



UNIVERSITY
OF TASMANIA

**Examining Optimal Exploitation Mechanisms that Enhance First
Product Commercialisation in New Technology Ventures in India**

By

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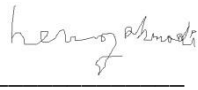
Tasmanian School of Business and Economics

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University of Tasmania October, 2014

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Abstract

The economic value of new technology ventures (NTVs) is substantial because they are often identified as sources of technological breakthroughs. Critically, the success of a first product is often a predictor of the ultimate survival of the NTVs. The limitations in product level resources, routines and structures, make commercialisation of the NTV's first product a serious challenge. The mainstream research investigating the antecedents of new product success has focused on established technology firms while neglecting NTVs' first product. Accordingly scholars and managers need to understand how NTVs configure their limited assets to enhance first product commercialisation activities.

Drawing on Day and Wensley's influential model, this research proposes a theoretical model which examines the influence of exploitation mechanisms of marketing and technology assets on first product performance and the overall NTV performance via generating first product differentiation and cost-efficiency. By choosing India as an important emerging economy as the laboratory and through integrating configuration, complementarity and contingency theories with resource-based theory (RBT), this research shows that the effective (1) interplay of resources and capabilities in each product-focused functional area and (2) interplay between the capabilities in the two functional areas, enhances NTV's first product commercialisation outcomes. This research advances the argument that overall NTV's performance in terms of growth and development is dependent on first product success in achieving desired sales, profitability and customer satisfaction, which itself depends on the (1) marketing resource-capability (R-C) complementarity and technology R-C complementarity (2) complementarity between marketing and technology capabilities as bundles of processes and skills used to undertake commercialisation activities, and (3) the achievement of first product positional advantages including differentiation and cost-efficiency. Further, the influence of marketing and technology R-C complementarity is contingent upon the deployment of integration mechanisms, entrepreneurial orientation (EO) and political networking capabilities

during first product commercialisation. And finally the influence of complementarity in first product capabilities is contingent on the possession of superior communication and information technology (ICT) capabilities to facilitate knowledge exchange and communication.

The theoretical framework is tested using data from 142 Indian NTVs. The findings of the research reveal that for an effective and efficient first product commercialisation, NTVs need to accumulate the configuration of first product assets with optimal level of complementarity within marketing and product development areas; also they need to acquire a well-balanced cross-functional integration through achieving complementarity between the marketing and technology capabilities. The findings also enclose that possessing such a configuration of first product assets allow NTVs to achieve differentiation and cost-efficiency simultaneously. Besides, the findings offer insights into understanding why such complementary first product assets are positively related to first product outcomes, through revealing the role of other capabilities-as contingency factors- including supplier integration, customer integration, ICT capabilities, EO and political networking capabilities. The current research shows the importance of first product commercialisation as one of the most vital factors in enhancing the overall performance of new ventures in competitive technology-orientated markets. The model is tested in an important but understudied economy India, offering insights concerning the necessary antecedents utilised to commercialise a competitive first product.

CHAPTER ONE

Introduction

1.1 Introduction

New product commercialisation is regarded as the lifeblood of technology-based firms (Day, 1994; Di Benedetto, 1999; Langerak, 2003; Ettlie & Pavlou, 2006; Mohr, Sengupta, & Slater, 2009). The short life cycle of technology-oriented products and increasing competitiveness in markets (Kim, Im, & Slater, 2013) requires ongoing commercialisation of new products (Cooper & Kleinschmidt, 2007). One of the main reasons underlying the ongoing effort by scholars to study new product commercialisation is the continued unsatisfactory financial outcomes of new product commercialisation projects (Barczak, Griffin, & Kahn, 2009). Failure rates for new product projects are consistently reported to be as high as 50 to 60 percent among technology and manufacturing firms (Kuester, Homburg, & Hess, 2012), which places significant pressure on managers to improve their commercialisation efforts. With rapid market development and high failure rates, scholars and practitioners have sought to identify factors that drive new product success, especially those that support new product cost reduction and product differentiation (Durmuşoğlu & Barczak, 2011).

In studying the new product and new venture literature, it becomes clear that an important domain of product commercialisation resides where new ventures and new technology converge in the commercialisation of a new ventures' first product. New technology-based ventures (NTVs) are small and medium sized firms (Li & Zhang, 2007), less than eight years old, and are R&D (research and development) oriented (Li & Atuahene-Gima, 2001; Atuahene-Gima & Murray, 2007; Song, Podoyntsyna, Bij, & Halman, 2008). It is noted that NTVs' wealth creation and growth depends largely on the commercialisation (i.e., first product development

and launch) of novel products (Atuahene-Gima, Li, & De Luca, 2006). In particular, NTV's first product commercialisation has been identified as the most significant entrepreneurial event (opportunity) during the start-up stage (Schoonhoven, Eisenhardt, & Lyman, 1990; Park & Bae, 2004). Nevertheless, the crucial role of first product commercialisation has received limited attention in investigating the success factors of the NTVs (Song, Song & Di Benedetto, 2011; Marion, Friar, & Simpson, 2012).

Currently, research into first product commercialisation is lacking in four respects. First, a large body of research on innovation and marketing has sought to understand how firms can reduce the risks involved with new product commercialisation (e.g., Song & Montoya-Weiss, 2001; Xie, Song, & Stringfellow, 2003; Atuahene-Gima, 2005; Swink & Song, 2007; Mu & Di Benedetto, 2011; Atuahene-Gima & Wei, 2011). However, the majority of this work has focused on established technology and manufacturing firms (Song, Di Benedetto, & Song, 2010a; Marion et al., 2012), neglecting NTVs. Consequently, the literature provides little guidance for scholars or practitioners about how a successful first product is commercialised by NTVs (Song et al., 2010a; Song et al., 2011).

Second, a growing body of literature on new product success is grounded in the resource-based theory (RBT) of the firm. RBT asserts that firms possess heterogeneous bundles of product-level assets (i.e. capabilities and resources) that influence their new product commercialisation (Conner, 1991; Priem & Butler, 2001). The new product development literature shows that achieving desired product outcomes may be associated with how a firm manages to accumulate and deploy its marketing and technology resources and capabilities in the commercialisation process (e.g., Wang, Lo, Zhang, & Xue, 2006; Song et al., 2010a). Scholars have adopted different interpretations and conceptualisations of RBT to investigate new product commercialisation in on-going organisations. Yet knowledge is scarce about optimal asset exploitation mechanisms purported to enhance first product positional advantages in NTVs. In this sense there is lack of theoretical convergence stemming from RBT literature to

realise the optimal configurations of product level assets that may enhance first product commercialisation activities.

Third, extensive research has focused on the relationship between product level assets in product development and marketing areas and new product outcomes (see Henard & Szymanski, 2001; Kim et al., 2013). However, studies that explore contingency factors impacting these relationships, particularly in the context of first product commercialisation have been limited. In other words, the current literature in the area of NTV's first product commercialisation has not clearly defined the role of contingency factors (as moderators) that impact first product assets' influence on first product positional advantages. Specifically, there is lack of information about capabilities which enhance (or impede) the efficiency and effectiveness of the NTV's product assets in achieving first product positional advantages. Hence, knowledge is limited about which contingency factors (i.e. capabilities) help to maximize the impact of first product resources and capabilities in enhancing first product commercialisation activities.

