $t\text{-value} = 2.07$), exploratory marketing ($\beta = 0.21$, $t\text{-value} = 2.61$), and marketing ambidexterity ($\beta = 0.23$, $t\text{-value} = 3.42$) and R&D ambidexterity ($\beta = 0.52$, $t\text{-value} = 6.25$). Finally, new product performance significantly influenced firm performance

($\beta = 0.45$, $t\text{-value} = 9.28$). Regarding the control variables, none of the control variables significantly affected new product performance and firm performance.

As shown in Table 5.21 (the inner-structural model for the selected established product - Ambidexterity Model), exploratory strategy significantly influenced exploratory R&D ($\beta = 0.49$, $t\text{-value} = 5.18$). Exploitative strategy significantly affected exploratory marketing ($\beta = 0.40$, $t\text{-value} = 5.94$), exploitative R&D ($\beta = 0.31$, $t\text{-value} = 2.91$), and exploitative marketing ($\beta = 0.41$, $t\text{-value} = 4.62$). Strategic ambidexterity significantly affected exploratory R&D ($\beta = 0.49$, $t\text{-value} = 5.18$), exploratory marketing ($\beta = 0.49$, $t\text{-value} = 5.18$), marketing ambidexterity ($\beta = 0.36$, $t\text{-value} = 3.83$) and R&D ambidexterity ($\beta = 0.40$, $t\text{-value} = 4.82$). Established product performance was predicted by exploitative R&D ($\beta = 0.22$, $t\text{-value} = 2.07$) and R&D ambidexterity ($\beta = 0.52$, $t\text{-value} = 6.25$). Finally, established product performance significantly influenced firm performance ($\beta = 0.43$, $t\text{-value} = 7.70$). Regarding the control variables, none of the control variables significantly affected new product performance and firm performance.

Table 5.20- Stage B: Inner-structural model for the selected new product

Exogenous Variables	Endogenous Variables	Basic Model			Ambidexterity Model		
		β	t-Value	R ²	β	t-Value	R ²
Exploratory Strategy	New Product Performance	-.24	1.73		.07	1.24	
	ExrM	.42**	5.05	.18	.40**	5.94	.21
	ExrR&D	.51**	6.33	.27	.49**	5.18	.28
	ExiM	.42**	4.48	.19	.41**	4.62	.19
	ExiR&D	.31**	3.34	.10	.31*	2.91	.10
Exploitative Strategy	New Product Performance	.11	1.27		.04	.03	
	ExrM	.04	.42		.04	.44	
	ExrR&D	.07	.70		.08	.66	
	ExiM	.08	.93		.08	.81	
	ExiR&D	.03	.22		.02	.16	
Strategic Ambidexterity	New Product Performance				.18	1.84	
	ExrM				.15	1.88	
	ExrR&D				.10	1.14	
	ExiM				.07	.89	
	ExiR&D				-.05	.51	
	Marketing Ambidexterity				.36**	3.83	.13
	R&D Ambidexterity				.40**	4.82	.16
ExrM	New Product Performance	.26*	2.31	.44	.21*	2.61	.68
ExrR&D		.54**	5.11		.22*	2.07	
ExiM		.09	.77		-.04	.67	
ExiR&D		-.13	1.23		.01	.12	
Marketing Ambidexterity					.23**	3.42	
R&D Ambidexterity					.52**	6.25	
Market Turbulence		-.02	.15		.01	.07	
Technological Turbulence		-.15	1.06		-.06	.81	
Organisational Slack		.16	1.68		.09	1.31	
Firm Size		-.06	.76		-.03	.45	
Firm Age		-.02	.15		-.04	.68	
New Product Performance	Firm Performance	.46**	7.04	.34	.45**	9.28	.36
Marketing Ambidexterity					.05	.47	
R&D Ambidexterity					.19	1.50	
Market Turbulence		-.09	1.14		-.08	1.05	
Technological Turbulence		-.02	.18		-.05	.20	
Organisational Slack		.16	1.67		.10	1.54	
Firm Size		.01	.08		-.01	.06	
Firm Age		.03	.28		.01	.29	
GoF			.40			.42	
q^2			.35			.36	

Notes: ExrR&D= Exploratory R&D, ExrM= Exploratory marketing, ExiR&D= Exploitative R&D, ExiM= Exploitative marketing, * $p < .05$, ** $p < .01$.

Table 5.21- Stage B: Inner-structural model for the selected established product

Exogenous Variables	Endogenous Variables	Basic Model			Ambidexterity Model		
		β	t-Value	R ²	B	t-Value	R ²
Exploratory Strategy	Established Product Performance	-.05	.49		.09	.54	
	ExrM	.18*	2.01	.19	.16	1.87	.24
	ExrR&D	.26*	2.81	.09	.24*	2.27	.14
	ExiM	.17	1.91	.36	.16	1.78	.36
	ExiR&D	.23	1.11	.15	.23	1.73	.15
Exploitative Strategy	Established Product Performance	-.10	.95		.20	.42	
	ExrM	.37**	4.65		.37**	5.34	
	ExrR&D	.09	1.11		.08	1.15	
	ExiM	.45**	7.92		.55**	8.63	
	ExiR&D	.28	3.57		.28**	2.86	
Strategic Ambidexterity	Established Product Performance				.16	1.82	
	ExrM				.23**	2.72	
	ExrR&D				.24	3.01	
	ExiM				.10	1.18	
	ExiR&D				.01	.02	
	Marketing Ambidexterity				.36**	4.84	.13
	R&D Ambidexterity				.49**	7.04	.24
ExrM	Established Product Performance	-.13	1.29	.33	.05	.18	.41
ExrR&D		.04	.52		-.07	.84	
ExiM		.35**	2.72		.14	.05	
ExiR&D		.46**	5.69		.54**	6.69	
Marketing Ambidexterity					.22	1.23	
R&D Ambidexterity					.25	2.23	
Market Turbulence		-.11	1.09		-.10	.91	
Technological Turbulence		-.10	.69		-.12	1.10	
Organisational Slack		.14	1.65		.18	1.93	
Firm Size		.02	.12		.06	.69	
Firm Age		.04	.42		.06	.82	
Established Product Performance	Firm Performance	.44**	9.01	.42	.43**	7.70	.43
Marketing Ambidexterity					.03	.42	
R&D Ambidexterity					.09	1.31	
Market Turbulence		-.01	.03		-.06	.02	
Technological Turbulence		-.01	.03		-.08	.03	
Organisational Slack		.19*	2.06		.15	1.91	
Firm Size		-.01	.12		.04	.14	
Firm Age		-.03	.38		.02	.43	
GoF			.42			.43	
q ²			.36			.36	

Notes: ExrR&D= Exploratory R&D, ExrM= Exploratory marketing, ExiR&D= Exploitative R&D, ExiM= Exploitative marketing, EPP= Established product performance, * $p < .05$, ** $p < .01$.

5.6. Hypotheses results

This section explains the results of the analysis for testing hypotheses 1 to 8. As explained in Chapter Three (Section 3.3 and 3.4), hypotheses 1 to 4 (or Stage A) are related to the mediational effects of business-level capabilities (exploratory R&D, exploratory marketing, exploitative R&D, and exploitative marketing) and their integrations in the relationships between exploratory strategy, exploitative strategy, new product performance, and established product performance. Hypotheses 5a, 5b, 6a, and 6c are related to the mediational effects of marketing ambidexterity and R&D ambidexterity in the relationships between strategic ambidexterity, new product performance, and established product performance. Further, hypotheses 7a, 7b, 8a, and 8c are related to the mediational effects of product performance and established product performance in the relationships between marketing ambidexterity, R&D ambidexterity, and firm performance.

The mediational effect represents the extent that the relationship between two variables is more complex than a simple bivariate relationship, and it might be formed through one or more additional variables (Fairchild & MacKinnon, 2009). Instead of demonstrating the existence of an effect between exogenous and endogenous variables, the mediational effect seeks to understand the mechanism(s) by which an effect between two variables operates via one or more mediator variables (Preacher & Hayes, 2004, 2008). In other words, the mediational effect seeks to answer the question of the extent an exogenous variable influences an endogenous variable (Fairchild & MacKinnon, 2009).

This study examined the mediational effect following the approach suggested by James and Brett (1984; Kenny, Kashy, & Bolger, 1998; Siren et al., 2012). Following this approach, the mediation model was tested with a path from the exogenous variable to the mediator(s) and from the mediator(s) to the endogenous variable. The mediational effect occurs when the relationship between exogenous variable-mediator and mediator-endogenous variable is

significant. Further, within this approach a direct relationship between exogenous and endogenous variables does not need to be included in the model, but it can be controlled (James & Brett, 1984; Kenny et al., 1998).

To examine the significance of the mediational effect, Sobel's (1982) test and the bootstrapping test as outlined by Preacher and Hayes (2004) were adopted. Sobel's (1982) test determines the significance of the mediational effect of the mediator (t-value) by testing the hypothesis of no difference between the total effect and the direct effect (Fairchild & MacKinnon, 2009). However, Sobel's test suffers from low statistical power in small samples (Meyer & Baker, 2010). Recently, Preacher and Hayes (2004) have proposed a non-parametric bootstrapping method to overcome the limitation of Sobel's test that derives confidence intervals for total and specific indirect effects. If the confidence intervals of mediational effect exclude zero, the mediational effect will be significant and different from zero (Preacher & Hayes, 2004).

Sections 5.6.1 and 5.6.2 present the Hypotheses results related to Stage A (Hypotheses 1 to 4) and Stage B (Hypotheses 5 to 8), respectively.

5.6.1. Stage A: Hypotheses 1 to 4

Hypotheses 1a, 1b, and 2 are related to the mediational effect of exploratory R&D, exploratory marketing, and their integration in the relationship between exploratory strategy and new product performance. Table 5.18 reveals that exploratory strategy significantly influenced exploratory R&D ($\beta = 0.41$, t-value= 5.05), exploratory marketing ($\beta = 0.51$, t-value= 6.33), and their integration ($\beta = 0.60$, t-value= 8.89). In addition, new product performance was predicted by exploratory R&D ($\beta = 0.26$, t-value= 2.31), exploratory marketing ($\beta = 0.50$, t-value= 5.11), and their integration ($\beta = 0.60$, t-value= 1.96). However, exploratory strategy had an insignificant direct effect on new product performance ($\beta = -0.24$,

t-value= 1.73, $\rho > 0.05$). Following the arguments of James and Brett (1984), the results indicate that exploratory R&D, exploratory marketing, and their integration fully mediate the effect of exploratory strategy on new product performance, supporting hypotheses 1a, 1b, and 2.

Hypotheses 3a, 3b, and 4 are related to mediational effect of exploitative R&D, exploitative marketing, and their integration in the relationship between exploitative strategy and established product performance. Table 5.19 reveals that exploitative strategy significantly influenced exploitative R&D ($\beta = 0.28$, t-value= 3.57), exploitative R&D ($\beta = 0.45$, t-value= 7.92), and their integration ($\beta = 0.57$, t-value= 3.93). In addition, established product performance was predicted by exploitative R&D ($\beta = 0.45$, t-value= 5.69) and exploitative marketing ($\beta = 0.35$, t-value= 2.72). However, the integration of exploitative R&D and exploitative marketing had an insignificant effect on established product performance ($\beta = 0.14$, t-value= 0.74, $\rho > 0.05$). Exploitative strategy also had an insignificant direct influence on established product performance ($\beta = -0.10$, t-value= 0.95, $\rho > 0.05$). Following James and Brett (1984), the results indicate that exploitative R&D and exploitative marketing fully mediate the effect of exploitative strategy on established product performance, supporting hypotheses 3a and 3b. However, the integration of these two capabilities does not mediate the effect of exploitative strategy on established product performance, rejecting hypothesis 4.

As shown in Table 5.22, Sobel's (1982) test and the bootstrapping test provide evidence for significance of hypotheses 1 to 3, as the t-value of all mediational effects were greater than the cut-off value (± 1.96) and the confidence interval of all mediational effects did not include zero. This shows hypotheses 1a, 1b, 2, 3a, and 3b are significant.

Table 5.22- Sobel's test and bootstrapping test for Hypotheses 1a, 1b, 2, 3a, and 3b

Hypothesis	Mediational effect	Effect	Normal theory test			Bootstrapping		
			SE	t-value	ρ	SE	LL	UL
H1a	Exr S→Exr R&D→ NPP	.29**	.05	5.25	.00	.07	.15	.43
H1b	Exr S→Exr M→ NPP	.11**	.03	2.81	.00	.04	.04	.18
H2	Exr S→Exr R&D × Exr M→ NPP	.36**	.06	5.64	.00	.07	.21	.52
H3a	Exi S→Exi R&D→ EPP	.15**	.04	3.39	.00	.04	.06	.26
H3b	Exi S→Exi M→ EPP	.13*	.05	2.37	.02	.05	.03	.22

Notes: Notes: ExrS= Exploratory strategy, ExiS= Exploitative strategy, ExrR&D= Exploratory R&D, ExrM= Exploratory marketing, ExiR&D= Exploitative R&D, ExiM= Exploitative marketing, NPP= New product performance, EPP- Established product performance, UL= Upper-level, LL= Lower-level, * $p < .05$, ** $p < .01$.

5.6.2. Stage B: Hypotheses 5 to 8

Hypotheses 5a, 5b, 6a, and 6c are related to the mediational effects of marketing ambidexterity and R&D ambidexterity in the relationships between strategic ambidexterity, new product performance, and established product performance. Table 5.20 reveals that strategic ambidexterity significantly influenced marketing ambidexterity ($\beta = 0.36$, t -value= 3.83) and R&D ambidexterity ($\beta = 0.40$, t -value= 4.82). In addition, new product performance was significantly predicted by marketing ambidexterity ($\beta = 0.23$, t -value= 3.42) and R&D ambidexterity ($\beta = 0.52$, t -value= 6.25). However, strategic ambidexterity had an insignificant direct effect on new product performance ($\beta = 0.18$, t -value= 1.84, $\rho > 0.05$). Following James and Brett (1984), the results indicate that marketing ambidexterity and R&D ambidexterity fully mediate the effect of strategic ambidexterity on new product performance, supporting hypotheses 5a and 6a.

Hypotheses 7a, 7b, 8a, and 8c are related to the mediational effects of new product and established product performance in the relationships between marketing ambidexterity, R&D ambidexterity, and firm performance. Table 5.21 reveals that strategic ambidexterity significantly influenced marketing ambidexterity ($\beta = 0.36$, t -value= 4.84) and R&D ambidexterity ($\beta = 0.49$, t -value= 7.04). In addition, established product performance was significantly predicted by R&D ambidexterity ($\beta = 0.25$, t -value= 2.23). However, strategic

ambidexterity ($\beta = .016$, $t\text{-value} = 1.82$, $\rho > 0.05$) and marketing ambidexterity ($\beta = -0.22$, $t\text{-value} = 1.13$, $\rho > 0.05$) had insignificant effects on established product performance. Therefore, the results indicate that R&D ambidexterity fully mediates the effect of strategic ambidexterity on established product performance, supporting hypothesis 5b. Since marketing ambidexterity had an insignificant effect on established product performance, marketing ambidexterity does not mediate the effect of strategic ambidexterity on established product performance, rejecting hypothesis 6b.