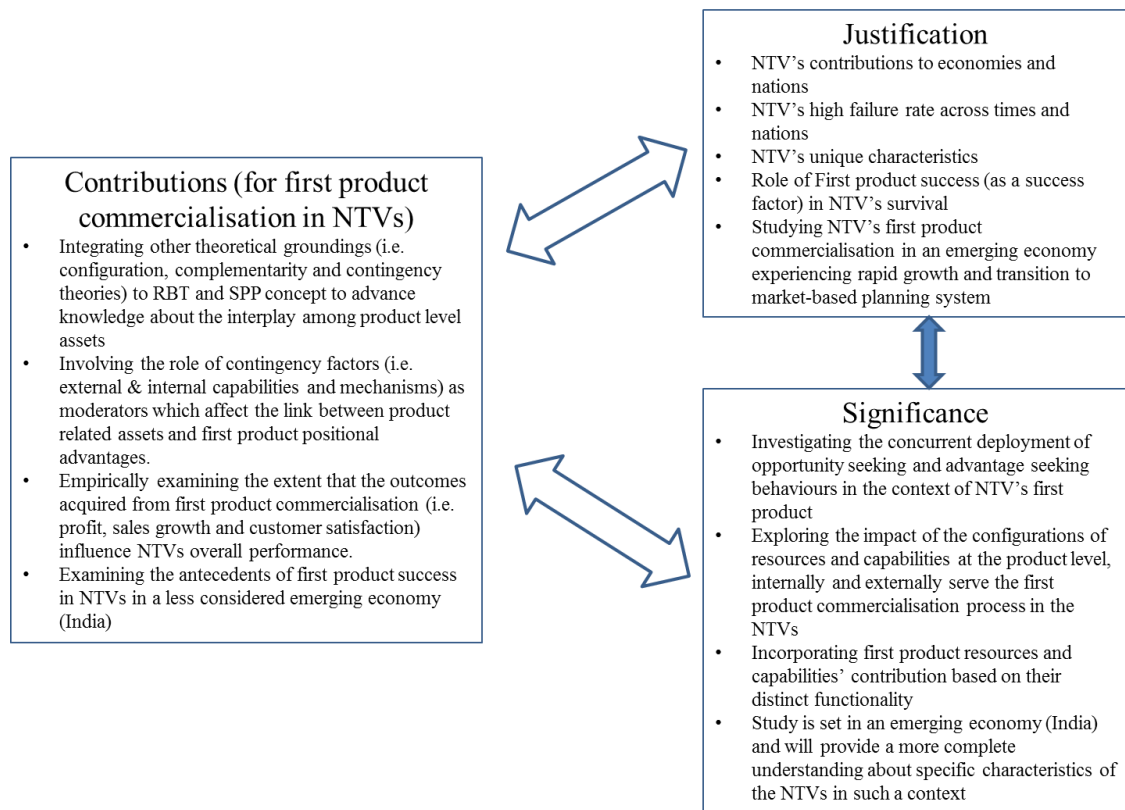
Fourth, empirical research about new product and first product success has largely focused on developed economies such as United States, Germany, Japan and Taiwan (Li, Liu, & Zhao, 2006; Atuahene-Gima et al., 2006; Song et al., 2010a; Bstieler, 2012). Interestingly, with the increasing importance of emerging nations in the world economy, there has been very little empirical work on entrepreneurial processes such as first product commercialisation by NTVs in emerging economies; especially the group of BRICS (Brazil, Russia, India, China and South Africa) nations (Bruton, Ahlstrom & Obloj, 2008; Lau & Bruton, 2011).

1.2 Objectives and theoretical / empirical contributions

Figure 1.1 outlines the contributions, justifications and the significance of the study. As outlined in Figure 1.1, the study seeks to contribute to the literature in four ways. First, through proposing and testing a theoretical model for first product success in NTVs, the study aims to highlight the impact of the inter-relations between NTVs' marketing and technology assets

(R&D and manufacturing in product development) both within, and between product-focused functional areas in first product commercialisation. The study explores how the deployment of technology and marketing resources and capabilities contribute to first product performance. In this regard, the study advances RBT and contributes to a greater understanding of the resource-performance link in the context of first product commercialisation. Further, the study integrates other theoretical groundings (i.e. configuration, complementarity theories) with RBT to advance knowledge about the interplay and interdependence of product level resources and capabilities in the context of first product commercialisation. The study contributes to the first product commercialisation literature through the application of configuration theory in the deployment of product level resources and capabilities. The present study theorises that resources and capabilities should be deployed as a configuration of complementary relationships (Song, Droge, Hanvanich, & Calantone, 2005; Slotegraaf, Moorman, & Inman, 2003) for first product commercialisation and determines how these configurations are related to different performance outcomes. Therefore, the study investigates the influence of resource-capability complementarity in the area of product development and marketing (Ngo & O'Cass, 2012a; Slotegraaf et al., 2003) on first product positional advantages, as well as their cross-functional complementarity (Moorman & Slotegraaf, 1999; Song et al., 2005).

Figure 1.1 The significance and justification of the study



Second, the study aims to identify whether the achievement of product positional advantage and improved first product performance can be attributable to a match between first product resources and capabilities and external (environment) conditions. The current literature focusing on established firms has focused largely on the relationship between assets complementarity and new product performance. The study advances the literature by examining whether benefiting from asset complementarity at product level in first product commercialisation is contingent on the deployment of other capabilities. As depicted in Figure 1.1, the study builds on contingency theory and extends the literature of first product commercialisation by involving the role of contingency factors (i.e. external and internal capabilities) as moderators which affect the relationship between product related assets and first product positional advantages. The study incorporates and examines the role of contingency factors in enhancing the impact of two forms of asset complementarity in first product commercialisation including marketing resource-capability and technology resource-capability

complementarities as well as marketing-technology capabilities complementarity. The impact of integration mechanisms, entrepreneurial orientation (EO), political networking capabilities and information communication and technology (ICT) capabilities as contingency factors are examined in the study.

The study builds on social capital theory to examine how supplier and customer integration mechanisms contribute to first product commercialisation process by providing complementary co-development and information sharing as a means to increase the efficiency and effectiveness of the first product commercialisation (Rosenzweig, Roth, & Dean, 2003; Lau, Yam, & Tang, 2010). Hence the study examines whether specific integration mechanisms encompassing supplier integration and customer integration enhance the impact of marketing and technology resource-capability complementarities on first product positional advantages. In the context of strategic orientations' role in asset exploitation, the study introduces EO as a managerial capability and a contingency factor (Miller, 2011). Hence, it is theorised that to enhance the influence of complementary assets on product positional advantages, a high level of EO is needed to drive first product assets towards breakthrough innovations and low cost operations (see Wiklund & Shepherd, 2003). In the context of managing environmental uncertainty and weak institutional business structures, building on institutional and social capital theory, the study informs the literature about the importance of political networking capabilities in first product commercialisation. Political networking capabilities in this study is theorised to be a critical factor in acquiring knowledge-based and financial resources to complement NTV's current possessing (Li & Atuahene-Gima, 2001; Li & Zhang, 2007). Along with examining the role of knowledge sharing and communication between functional areas and with external partners, the study provides insights into the role of inter-firm information communication and technology (ICT) capabilities in enhancing the efficiency and effectiveness of first product commercialisation (Day, 1994; DeSarbo, Di Benedetto, Jedidi, & Song, 2006; Durmuşoğlu & Barczak, 2011).

Third, the study aims to determine if there is a link between first product performance and further growth of NTVs in emerging economies. As shown in Figure 1.1, the study contributes to the current literature about new product success - organisational performance link by empirically examining the extent that the outcomes achieved in first product commercialisation (i.e. profit, sales growth and customer satisfaction) influence NTVs overall performance. By adopting a context specific approach, the study investigates the impact of successful first product commercialisation on NTVs overall success.

The fourth contribution outlined in Figure 1.1, is related to the context of the study. The study aims to identify the impact of the antecedents of first product success in NTVs in an important emerging economy, India which has a rapidly growing and globally important technology sector (Javalgi, Todd, Johnston, & Granot, 2012). The investigation of emerging economies has become prominent across entrepreneurship and marketing in the past several years (e.g., Song et al., 2010a; Lau & Bruton, 2011; Javalgi et al., 2012). There has been a call for more empirical attention to the nature of entrepreneurial processes (Bruton et al., 2008; Lau & Bruton, 2011) and antecedents of NTV's performance in emerging BRICS economies such as India. The findings will provide insights about the first product commercialisation process in NTVs in an under-studied context India (as outlined in Figure 1.1).

Based on the above points in relation to the theoretical and empirical contributions, the study seeks to answer the following research questions:

- 1- To what extent does marketing resource-capability complementary enhance first product positional advantages: product differentiation and cost-efficiency in NTVs?
- 2- To what extent does technology resource-capability complementarity enhance first product positional advantages: product differentiation and cost-efficiency in NTVs?
- 3- To what extent does the complementarity between marketing and technology capabilities enhance first product positional advantages: product differentiation and cost-efficiency in NTVs?

- 4- To what extent do first product positional advantages in the form of product differentiation and cost-efficiency enhance first product performance in NTVs?
- 5- To what extent does first product performance influence overall NTV performance?
- 6- To what extent is the relationship between product-level resource-capability complementarity and first product differentiation and cost efficiency contingent on political networking capabilities, supplier integration, customer integration, and EO in NTVs?
- 7- To what extent is the effect of cross-functional capability complementarity on first product differentiation and cost-efficiency contingent on the deployment of ICT capabilities in NTVs?

1.2.1 Definitions of core constructs

The review of entrepreneurship, strategic management, new product development and new product innovation literatures discussed in Chapter Two assists in addressing the research questions and provides a theoretical platform by which the study can investigate how a first product can be commercialised successfully by NTVs. Chapter Three presents a theoretical model and articulates the theory underpinning it. Table 1.1 provides the definitions of the constructs used in the theoretical framework of the study presented in Chapter Three.

Table 1.1 Definitions of Constructs

Construct	Definition
Marketing resources	<ul style="list-style-type: none"> • Refer to the level of static marketing assets possessed by NTVs for first product commercialisation including the marketing budget and market knowledge. <ul style="list-style-type: none"> ○ Marketing budget refers to the financial resources (cash flow) possessed for marketing processes implementation during the first product commercialisation (Song et al., 2011; Gruber, Heinemann, Brettel, & Hungeling, 2010). ○ Market knowledge refers to the depth, breadth, tacitness and

Construct	Definition
	specificity of information utilised by the NTVs in relation to customers, competitors' strategies and regulations of the market environment during the first product development and launch (Kohli & Jaworski, 1990; De Luca & Atuahene-Gima, 2007).
Technology resources	<ul style="list-style-type: none"> • Refer to the level of static technology assets possessed by NTVs for first product commercialisation including financial and physical. <ul style="list-style-type: none"> ○ R & D budget denotes the financial resources (cash flow) acquired or possessed by NTVs to invest in running their first product research, engineering, development and manufacturing project (Song et al., 2011). ○ Physical resources refers to the plants, machinery, test and production equipment providing the infrastructure for the development, testing and manufacturing of the first product in NTVs (Sirmon & Hitt, 2009; McKelvie & Davidsson, 2009; Zahra & Bogner, 2000).
Marketing capabilities	Refers to the accumulated bundles of skills and related processes to undertake and coordinate marketing planning, sales, pricing, promotion, product launch and market linking functions (Vorhies & Morgan, 2005; DeSarbo et al., 2006; Song et al., 2010a).
Technology capabilities	Refers to the accumulated bundles of skills and related processes to undertake new product and technology design, engineering, formulation, development, manufacturing processes, forecasting technological changes and quality control functions (Lee, Lee, & Pennings, 2001; Moorman & Slotegraaf, 1999; Song et al., 2005; DeSarbo et al., 2006).
First product differentiation	Refers to distinct attributes of the first product that presents a superior value proposition to the target market consisting of attributes including superior quality and design, extended features and functions, reliability, long lasting and technical performance of the offered product comparing to competitors (Day, 1994; Day & Wensley, 1988; Kim & Atuahene-Gima, 2010).
First Product cost-efficiency	Refers to distinct attributes of the first product that presents the commercialisation operations at a lower cost than its competitors (Day & Wensley, 1988). Operations encompass (information processing, production, manufacturing and distribution

Construct	Definition
	processes) during the commercialisation process (Kim & Atuahene-Gima, 2010).
First product performance	Refers to the extent that a first product meets the objectives in terms of profitability, sales growth and customer satisfaction (Lau et al., 2010).
NTV overall performance	Refers to the extent that a NTV has met its overall goals in terms of growth, development, products / services performance, operations profit since its establishment comparing to strongest rivals (Gruber et al., 2010).
ICT capabilities	Refers to the level of skills and process in adopting and integrating ICT-based solutions to first product commercialisation (Day, 1994; DeSarbo et al., 2006).
Political networking capabilities	Refers to the abilities in NTVs to establish close ties with government and politicians (Xin & Pearce, 1996; Li & Atuahene-Gima, 2001; Li & Zhang, 2007).
Entrepreneurial orientation (EO)	Refers to the strategic proclivity of NTV leaders (i.e. founders) reflecting particular entrepreneurial aspects of practices, methods and decision-making styles (Miller, 2011). Includes sets of distinct behaviours that have the qualities of innovativeness, proactiveness and risk taking (Covin & Slevin, 1989).
Supplier integration	Refers to sharing information regarding production processes as well as working (in terms of processes integration) with suppliers (Rosenzweig et al., 2003).
Customer integration	Refers to sharing information regarding production processes as well as working (in terms of processes integration) with customers (Rosenzweig et al., 2003; Lau et al., 2010).

1.3 Justification of the study

The justifications for the study are outlined in Figure 1.1 and are interrelated with the contributions of the study discussed in the previous section. As depicted in Figure 1.1, five aspects are identified describing the justifications of the study. These aspects include the important role of NTVs across nations, their high failure rates, their distinct characteristics, their first product driving their life cycle and the type of economy chosen as the context of the study.

First, the formation and growth of new ventures has been characterised as a global and multifaceted phenomenon, and investigating how growth happens is critical for theory and practice (Yang & Aldrich, 2012). New ventures are significant to: (1) creating employment (Reynolds, Bygrave & Autio, 2003; Newbert, 2005); (2) the creation of wealth (Gilbert, McDougall, & Audretsch, 2006; Van Praag & Versloot, 2007); and (3) the development of product and technological innovations (Atuahene-Gima, et al., 2006; Rosenbusch, Brinckmann, & Bausch, 2011). Studying new ventures is justified especially when they are identified as sources of break thorough technology-based products in the market (Lee et al., 2001; Atuahene-Gima et al., 2006).

For example, Neck, Meyer, Cohen and Corbett's (2004) research on the entrepreneurial system of Silicon Valley – called the home to many of the world's most significant technology corporations- in the United States, exposes the role of newly born technology ventures in providing job vacancies and wealth for the people in different regions (i.e. Silicon Valley, Boston's Route 128 and North Carolina). In a comprehensive analysis, Reynolds et al. (2003), report the creation of 10 million jobs in the USA and 100,000 in countries such as Sweden. Their study indicates that between 2 percent and 15 percent of new jobs were created by ventures between 3 and 42 months old. In the past decade, the considerable growth (in terms of numbers) of new ventures has been observed all over the world. For instance, "Business Review" bulletins of the International Finance Corporation (World Bank Group), verify the considerable growth of new ventures in terms of numbers in Europe and Asia (Doing Business, 2008). In South Korea, the reforms in the economic system have led to considerable entrepreneurial venturing and consequently caused the high rate of new ventures commencement over the past decade (e.g., Lee et al., 2001; Park & Bae, 2004). In Europe, official statements published by the government of Scotland reveal an ascending trend of new ventures registration during the past decade (Scotland Government, 2010). Similarly, in the Pacific region, 160,000 new ventures have been established in Australia during 2010 and this

number indicates a 13 percent growth compared to 2009 (Milman, 2011). In the United States, the Small Business Administration (SBA), a Federal Government agency, in its official statement of 2008, reported the commencement of 600,000 new ventures per year in a five year period (2003-2008) within United States.