Regarding the mediational effect of new product performance, Table 5.21 indicates that marketing ambidexterity and R&D ambidexterity significantly influenced new product performance, while new product performance also significantly affected firm performance ($\beta = 0.45$, $t\text{-value} = 9.28$). However, marketing ambidexterity ($\beta = 0.05$, $t\text{-value} = .47$, $\rho > 0.05$) and R&D ambidexterity ($\beta = .19$, $t\text{-value} = 1.50$, $\rho > 0.05$) had insignificant direct effects on firm performance. Therefore, the results indicate that new product performance fully mediates relationships between marketing ambidexterity, R&D ambidexterity, and firm performance, supporting hypotheses 7a and 7b.

Regarding the mediational effect of established product performance, Table 5.22 shows that R&D ambidexterity significantly influenced established product performance, while established product performance also significantly affected firm performance ($\beta = 0.43$, $t\text{-value} = 7.70$). However, R&D ambidexterity ($\beta = 0.09$, $t\text{-value} = 1.18$, $\rho > 0.05$) had an insignificant direct effect on firm performance. Therefore, the results indicate that established product performance fully mediates the relationship between R&D ambidexterity and firm performance, supporting hypothesis 8a. Since marketing ambidexterity has an insignificant effect on established product performance, established product performance does not mediate the relationship between marketing ambidexterity and firm performance, rejecting hypothesis 8b.

As shown in Table 5.23, Sobel's (1982) test and bootstrapping test provide evidence for significance of hypotheses 5 to 8, as the t-value of all mediational effects were greater than the cut-off value (1.96) and the confidence interval of all mediational effects did not include zero. This shows hypotheses 5a, 5b, 6a, 7a, 7b, and 8a are significant.

Table 5.23- Sobel's test and bootstrapping test for Hypotheses 5a, 5b, 6a, 7a, 7b, and 8a

Hypothesis	Mediational effect	Effect	Normal theory test			Bootstrapping		
			SE	t-value	ρ	SE	LL	UL
H5a	SA→MA→ NPP	.58**	.13	4.31	.00	.13	.33	.88
H5b	SA→R&DA→ NPP	.85**	.16	5.17	.00	.16	.50	1.16
H6a	SA→MA→ EPP	.29*	.11	2.064	.01	.10	.13	.57
H7a	MA → NPP → FP	.37**	.07	5.03	.00	.09	.20	.56
H7b	R&DA → NPP → FP	.28**	.07	3.66	.00	.08	.11	.45
H8a	R&DA → EPP → FP	.08*	.04	2.00	.04	.03	.02	.13

Notes: Notes: SA= Strategic ambidexterity, R&DA= R&D ambidexterity, MA= Marketing ambidexterity, NPP= New product performance, EPP= Established product performance, FP= Firm performance, UL= Upper-level, LL= Lower-level, * $p < .05$, ** $p < .01$.

5.7. The model fit of inner-structural models

PLS-SEM unlike CB-SEM techniques does not provide statistics to measure overall model fit (i.e., GFI, CFI, and NFI). Instead, the primary objective of PLS-SEM is the minimisation of error in all endogenous constructs. Instead, variance explained (R^2) can be used to assess nomological validity (or predictive power) of the inner-structural model (Fornell & Bookstein, 1982; Hulland, 1999). Where the inner-structural model encompasses more than one endogenous construct, the predictive power is assessed by calculating mean R^2 endogenous construct (or average variance accounted for) (Fornell & Bookstein, 1982; Hulland, 1999). By calculating average variance accounted for ($\overline{R^2}$), the predictive power of the inner-structural model can be evaluated by F-test ($f^2 = \frac{\overline{R^2}}{1-\overline{R^2}}$) suggested by Cohen (1988). According to Cohen (1988), f^2 values of 0.02, 0.15, and 0.35 signify small, medium, and large effects, respectively. More recently, Amato et al. (2004) suggest an approach to measure goodness of fit (GoF) of the inner-structural model. GoF represents the geometric

mean of the average communality and average R^2 for endogenous constructs (Amato et al., 2004; Tenenhaus, Vinzi, Chaltelin, & Lauro, 2005; Wetzels, Odekerken-Schröder, & van Oppen, 2009). GoF is measured by taking the square root of the product of the average communality of all constructs and the average R^2 value of the endogenous constructs:

$$GoF = \sqrt{\overline{Communality}^2 \times \overline{R^2}}.$$

Drawing upon the categorisation of R^2 effect sizes by Cohen (1988) and using the cut-off value of 0.5 for AVE (Fornell and Larcker, 1981), GoF criteria for poor, medium, and good model fit are 0.1, 0.25 and 0.36 respectively (Schepers, Wetzels, & Ruyter, 2005; Wetzels et al., 2009).

Another assessment of the inner-structural model involves the model's capability to predict. The predominant measure of predictive relevance is Stone-Geisser's Q^2 (Stone, 1974; Geisser, 1975), which can be measured using blind folding procedure (Henseler et al., 2009; Hair et al., 2011a). Q^2 represents a statistic of how well the observed values are reconstructed in the model (or the model is able to adequately predict each endogenous variable's items) (Stone, 1974; Geisser, 1975; Hair et al., 2011a). The blind folding procedure is only applied to endogenous constructs that have a reflective measurement model operationalisation (Henseler et al., 2009). The predictive relevance of an endogenous construct is evident, when Q^2 is larger than zero (Hair et al., 2011a). Similar to R^2 , the predictive relevance of an inner-structural model is assessed by calculating mean Q^2 of all endogenous constructs, when the inner-structural model encompasses more than one endogenous construct. In analogy to the effect-size f^2 evaluation, the relative impact of the predictive relevance (q^2) of an inner-structural model can be calculated by: $q^2 = \frac{\overline{Q^2}}{1 - \overline{Q^2}}$ (Hair et al., 2011a). Similar to f^2 , values of 0.02, 0.15, and 0.35 reveal a small, medium, or large predictive relevance (Henseler et al., 2009). This study adopted both GoF and q^2 indices to assess the inner-structural model fit

and predictive relevance. Sections 5.7.1 and 5.7.2 present the results of the model fit for inner-structural models related to Stage A and Stage B, respectively.

5.7.1. Stage A: The model fit of inner-structural models

As shown in Table 5.18, the R^2 values for all endogenous variables were greater than the cut-off value of 0.10 suggested by Falk and Miller (1992), ranged from 0.10 to 0.44. GoF were 0.40 and 0.42 for basic and interaction models, respectively, indicating good fit for these models (Schepers et al., 2005; Wetzels et al., 2009). Further, q^2 were 0.35 and 0.36 for the basic and interaction models, respectively, indicating large predictive relevance of these models (Henseler et al., 2009). Table 5.19 reveals that the R^2 values for all endogenous variables except exploratory R&D (0.09) were greater than the cut-off value of 0.10 (Falk & Miller, 1992), ranged from 0.09 to 0.42. GoF were 0.42 and 0.43 for the basic and interaction models, respectively, indicating good fit for these models (Schepers et al., 2005; Wetzels et al., 2009). Further, q^2 were 0.36 and 0.37 for the basic and interaction models, respectively, indicating large predictive relevance of these models (Henseler et al., 2009).

5.7.2. Stage B: The model fit of inner-structural models

As shown in Table 5.20, the R^2 values for all endogenous variables in the Ambidexterity Model were greater than the cut-off value of 0.10 (Falk & Miller, 1992), ranged from 0.10 to 0.68. GoF was 0.42 for Ambidexterity Model indicating good fit for the model (Schepers et al., 2005; Wetzels et al., 2009). Further, q^2 was 0.36 for the Ambidexterity Model, indicating large predictive relevance of the model (Henseler et al., 2009). Table 5.21 reveals that the R^2 values for all endogenous variables in Ambidexterity Model were greater than the cut-off value of 0.10 (Falk & Miller, 1992), ranged from 0.13 to 0.43. GoF was 0.43 for the Ambidexterity Model indicating good fit for the model (Schepers et al., 2005; Wetzels et al.,

2009). Further, q^2 was 0.36 for the Ambidexterity Model, indicating large predictive relevance of the model (Henseler et al., 2009).

5.8. Additional analysis

In addition to the analysis provided in Sections 5.4 to 5.7, this section provides additional analysis to articulate the relationships between constructs of interest in this study's theoretical framework (Figure 3.1). In particular, Section 5.8.1 presents the results that seek to investigate the extent that strategic ambidexterity and operational ambidexterity enhance the performance of a firm's new and established product (hypotheses 5 and 6), when exploratory and exploitative constructs complement each other (combined ambidexterity approach). Section 5.8.2 examines the mediational roles of integration of exploratory R&D-exploratory marketing and exploitative R&D-exploitative marketing following moderated-mediation approach (Preacher, Rucker, & Hayes, 2007; Hayes, 2012).

5.8.1. The test of Hypotheses 5 and 6 following the combined ambidexterity approach

As noted in Chapter Two (Section 2.3), the literature operationalises ambidexterity following two approaches, balanced and combined ambidexterity (Gupta et al., 2006; Cao et al., 2009). Balanced ambidexterity defines ambidexterity as the management of the balance between the pursuits of exploratory and exploitative constructs (i.e., exploratory strategy-exploitative strategy, exploratory R&D-exploitative R&D, exploratory marketing-exploitative marketing). Combined ambidexterity defines ambidexterity as the complementarity (i.e., combination, integration) between exploratory and exploitative constructs (He & Wong, 2004; Cao et al., 2009; Jansen et al., 2009). Specifically, those adopting combined ambidexterity argue that high levels of exploratory and exploitative R&D can complement and augment the performance-outcomes of each other (Katila & Ahuja, 2002; Cao et al., 2009). Statistically, combined ambidexterity can be operationalised by multiplying the magnitude of exploratory

and exploitative constructs together (Kannai, 1980; He & Wong, 2004; Jansen et al., 2009). This section follows the combined ambidexterity approach and examines the mediational effect of operational ambidexterity in the relationships between strategic ambidexterity, new product performance, and established product performance (Hypotheses 5 and 6).

Similar to Section 5.5.2, two predictive structural models (Basic and Ambidexterity Models) were developed for the selected new product and established product separately. Table 5.24 (the inner-structural model for the selected new product) illustrates the results for the inner-structural models related to the selected new product (Data Set I). In this table, the results in the ambidexterity model indicate that strategic ambidexterity significantly influenced marketing ambidexterity ($\beta = 0.45$, $t\text{-value} = 4.11$) and R&D ambidexterity ($\beta = 0.44$, $t\text{-value} = 4.82$). However, marketing ambidexterity ($\beta = 0.67$, $t\text{-value} = 1.05$, $\rho > 0.05$) and R&D ambidexterity ($\beta = 0.62$, $t\text{-value} = 1.11$, $\rho > 0.05$) had insignificant effects on new product performance. Following James and Brett (1984), the results indicate that marketing ambidexterity and R&D ambidexterity did not mediate the relationships between strategic ambidexterity and new product performance, rejecting hypotheses 5a and 5b.

Table 5.25 (the inner-structural model for the selected established product) indicates the results for the inner-structural models related to the selected established product (Data Set II). In this table, the results in the ambidexterity model indicate that strategic ambidexterity significantly influenced marketing ambidexterity ($\beta = 0.46$, $t\text{-value} = 6.10$) and R&D ambidexterity ($\beta = 0.39$, $t\text{-value} = 3.53$). However, marketing ambidexterity ($\beta = 0.49$, $t\text{-value} = .90$, $\rho > 0.05$) and R&D ambidexterity ($\beta = 0.86$, $t\text{-value} = 1.36$, $\rho > 0.05$) had insignificant effects on established product performance. Therefore, the results indicate that marketing ambidexterity and R&D ambidexterity did not mediate the relationships between strategic ambidexterity and established product performance, rejecting hypotheses 6a and 6b.

Table 5.24- Combined ambidexterity: The inner-structural models for the selected new product

Exogenous Variables	Endogenous Variables	Basic Model			Ambidexterity Model		
		β	t-Value	R ²	β	t-Value	R ²
Exploratory Strategy	New Product Performance	-.24	1.73		.29	.71	
	ExrM	.42**	5.05	.18	.07	.19	.19
	ExrR&D	.51**	6.33	.27	.02	.03	.28
	ExiM	.42**	4.48	.19	-.44	.17	.24
	ExiR&D	.31**	3.34	.10	-.07	.16	.11
Exploitative Strategy	New Product Performance	.11	1.27		.77	1.71	
	ExrM	.04	.42		-.28	.65	
	ExrR&D	.07	.70		-.39	1.03	
	ExiM	.08	.93		-.74	1.73	
	ExiR&D	.03	.22		-.33	.69	
Strategic Ambidexterity	New Product Performance				-.51	1.55	
	ExrM				.49	.81	
	ExrR&D				.71	1.37	
	ExiM				1.26	2.07	
	ExiR&D				.5	.90	
	Marketing Ambidexterity				.45**	4.11	.21
	R&D Ambidexterity				.44**	4.82	.20
ExrM	New Product Performance	.26*	2.31	.44	-.02	.07	.47
ExrR&D		.54**	5.11		.27	.78	
ExiM		.09	.77		-.33	.79	
ExiR&D		-.13	1.23		-.46	1.54	
Marketing Ambidexterity					.67	1.05	
R&D Ambidexterity					.62	1.11	
Market Turbulence		-.02	.15		-.01	.14	
Technological Turbulence		-.15	1.06		-.12	1.03	
Organisational Slack		.16	1.68		.07	.92	
Firm Size		-.06	.76		-.01	.09	
Firm Age		-.02	.15		-.17*	2.05	
New Product Performance	Firm Performance	.46**	7.04	.34	.48**	7.25	.35
Marketing Ambidexterity					.43	.38	
R&D Ambidexterity					.26	.94	
Market Turbulence		-.09	1.14		-.10	1.12	
Technological Turbulence		-.02	.18		-.07	.01	
Organisational Slack		.16	1.67		.12	1.53	
Firm Size		.01	.08		.02	.20	
Firm Age		.03	.28		-.05	.40	
GoF			.40			.42	
q ²			.35			.36	

Notes: ExrR&D= Exploratory R&D, ExrM= Exploratory marketing, ExiR&D= Exploitative R&D, ExiM= Exploitative marketing, * $p < .05$, ** $p < .01$.