Second, while NTVs contribute much too economic activity, failure rates are high and this has caused serious concerns among scholars, practitioners, economists and policy makers (Ucbasaran, Shepherd, Lockett, & Lyon, 2012; Li & Zahra, 2012). High NTV failure rates exist across all countries and high technology industries. Recent studies suggest that failure rates for new ventures (including NTVs) might be as high as 30 percent over the first 2 years of operations (Headd, 2003; Townsend, Busentiz, & Arthurs, 2010). For example, in a study analysing failure rates among U.S. new ventures, only 66 percent of new ventures across different industry sectors still existed two years after their establishment and only 44 percent still existed after 4 years (Campbell, 2005). In addition, a study of survival rates of NTVs indicated that out of 11,259 NTVs established between 1991 and 2000 in the United States, only 36 percent of ventures with more than five full-time employees had survived more than four years (Song et al., 2008). High failure rates have also been reported for new ventures during their early years of operation in other countries. For example, failure rates of 55 percent in New Zealand (Pinfold, 2000), high rates in South Africa (Fatoki, 2012), and 40 percent in UK (Mudambi & Zahra, 2007) have been reported.

Third, focusing on NTV's first product commercialisation is justified as they are at a disadvantage compared to established technology firms in several ways including: (1) reputation and legitimacy; (2) social ties; and (3) productive capabilities. NTVs often lack legitimacy in the business environment (Hannan & Freeman, 1984). They are not perceived as trustworthy as established firms (Delmar & Shane, 2004). Hence, NTVs usually face challenges to create external perceptions that they are legitimate enough to acquire resources and survive the competitive pressure of technology-based markets (Elfring & Hulsnik, 2003). Social ties are an

essential factor in all economic transactions (Acquaah, 2007). However, NTVs usually lack the types of relationships with suppliers and customers enjoyed by their established rivals (Song & Di Benedetto, 2008).

Figure 1.1 also outlines the role of specific characteristics differentiating NTVs from ongoing organisations as a factor justifying the focus of the study. NTVs, because of the liability of newness, often have deficiencies in productive capabilities established firms have for transforming resources into products (Katila & Shane, 2005; Li & Zhang, 2007). To compete with established technology rivals, NTVs must garner the resources needed to develop, transform and exploit, and develop a set of capabilities, and market the output of that transformation (Delmar & Shane, 2006). As the differences between large, established technology firms and NTVs are substantial, research findings generated within one group often cannot be directly or automatically applied to the other (Short, McKelvie, Ketchen, & Chandler, 2009). Hence, scholars are attempting to investigate the generalisability of theories developed through studying established firms by testing them in the context of NTVs (Kawakami, MacLachlan, & Stringfellow, 2012). Accordingly, the antecedents that shape NTVs performance have been identified as important for theory, practice and policy (Song et al., 2008; Short et al., 2009).

Fourth, scholars across a range of disciplines such as management, marketing and the like consistently argue that the success of any business depends on achieving two objectives, growth and wealth creation (Conner, 1991; Ireland, Hitt, & Sirmon, 2003; Sirmon, Hitt, & Ireland, 2007; Hitt, Ireland, Sirmon, & Trahms, 2011). Scholars have argued that first product failure can affect not only the competitive growth of NTVs, but even their very survival (Song & Di Benedetto, 2008; Song et al., 2010a). Some scholars have reported a high correlation between the success of the first product and success of NTVs in developed economies such as United States even during the global economic recession (e.g., Song, Song, & Parry, 2010b). Early cash flows derived from market acceptance obtained through a successful first product, enable

NTVs to build their reputation and brand, establish external ties with key actors, obtain additional financial and human resources, and increase their chance of survival (Song et al., 2010a; Song et al., 2011). In addition, successful commercialisation of the first product can be regarded as essential for the survival of NTVs as the life cycle of the high-tech products is getting shorter and the competition in technology-oriented markets is becoming more aggressive (Howell, Shea, & Higgins, 2005; Kim et al., 2013).

Fifth, in an increasingly globalised business world, there is need to test theories in the contexts of different countries (Xie, Song, & Stringfellow, 1998; Kawakami et al., 2012). Economists have predicted that during the next four decades, BRICS economies will become stronger than the group of six countries including the United States, Germany, Japan, United Kingdom, Italy, and France (Wilson & Purushothaman, 2003). However, there is limited research in relation to NTVs success, particularly in Brazil, Russia, and India (Bruton et al. , 2008), as the focus of many studies has been on Chinese NTVs in the past several years (e.g., Li & Atuahene-Gima, 2001; Atuahene-Gima et al., 2006; Atuahene-Gima & Murray, 2007; Song et al., 2010a). Consequently, countries such as India have received significantly less attention.

Given that, emerging economies such as India are in the process of rapid economic growth and transition to market-based systems, examining entrepreneurial processes in that context such as the ability of NTVs to develop and launch a successful first product can be critical (Lau & Bruton, 2011). At the same time, the Indian government is encouraging entrepreneurship, and new government policies have been established to support new ventures including NTVs (Javalgi et al., 2012). Evidence shows that Indian top managers are optimistic about the future and opportunities for business expansion in SMEs (Javalgi et al., 2012).

1.4 Significance of the study

Figure 1.1 also outlines the aspects that explain why the study is significant. First, in recognising success factors in NTVs, wealth creation and growth have been identified as two

major aims of all newly established firms (Hitt, Ireland, Camp, & Sexton, 2001; Ireland et al., 2003). It has been asserted that to create wealth and enjoy growth, new ventures need to put their efforts into reaching an advantageous position to outperform their rivals. This position can be obtained through identifying a need in the market and responding appropriately by commercialising innovative and market-creating products (Lee et al., 2001; Qian & Li, 2003; Chen, 2009). Hence, in this respect, it has been suggested that new ventures must concurrently leverage both “advantage seeking” (strategically managing product level assets to create economic rent through first product) and “opportunity seeking” (entrepreneurship) behaviours applied simultaneously to achieve sustainable positional advantages (Ireland et al., 2003; McGrath & MacMillan, 2000). The present study is significant as it adds to the body of literature examining the simultaneous adoption of these behaviours (opportunity and advantage seeking) in the context of NTV’s first product in emerging economies (Kuratko & Audretsch, 2009).

As shown in Figure 1.1, the second aspect that explains why the study is significant pertains to the impact of start-up resources and capabilities in the context of NTVs. In studying the process of wealth creation in NTVs, it has been discussed that the founders and managers of NTVs need to acquire and deploy bundles of resources to deliver an offering (i.e. product) to the customers (Sirmon et al., 2007; Gruber et al., 2010). Hence, they need to construct a portfolio of resources (Sirmon, Gove, & Hitt, 2008) and develop capabilities (Delmar & Shane, 2006) to exploit those resources. In this regard, there is little empirical work that sheds light on how resources and capabilities impact NTV performance and how NTVs configure their resources and capabilities to achieve superior performance (Miller & Shamsie, 1996; Sheehan & Foss, 2007). In this regard, the proposed study is significant as it extends the literature by exploring optimal configurations of resources and capabilities serving the first product commercialisation process in NTVs.

Third, existing research on new product success has seen scholars investigate the singular role of either product level resources or capabilities (e.g., Weerawardena, 2003; DeSarbo et al., 2006; Wang et al., 2006; Vorhies, Morgan, & Autry, 2009; Kim & Atuahene-Gima, 2010; Kim et al., 2013). Few studies have considered the simultaneous influence of both resources and capabilities in terms of combinations and complementary attributes (Newbert, 2008; Song et al., 2010a; Sok & O'Cass, 2011). Some have addressed the significance of cross-functional capability complementarity in enhancing efficiency and effectiveness (Moorman & Slottergraaf, 1999; Ngo & O'Cass, 2012b). However, rarely have researchers addressed the inter-relation between specific resources and capabilities and inter-relation between cross-functional capabilities in NTVs as sources of product advantage in the first product. This point is important given the fact that RBT scholars have stressed the functionality and interdependence of resources and capabilities (Amit & Schoemaker, 1993; Priem & Butler, 2001; Barney & Mackey, 2005; O'Cass & Sok, 2012).

Fourth, the commercialisation of the first product by NTVs has been recognised as the most important entrepreneurial event for these new ventures (Song et al., 2011). A successful first product provides effective external linkages, financial liquidity for further investment and legitimacy necessary for economic and viability and further growth of NTVs (Song et al., 2011). While, the study of this phenomenon in NTVs is significant for entrepreneurship and new product development theory, practice, and policy because it can uncover important factors shaping their performance, it has received little attention to-date (Song et al., 2010a). As outlined in Figure 1.1, the study is significant as it provides insights by extending the theory linking the exploitation of the start-up resources and capabilities and the outcomes of first product commercialisation in NTVs.

Fifth, as outlined in Figure 1.1, the country selected as the laboratory, represents one of the aspects that highlight the significance of the study. The creation and cultivation of NTVs has been underscored as an important source of economic revival in developed economies and a

driving force in the development of emerging economies (Li & Atuahene-Gima, 2001). Researchers have largely focused on developed economies (Bruton et al., 2008), ignoring emerging economies that are rapidly evolving as high-tech developers. In addition, the explicit usage of management theories such as RBT (understanding how resources and their applications differentiate firms' performance) and its related research themes in the new venture literature has been rather limited in regard to emerging contexts (Bruton & Rubanik, 2002) and in the domain of product development (Ozer, 2006; Bstieler, 2012). In addition, as these emerging economies are in the process of transformation to market-based economies (Li & Zhang, 2007); improving knowledge about entrepreneurship has become important for theory, practice and policy (Lau & Bruton, 2011). The present study is significant as it is set in an emerging economy, India and will provide greater understanding about specific characteristics of the NTVs in this context.

1.5 Research Method

A drop-and-collect, self-administered survey design was employed to collect the data from Indian NTVs. The design is based on the work of Ibeh, Brock and Zou (2004), Li and Zhang (2007), Soltani and Wilkinson (2011) and Sok and O'Cass (2011). Building on the procedure followed and recommended by De Luca and Atuahene-Gima (2007), Li and Zhang (2007) and Wei and Lau (2008), the study utilised a multi-informant approach for data collection. The study acquired the data from two members of each NTV including the CEO and a mid-level manager who had been engaged in the commercialisation of the first product. These people are identified as the most knowledgeable in relation to NTV strategic posture, resources, capabilities and business environment. Prior research has found that managers provide valuable and reliable data (Zahra & Covin, 1993; Miller, Cardinal, & Glick, 1997). Above all, considering the small-medium size nature of the NTVs, managers at the top level and operations level are assumed to possess sufficient knowledge and represent a reliable source for the required information (Li & Zhang, 2007).

To check the validity of the measures, sample surveys were provided to each of respondents for reading and responding in the presence of the researcher. Drawing on previous studies (e.g., Atuahene-Gima, Olson, & Slater, 2005), the study used the assistance of a group of six PhD candidates (in marketing field) to check the timing, flow, readability and format of the survey. To analyse the data PLS-SEM (partial least squares-structural equation modelling) was adopted. In particular, based on the number of valid questionnaires the study used PLS-SEM for data analysis. Details of the analysis phase and justifications for the analytical techniques are provided in Chapter Five.

1.6 Limitations of the study

The study has specific limitations that need to be identified and acknowledged. Limitations include: (1) the sampling frame; (2) a cross-sectional methodology; (3) only focusing on one of the BRICS nations; (4) only involving product internal and external capabilities and contingency factors. First, the study only focused on new ventures' first product in the space of technology for its theory examination. Second, the cross-sectional approach for the research design may not fully address the dynamic relationship between the configurations of first product assets and the positional advantages outcomes and first product performance results for NTVs. Third, the study only focused on NTVs' first product commercialisation in India, while other emerging contexts (other BRICS countries) and more developed economies may provide different patterns in relation to the first product commercialisation process. Finally, this study only involved the role of internal and external capabilities as contingency factors affecting the linkage between first product assets complementarity and first product positional advantages.

1.7 Thesis Outline

The following outline of the study conforms to widely adopted formats for PhD dissertations in marketing. The study consists of six chapters and follows the structure and procedures provided by Perry (1994) in writing and developing a doctoral dissertation. Chapter one is the opening

chapter. It explains the background, topic, domain, objectives and the contributions of the study. Chapter one also provides significance and justification of the study and it also introduces methodological and analytical approaches that underpin the study. Chapter one also presents the definitions of the constructs of interest and the limitations associated with the study.

Chapter Two constructs a theoretical foundation for the study by reviewing and analysing the relevant literature, specifically pertaining to strategic entrepreneurship, RBT and new product development. Issues arising from the domain of first product launch in NTVs and its relation to NTVs success are discussed. Moreover, major constructs and themes which depict the final theoretical framework in Chapter Three are discussed and elaborated in Chapter Two.

Based on the discussions provided in Chapter Two, Chapter Three develops the theoretical model. The model outlines the role of configurations of product level resources and capabilities in determining first product performance and NTV overall performance through generating first product positional advantages.

Chapter Four provides the details of the methodology adopted for the research to acquire the data. It elaborates on the research design, details of data gathering process and justification of data gathering techniques adopted for the study.

Chapter Five presents NTVs' profiles and demographics. It presents the results of the preliminary analysis of the measures to assess the psychometrics properties of measurement model. After reporting on validity and reliability tests on the adopted measures, the statistical techniques adopted are described and the results of the hypotheses testing are presented.

Chapter Six provides a comprehensive discussion on the research findings and elaborates on the theoretical / managerial implications of the study. In addition, limitations of the study are discussed and the future research avenues are provided.

1.8 Conclusion

Chapter One introduced the topic and context of the study (first product commercialisation in NTVs). New ventures and in particular new technology-based ventures were defined and their characteristics were discussed. This chapter presented a summary of the study by providing the background for the domain of the research, delineating research objectives and gaps, stating the importance and justification, providing definitions for the key terms and constructs, and discussed the methodological and analytical procedures that has been applied for the study. The domain of first product commercialisation was identified as a significant factor for successfully competing in the market. Theoretical and empirical gaps in relation to NTVs' first product commercialisation were discussed which reflected: (1) the lack of attention to first product commercialisation process in NTVs and (2) lack of theoretical convergence regarding the effective deployments of product level resources and capabilities for first product commercialisation.

Further the contributions of the study were identified which were mainly based on examining competitive configurations of product-focused resources and capabilities as antecedents to first product performance and the overall performance of the NTVs. Correspondingly, the importance of examining the contingency factors (including ICT capabilities, political networking capabilities, EO, supplier integration and customer integration) which can enhance the impact of first product assets was discussed. Justification of the study was discussed which mainly focused on (1) the contribution of the NTVs to economies (2) their high failure rate across different times and countries and (3) the context (India) of the study. Moreover, the significance of the study was discussed including (1) the essentiality of examining the simultaneous effect of advantage and opportunity seeking behaviours in the context of NTV's first product (2) importance of the first product commercialisation and its consequences for NTVs and (3) importance of simultaneous involvement of the first product

resources and capabilities while studying the first product success. Finally the structure of the thesis and the focus of each of the six chapters were described.

CHAPTER TWO

Literature Review

2.1 Introduction

There has been an ongoing debate among scholars that one path for firms to create positional advantage and enhance performance is through new product commercialisation (Day, 1994; Di Benedetto, 1999; Langerak, 2003; Mohr et al., 2009). Given the economic and social importance of new ventures, the successful commercialisation of NTVs' first product is potentially one of the most significant initiatives they undertake, and is vital to their survival (Schoonhoven, et al., 1990; Song et al., 2011).