Table 5.25- Combined ambidexterity: The inner-structural models for the selected established product

Exogenous Variables	Endogenous Variables	Basic Model			Ambidexterity Model		
		B	t-Value	R ²	B	t-Value	R ²
Exploratory Strategy	EPP	-.24	1.73		.08	.14	
	ExrM	.42**	5.05	.18	-.01	.02	.19
	ExrR&D	.51**	6.33	.27	.05	.10	.09
	ExiM	.42**	4.48	.19	.24	.54	.35
	ExiR&D	.31**	3.34	.10	-.35	.90	.17
Exploitative Strategy	EPP	.11	1.27		.38	.01	
	ExrM	.04	.42		.20	.54	
	ExrR&D	.07	.70		-.11	.21	
	ExiM	.08	.93		.62	1.53	
	ExiR&D	.03	.22		-.26	.72	
Strategic Ambidexterity	EPP				-.14	.34	
	ExrM				.27	.49	
	ExrR&D				.31	.40	
	ExiM				-.12	.19	
	ExiR&D				.84	1.54	
	Marketing Ambidexterity				.48**	6.10	.24
	R&D Ambidexterity				.39**	3.53	.16
ExrM	EPP	.26*	2.31	.44	.20	.50	.35
ExrR&D		.54**	5.11		-.64	1.18	
ExiM		.09	.77		.49**	2.84	
ExiR&D		-.13	1.23		.14	.48	
Marketing Ambidexterity					-.49	.90	
R&D Ambidexterity					.86	1.36	
Market Turbulence		-.02	.15		-.10	.91	
Technological Turbulence		-.15	1.06		-.10	.70	
Organisational Slack		.16	1.68		.14	1.43	
Firm Size		-.06	.76		.01	.04	
Firm Age		-.02	.15		.05	.70	
EPP	Firm Performance	.46**	7.04	.34	.42**	7.28	.44
Marketing Ambidexterity					-.23	.12	
R&D Ambidexterity					.54	.70	
Market Turbulence		-.09	1.14		-.08	.19	
Technological Turbulence		-.02	.18		-.06	.07	
Organisational Slack		.16	1.67		.11	1.87	
Firm Size		.01	.08		-.01	.12	
Firm Age		.03	.28		.01	.21	
GoF			.40			.41	
q ²			.36			.37	

Notes: ExrR&D= Exploratory R&D, ExrM= Exploratory marketing, ExiR&D= Exploitative R&D, ExiM= Exploitative marketing, EPP= Established product performance. * $p < .05$, ** $p < .01$.

5.8.2. The test of Hypotheses 2 and 4 following the moderated-mediation approach

As noted in Chapter Three, Section 3.3.1 argued that the integration of exploratory R&D-exploratory marketing intervenes the relationship between exploratory strategy and new product performance (hypothesis 2). In the same vein, Section 3.3.2 suggested that the integration of exploitative R&D-exploitative marketing intervenes the relationship between exploitative strategy and established product performance (hypothesis 4). According to Section 5.5.1, integration of these capabilities is operationalised by multiplying the magnitude of R&D and marketing capability together (Baron & Kenny, 1986; Moorman & Slotegraaf, 1999). This approach, however, does not articulate the extent that the integration of R&D and marketing capabilities mutually reinforce each other.

This section sought to provide a deeper understanding about the manner in which the integration of R&D and marketing capabilities assist a firm to implement its exploratory and exploitative strategies to enhance its product's performance. To do so, this section adopted moderated-mediation approach suggested by Preacher et al. (2007) and Hayes (2012) to articulate the extent that the integration of R&D and marketing capabilities mutually reinforce each other. Moderated-mediation represents the extent that the magnitude of a mediational effect varies at a particular value of a moderator (Morgan-Lopez & MacKinnon, 2006; Preacher et al., 2007; Rodríguez-Pinto et al., 2011). Moderated-mediation effects seek to explain when or under what condition a mediational effect occurs (Preacher et al., 2007; Hayes, 2012). The application of moderated-mediation effect implies that the integration of exploratory R&D-exploratory marketing occurs (hypothesis 2) when: (1) the strength of relationships between exploratory strategy-exploratory R&D-new product performance increases with the increasing level of exploratory marketing, and (2) the strength of relationships between exploratory strategy-exploratory marketing-new product performance increases with the increasing level of exploratory R&D. In the same vein, the integration of

exploitative R&D-exploitative marketing occurs (hypothesis 4) when: (1) the strength of relationships between exploitative strategy-exploitative R&D-established product performance increases with the increasing level of exploitative marketing, and (2) the strength of relationships between exploitative strategy-exploitative marketing-established product performance increases with the increasing level of exploitative R&D.

To conduct moderated-mediation test, this study employed an SPSS Marco developed by Preacher et al. (2007) and Hayes (2012). As shown in Table 5.26 (Panel A), the strength of relationships between exploratory strategy-exploratory R&D-new product performance increased with the increasing level of exploratory marketing (from .05 to .07). Further, the confidence interval for the conditional mediational effect was entirely above zero among all levels of exploratory marketing. In addition, the strength of relationships between exploratory strategy-exploratory marketing-new product performance increased with the increasing level of exploratory R&D (from .12 to .15), and the confidence interval for the conditional mediational effect was entirely above zero among all levels of exploratory R&D. Therefore, the results indicate that exploratory R&D and exploratory marketing mutually reinforced the mediational effect of each other in the relationship between exploratory strategy and new product performance, supporting hypothesis 2.

Table 5.26 (Panel B) indicates that the strength of relationships between exploitative strategy-exploitative R&D-established product performance increased with the increasing level of exploitative marketing (from .05 to .07). Further, the confidence interval for the conditional mediational effect was entirely above zero among all levels of exploitative marketing. In addition, the strength of relationships between exploitative strategy-exploitative marketing-established product performance increased with the increasing level of exploitative R&D (from .12 to .15), and the confidence interval for the conditional mediational effect was entirely above zero among all levels of exploitative R&D. Therefore, the results indicate that

exploitative R&D and exploitative marketing mutually reinforced the mediational effect of each other in the relationship between exploratory strategy and established product performance, supporting hypothesis 4.

Table 5.26 – Moderated-mediation test for Hypotheses 2 and 4

Conditional indirect effect	Moderator value	β	SE	LL	UL
Panel A					
Exr S→Exr R&D→ NPP at values of Exr M					
-1 SD	2.42	.28	.09	.12	.46
Mean	3.42	.31	.07	.19	.48
+1 SD	4.43	.35	.09	.17	.55
Exr S→Exr M→ NPP at values of Exr R&D					
-1 SD	2.97	.06	.05	.03	.17
Mean	4.00	.11	.03	.04	.19
+1 SD	5.01	.15	.05	.05	.27
Panel B					
Exi S→Exi R&D→ EPP at values of Exi M					
-1 SD	2.60	.09	.07	.01	.27
Mean	3.80	.13	.05	.04	.29
+1 SD	5.00	.17	.06	.06	.32
Exi S→Exi M→ EPP at values of Exi R&D					
-1 SD	3.19	.07	.06	.01	.22
Mean	3.94	.12	.05	.02	.24
+1 SD	4.70	.18	.06	.05	.31
Notes: Notes: ExrS= Exploratory strategy, ExiS= Exploitative strategy, ExrR&D= Exploratory R&D, ExrM= Exploratory marketing, ExiR&D= Exploitative R&D, ExiM= Exploitative marketing, NPP= New product performance, EPP= Established product performance, UL= Upper-level, LL= Lower-level.					

5.9. Conclusion

This chapter has presented the results of the analysis undertaken on the data collected to test the hypotheses. The data were obtained from 169 survey packages (including Questionnaires A, B, and C) from a cross-industry sample of large-sized firms in Iran. Preliminary data

analysis revealed that some items were departed from normal distribution. Based on preliminary data analysis, predictive nature of study, complexity of the theoretical model, and sample size obtained for this study, PLS-SEM was selected as the means of data analysis. PLS-SEM examines the adequacy of measurement models and tests the hypotheses by developing by two sets of linear relationship equations namely outer-measurement model and inner-structural model, respectively.

The assessment of outer-measurement models (Section 5.4) indicated that all measurement items have acceptable loading, composite reliability, and bootstrapped t-value. The assessment of outer-measurement models also revealed that all construct of interests the synchronised multi-level - multi-unit ambidexterity framework (Figure 3.1) had satisfactory convergent validity. In terms of convergent validity, Section 5.4.8 indicated that two developed data sets related to the selected new product and established product had satisfactory convergent validity. The assessment of inner-structural models (Sections 5.5 to 5.7) provided support for hypotheses 1a, 1b, 2, 3a, 3b, 5a, 5b, 6a, 7a, 7b, and 8a. However, results rejected hypotheses 4, 6b, and 8b. Table 5.27 summarise the results of hypotheses testing.

Beyond the examination of hypotheses 5a, 5b, 6a, and 6b provided in Sections 5.5 to 5.7, additional analysis was undertaken to test these hypotheses following the combined ambidexterity approach (Section 5.8.1). The results of the analysis in Section 5.5 rejected hypotheses 5a, 5b, 6a, and 6b. Finally, despite the fact that the results provided in Section 5.6.1 rejected hypotheses 4, additional analysis (Section 5.8.2) provided support for hypotheses 4 following the moderated-mediation approach.

Table 5.27 – Summary of hypotheses results

Hypotheses		Outcomes
Stage A		
H1a	Exploratory R&D mediates the relationship between exploratory strategy and new product performance.	Supported
H1b	Exploratory Marketing mediates the relationship between exploratory strategy and new product performance.	Supported
H2	The integration of exploratory R&D and marketing capabilities mediates the relationship between exploratory strategy and new product performance.	Supported
H3a	Exploitative R&D mediates the relationship between exploitative strategy and established product performance.	Supported
H3b	Exploitative marketing mediates the relationship between exploitative strategy and established product performance.	Supported
H4	The integration between exploitative R&D and marketing capabilities mediates the relationship between exploitative strategy and established product performance.	Not Supported
Stage B		
H5a	R&D ambidexterity mediates the relationships between strategic ambidexterity and new product performance.	Supported
H5b	R&D ambidexterity mediates the relationships between strategic ambidexterity and established product performance.	Supported
H6a	Marketing ambidexterity mediates the relationships between strategic ambidexterity and new product performance.	Supported
H6b	Marketing ambidexterity mediates the relationships between strategic ambidexterity and established product performance.	Not Supported
H7a	New product performance mediates the relationship between R&D ambidexterity and firm performance.	Supported
H7b	New product performance mediates the relationship between marketing ambidexterity and firm performance.	Supported
H8a	Established product performance mediates the relationship between R&D ambidexterity and firm performance.	Supported
H8b	Established product performance mediates the relationship between marketing ambidexterity and firm performance.	Not Supported

The findings presented in this chapter provide a comprehensive base for the ensuing discussion in Chapter Six that includes interpretation of the results, presentation of theoretical and practical implications, and recommendations for future research.

Chapter Six

Discussion and Conclusions

6.1. Introduction

The main objective of this study was to examine the extent that firms are ambidextrous when they have the capacity to pursue exploration and exploitation at multiple organisational levels, multiple functional areas, and multiple product development projects. Building on the review of the literature provided in Chapter Two, Chapter Three presented the synchronised multi-level - multi-unit ambidexterity framework, which articulated interrelations among exploratory and exploitative strategies, exploratory and exploitative R&D and marketing capabilities, new product and established product performance, and firm performance. Specifically, Chapter Three developed the theory leading to eight hypotheses explaining the relationships among constructs of interest. In Chapter Four, the research design was developed to link the hypotheses with empirical data. Chapter Five presented the results of the analysis undertaken to test the hypotheses. Overall, Chapters Two to Five provide a comprehensive base for the ensuing discussions regarding the interpretation of results and the presentation of theoretical and practical implications.

The purpose of this chapter is to discuss and evaluate the findings and outline the theoretical and practical implications of the study. Chapter Six is structured as follows. Section 6.2 presents the interpretation of the findings. Sections 6.3 and 6.4 present the implications for theory and practitioners, respectively. Section 6.5 explains the limitations and directions for future research. Finally, Section 6.6 closes this chapter with the conclusion.

6.2. Discussion of overall model results

The review of the literature presented in Chapter Two showed that while the significance of organisational ambidexterity is widely recognised, especially in the context of product development, this stream of research has three broad limitations. First, limited effort has been devoted to the extent that the interaction between corporate-level exploratory and exploitative strategies and business-level exploratory and exploitative capabilities enable a firm to become ambidextrous. Second, limited attention has been given to the extent that the deployment and integration of exploratory and exploitative capabilities across multiple functional areas provide the capacity to implement exploratory and exploitative strategies, particularly in the context of product development projects and their marketing. Third, there has been limited attention paid to the extent that organisational ambidexterity provides the capacity to synchronise the development and marketing of new and established products. To address these three broad limitations, four specific research questions were developed and are detailed below:

- RQ1. To what extent does the congruence between exploratory strategy and business-level exploratory R&D and marketing capability deployment enhance new product performance?
- RQ2. To what extent does the congruence between exploitative strategy and business-level exploitative R&D and marketing capability deployment enhance established product performance?
- RQ3. To what extent does the synchronous pursuit of corporate-level exploratory and exploitative strategies and the synchronous deployment of business-level exploratory and exploitative capabilities contribute to both new product and established product performance?

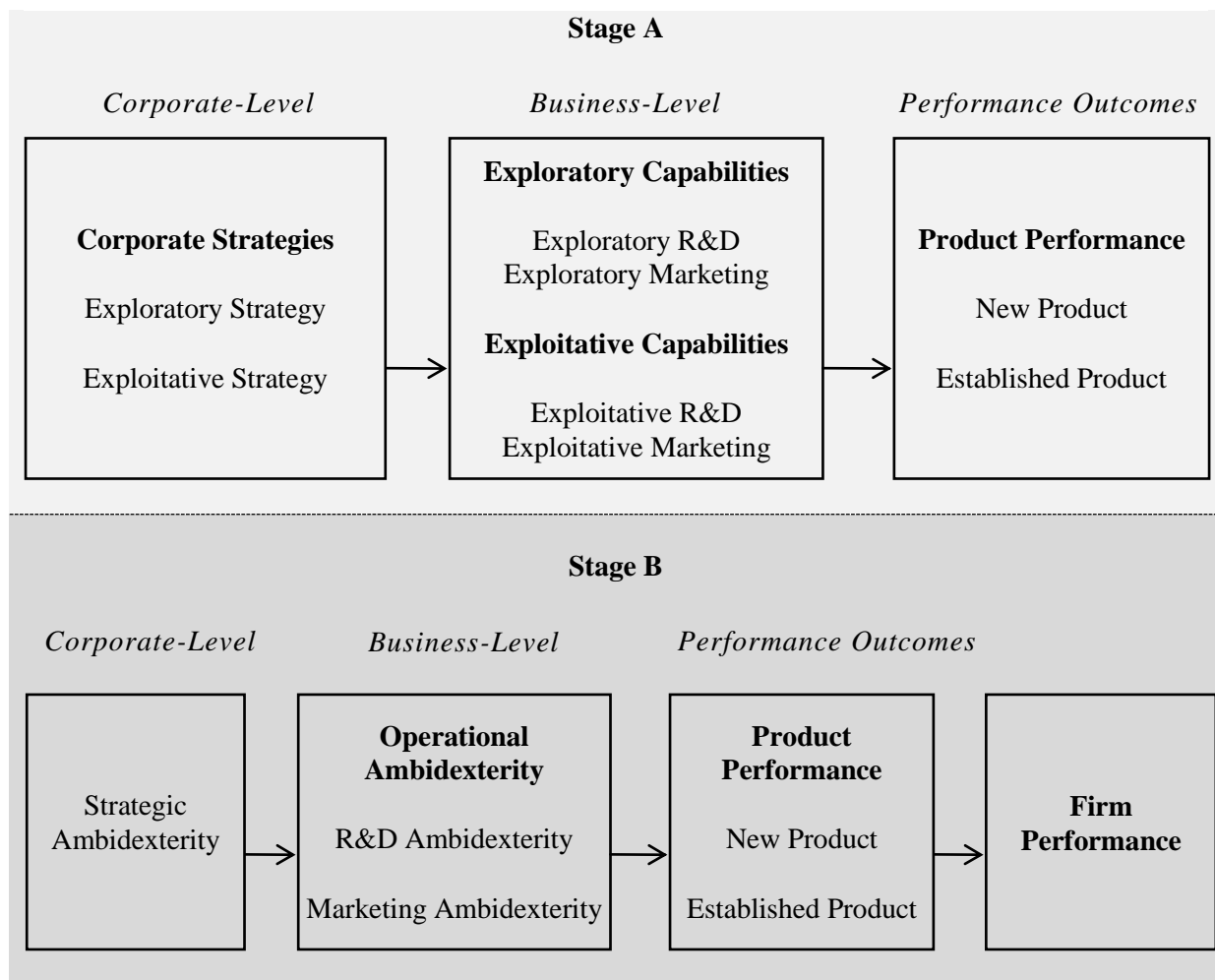
- RQ4. To what extent does the synchronous development and marketing of new and established products enhance firm performance?