Studying the impact of product level resources and capabilities on new product performance has been a major theme in RBT research (e.g., Wang et al., 2006; Yam, Tang, & Lau, 2011; Ngo & O'Cass, 2012a). Interestingly, analysing the literature indicates that much of the scholarly attention has focused on understanding the antecedents (such as marketing and technology resources and capabilities) of new product success in the setting of ongoing enterprises with established product commercialisation operations. Recently, there has been work on exploring the first product commercialisation process in new ventures (Marion et al., 2012). Investigations pertaining to the antecedents of first product success in NTVs are now emerging (e.g., Song et al., 2010a; Song et al., 2011).

Further, an analysis of the current literature shows that different theoretical perspectives are applied to conceptualise product focused assets (i.e. resources and capabilities) and their exploitation mechanisms. However, the literature indicates that there is not a high degree of theoretical convergence in this domain and accordingly, there is little work focusing on

unpacking first product success and its associated effective exploitation mechanisms (Song et al., 2010a). Further, literature on first product success, often builds on the findings from the literature studying on-going organisations, while these entities possess different characteristics from NTVs (Short et al., 2009).

Given the focus of the study as well as the empirical and theoretical gaps outlined in Chapter One, Chapter Two reviews and discusses the concepts of (1) product level resources and capabilities in the domain of product development and marketing, (2) their exploitation mechanisms and (3) their contribution to new product commercialisation. This review considers the theoretical perspectives in the domain of RBT which is a key theoretical foundation applied by scholars in the new product commercialisation literature, and in particular first product commercialisation in NTVs. This review also provides the foundation to further examine contingency (moderator) factors, with a specific focus on supplier integration, customer integration, ICT capabilities, EO and political networking capabilities for first product commercialisation process.

2.2 First and new product commercialisation antecedents

The emergence of studies highlighting the significance of new and first product commercialisation has led to research efforts to explore the antecedents of new product success in both contexts of established firms and NTVs. A review in literature indicates four categories of attributes used as predictors of financial and non-financial outcomes of new and first product performance in the context of established firms and NTVs. The four groups of product success predictors are: (1) product characteristics (2) strategy characteristics (3) process characteristics and (4) market characteristics. Recent meta-analysis works studying new product antecedents underscore the growing attention to strategy and process-related factors in the past several years (e.g., Evanschitzky, Eisend, Calantone, & Jiang, 2012). Research examining process-related factors focuses on concepts associated with the new product commercialisation process and its

execution (Henard & Szymanski, 2001; Page & Schirr, 2008; Evanschitzky et al., 2012). They include product-focused departments' integration (e.g., Song & Song, 2010), firm's skills and proficiencies in undertaking product-related activities (e.g., Song & Parry, 1997; Song et al., 2010a), top management support (e.g., Swink, 2000), and market orientation (e.g., Langerak, 2003). Strategy-related factors refer to planned actions that have the potential for providing a positional advantage in the marketplace separate from any factors associated with the new product commercialisation process. These strategic elements include planning to allocate resources to the new product commercialisation initiative (e.g., Henard & McFayden, 2012), timing market entry, and capitalizing on marketing and technological synergies (Harmancioglu, Droge, & Calantone, 2009).

In the literature focusing on process and strategy-related factors, a growing number of studies have adopted RBT as the basis to investigate new product performance differentials (e.g., Moorman & Slotegraaf, 1999; Song et al., 2005; Kim & Atuahene-Gima, 2010). In linking RBT to the domain of new product commercialisation scholars often adopt the perspective that firms' new product and or first product success is contingent upon the heterogeneity in product level resources and capabilities and their exploitation mechanisms (Leonard-Barton, 1992; Song et al., 2011). Throughout this research engaging product level resources and capabilities have been labelled as deployment in the literature. Deployment is characterised as identification and exploitation of the product level resources and capabilities necessary to enact the projects (Morgan, 2012; Henard & McFayden, 2102) such as first product commercialisation (Song et al., 2010a). Specifically, both strategy and process research streams have seen growing attention given to the impact of product-related resources and capabilities and their deployment strategies in new product commercialisation (Harmancioglu et al., 2009).

New product commercialisation researchers underpinning their work with RBT characterise efficiency as the efficacious use of product-related resources and capabilities, or getting more out of the resources and capabilities used to manufacture and market products (e.g.,

Moller & Torronen, 2003). Effectiveness is often characterised by scholars as a firm's capacity in utilising product level resources and capabilities to invent, produce and market products that provide unique features and more value to markets (customers) than existing offers (Moller & Torronen, 2003). The literature also indicates that RBT is also applied to examine NTVs' new and first product commercialisation and the deployment of start-up product focused assets (Chen, 2009; Song et al., 2010a).

An analysis of the literature (e.g., Song et al., 2010a; Ngo & O'Cass, 2012b) indicates that scholars often focus on two areas while examining the impact of product related resources and capabilities. Some scholars build on Drucker's (1954) perspective which recognises the two major sources of value creation in firms to include innovation and marketing. These researchers believe that now more than ever, innovation and marketing activities are viewed as stimuli to economic growth and key elements of the new product commercialisation process (e.g., Lukas & Ferrell, 2000; DeSarbo et al., 2006;; O'Cass & Sok, 2012). Scholars following this line of thought scrutinise the impact of product level resources and capabilities (e.g., Ngo & O'Cass, 2012a), particularly those devoted to the first product (Song et al., 2010a). Similarly, the singular impact of constructs such as marketing-related (for marketing functional area) and technology-related (for product development including R&D and manufacturing functions) has also been scrutinised by the scholars (Dutta, Narasimhan, & Rajiv, 1999; Song et al., 2005; DeSarbo et al., 2006; Song et al., 2008) when trying to match them with environmental opportunities to achieve positional advantage. In this research, scholars characterise innovation as the capacity of a firm to successfully generate, accept and implement new products (Hurley & Hult, 1998) which is usually conceptualised as technological innovation (e.g., Moorman & Slotegraaf, 1999). Extending this view, some argue that innovation is embedded within the function of technology-related assets where new product ideas are created, new technologies are adopted, acquired and consequently novel products are developed, and manufactured (Lee et al., 2001; DeSarbo et al., 2006; Chen, 2009).

Importantly, literature focusing on both established and new ventures encompasses distinct streams of research that explore the impact of marketing-related and technology-related resources and capabilities on new product and first product commercialisation. Based on this understanding a content analysis was carried out to identify and place research into meaningful categories applying a pre-determined set of rules (see Hair, Bush, & Ortinau, 2002). According to Ridley (2012) content analysis: (1) helps researchers to better comprehend a specific phenomenon (2) provides a proper base to identify theories and research related to a specific topic and (3) assist researchers in locating theoretical and empirical gaps needed to be filled by further research. Given the aims of the study as well as the gaps outlined in Chapter One, it is essential to review and categorise the extant literature to better identify the domain of the theoretical perspectives and related issues within the new product and first product commercialisation literature. This section provides an analytical categorisation of the current literature in the form of a content analysis of the first product and new product commercialisation literature in terms of theoretical perspective, type of the product, type of the firm and the context of the study. This categorisation is based on a thorough literature review of articles from a number of A, A* and B level business and management journals. The selection of journals to source papers was based on the ABDC (Australian Business Dean Council) journal quality list which included four tiers of quality rating including A*, A, B and C. A* and A tiers represent the highest quality level among the tiers and are equivalent to 4* and 3* tiers in the UK journal ranking system. In this regard journals such as Industrial Marketing Management, Journal of World Business, Management Decision, Journal of Business Venturing, Marketing Research, Strategic Marketing, Strategic Management Journal and Research policy were used for this analysis.

A four-step systematic procedure was employed to select the papers related to the focus of this research. First, scholarly portals such as Elsevier, ABI/inform and Google scholar were used to search for the list of papers. Given the focus of the research, keywords including “new

product commercialisation” , “first product performance” , “technology capabilities” , “product innovation capabilities” , “marketing capabilities” , “technology resources” , “marketing resources” , “product innovation resources”, “NTV” and “NTBF” were used. Second, articles from C level journals were removed. Third, as outlined in Chapter One, the focus of the study is on the extent that different asset exploitation mechanisms (e.g., resource-capability complementarity) and contingency factors can contribute to first product commercialisation in terms of generating first product positional advantages. Hence the selected paper (1) should have new product or first product performance or aspects of product performance as a dependent variable, (2) a paper must have product focused resources and capabilities as the constructs linked to performance or product-related positional advantages leading to performance and (3) RBT should be used as the theory basis. Fourth, of the selected papers no articles were removed. Using the four selection criterion 23 papers were identified for analysis. Table 2.1 depicts the identified papers and categorises them based on the conceptualisation of marketing and technology assets and their exploitation mechanisms (e.g., in the form complementarity in each product functional area or cross-functionally).

Table 2.1 Literature focusing on product-related assets and their impact on new product outcomes

<u>Author and Year</u>	<u>Dependent variable</u>	<u>Product focused assets</u>	<u>Deployment / exploitation mechanism articulation</u>	<u>Hypotheses result</u>	<u>Sample size</u>	<u>Industry Type</u>	<u>Context</u>	<u>Type of Product studied</u>	<u>Type of the firm</u>
Eng and Spickett-Jones (2009)	Upgrading performance of manufacturers (number of product release success)	Marketing Capabilities: bundles of skills and knowledge to undertake marketing activities in pricing, selling, planning, communication and implementation.	Capability-based view	Supported	268	Electronics manufactures	China and Hong Kong	New product	On-going-small-medium size firms
Nath, Nachiappan, and Ramanathan (2010)	Firm performance (profitability from selling and delivering products and services)	Marketing capability: the integrative process, in which a firm uses its tangible and intangible resources to understand complex consumer specific needs, achieve product differentiation relative to competition, and achieve superior brand equity Operation capability: the integration of a complex set of tasks performed by a firm to enhance its output through the most efficient use of its production capabilities, technology, and flow of materials	Resources leading to capability	Both supported	102	Logistics	UK	New Product	On-going and established large organisations
Parnell (2011)	Business performance (sales and market share)	Marketing capabilities: integrated skills and knowledge to undertake and coordinate 4ps activities. Technology capabilities: overall firm abilities in product and technology development.	Capability-based view	Both supported	576	Retailers	Argentina, Perue and USA	Products and services	On-going firms
Deeds, Decarolis, and Coombs (1999)	New product development (number of new products)	R & D capabilities: the skills and expertise of a firm's research scientists may be viewed as a bundle of intangible and valuable resources which accumulate over time.	Capability-based view	supported	106	High tech industry: Biotechnology firms	US	New product	NTVs

<u>Author and Year</u>	<u>Dependent variable</u>	<u>Product focused assets</u>	<u>Deployment / exploitation mechanism articulation</u>	<u>Hypotheses result</u>	<u>Sample size</u>	<u>Industry Type</u>	<u>Context</u>	<u>Type of Product studied</u>	<u>Type of the firm</u>
Song and Parry (1997)	Product competitive advantages (proficiency, market intelligence),	Marketing resources and skills (marketing synergy) Technical resources and skills (technical synergy)	Combination of resources and capabilities at the product level	Both supported	792	Manufacturing	Japan	New product	On-going firms
Wang et al. (2006)	Customer value and new product development performance	Technological capabilities: ability to develop and design new products and processes and upgrade knowledge about the physical world in unique ways, thus transforming this knowledge into designs and instructions for the creation of desired outcomes.	Capability-based view	supported	248	High tech	China	New product	On-going firms
Weerawardena (2003)	Product market competitive advantage (sustained competitive advantage)	Marketing capabilities: as integrative processes designed to apply the collective knowledge, skills, and resources of the firm to the market-related needs of the business, enabling the business to add value to its goods and services and meet competitive demands. Organisational innovation: the application of ideas that are new to the firm, to create added value either directly for the enterprise or indirectly for its customers, whether the newness and added value are embodied in products, processes, services, or in work organization, management or marketing systems.	Capability-based view.	Both supported	326	Manufacturing industry : metal, equipment and machines	A regional area	New product	On-going firms
Yam et al. (2011)	Product and technological innovation performance (sales performance)	Technological innovation capabilities: a comprehensive set of firm characteristics including assets and processes that facilitate that support the firm's technological innovation strategies	Barney's articulation	Supported	200	Manufacturing	Hong Kong	New product	On-going

<u>Author and Year</u>	<u>Dependent variable</u>	<u>Product focused assets</u>	<u>Deployment / exploitation mechanism articulation</u>	<u>Hypotheses result</u>	<u>Sample size</u>	<u>Industry Type</u>	<u>Context</u>	<u>Type of Product studied</u>	<u>Type of the firm</u>
Yoo and Frankwick (2012)	New product development performance (sales, market share, ROI, ROA)	New product development capabilities: a composition of various steps including idea generation, idea screening, technical development, market test, and commercialisation	Barney's articulation	Supported	284	Hi-tech manufacturing	USA	New product	On-going
Li and Zhang (2007)	New technology venture performance	Managerial resources (R & D and marketing experience)	Barney's articulation	Supported	184	High tech	China	New product	NTVs
Lee et al. (2001)	New technology venture performance (number of product-related innovations and patents)	Internal capabilities (Technological capabilities): roots of a firm's sustainable competitive advantage, since the capabilities comprise patents protected by law, technological knowledge, and production skills that are valuable and difficult to imitate by competitor	Barney's articulation	Supported	175	High tech	Korea	New product	NTVs
Song et al. (2011)	First product performance and innovativeness, supplier involvement and timing to the market as positional advantages	Marketing resources (Only the financial aspects) R & D resources (Only the financial aspects) Founding team capabilities level of experience (in R&D and marketing)	Barney's articulation	Supported- except the innovativeness and performance link	711	High tech manufacturing	USA	First product	NTVs

<u>Author and Year</u>	<u>Dependent variable</u>	<u>Product focused assets</u>	<u>Deployment / exploitation mechanism articulation</u>	<u>Hypotheses result</u>	<u>Sample size</u>	<u>Industry Type</u>	<u>Context</u>	<u>Type of Product studied</u>	<u>Type of the firm</u>
Song et al. (2010a)	First product competitive advantage	<p>Skills (distinctive capabilities that set the new venture's personnel apart from competing firms) and resources (tangible requirements that enable a new venture to exercise its capabilities):</p> <p>Marketing resource and skills in sales, pricing, distribution and advertising</p> <p>Technology resources and skills in engineering and R & D</p>	Simultaneous deployment of resources and capabilities (conceptualised as combination)	Supported for technology and not supported for marketing effect	694		China	First product	NTVs
Chen (2009)	Product and technology commercialisation competence	<p>Innovation capability (process and product): firm's capabilities, grounded in the processes, systems, and organizational structure, which can be applicable to the product or process innovation activities.</p> <p>Organisational resources: financial, physical, human, technological, and organizational endowments that allow a company to create value for the customers</p>	Simultaneous deployment of resources and capabilities	Both supported	122	High tech	Taiwan	New product	NTVs
Moorman and Slotegraaf (1999)	New product development performance	<p>Product marketing capabilities: firm's ability to develop and maintain relationships with customers, including both end users and channel members.</p> <p>Product technology capabilities: firm's technological ability to formulate and develop new products and related processes.</p>	Capabilities complementarity	Supported	132 brands	Manufacturing		New product	On-going organisations