These questions were rooted in an extensive review of the literature related to organisational ambidexterity, strategy implementation, dynamic capability, and product development presented in Chapters Two and the theory development in Chapter Three. To address these specific research questions, a theoretical framework incorporating eight hypotheses was developed in Chapter Three (Figure 3.1). Figure 6.1 presents the synchronised multi-level - multi-unit ambidexterity framework developed for this study.

As shown in Figure 6.1, this theoretical framework encompasses two distinctive stages, Stages A and B. Stage A pertains to the extent that the implementation of corporate-level exploratory and exploitative strategies influences a firm's new product and established product performance, respectively. This stage underscores the implementation roles of exploratory and exploitative R&D and marketing capabilities at the business-level of firms which act as intervening mechanisms in the strategy-performance context. Stage A encompasses hypotheses 1 to 4 and is related to research questions RQ1 and RQ2.

Stage B pertains to the extent that synchronising the pursuit and implementation of exploratory and exploitative strategies drives a firm's new product and established product performance simultaneously. This stage underscores the implementation role of business-level R&D and marketing ambidexterity as two important linchpins in the relationships between strategic ambidexterity, new product performance, and established product performance. In addition, Stage B articulates the mediational roles of new and established product performance in the relationships between R&D ambidexterity, marketing ambidexterity, and firm performance. Stage B encompasses hypotheses 5 to 8 and is related to research questions RQ3 and RQ4.

Figure 6.1– The synchronised multi-level - multi-unit ambidexterity framework



As shown in Table 5.27 (p. 198), the results support hypotheses 1a, 1b, 2, 3a, 3b, 5a, 5b, 6a, 7a, 7b, and 8a. However, the results of the initial analysis do not support hypotheses 4, 6b, and 8b. However, as shown in Table 5.27, the additional analysis undertaken and presented in Section 5.8.2 provided support for hypotheses 2 and 4. The next four sections (6.2.1 to 6.2.4) present the interpretation of the results regarding hypotheses 1 to 8.

6.2.1. The discussion of the results related to Hypotheses 1a, 1b, 3a, and 3b

As noted in Chapter Three (Section 3.3), hypotheses 1a, 1b, 3a, and 3b focused on the extent that exploratory and exploitative R&D and marketing capabilities act as intervening mechanisms between corporate level exploratory and exploitative strategies, new product

performance, and established product performance (Figure 6.1, Stage A). The contention underpinning these hypotheses was that exploratory and exploitative strategies might not influence a product's performance unless appropriate business-level exploratory and exploitative capabilities are developed and deployed (see Section 3.3.1). Specifically, hypotheses 1a, 1b, 3a, and 3b underscored the roles of exploratory and exploitative R&D and marketing capabilities as the means to implement the firm's exploratory and exploitative strategies and to develop and market new and established products.

In particular, hypotheses 1a and 1b focused on relationships between exploratory strategy, exploratory R&D and marketing capabilities, and new product performance. The results presented in Section 5.6.1 indicate that exploratory R&D and exploratory marketing fully mediate the effect of exploratory strategy on new product performance within firms studied, supporting hypotheses 1a and 1b. In this sense, exploratory R&D and marketing capabilities act as important intervening mechanisms in the relationship between exploratory strategy and the performance of the firm's new products. As noted in Appendix I, the contention was advanced that exploitative R&D and marketing capabilities play insignificant roles in the implementation of exploratory strategy. The results supported this argument indicating that both exploitative R&D and marketing capabilities do not mediate the effect of exploratory strategy on the performance of the firm's new products.

Hypotheses 3a and 3b focused on relationships between exploitative strategy, exploitative R&D and marketing capabilities, and established product performance. The results presented in Section 5.6.1 indicate that exploitative R&D and exploitative marketing fully mediate the effect of exploitative strategy on established product performance within firms studied, supporting hypotheses 3a and 3b. In this sense, exploitative R&D and marketing capabilities act as important intervening mechanisms in the relationship between exploitative strategy and the performance of the firm's established products. As noted in

Appendix II, the contention was advanced that exploratory R&D and marketing capabilities play insignificant roles in the implementation of exploitative strategy. The results supported this contention indicating that both exploratory R&D and marketing capabilities do not mediate the effect of exploitative strategy on the performance of the firm's established products.

In conclusion, the results suggest that firms within this study achieve superior new product and established product performance when corporate-level exploratory and exploitative strategies interact with business-level exploratory and exploitative capabilities across R&D and marketing areas. The results provide a deeper understanding about the extent that a firm becomes ambidextrous, when it pursues and implements exploration and exploitation across multiple hierarchical levels (i.e., corporate and business levels), multiple functional areas (i.e., R&D and marketing), and multiple product development projects (i.e., new and established products).

6.2.2. The discussion of the results related to Hypotheses 2 and 4

Hypotheses 2 and 4 focused on the extent that the integration of exploratory R&D-exploratory marketing and the integration of exploitative R&D-exploitative marketing enhance the firm's capacity to implement its exploratory and exploitative strategies more than the deployment of these capabilities in isolation. As noted in Chapter Three, Section 3.3, the integration of two capabilities represents the extent that the benefits gained from one capability increase with the contribution of the other capability and *vice versa*. Sections 3.3.1 and 3.3.2 presented the theory about the extent that exploratory and exploitative R&D and marketing capabilities mutually reinforce their implementation effects in the relationship between exploratory strategy, exploitative strategy, new product performance, and established product performance.

In particular, Hypothesis 2 argued that the integration of exploratory R&D-exploratory marketing acts as an intervening mechanism between the firm's exploratory strategy and new product performance. The results presented in Section 5.6.1 indicate that the integration of exploratory R&D-exploratory marketing fully mediates the effect of exploratory strategy on new product performance within firms studied, supporting hypotheses 2. In this sense, the integration of exploratory R&D-exploratory marketing, acts as an important intervening mechanism in the relationship between exploratory strategy and the performance of the firm's new products.

Hypothesis 4 raised the argument that the integration of exploitative R&D-exploitative marketing acts as an intervening mechanism between the firm's exploitative strategy and established product performance. The results presented in Section 5.6.1 show that the integration of exploitative R&D-exploitative marketing within firms does not mediate the effect of exploitative strategy on established product performance within firms studied, rejecting hypothesis 4. This implies that the integration of exploitative R&D and marketing capabilities is not necessary, when a firm perceives that the advantages it has in an established product fit existing customer needs or the product's target market is stable in terms of customer needs. This appears to counter the literature which generally argues that a requisite level of integration between R&D and marketing capabilities is necessary for all product development projects, and this includes both new and established products (e.g., Day, 1994; Song & Parry, 1997; Jassawalla & Sashittal, 1998; Moorman & Slotegraaf, 1999; Leenders & Wierenga, 2002; Song et al., 2005). The consensus from the work of these researchers show that more integration between marketing and R&D enhances the efficiency and effectiveness of a product development project.

Given these findings, the moderated-mediation test was undertaken to gain further insight into the role of the integration of exploitative R&D and marketing capabilities. As

noted in Section 5.8.2, the literature commonly operationalises the integration of two capabilities by multiplying the magnitude of each capability together (e.g., Kannai, 1980; Baron & Kenny, 1986; Moorman & Slotegraaf, 1999). This approach, however, does not articulate the extent that R&D capability complements the benefits gained from marketing capabilities, and *vice versa*. In this sense, the moderated-mediation test has the capacity to provide a deeper understanding about when or under what conditions a mediational effect occurs. The results of the moderated-mediation test indicated that (a) the strength of relationships between exploitative strategy - exploitative R&D - established product performance increased with the increasing level of exploitative marketing undertaken by firms, and (b) the strength of the relationship between exploitative strategy - exploitative marketing - established product performance increased with the increasing level of exploitative R&D undertaken by firms. This implies that exploitative R&D and marketing capabilities mutually reinforced the mediational effect of each other in the relationship between exploitative strategy and established product performance, supporting hypothesis 4. In addition, such mutual reinforcement exists at all levels (i.e., low, medium, and high) of the firms' exploitative R&D and marketing capabilities (see Table 5.26, Chapter Five, Section 5.8.2).

Further, in the same vein, the moderated-mediation test revealed that exploratory R&D and marketing capabilities mutually complemented the mediational effect of each other in the relationship between exploratory strategy and new product performance, supporting hypothesis 2. The results of the moderated-mediation test are consistent with the work of Moorman and Slotegraaf (1999), Leenders and Wierenga (2002), and Song et al. (2005) who contend that a requisite level of integration between R&D and marketing capabilities is necessary for a product development project. Therefore, the additional analysis undertaken

and reported in Section 5.8.2 indicates that the employment of the moderate-mediation test can provide a better understanding about the role of integrative capabilities.

In conclusion, the results suggest that the integration of exploratory R&D-Exploratory marketing and exploitative R&D-exploitative marketing within the firms studied is a necessary condition for the successful implementation of exploratory and exploitative strategies, respectively. Specifically, integration of these capabilities enhances the firm's capacity to implement its exploratory and exploitative strategies more than deploying its exploratory and exploitative capabilities in isolation. The results provide a deeper understanding about the role of integrative capabilities in the implementation of corporate exploratory and exploitative strategies.

6.2.3. The discussion of results related to Hypotheses 5a, 5b, 6a, and 6b

Hypotheses 5a, 5b, 6a, and 6b focused on the extent that R&D ambidexterity and marketing ambidexterity act as the intervening mechanisms between strategic ambidexterity, new product performance, and established product performance. As noted in Chapter Three, Section 3.4, strategic ambidexterity in this study is seen as the synchronicity of corporate-level exploratory and exploitative strategies. R&D ambidexterity is seen as the synchronicity of exploratory and exploitative R&D at the business-level of the firm. Marketing ambidexterity is seen as the synchronicity of exploratory and exploitative marketing at the business-level of the firm. These hypotheses were premised on the argument that achieving organisational ambidexterity is not limited to a single organisational level, a specific functional area, or a product development project. Instead, a firm becomes truly ambidextrous when it has the capacity to synchronise exploration and exploitation across multiple hierarchical levels (i.e., corporate and business levels), multiple functional areas

(i.e., R&D and marketing), and multiple product development projects (i.e., new and established products).

As noted in Sections 3.4 and 5.6.2, strategic ambidexterity, R&D ambidexterity, and marketing ambidexterity were operationalised using the balanced ambidexterity approach. Drawing on Cao et al. (2009, p. 784-785), balanced ambidexterity represents the extent that a firm places equal emphasis on exploration and exploitation, and it relates to the synchronous pursuit of medium-to-high levels of both exploration and exploitation simultaneously. It is empirically (statistically) operationalised as the reversed absolute difference between exploration and exploitation. Following the balanced ambidexterity approach, the theory advanced here sees strategic ambidexterity as the extent that a firm places equal emphasis on the pursuit of exploratory and exploitative strategies. At the R&D ambidexterity addresses the extent that a firm places equal emphasis on the deployment of exploratory and exploitative R&D. Marketing ambidexterity pertains to the extent that a firm places equal emphasis on the deployment of exploratory and exploitative marketing. Both R&D and marketing ambidexterity are operationalised of the business-level of the firm, whereas strategic ambidexterity is operationalised at the corporate level.

Hypotheses 5a and 5b focused on the extent that R&D ambidexterity and marketing ambidexterity act as the intervening mechanisms between strategic ambidexterity and new product performance. The results presented in Section 5.6.2 reveal that marketing ambidexterity and R&D ambidexterity fully mediate the effect of strategic ambidexterity on new product performance within firms studied, supporting hypotheses 5a and 6a. The findings show that achieving organisational ambidexterity is a critical prerequisite for new product success within the firms studied. Further, the results provide an advanced understanding about the extent that organisational ambidexterity matters to firms in their efforts to enhance their new product(s) success. Specifically, the results show that

organisational ambidexterity drives new product performance when a firm has the capacity to balance the pursuit of exploration and exploitation across corporate and business levels and R&D and marketing functional areas of the firm.

Hypotheses 6a and 6b focused on the extent that R&D ambidexterity and marketing ambidexterity act as intervening mechanisms between strategic ambidexterity and established product performance. The results presented in Section 5.6.2 reveal that R&D ambidexterity fully mediates the effect of strategic ambidexterity on established product performance within firms studied, supporting hypothesis 5b. However, the findings also show that marketing ambidexterity does not mediate the relationship between strategic ambidexterity and established product performance within firms studied, rejecting hypothesis 6b. Therefore, the findings suggest that managing the balance between exploratory marketing and exploitative marketing was not critical for the marketing of an established product within the firms studied, where the existing product's advantages fit existing customer needs or the target market is stable in terms of customer needs. In other words, achieving marketing ambidexterity appears to be not as necessary in comparison to R&D ambidexterity, when a firm deliberately decides not to be proactive in responding to market changes or views the market as stable over time.

Beyond operationalising strategic ambidexterity and R&D and marketing ambidexterity using the balanced ambidexterity approach, Section 5.8.1 presented the re-examination of hypotheses 5 and 6 by operationalising strategic, R&D, and marketing ambidexterity using the combined ambidexterity approach. Drawing on Cao et al. (2009), the combined ambidexterity represents the extent that exploration and exploitation complement (i.e., combine, integrate) each other, and it is statistically operationalised through multiplying exploration and exploitation. The results presented in 5.8.1 did not provide support for hypotheses 5a, 5b, 6a, and 6b. Therefore, the results support (1) the contention raised in

Section 3.4 which potentially firms may not invest all or significantly large enough amounts of their available resources in a specific product development project (see also the insignificant effect of organisational slack on new product performance in Tables 5.20, 5.21, 5.24, 5.25) (2) the theory raised by Smith and Tushman (2005) where they argue that firms have a limited amount of resources to invest in the development and marketing of new and established products, and (3) the contention raised in Section 3.4 which present the argument that balanced ambidexterity approach is most appropriate for new product development project with resource constraints.

6.2.4. The discussion of results related to Hypotheses 7a, 7b, 8a, and 8b

Hypotheses 7a, 7b, 8a, and 8c focused on the extent that the implementation of strategic ambidexterity through business-level R&D ambidexterity and marketing ambidexterity deployment drives firm performance via enhancing the performance of the firm's new and established products simultaneously. This implies that new product and established product performance play an intervening role between marketing ambidexterity, R&D ambidexterity, and the firm's performance. The results presented in Section 5.6.1 indicate that a firm's new product performance fully mediates the relationships between its marketing ambidexterity, R&D ambidexterity, and its performance, supporting hypotheses 7a and 7b.

Regarding the mediational effect of the firm's established product performance, the results indicate that a firm's established product performance fully mediates the relationship between R&D ambidexterity and its performance, supporting hypothesis 8a. Since the firm's marketing ambidexterity had no significant effect on their established product performance, the findings show that their established product performance does not mediate the relationship between marketing ambidexterity and firm performance, rejecting hypothesis 8b. As discussed for hypotheses 6b in Section 6.2.3, this implies that achieving marketing

ambidexterity is not as necessary as it is for R&D ambidexterity, when a firm deliberately decides not to be proactive in responding to market changes or views the market as stable over time.

To this end, the findings show that the implementation of strategic ambidexterity through R&D and marketing ambidexterity (except marketing ambidexterity for the firm's established product) drives firm performance because of their ability to enhance the performance of the firm's new and established products. Since both new product and established product enhance firm performance simultaneously, the synchronous pursuit and implementation of exploratory and exploitative strategies within the firms studied appears as a necessary condition to achieve superior firm performance.

6.3. Theoretical implications

The central argument of the synchronised multi-level - multi-unit ambidexterity framework is that firms become ambidextrous and achieve superior firm performance when they have the capacity to pursue exploration and exploitation across multiple organisational levels, multiple functional areas, and multiple product development projects. As noted in Section 6.2 (Figure 6.1), the synchronised multi-level - multi-unit ambidexterity framework encompasses Stages A and B and eight hypotheses to address four specific questions (RQ1 to RQ4). As noted in Section 6.2, Stage A in Figure 6.1 encompasses hypotheses 1 and 4, which address RQ1 and RQ2. Further, Stage B in Figure 6.1 encompasses hypotheses 5 and 8, which address RQ3 and RQ4.

Specifically, RQ1 asked to what extent does the congruence between exploratory strategy and business-level exploratory R&D and marketing capability deployment enhance new product performance? Section 6.2.1 provides support for hypotheses 1 and 2 and shows that the firm's corporate-level exploratory strategy indirectly influences their new product

performance through the deployment of business-level exploratory R&D and marketing capabilities. However, the transformation of exploratory strategy into superior new product performance was lost when a firm focuses on the deployment of business-level exploitative R&D and marketing capabilities. Therefore, the findings of this study successfully address RQ1 and show that the congruence between exploratory strategy and business-level exploratory R&D and marketing capabilities deployment appears to be a necessary condition for firms to achieve superior new product performance.

RQ2 asked to what extent does the congruence between exploitative strategy and business-level exploitative R&D and marketing capability deployment enhance established product performance? Section 6.2.2 provides support for hypotheses 3 and 4 and shows that the firm's corporate-level exploitative strategy indirectly influenced their established product performance through the deployment of business-level exploitative R&D and marketing capabilities. However, the transformation of exploitative strategy into superior established product performance was lost when a firm focuses on the deployment of business-level exploratory R&D and marketing capabilities. Therefore, the findings of this study successfully address RQ2 and show that the congruence between exploitative strategy and business-level exploitative R&D and marketing capabilities deployment appears to be a necessary condition for firms to achieve superior established product performance.

RQ3 asked to what extent does the synchronous pursuit of corporate-level exploratory and exploitative strategies and the synchronous deployment of business-level exploratory and exploitative capabilities contribute to both new product and established product performance? Section 6.2.3 provides support for hypotheses 5a, and 5b. The findings imply that achieving a balance between the pursuit exploration and exploitation across multiple hierarchical levels (i.e., corporate and business levels) and multiple functional areas (i.e., R&D and marketing) is necessary for firms to achieve superior new product performance. In other words, R&D

and marketing ambidexterity provide the capacity to implement strategic ambidexterity to drive the performance of a firm's new products. In addition, Section 6.2.3 provides support for hypothesis 6a, but not hypothesis 6b. In this sense, only R&D ambidexterity provides the capacity to implement strategic ambidexterity to drive the performance of a firm's established products. This shows that achieving marketing ambidexterity is not as necessary as achieving R&D ambidexterity, when a firm deliberately decides not to be proactive in responding to market changes or views market as stable over time. To this end, the findings of this study successfully address RQ3 and show that the synchronous pursuit of corporate-level exploratory and exploitative strategies and the synchronous deployment of business-level exploratory and exploitative capabilities appear to be a necessary condition for firms to enhance the performance of both new and established products.

RQ4 asked to what extent does the synchronous development and marketing of new and established products enhance firm performance? Section 6.2.4 provides support for hypotheses 7a, 7b, and 8a, but not hypothesis 8b. This implies that the superior firm performance (couched in terms of financial-, market-, and customer-based performance) is grounded in the extent that a firm achieves market success with its new and established product simultaneously. In other words, a firm's ability to synchronously deploy and market new and established products is what yields superior firm performance. To this end, the findings of this study successfully address RQ4 and show that the synchronous development and marketing of both new and established products appears to be a necessary condition to achieve superior firm performance.

In conclusion, the findings of the study successfully address all research questions developed in this study. Based on the findings of the study outlined above, this section presents seven important theoretical implications.

Theoretical implication 1

This study advances theory by articulating the extent that firms become ambidextrous and addresses the need to investigate the roles of organisational ambidexterity using multilevel theory and analysis (Gupta et al., 2006; Simsek, 2009; Cantarello et al., 2012). This implication is important as this study is among the first to investigate the role of organisational ambidexterity using a comprehensive and multilevel analysis approach. The findings of this study provide a step forward in understanding the extent that interaction between corporate level exploratory and exploitative strategies and business-level exploratory and exploitative capabilities across R&D and marketing areas enables a firm becomes ambidextrous. This study shows that organisational ambidexterity is not simply rooted in an individual's ability to divide time between competing activities, or in the top managers' ability to integrate exploration and exploitation across individuals or business units. In effect, true organisational ambidexterity stems from the interactions between senior managers, who formulate corporate-level exploratory and exploitative strategies, and mid-level managers and employees, who develop and deploy specific routines to translate corporate strategies into superior performance outcomes (i.e., new product and established product success).

This study presents the synchronised multi-level - multi-unit ambidexterity framework to articulate the extent that the interaction between corporate level exploratory and exploitative strategies and business-level exploratory and exploitative capabilities across both R&D and marketing functions enables a firm becomes ambidextrous. This multi-level - multi-unit theoretical framework aids future researchers to better position their work to analyse organisational ambidexterity using multilevel theory and analysis.

Theoretical implication 2

This study advances theory by articulating that the successful implementation of exploratory and exploitative strategies is grounded in the firm's capacity to deploy and integrate specific business-level exploratory and exploitative capabilities across multiple functional areas. This implication is important, as the attention devoted to the role of integrative capability has not been significant in the organisational ambidexterity literature. This study shows that the integration of exploratory and exploitative capabilities across R&D and marketing areas enhances the firm's capacity to implement its exploratory and exploitative strategies more effectively than the deployment of these capabilities in isolation. This study addresses growing calls for further research on the role of integrative capabilities (e.g., Teece et al., 1997; Moorman and Slotegraaf, 1999; Song et al., 2005; Newbert, 2007; Vorhies et al., 2009; Morgan et al., 2009). The findings of this study offer a new perspective regarding the role of integrative capabilities in the implementation of ambidextrous strategies and in the development and marketing of new and established products. In addition, this study provides a deeper understanding about the role of integrative capabilities using the moderated-mediation test. Specifically, this study shows the operationalisation of the integration between two capabilities by multiplying the magnitude of those capabilities does not articulate to which extent the they mutually reinforce each other. In effect, the two-step moderated-mediation test suggested in this study provides a deeper understanding about when and under what condition the integration of exploratory and exploitative R&D and marketing capabilities occurs.

The results of this two-step moderated-mediation test revealed that the integration of exploratory R&D-exploratory marketing and the integration of exploitative R&D-exploitative marketing at all levels (i.e., low, medium, and high) of these capabilities is necessary for the success of new and established products projects, respectively. These findings are in contrast

to Rubera et al. (2012) who suggest that not all product development projects require high levels of integration between exploratory and exploitative marketing and R&D capabilities. Instead, the findings show that a higher level of integration between these capabilities leads to greater performance outcomes and integration is necessary for both new and established product projects. This implication is important, as no study at present has adopted a quantitative-based research approach, and validated the contention that a higher level of integration between R&D and marketing capabilities leads to greater performance outcomes (i.e., new product performance, established product performance) in the context of organisational ambidexterity. The findings of this study have the potential to help future researchers to better develop and test theory on the role of integrative capabilities, particularly in the context of organisational ambidexterity.

Theoretical implication 3

This study advances theory by arguing that exploratory and exploitative capabilities can be conceptualised as the bundle of “learning” and “non-learning” routines. This position implies that exploratory and exploitative capabilities are dual-purpose capabilities. Where their first purpose is to generate new routines or refine existing routines, the second purpose is to perform a specific task (i.e., implement strategy, develop a product, or distribute a product). This conceptualisation promotes the understanding about the nature and roles of exploratory and exploitative capabilities in the context of strategy implementation and product development. This approach is appeared to be better compared to viewing these capabilities as “different types of learning” suggested by March (1991) or “the presence or the absence of learning” suggested by Rosenkopf and Nerkar (2001) for two reasons. First, treating exploratory and exploitative capabilities as different types of organisational learning implies that these two capabilities can only support other operational capabilities to perform new and

existing product development activities. In this sense, the causal effects of exploratory and exploitative capabilities with respect to new product or established product performance are ambiguous and circuitous. Second, defining exploratory and exploitative capabilities as the bundle of learning and non-learning routines provides a better understanding of the extent that they help a firm to implement its exploratory and exploitative strategies, as well as their role in resolving inefficiency of existing routines to implement exploratory and exploitative strategies. Furthermore, conceptualising exploratory and exploitative capabilities as the bundle of “learning” and “non-learning” routines is consistent with research arguing that an operational capability can be dynamic, and it can be clearly seen in the work of Vorhies (1998), Luo (2002), Schreyögg and Kliesch-Eberl (2007), Morgan et al. (2009), and Helfat and Winter (2011). Therefore, this study opens a new perspective regarding the conceptualisation of exploratory and exploitative capabilities and helps to pave the way for further analysis on the role of these capabilities.

Theoretical implication 4

This study advances theory by showing that it is necessary to examine performance-outcomes of corporate exploratory and exploitative strategies and business-level exploratory and exploitative capabilities with respect to macro-level (i.e., firm performance) and micro-level (i.e., new product and established product performance) performance indicators, respectively. Specifically, examining outcomes of business-level capabilities with respect to ultimate firm performance is not effective because the firm’s ultimate performance is multi-dimensional and might be affected by a range of different organisational activities at the same time (Richard et al., 2009; Devinney et al., 2010). Alternatively, the ultimate firm performance results from the aggregation of benefits (i.e., revenue, sales growth, market share, profitability, customer loyalty) gained from the development and marketing of different

products (i.e., new and established products) simultaneously. This study provides a step forward understanding about the causal effects of exploratory and exploitative strategies on firm performance, by adopting strategy-capability-product-performance-firm performance linkage. In this sense, micro-level performance indicators (i.e., new product and established product performance) act as different positional advantages suggested by Day and Wensley (1988), Ketchen et al. (2007), Hughes et al. (2010), and O'Cass and Ngo (2011), which have been employed to unlock the effects of the firm's strategies and capabilities on firm performance. Therefore, this study shows that using distinctive micro-level performance indicators can be seen as a remedy to resolve some of the inconsistencies in the current literature regarding the effects of exploration and exploitation on macro-level performance indicators such as the firm's financial-, market-, customer-based performance.

Theoretical implication 5

This study advances theory by showing that the synchronous development and marketing of both new and established products is an important aspect of organisational ambidexterity. This implication is based on the argument that firms make a number of decisions in which they might preferentially support the development and marketing of either a new product or an established product. A firm becomes ambidextrous when these decisions support the development and marketing of both new and established products at the same time. However, no study at present has empirically examined and validated the extent that organisational ambidexterity assists a firm to synchronise the development and marketing of both new and established products. Therefore, this study is among the first to empirically examine the extent that organisational ambidexterity provides the capacity to synchronise the development and marketing of both new and established products. The focus here was on the extent that a new product represents a line extension to the established product(s) rather than a substitute

to the established product(s). Therefore, this study extends and validates the theory advanced by Adler et al. (1999), Smith and Tushman (2005), and O'Reilly and Tushman (2008) by showing the extent that organisational ambidexterity helps in resolving the innovator's dilemma.

Theoretical implication 6

This study advances theory by showing that managing a balance between exploratory marketing and exploitative marketing is not necessary for the development and marketing of an established product, where the product features and advantages meet existing customer needs and customers see a need or desire for purchasing that established product, and its target market is stable in terms of customer needs. In this sense, the firm might deliberately decide not to be proactive in responding to market changes through synchronous generation of new marketing routines and refinement of existing marketing routines. This implies that achieving ambidexterity in all functional areas and/or product development projects is not necessary. This implication is important, as the general agreement in the current literature is that organisational ambidexterity leads to superior performance (i.e., firm performance, new product performance). However, the attention has not been significant towards the specific conditions that pursuing exploration and exploitation at the expense of each other might be more beneficial than achieving a balance or a combination between them. The findings of this study will not only help future researchers to better position their work to analyse organisational ambidexterity, but it also provides a deeper understanding about when and where balanced ambidexterity is more beneficial than combined ambidexterity.

Theoretical implication 7

This study advances theory by articulating the extent that firms operating in the Middle-Eastern emerging economies become ambidextrous and extends organisational ambidexterity theory into new contexts. Achieving organisational ambidexterity is to some extent more critical for firms within emerging economies, because (1) firms in these economies are experiencing rapid economic development and transition toward market-based systems, and (2) competition in emerging economies has now become more intense as firms within these economies not only compete with other domestic competitors, but also they face growing competition with foreign firms entering their home markets. Much of the work on organisational ambidexterity has been undertaken in advanced Asian emerging economies (i.e., China, Taiwan). However, the global business environment has changed dramatically over the past two decades, and emerging economies in the Middle-East (i.e., Iran, Qatar), South Asia (i.e., India, Vietnam), and South America (i.e., Brazil) now play important roles in the global economy (Burgess & Steenkamp, 2006; Mellahi et al., 2011; Sheng et al., 2011; Bang & Joshi, 2012). A review of the foreign direct investment growth in the Middle-East by Mellahi et al. (2011) highlights that firms (i.e., domestic and multinationals) have given greater attention to undertaking their operations in Middle-Eastern countries and are attempting to penetrate these markets. Given the growing importance of the Middle-East in the global economy, attention has not been significant towards investigating the role of organisational ambidexterity in the Middle-East. This study provides additional empirical validation regarding the role of organisational ambidexterity in the context of new product and established product development in the Middle-East region.

6.4. Managerial implications

Ultimately, the value of any research in the broad areas such as strategic marketing and strategic management lies in its ability to be applied in practice. This study offers four important implications to managers.

Managerial implication 1

Although managers have generally been advised that innovating new product success is the prerequisite for future success, the payoff is uncertain and the percentage of new product development project failure is high (Thieme, Song, & Shin, 2003; Harmancioglu et al., 2009; Cooper, 2011). In this sense, improving the ongoing performance of established products is what secures the firm's survival in the short run. Therefore, the success and survival of the firm does not rest solely on the development and marketing of new products, but managers must also focus on their established products at the same time. The task for successful firms is to divide their attention between both new and established products and to synchronise the development and marketing of these products. In addition, the synchronous development and marketing of multiple products (i.e., new and established products) enables a firm to offer a broader product portfolio to the market and thus allowing greater opportunities if attention is paid to both new and established products. Such a broad product portfolio enables firms to offer different solutions to customers, increases market share through cross-selling, and strengthens brand image within a market. The success of Nike in developing and marketing shoes, clothes, and accessories for basketball player is an example a firm that continually engage in the product line extensions to offer superior advantages to its customers.

Managerial implication 2

Managers are advised to address two important questions before investing in a product development project: Which specific product development projects should you do (i.e., creating a new product or upgrading an established product)? What organisational strategies and capabilities should be allocated to each? The high percentage of product development project failures indicates that most of managers do not address these questions properly. Specifically, product development projects that suffer from a lack of congruence between the allocated corporate strategy and business-level capabilities are not likely to be successful. For instance, this study shows that the transformation of exploitative strategy into superior established product performance was lost when a firm focuses on the deployment of business-level exploratory R&D and marketing capabilities. On the contrary, the deployment of exploitative R&D and marketing capabilities provides the capacity to successfully implement exploratory strategy within a new product development project and achieve new product success. Therefore, deciding what corporate strategies and business-level capabilities are required for a specific product development project and achieving congruency between them is fundamental for the success of that project.

Managerial implication 3

Although managers have generally been advised to synchronise the pursuit of exploratory and exploitative strategies, this study shows that such synchronicity per se is not enough to achieve superior performance (i.e., financial-, market-, and customer-based performance). Without the proper implementation at the business-level, the translation of exploratory and exploitative strategies into superior performance can be lost. Therefore, the effective synchronisation of exploratory and exploitative strategies depends on the firm's capacity to formulate and implement those strategies. Such implementation occurs when a firm

successfully develops and deploys appropriate exploratory and exploitative capabilities across different functional areas within the firm (i.e., R&D and marketing). In this sense, the critical tasks of the top management team are to formulate exploratory and exploitative strategies, interact with mid-level managers and employees within different business units to implement those strategies, and control the performance-outcomes of different product development projects (i.e., new and established products). The challenge here is to build a firm that consists of specific units (i.e., departments, projects) that are specialised in different activities to implement exploratory and exploitative strategies. On the other hand, mid-level managers face the challenge to build a single unit that consists of specific individuals or teams that are specialised in different activities to perform exploratory and exploitative activities.

In addition to these challenges, the top management team and mid-level managers should ensure that the formulated corporate-strategies fit with the business-level capabilities. Such fit represents the degree of congruence between routines and capabilities possessed and that required for implementing a particular strategy. In this sense, the constant vertical interactions between the top management team and mid-level managers can help them to ensure the formulated corporate-strategies fit with the business-level capabilities. Such fit enables a firm to implement its exploratory and exploitative strategies and transform them into productive actions and superior performance-outcomes effectively. Therefore, the effective vertical integration across the top management team and mid-level managers is what enables firms become truly ambidextrous and translate their ambidextrous strategies into specific actions related to the development and marketing of the firm's new and established products.

Managerial implication 4

In addition to the importance of vertical integration across the top management team and mid-level managers, managers are advised to facilitate the horizontal interactions across different business units within a firm. The underlying reason is that the translation of exploratory and exploitative strategies into productive actions and superior performance is most successful when a firm deploys and integrates exploratory and exploitative capabilities across multiple functional areas (i.e., R&D and marketing). This study shows that the integration of exploratory R&D-exploratory marketing and exploitative R&D-exploitative marketing enhances the firm's capacity to implement its exploratory and exploitative strategies more than deploying exploratory and exploitative capabilities in isolation. Such integration provides the capacity to identify market opportunities, assess the market potential of a specific technology, determine what features are required to meet customer needs, minimise the need for costly redesigns through market-testing, and help sales force to train customers and enhance their awareness about the benefits of a new product's features.

In conclusion, the findings of this study emphasise the importance of both vertical and horizontal integration between the top management team and mid-level managers across multiple hierarchical levels and multiple business units to successfully synchronise the pursuit and implementation of exploratory and exploitative strategies. In doing so, managers are advised to make specific liaison teams to facilitate both vertical and horizontal integrations among different bodies within a firm. These teams should consist of senior managers, mid-level managers, and operational employees across multiple hierarchical levels and multiple business units. Drawing on the normative model of the strategic management process (or strategy formulation-strategy implementation-control cycle) suggested by Preble (1994), Figure 6.2 has been developed for this study and outlines the continuous cycle of strategy formulation and implementation in the context of organisational ambidexterity and

product development. This cycle provides a better understanding about the extent that the decisions and actions of the top management team and mid-level managers across multiple hierarchical levels and multiple business units are linked together. Therefore, both vertical and horizontal integrations between the top management team and mid-level managers across multiple hierarchical levels and multiple business units is what enables a firm become ambidextrous and transform its ambidextrous strategies into superior performance-outcomes.

Figure 6.2– Strategy formulation-strategy implementation-control cycle



Source: Developed for this study

6.5. Limitations and recommendations of future research

While all studies have limitations, confidence in the results is increased by several aspects of the research design. Initial confidence comes from employing a multiple informant design, which reduces the possibility for common method bias in research findings. Further, we conducted a multi-industry study, which improves the generalisability of our findings. While this study has several distinctive strengths, limitations resulting from trade-off decisions required in all empirical research are present. First, any research that uses a questionnaire method and multiple variables include the inherent limitation of measurement error. Nonetheless, every attempt has been made to reduce measurement error by ensuring the reliability and validity of the all studied constructs. Second, the adaptation of cross-sectional research design leads to issues of causal inference. Future research by adopting longitudinal data may help in evaluating the prescribed order of the investment in the development of relationships among corporate-level exploratory and exploitative strategies, business-level exploratory and exploitative R&D and marketing capabilities, new product and established product performance, and firm performance. Third, exploratory and exploitative capabilities from R&D and marketing area are considered as the mean of strategy implementation. Future research may consider the strategy implementation role of other exploratory and exploitative capabilities in other functional areas such as manufacturing and human resource management. However, it is necessary to make the point here that the purpose of this study was not to consider the implementation role of exploratory and exploitative capabilities from a wide range of functional areas. The focus on R&D and marketing was based on the contention that a firm has two primary basic functions: marketing and innovation. Marketing and innovation produce results; all the rest are costs” (Drucker & Maciariello, 2008, p. 30). Fourth, this study does not take into account the potential impact of firms’ internal conditions (i.e., cross-functional integration) and external characteristics (i.e., competitive intensity) on

the associations between corporate-level strategies, business-level capabilities, new and established product performance, and firm performance. Future research might seek to include the internal and external factors as the potential moderators in the relationships between corporate-level exploratory and exploitative strategies, business-level exploratory and exploitative R&D and marketing capabilities, new product and established product performance, and firm performance. Finally, the sample of this study is limited to large-sized firms in a Middle-Eastern emerging economy, Iran. Although emerging economies may share some common features in their markets, they vary remarkably in the stages of their economic development. Future research may focus on large-sized firms in other emerging economies (i.e., Brazil, India, China) or developed economies (i.e., US, UK) to help prove the validity of the model being studied.

6.6. Conclusion

In today's dynamic and turbulent world, synchronising exploration and exploitation represents an important driver of the firm's success and survival. Synchronicity in this sense is to some extent more critical for firms operating in emerging economies, because these economies are experiencing rapid economic development and transition toward market-based systems. In addition, the level of competition in emerging economies has now become more intense as firms within these economies not only compete with other domestic competitors, but also they face growing competition with foreign firms entering their home markets. The primary objective of this study was to explore the extent that firms become ambidextrous when they have the capacity to pursue exploration and exploitation across multiple hierarchical levels, multiple functional areas, and multiple product development projects.

In particular, this study addresses four research questions by showing that: (1) the congruence between exploratory strategy and business-level exploratory R&D and marketing

capabilities deployment appears as a necessary condition for firms to achieve superior new product performance, (2) the congruence between exploitative strategy and business-level exploitative R&D and marketing capabilities deployment appears as a necessary condition for firms to achieve superior established product performance, (3) the synchronous pursuit of corporate-level exploratory and exploitative strategies and the synchronous deployment of business-level exploratory and exploitative capabilities appears as a necessary condition for firms to enhance the performance of both new and established products, and (4) the synchronous development and marketing of both new and established products appears as a necessary condition to achieve superior firm performance.

The results of this study show that that organisational ambidexterity is stemmed from the interactions between senior managers, who formulate corporate-level exploratory and exploitative strategies, and mid-level managers and employees, who develop and deploy specific routines to translate corporate strategies into superior performance outcomes (i.e., new product and established product success). More importantly, this study opens a new perspective about the extent that organisational ambidexterity provides the capacity to resolve the innovator's dilemma, particularly tensions related to the product range extension. In this sense, this study is among the first attempts (a) to address the need to investigate the role of organisational ambidexterity using a multilevel analysis approach and (b) to show that the synchronous development and marketing of new and established product represents an important facet of organisational ambidexterity. The findings of this study are insightful and contribute to the organisational ambidexterity literature providing a fuller understanding of the extent that firms truly become ambidextrous and delineation of the synchronicity required to resolve the innovator's dilemma. In addition, this study extends organisational ambidexterity literature into new contexts investigating the extent that firms operating in the Middle-East region become ambidextrous.

In conclusion, the modern firm faces many challenges with increasing competition and globalisation, but no challenge is more critical than the innovator's dilemma and the paradox of successfully managing organisational ambidexterity to enhance new and established product success. Scholars have developed theory related to ambidexterity and directed managers to devote their attention to the development and marketing of new products as the lifeblood of the firm. However, little attention has been given to what managers do with established products in the context of organisational ambidexterity. This creates both a theoretical and practical paradox, as the success and survival of the firm does not rest solely on new product success, but surely also rests on established products as well. The theoretical and practical paradox is how both new and established products are best managed simultaneously. This paradox is best resolved when firms have the capacity to synchronise the development and marketing of their new and established products. Theoretical advances put forward in this study show that such synchronicity can be achieved through the integration of all actors and actions across multiple hierarchical levels, multiple functional areas, and multiple business units within the firm. In this sense the proclamation by Slatte (1968) over four decades ago seems relevant to the pursuit of theory and practice through organisational ambidexterity:

"A paradox is an idea involving two opposing thoughts or propositions which, however contradictory, are equally necessary to convey a more imposing, illuminating, life related or provocative insight into truth than either fact can muster in its own right. What the mind seemingly cannot think, it must think."
(Slatte 1968, p. 4)

Therefore, both theorists and managers can best understand and resolve this paradox by approaching organisational ambidexterity through the synchronised multi-level - multi-unit ambidexterity framework developed by this study.

Appendix I

The extensive review and classification of the organisational ambidexterity literature

Research	Research Type	Theoretical Lens	Level of Analysis	Performance Indicators	Journal
McDonough and Leifer (1983)	Quantitative	Structural	Corporate	-	Academy of Management Journal
March (1991)	Conceptual	Realised	Corporate	-	Organization Science
Levinthal and March (1993)	Conceptual	Realised	Corporate	-	Strategic Management Journal
Tushman and O'Reilly (1996)	Qualitative	Structural	Corporate	-	California Management Review
Rosenkopf and Nerkar (2001)	Quantitative	Realised	Corporate	Innovation Performance	Strategic Management Journal
Adler et al. (2002)	Qualitative	Structural	Corporate	-	Organization Science
Danneels (2002)	Qualitative	Realised	Business Unit	-	Strategic Management Journal
Katila and Ahuja (2002)	Quantitative	Realised	Corporate	Firm Performance	Academy of Management Journal
Benner and Tushman (2003)	Conceptual	Structural & Realised	Corporate	-	Academy of Management Review
Siggelkow and Levinthal (2003)	Conceptual	Realised	Corporate	-	Organization Science
Gibson and Birkinshaw (2004)	Quantitative	Contextual	Business Unit	Business Unit Performance	Academy of Management Journal
He and Wong (2004)	Quantitative	Realised	Corporate	Firm Performance	Organization Science
Kyriakopoulos and Moorman (2004)	Quantitative	Realised	Corporate	New Product Performance	International Journal of Research in Marketing
Nickerson and Zenger (2004)	Conceptual	Realised	Corporate	-	Organization Science
Vera and Crossan (2004)	Conceptual	Contextual	Business Unit	-	he Academy of Management Review
Jansen et al. (2005)	Quantitative	Realised	Business Unit	Levels of Exploration & Exploitation	Schmalenbach Business Review
Atuahene-Gima (2005)	Quantitative	Realised	Corporate	Incremental & Radical innovation	Journal of Marketing
Auh and Menguc (2005)	Quantitative	Realised	Corporate	Firm performance	Journal of Business Research

The extensive review and classification of the organisational ambidexterity literature (cont'd)

Research	Research Type	Theoretical Lens	Level of Analysis	Performance Indicators	Journal
Smith and Tushman (2005)	Conceptual	Structural	Corporate	-	Organization Science
Beckman (2006)	Quantitative	Contextual	Business Unit	Firm Growth	Academy of Management Journal
Gupta et al. (2006)	Conceptual	Realised	Corporate	-	Academy of Management Journal
Jansen et al. (2006)	Quantitative	Realised	Business Unit	Business Unit Performance	Management Science
Lubatkin et al. (2006)	Quantitative	Contextual & Realised	Corporate	Firm Performance	Journal of Management
Atuahene-Gima and Murray (2007)	Quantitative	Realised	Corporate	New Product Performance	Journal of International Marketing
Sidhu et al. (2007)	Quantitative	Realised	Corporate	-	Organization Science
Yalcinkaya et al. (2007)	Quantitative	Realised	Corporate	New Product Performance	Journal of International Marketing
Judge and Blocker (2008)	Conceptual	Realised	Corporate	-	European Journal of Marketing
Li and Lin (2008)	Quantitative	Realised	Corporate	Levels of Exploration & Exploitation	Management Decision
Morgan and Berthon (2008)	Quantitative	Realised	Corporate	Firm Performance	Journal of Management Studies
O'Reilly and Tushman (2008)	Conceptual	Structural & Contextual	Corporate	-	Research in Organizational Behaviour
Voss et al. (2008)	Quantitative	Realised	Corporate	Firm Performance	Academy of Management Journal
Sarkees et al. (2009)	Quantitative	Realised	Corporate	Firm Performance	Business Horizons
Andriopoulos and Lewis (2009)	Conceptual	Structural & Contextual	Corporate	-	Organization Science
Cao et al. (2009)	Quantitative	Realised	Corporate	Firm Performance	Organization Science
Jansen et al. (2009)	Quantitative	Structural	Corporate	-	Organization Science
Mom et al. (2009)	Quantitative	Structural & Contextual	Corporate	-	Organization Science
Prange and Schlegelmilch (2009)	Conceptual	Structural & Contextual	Corporate & Business Unit	-	BuR - Business Research
Simsek et al. (2009)	Conceptual	Structural	Corporate	-	Journal of Management Studies
Fang et al. (2010)	Conceptual	Structural	Corporate	-	Organization Science

The extensive review and classification of the organisational ambidexterity literature (cont'd)

Research	Research Type	Theoretical Lens	Level of Analysis	Performance Indicators	Journal
Hughes et al. (2010)	Quantitative	Realised	Corporate	Export Venture Performance	Journal of International Marketing
Revilla et al. (2010)	Quantitative	Realised	Corporate	Levels of Exploration & Exploitation	Knowledge and Process Management
Sarkees et al. (2010)	Quantitative	Contextual	Business Unit	Innovation & Firm Performance	Journal of Strategic Marketing
Zhou and Wu (2010)	Quantitative	Realised	Corporate	Levels of Exploration & Exploitation	Strategic Management Journal
Lisboa et al. (2011)	Quantitative	Realised	Corporate	New Product Performance	Industrial Marketing Management
Molina-Castillo et al. (2011)	Quantitative	Realised	Corporate	New Product Performance	Industrial Marketing Management
Kim and Atuahene-Gima (2011)	Quantitative	Realised	Business Unit	New Product Performance	Journal of Product Innovation Management
Boumgarden et al. (2012)	Qualitative	Structural	Corporate	-	Strategic Management Journal
Jansen et al. (2012)	Quantitative	Realised	Business Unit	Business Unit Performance	Strategic Management Journal
Phene et al. (2012)	Quantitative	Realised	Corporate	Firm Performance	Journal of Management
Siren et al. (2012)	Quantitative	Realised	Corporate	Firm Performance	Strategic Entrepreneurship Journal
Vorhies et al. (2011)	Quantitative	Realised	Corporate	Firm Performance	Journal of the Academy of Marketing Science
Yannopoulos et al. (2012)	Quantitative	Realised	Corporate	New Product Performance	Journal of Product Innovation Management
Rubera et al. (2012)	Qualitative	Realised	Business unit	-	Journal of Product Innovation Management

Appendix II

In addition to the mediational roles of exploratory R&D, exploratory marketing, and the integration of the two capabilities in the relationship between exploratory strategy and new product performance, it could be argued that exploitative capabilities may enable a firm to implement exploratory strategy. The pursuit of exploitative capabilities may be taken into consideration when firms face high costs and failure risks associated with the development of new routines and experimenting with new ways to develop and market new products (Gupta et al., 2006; Kim & Atuahene-Gima, 2010). In particular, the repeated deployment and improvement of existing operational routines results in a deeper understanding of their functionality. This deeper understanding enables the reconfiguration of existing knowledge and skills to develop new routines to perform a specific activity (such as R&D) (see Levinthal & March, 1993; Cao et al., 2009). However, if a firm has deep understanding in a narrow area, the narrowness of the knowledge limits the firm's ability to make new conclusions or find new links among diverse knowledge (De Luca & Atuahene-Gima, 2007). Therefore, improving existing routines may result in selection-induced inertia and stifle the development of new knowledge and skills and the discovery of innovative ways to meet customer needs (Tripsas, 1997; Atuahene-Gima, 2005). The failure of many firms to explore new product-market opportunities and adapt to market changes such as Eastman Kodak, Motorola, Sony, Microsoft, and Yahoo has been documented in a number of empirical studies. For example, while Microsoft has dominated much of the PC's software industry, it has also mishandled many emerging opportunities that other firms have capitalised on, like Web TV, E-books, smart-phones, and tablet computers (Govindarajan & Trimble, 2010). To this end, the contribution of exploitative capabilities to the implementation of exploratory strategy can be offset by the disadvantages associated with the selection-induced inertia.

Therefore, this study contends that exploitative capabilities play an insignificant, or minimal, role in the implementation of exploratory strategy. Therefore, this study does not develop hypotheses related to the relationships between exploratory strategy, exploitative capabilities, and new product performance.

Appendix III

In addition to the mediational roles of exploitative R&D, exploitative marketing, and the integration between these two capabilities in the relationship between exploitative strategy and established product performance, it could be argued that exploratory capabilities may enable a firm to implement exploitative strategy. According to Kim and Atuahene-Gima (2010), exploratory capabilities may improve the efficiency of current product development and marketing activities using new routines and advanced technologies. In particular, the deployment of exploratory capabilities results in a larger pool of knowledge and routines that enable improvements in the efficiency of existing routines (Cohen & Levinthal, 1990; Cao et al., 2009). However, over-emphasis on the deployment of exploratory capabilities increases the risk of “failure trap” (Kyriakopoulos & Moorman, 2004; Gupta et al., 2006). Failure trap represents the condition that a firm locks itself into a cycle in which “failure leads to search and change which leads to failure which leads to more search, and so on” (Levinthal and March, 1993, pp. 105–106). Consequently, failure trap negatively influences product performance by failing to achieve appropriate returns from its costly search and experimentation activities (Kyriakopoulos & Moorman, 2004; Fang et al., 2010). The failure of American Biophysics with its “Mosquito Magnet” is an example of a firm that focus on new ways to improve its product rather than on improve its production capacity (i.e., volume) to meet the fast-growing market demands. When American Biophysics eventually expanded manufacturing from its low-volume facilities in US to a new mass-production plant in China, quality dropped. Customers became angry, and a product that was dominant in the market almost went off the market. American Biophysics, which once had \$70 million in annual revenue, was sold to Woodstream for the bargain-basement price of \$6 million (Schneider & Hall, 2011). To this end, the contribution of exploratory capabilities to the implementation of

exploitative strategy can be offset by the disadvantages associated with failure trap. Therefore, this study contends that exploratory marketing has an insignificant or minimal contribution to the implementation of exploitative strategy. Therefore, this study does not develop hypotheses related to the relationships between exploitative strategy, exploratory capabilities, and established product performance.

Appendix IV

Information Sheet

ATTN to: _____

You are invited to participate in a research study regarding how firms develop and market new products. The questionnaire focuses on your firm's strategies and operational activities. The results of this study will assist in improving firms' performance and business development practices in dealing with the mounting competition in new product development. By completing and returning this questionnaire, you will be helping us to help Iranian industry. This information will be put into a database to assist us to better understand new product development in Iranian firms.

You are eligible to participate in this study because your firm has a record of developing and launching a new product in the previous 1 year, and a product for 3 or more than 3 years. The term "firm" refers to either the company or the business unit where you are working. The term "product" refers to either the good or the service, which your firm introduces to the marketplace.

We appreciate for taking the time to consider this study. **By accepting the survey package (including information sheet and questionnaire) and completing the questionnaire, your consent to participate in this study will be assumed.** If you decide to participate in this study, please kindly consider the following tasks that we request you to undertake:

- Read and complete the attached questionnaire (identified as Questionnaire A). We will collect the completed Questionnaire A from you within the next week.
- In the Questionnaire A, you will be asked to choose two product/brand names. One product should be a product your firm launched in the previous 1 year (2009) (please see question **FC8** in the Questionnaire A). The second should be a product your firm has marketed for 3 or more years (please see question **FC9** in the Questionnaire A).
- It is preferable but it is not necessary that the two above mentioned products relate to same or similar markets (e.g. an existing printer model and a new scanner model related to the same or similar types of customers).
- Now, nominate a manager (e.g. marketing manager, product manager, or sales manager) who should be the most knowledgeable person regarding your firm's operational activities related to development and marketing a product for the selected product in the question **FC8** in the Questionnaire A. Please ensure that you seek the nominated manager's agreement to participate as a condition of this study's consent agreement.
- Now, go to the Questionnaire B, and write the same information in the question **FC8** in its first page. Then, please send the Questionnaire B to the selected manager.

- Now, nominate a manager (e.g. marketing manager, product manager, or sales manager) who should be the most knowledgeable person regarding your firm's operational activities related to development and marketing a product for the selected product in the question **FC9** in the Questionnaire A. Please ensure that you seek the nominated manager's agreement to participate as a condition of this study's consent agreement.
- Now, go to the Questionnaire C, and write the same information in the question **FC9** in its first page. Then, please send the Questionnaire C to the selected manager.

It is important that you understand that your involvement in this study is voluntary. While we would be pleased to have you participate, we respect your right to decline. There will be no consequences to you if you decide not to participate. If you decide to discontinue participation at any time, you may do so without providing an explanation. In this study, it will not be possible to identify participants as no individuals' names need to be supplied. There are no specific risks anticipated with participation in this study. All of the research will be kept in a locked cabinet in the office of *Dr. Martin Grimmer, Chief Investigator at the University of Tasmania and will be securely destroyed five years after publication of the data*. Please contact Nima Heirati if you would like to receive a summary of study after a certain period of time. You are welcome to contact us at that time to discuss any issue relating to the research study.

This study is part of a PhD being conducted by Nima Heirati and supervised by Prof. Aron O'Cass, Dr. Martin Grimmer, and Dr. John Byrom. Further, this study has been approved by the Tasmanian Social Science Human Research Ethics Committee. If you have concerns or complaints about the conduct of this study should contact the Executive Officer of the HREC (Tasmania) Network on +61 3 6226 7479 or email human.ethics@utas.edu.au. The Executive Officer is the person nominated to receive complaints from research participants. You will need to quote H11394.

Thank you for taking the time to consider this study.
This information sheet is for you to keep.

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Questionnaire A

New Product Success Study

We realise you are very busy, but we ask for 20-25 minutes of your time. Please do not rush, as your experiences and knowledge are very important and your accurate responses ensure your time is well served.

The following statements refer to general information about your firm. Please circle or fill in the appropriate answer.

FC1 - Our firm is predominantly a ☐ 1 Manufacturer or ☐ 2 Service Provider

FC2 - Our firm predominantly serves ☐ 1 Other Firms or ☐ 2 End Consumers

FC3 - Our firm is predominantly a ☐ 1 State-Owned or ☐ 2 Non State-Owned (Private)

FC4 - The principle industry of our firm is: _____

FC5 - Our firm has _____ full-time employees.

FC6 - Our firm has been in business (i.e., operating) for _____ years.

FC7 - How many new products has your firm developed and launched in the year:

- 2010: _____
- 2009: _____
- 2008: _____

FC8 - What is the product-brand name of one of your firm's products launched in the previous 1 year (2010):

Product: _____ Brand Name: _____ Related Manager: _____

FC9 - What is the product-brand name of one of your firm's products launched for 3 or more years:

Product: _____ Brand Name: _____ Related Manager: _____

FC10 – The mentioned two products (in FC8 and FC9) are in: ☐ 1 The Same Market
or ☐ 2 Two (closely related) Similar Markets
or ☐ 3 Two Different Markets

Please indicate the extent to which you believe that you are:

		Not at All							Very Much So
GQ11	...knowledgeable about your firms' business operations, strategies, characteristics, business processes, performance, and business	1	2	3	4	5	6	7	

environment (competitors, regulations, and the like).

Firm Strategic Orientation

The following statements relate to *your firm's strategies* and how you see them. Please circle the number in each statement that best reflects your views.

Our firm places its strategic emphasis on:		Strongly Disagree					Strongly Agree	
RS1	...identifying opportunities for new products.	1	2	3	4	5	6	7
RS2	...utilizing new opportunities in new markets.	1	2	3	4	5	6	7
IS2	...strengthening its existing position in its current markets.	1	2	3	4	5	6	7
RS4	...expanding its product range (e.g. add new product line(s)).	1	2	3	4	5	6	7
IS1	...identifying opportunities for its existing products.	1	2	3	4	5	6	7
IS3	...improving efficiency of its current products.	1	2	3	4	5	6	7
RS6	...acquiring product development skills and processes entirely new in the firm.	1	2	3	4	5	6	7
IS6	...improving its current product development processes and skills for its existing products.	1	2	3	4	5	6	7
IS4	...focusing on a stable (e.g. specific, limited) range of products.	1	2	3	4	5	6	7
RS3	...inventing new products with unique features not available in competing products.	1	2	3	4	5	6	7
IS5	...introducing improved, but existing products for its existing markets.	1	2	3	4	5	6	7
RS5	...discovering new ways to meet customer needs.	1	2	3	4	5	6	7

Firm & Environment Characteristics

The following statements relate to *the level of resources that are in excess of what is needed for the immediate continuation of business*. Please circle the number in each statement that best reflects your views.

Our firm:		Strongly Disagree					Strongly Agree	
SL1	...has available resources for future projects.	1	2	3	4	5	6	7
SL2	...has discretionary financial resources.	1	2	3	4	5	6	7
SL3	...has manpower to work on special projects.	1	2	3	4	5	6	7

The following statements focus on *environmental conditions of your firm's industry (i.e., the business environment you face)* over the past year. Please circle the number in each statement that best reflects your views.

In our firm's business environment:		Not at All					Very Much So	
TU4	...technology environment was complex.	1	2	3	4	5	6	7
MU2	...customer product demands and preferences were uncertain.	1	2	3	4	5	6	7
TU2	...technology environment was uncertain.	1	2	3	4	5	6	7
MU1	...customer needs and product preferences changed rapidly.	1	2	3	4	5	6	7
MU3	...it was difficult to predict changes in customer needs and preferences.	1	2	3	4	5	6	7
TU3	...technological developments were unpredictable.	1	2	3	4	5	6	7

TU1	...it was difficult to forecast technology developments.	1	2	3	4	5	6	7
-----	--	---	---	---	---	---	---	---

Firm Performance

The following statements focus on *how well your firm was performed* in relation to the goals set by your firm over the past year. Please circle the number in each statement that best reflects your views.

In relation to goals set, our firm has:		Not at All					Very Much So	
FP1	...met revenue goals.	1	2	3	4	5	6	7
FP2	...met sales growth goals.	1	2	3	4	5	6	7
FP3	...met market share goals.	1	2	3	4	5	6	7
FP4	...met return on investment goals.	1	2	3	4	5	6	7
FP5	...met profitability goals.	1	2	3	4	5	6	7
FP6	...achieved customer satisfaction goals.	1	2	3	4	5	6	7
FP7	...achieved customer loyalty goals.	1	2	3	4	5	6	7

General Questions

GQ12 - My designated title is: _____

GQ13 - Please tick the box below for your highest educational level:

☐ 1 High School ☐ 2 Undergraduate ☐ 3 Post Graduate ☐ 4 Others _____

Please indicate the extent to which you agree or disagree with the statement below:

		Not at All					Very Much So	
GQ14	I am confident I had the necessary knowledge to complete the statements asked throughout the questionnaire.	1	2	3	4	5	6	7

THANK YOU FOR YOUR COOPERATION AND VALUED HELP



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Questionnaire B

New Product Success Study

FC8 - What is the product-brand name of one of your firm's products launched in the previous 1 year (2010):

Product: _____ Brand Name: _____ Related Manager: _____

Dear Respected Manager,

You are identified by your senior manager to complete this questionnaire related to above mentioned product/brand name. This study examines the development and marketing of products. The term "firm" refers to either the company or the business unit where you are working. The term "department" refers to the division or the operational unit where you are working. The term "product" refers to either good or service which your firm introduced to the marketplace.

We realise you are very busy, but we ask for 25-30 minutes of your time. Please do not rush, as your experiences and knowledge are very important and your accurate responses ensure your time is well served. The results of this study will assist in improving business development practices related to a product development and marketing.

By completing and returning this questionnaire, you will be helping us to help Iranian industry. This information will be put into a database to assist us to better understand new product performance factors in Iranian firms.

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Please indicate the extent to which you believe that you are:

		Not at All						Very Much So
GQ21	...knowledgeable about your firms' business operations, strategies, characteristics, business processes, performance, and business environment (competitors, regulations, and the like).	1	2	3	4	5	6	7

PM21- In relation to the selected product that your firm launched in the previous 1 year (as mentioned in the FC8), choose one of the following statements that best describes that product. Please circle the appropriate answer:

- ☐ 1 This product/brand was a new product and it was marketed into a new marketplace (new customers).
- ☐ 2 This product/brand was a new product and it was marketed into an existing marketplace (existing customers).
- ☐ 3 This product/brand was an existing product and it was marketed into a new marketplace (new customers).

BM21- In relation to the above product, tick the one box of the following statements that best describes that product. Please circle the appropriate answer:

- ☐ 1 The product was launched using an existing brand name.
- ☐ 2 The product was launched using a new brand name.

Firm Operational Processes

In relation to the specific new product your firm launched in the previous 1 year (as mentioned in the FC8), the following statements relate to your firm's processes and behaviours to develop that product. Please circle the number in each statement that best reflects your views.

Our Firm:		Not at All						Very Much So
RI21	...acquired entirely new product development processes that had not been used before by the firm.	1	2	3	4	5	6	7
II21	...improved its current (existing, well-established) processes aimed at quality improvement of our current products.	1	2	3	4	5	6	7
II22	...exploited mature, existing technologies to enhance the efficiency of our current products.	1	2	3	4	5	6	7
RI22	...acquired completely new manufacturing technologies and processes that had not been used before by the firm.	1	2	3	4	5	6	7
RI23	...acquired entirely new managerial and organizational skills related to new product development process (e.g. set up new liaison teams to integrate R&D, marketing, manufacturing, and other functions).	1	2	3	4	5	6	7
II23	...strengthened current (existing, well-established) managerial and organizational skills that improve the efficiency of the existing product development process (e.g. improve existing coordination between R&D, marketing, manufacturing, and other functions).	1	2	3	4	5	6	7
II24	...improved current (existing, well-established) processes to reduce the cost of our current products.	1	2	3	4	5	6	7
RI25	...set up completely new types of manufacturing facilities and operations.	1	2	3	4	5	6	7
RI24	...acquired entirely new technology and R&D training skills for personnel development.	1	2	3	4	5	6	7
II25	...refined current (existing, well-established) processes to reduce production time (i.e., improved the efficiency of our existing production processes).	1	2	3	4	5	6	7

In relation to the selected product, the following statements relate to *your firm's processes and behaviours to market that product*. Please circle the number in each statement that best reflects your views.

Our Firm:		Not at All							Very Much So
RM21	...developed completely new pricing processes.	1	2	3	4	5	6	7	
IM21	...refined current (existing, well-established) pricing processes.	1	2	3	4	5	6	7	
RM23	...developed entirely new advertising and/or promotion processes.	1	2	3	4	5	6	7	
RM24	...created a completely new brand for the new product.	1	2	3	4	5	6	7	
IM29	...refined current (existing, well-established) methods of marketing communication with customers.	1	2	3	4	5	6	7	
IM23	...refined current (existing, well-established) advertising and/or promotion processes.	1	2	3	4	5	6	7	
IM24	...strengthened the brand image for current product.	1	2	3	4	5	6	7	
RM29	...developed entirely new methods of marketing communication with customers.	1	2	3	4	5	6	7	
RM210	...set up completely new public relations methods.	1	2	3	4	5	6	7	
RM25	...researched about new customers.	1	2	3	4	5	6	7	
RM26	...researched about new competitors.	1	2	3	4	5	6	7	
IM28	...improved current (existing, well-established) customer relationship management methods.	1	2	3	4	5	6	7	
RM211	...set up entirely new marketing research processes.	1	2	3	4	5	6	7	
IM210	...improved current (existing, well-established) public relations methods.	1	2	3	4	5	6	7	
IM25	...researched about current customers.	1	2	3	4	5	6	7	
IM26	...researched about current competitors.	1	2	3	4	5	6	7	
RM28	...developed completely new customer relationship management methods.	1	2	3	4	5	6	7	
IM211	...refined current (existing, well-established) market research processes.	1	2	3	4	5	6	7	
IM212	...improved current (existing, well-established) market testing processes.	1	2	3	4	5	6	7	
RM27	...segmented the market in a completely new way.	1	2	3	4	5	6	7	
RM22	...set up entirely new sales and distribution channels.	1	2	3	4	5	6	7	
RM212	...developed completely new market testing processes.	1	2	3	4	5	6	7	
IM27	...improve efficiency of current (existing, well-established) market segmentation methods.	1	2	3	4	5	6	7	
IM22	...improved current (existing, well-established) sales and distribution channels.	1	2	3	4	5	6	7	
RM213	...developed entirely new marketing strategies.	1	2	3	4	5	6	7	
IM213	...implemented current (existing, well-established) marketing strategies more efficiently.	1	2	3	4	5	6	7	
IM214	...improved current (existing, well-established) marketing strategies.	1	2	3	4	5	6	7	
RM214	...implemented completely new types of marketing strategies.	1	2	3	4	5	6	7	

Product Characteristics

PM21- In relation to the selected new product (as mentioned in the FC8), choose one of the following statements that best describes the product innovation mode used by your firm. Please circle the appropriate answer:

- ☐ 1 The product was developed and marketed entirely within our firm using internal organizational resources and capabilities.
- ☐ 2 The product was developed and marketed entirely through cooperative efforts of our firm with those of one or more external partners (e.g. joint venture, licensing, franchise and the like) who played a major role in the development process and marketing process.
- ☐ 3 The product was developed and marketed entirely outside our firm, without your involvement, and subsequently acquired by our firm.

The following statements focus on how well the selected new product was performed in relation to the goals set by your firm over the past year. Please circle the number in each statement that best reflects your views.

In relation to goals set, this product has:		Not at All					Very Much So	
		1	2	3	4	5	6	7
S21	...met revenue goals.	1	2	3	4	5	6	7
S22	...met sales growth goals.	1	2	3	4	5	6	7
S23	...met market share goals.	1	2	3	4	5	6	7
S24	...met return on investment goals.	1	2	3	4	5	6	7
S25	...met profitability goals.	1	2	3	4	5	6	7
S26	...met development cost goals.	1	2	3	4	5	6	7
S27	...achieved customer acceptance goals.	1	2	3	4	5	6	7
S28	...achieved customer satisfaction goals.	1	2	3	4	5	6	7
S29	...achieved launch on time goals.	1	2	3	4	5	6	7
S210	...achieved time-to-market goals.	1	2	3	4	5	6	7

General Questions

GQ22 - My designated title is: _____

GQ23 - Please tick the box below for your highest educational level:

- ☐ 1 High School ☐ 2 Undergraduate ☐ 3 Post Graduate ☐ 4 Others _____

Please indicate the extent to which you agree or disagree with the statement below:

		Not at All					Very Much So	
		1	2	3	4	5	6	7
GQ24	I am confident I had the necessary knowledge to complete the statements asked throughout the questionnaire.	1	2	3	4	5	6	7

THANK YOU FOR YOUR COOPERATION AND VALUED HELP



Questionnaire C

New Product Success Study

FC9 - What is the product-brand name of one of your firm's products launched for 3 or more years:

Product: _____ Brand Name: _____ Related Manager: _____

Dear Respected Manager,

You are identified by your senior manager to complete this questionnaire related to above mentioned product/brand name. This study examines the development and marketing of products. The term "firm" refers to either the company or the business unit where you are working. The term "department" refers to the division or the operational unit where you are working. The term "product" refers to either good or service which your firm introduced to the marketplace.

We realise you are very busy, but we ask for 25-30 minutes of your time. Please do not rush, as your experiences and knowledge are very important and your accurate responses ensure your time is well served. The results of this study will assist in improving business development practices related to a product development and marketing.

By completing and returning this questionnaire, you will be helping us to help Iranian industry. This information will be put into a database to assist us to better understand new product performance factors in Iranian firms.

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Please indicate the extent to which you believe that you are:

		Not at All						Very Much So
GQ31	...knowledgeable about your firms' business operations, strategies, characteristics, business processes, performance, and business environment (competitors, regulations, and the like).	1	2	3	4	5	6	7

BM31- In relation to the above product, choose one of the following statements that best describes that product. Please circle the appropriate answer:

- ☐ 1 The product was launched using an existing brand name.
- ☐ 2 The product was launched using a new brand name.

Firm Operational Processes

In relation to the specific product your firm marketed for 3 or more than 3 years (as mentioned in the FC9), the following statements relate to your firm's processes and behaviours to develop that product. Please circle the number in each statement that best reflects your views.

Our Firm:		Not at All						Very Much So
RI31	...acquired entirely new product development processes that had not been used before by the firm.	1	2	3	4	5	6	7
II31	...improved its current (existing, well-established) processes aimed at quality improvement of our current products.	1	2	3	4	5	6	7
II32	...exploited mature, existing technologies to enhance the efficiency of our current products.	1	2	3	4	5	6	7
RI32	...acquired completely new manufacturing technologies and processes that had not been used before by the firm.	1	2	3	4	5	6	7
RI33	...acquired entirely new managerial and organizational skills related to new product development process (e.g. set up new liaison teams to integrate R&D, marketing, manufacturing, and other functions).	1	2	3	4	5	6	7
II33	...strengthened current (existing, well-established) managerial and organizational skills that improve the efficiency of the existing product development process (e.g. improve existing coordination between R&D, marketing, manufacturing, and other functions).	1	2	3	4	5	6	7
II34	...improved current (existing, well-established) processes to reduce the cost of our current products.	1	2	3	4	5	6	7
RI35	...set up completely new types of manufacturing facilities and operations.	1	2	3	4	5	6	7
RI34	...acquired entirely new technology and R&D training skills for personnel development.	1	2	3	4	5	6	7
II35	...refined current (existing, well-established) processes to reduce production time (i.e., improved the efficiency of our existing production processes).	1	2	3	4	5	6	7

In relation to the selected product, the following statements relate to *your firm's processes and behaviours to market that product*. Please circle the number in each statement that best reflects your views.

Our Firm:		Not at All							Very Much So
RM31	...developed completely new pricing processes.	1	2	3	4	5	6	7	
IM31	...refined current (existing, well-established) pricing processes.	1	2	3	4	5	6	7	
RM33	...developed entirely new advertising and/or promotion processes.	1	2	3	4	5	6	7	
RM34	...created a completely new brand for the new product.	1	2	3	4	5	6	7	
IM39	...refined current (existing, well-established) methods of marketing communication with customers.	1	2	3	4	5	6	7	
IM33	...refined current (existing, well-established) advertising and/or promotion processes.	1	2	3	4	5	6	7	
IM34	...strengthened the brand image for current product.	1	2	3	4	5	6	7	
RM39	...developed entirely new methods of marketing communication with customers.	1	2	3	4	5	6	7	
RM310	...set up completely new public relations methods.	1	2	3	4	5	6	7	
RM35	...researched about new customers.	1	2	3	4	5	6	7	
RM36	...researched about new competitors.	1	2	3	4	5	6	7	
IM38	...improved current (existing, well-established) customer relationship management methods.	1	2	3	4	5	6	7	
RM311	...set up entirely new marketing research processes.	1	2	3	4	5	6	7	
IM310	...improved current (existing, well-established) public relations methods.	1	2	3	4	5	6	7	
IM35	...researched about current customers.	1	2	3	4	5	6	7	
IM36	...researched about current competitors.	1	2	3	4	5	6	7	
RM38	...developed completely new customer relationship management methods.	1	2	3	4	5	6	7	
IM311	...refined current (existing, well-established) market research processes.	1	2	3	4	5	6	7	
IM312	...improved current (existing, well-established) market testing processes.	1	2	3	4	5	6	7	
RM37	...segmented the market in a completely new way.	1	2	3	4	5	6	7	
RM32	...set up entirely new sales and distribution channels.	1	2	3	4	5	6	7	
RM312	...developed completely new market testing processes.	1	2	3	4	5	6	7	
IM37	...improve efficiency of current (existing, well-established) market segmentation methods.	1	2	3	4	5	6	7	
IM32	...improved current (existing, well-established) sales and distribution channels.	1	2	3	4	5	6	7	
RM313	...developed entirely new marketing strategies.	1	2	3	4	5	6	7	
IM313	...implemented current (existing, well-established) marketing strategies more efficiently.	1	2	3	4	5	6	7	
IM314	...improved current (existing, well-established) marketing strategies.	1	2	3	4	5	6	7	
RM314	...implemented completely new types of marketing strategies.	1	2	3	4	5	6	7	

Product Characteristics

AM1- **In relation to the selected product (as mentioned in the FC9), choose one of the following statements that best describes that product. Please circle the appropriate answer:**

- ☐ 1 Our firm applied radical (dramatic-major) adjustments to the selected product's specifications over the past 3 years.
- ☐ 2 Our firm applied incremental (slight-minor) adjustments to the selected product's specifications over the past 3 years.
- ☐ 3 Our firm applied no adjustments to the selected product's specifications over the past 3 years.

PM31- **In relation to the selected product, choose one of the following statements that best describes the product innovation mode used by your firm. Please circle the appropriate answer:**

- ☐ 1 The product was developed and marketed entirely within our firm using internal organizational resources and capabilities.
- ☐ 2 The product was developed and marketed entirely through cooperative efforts of our firm with those of one or more external partners (e.g. joint venture, licensing, franchise and the like) who played a major role in the development process and marketing process.
- ☐ 3 The product was developed and marketed entirely outside our firm, without your involvement, and subsequently acquired by our firm.

The following statements focus on how well the selected product was performed in relation to the goals set by your firm over the past year. Please circle the number in each statement that best reflects your views.

In relation to goals set, this product has:		Not at All					Very Much So	
		1	2	3	4	5	6	7
S31	...met revenue goals.	1	2	3	4	5	6	7
S32	...met sales growth goals.	1	2	3	4	5	6	7
S33	...met market share goals.	1	2	3	4	5	6	7
S34	...met return on investment goals.	1	2	3	4	5	6	7
S35	...met profitability goals.	1	2	3	4	5	6	7
S36	...met development cost goals.	1	2	3	4	5	6	7
S37	...achieved customer acceptance goals.	1	2	3	4	5	6	7
S38	...achieved customer satisfaction goals.	1	2	3	4	5	6	7
S39	...achieved launch on time goals.	1	2	3	4	5	6	7

General Questions

GQ32 - My designated title is: _____

GQ33 - Please tick the box below for your highest educational level:

☐ 1 High School ☐ 2 Undergraduate ☐ 3 Post Graduate ☐ 4 Others _____

Please indicate the extent to which you agree or disagree with the statement below:

	Not at All						Very Much So
GQ34 I am confident I had the necessary knowledge to complete the statements asked throughout the questionnaire.	1	2	3	4	5	6	7

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