<u>Author and Year</u>	<u>Dependent variable</u>	<u>Product focused assets</u>	<u>Deployment / exploitation mechanism articulation</u>	<u>Hypotheses result</u>	<u>Sample size</u>	<u>Industry Type</u>	<u>Context</u>	<u>Type of Product studied</u>	<u>Type of the firm</u>
Slotegraaf et al. (2003)	Firm performance	Firm resources : intangible marketing resources, intangible technological resources, and financial resources) Market deployment : as the degree of action directed toward managing organizational resources in the marketplace	Resource-Capability complementarity (complementarity between the resources and their associated deployment processes)	Supported			USA		On-going
Song et al. (2005)	Firm performance	Marketing- related resources & Technology-related resources bundles of skills and accumulated knowledge, exercised through organizational processes,	Resources complementarity (interaction effect)	Supported	466		USA	Product	On-going (joint ventures)
Newbert (2008)	Financial and product related Competitive advantages	Financial, organisational, human and physical resources- capabilities combination.	Rareness and value of the combination of resources and capabilities (using Amit and Schoemaker conceptualisation)	Supported	117		USA		On-going

<u>Author and Year</u>	<u>Dependent variable</u>	<u>Product focused assets</u>	<u>Deployment / exploitation mechanism articulation</u>	<u>Hypotheses result</u>	<u>Sample size</u>	<u>Industry Type</u>	<u>Context</u>	<u>Type of Product studied</u>	<u>Type of the firm</u>
O'Cass and Sok (2012)	Product-related and customer- centric performance	<p>Marketing capabilities: bundles of interrelated routines firms engage in specified marketing related activities in areas such as pricing, product, distribution, marketing communication, selling and marketing planning relative to their competitors</p> <p>Innovation capabilities: the bundles of interrelated routines firms have in place for undertaking innovation-related activities such as developing new products, extending product ranges and improving existing product quality</p> <p>Marketing resources: including assets such as firm reputation, product reputation, customer service reputation and financial resources allocated for marketing purposes</p> <p>Innovation resources: including assets such as product or technology licences, technology, financial resources allocated for innovation purposes</p>	Complementarity between resources and capabilities in each domain/space	Supported	171	Manufacturing B2B firms	Cambodia	New product	On-going

<u>Author and Year</u>	<u>Dependent variable</u>	<u>Product focused assets</u>	<u>Deployment / exploitation mechanism articulation</u>	<u>Hypotheses result</u>	<u>Sample size</u>	<u>Industry Type</u>	<u>Context</u>	<u>Type of Product studied</u>	<u>Type of the firm</u>
Ngo and O'Cass (2012b)	Innovation-related performance (number of products, new markets, product uniqueness and product quality)	Marketing capabilities: firm's interrelated organizational routines for performing marketing activities such as product, pricing, channel management, marketing communications, marketing planning, and marketing implementation Innovation capabilities: represents a firm's ability to develop new solutions to satisfy customers' current and future needs	Complementarity between the product focused capabilities	Supported	163	Manufacturing and service firms		New product	On-going
DeSarbo et al. (2006)	Firm performance	Marketing capabilities & Technology capabilities: Complex bundles of knowledge and skills employed to undertake marketing, product development and technology development capabilities.	Capability-based view	Supported	216	High tech manufacturing	USA	New product	On-going
Vorhies et al. (2009)	Market effectiveness and Cash flow	Marketing capabilities at two levels : Architectural and specialised	Capability-based view	Supported	287	Motor carrier industry	USA	New product	On-going firms
Gruber et al. (2010)	Department performance and overall firm performance (new products developed)	Sales and distribution management capabilities and resources	Configurations of resources and capabilities interrelated in with product-related functional area	Supported	200	High tech	Germany	New products and services	NTVs

Table 2.1 summarises research focusing on the impact of product development and marketing assets in established firms and NTVs and their contribution to new product commercialisation. Amongst the selected studies in Table 2.1, most of the focus has been on new product commercialisation on on-going organisations with established product development processes (e.g., Song & Parry, 1997; Weerawardena, 2003; Eng & Spickett-Jones, 2009; Nath et al., 2010; Parnell, 2011; O’Cass & Sok, 2012), while first product commercialisation has been empirically studied only in few studies (e.g., Song et al., 2010a; Song et al., 2011). Further, those studies such as Deeds et al (1999), Lee et al. (2001), Chen (2009) and Gruber et al. (2010) which concentrate on new product commercialisation in NTVs haven’t specifically examined the antecedents of first product success, while this event has been theoretically highlighted as an imperative event for NTV’s development and growth.

As outlined in Table 2.1, most studies in new product commercialisation, have been conducted in developed economies such as USA (e.g., Deeds et al., 1999; Slotegraaf et al., 2003; Song et al., 2005; DeSarbo et al., 2006; Newbert, 2008; Yoo & Frankwick, 2012) , Germany (Gruber et al., 2010), UK (Nath et al., 2010), Taiwan (Chen, 2009) and Japan (Song & Parry, 1997), with only a limited number in emerging economy settings (e.g., Wang et al., 2006; Chen, 2009; Song et al., 2010a). The importance of BRICS economies has risen to prominence because they are becoming major economic powers (Siqueira & Bruton, 2010). Economists have predicted that within the next 40 years, these economies and other emerging economies will become stronger than the group of six countries including the United States, Germany, Japan, United Kingdom, Italy, and France (Wilson & Purushothaman, 2003).

Further, as shown in Table 2.1 research on NTV success in Brazil, Russia, and India (Bruton et al., 2008) is limited, with the primary attention being given to Chinese NTVs. Table 2.1 shows that China has received the majority of attention among the emerging economies in the context of NTVs and new product development / new product innovation management (e.g., Wang et al., 2006; Li & Zhang, 2007; Eng & Spickett-Jones, 2009; Song et al., 2010a). Other

emerging economies such as India have received much less attention (Bruton et al., 2008). Despite some economic and cultural commonalities, environmental/institutional infrastructure differences among emerging economies require a national context when studying entrepreneurial processes such as first product commercialisation in emerging economies (Lau & Bruton, 2011).

It is argued by many scholars that researchers should not assume that findings in a developed economy would be equally applicable in an emerging economy (Peng & Lou, 2003; Bruton et al., 2008). The dynamism and complexity of emerging economies environment means that new ventures encounter the challenges of new competitors as well as collapsing institutional infrastructures (Atuahene-Gima et al., 2006). Ahlstrom and Bruton (2006) raise an argument that emerging economies are in the process of experiencing fundamental and complete institutional makeovers as their economies start to mature and develop. Further, new ventures in emerging economies are much more constrained by resources than those in developed nations (Lee et al., 2001; Li & Zhang, 2007; Acquaah, 2007). The institutional configuration of emerging economies is also characterized by high levels of turbulence and complexity for new technology ventures (Li & Atuahene-Gima, 2001; Li & Zhang, 2007; Lau & Bruton, 2011). Therefore, what is known from developed economies may not readily apply to entrepreneurship in emerging economies and there is only limited empirical research directly on these environments (Bruton, 2010). Thus, there is a need to better understand issues associated with entrepreneurship in emerging economies especially in relation to NTVs as major actors in economic growth (Bruton et al., 2008).

2.2.1 Antecedents of first product success

Despite the considerable attention devoted to enhance understanding about product level resource and capability deployments, new product and specifically first product success literature lacks more holistic theoretical models. In fact, current literature lacks models which

effectively integrate the benefits of all the identified theoretical perspectives in the domain of asset exploitation research to provide more insights on how the first product success in NTVs can be achieved. According to Chapter One, first product commercialisation has been theoretically identified as the most significant entrepreneurial event for a NTV with its performance considered a predictive antecedent for the new venture's future potential for growth and development (Schoonhoven et al., 1990). In their meta-analysis of the performance drivers of NTV's, Song et al. (2008) propose a conceptual framework for success antecedents in NTVs in the domain of new product commercialisation. Constructs that create Song et al. (2008) conceptual model are entrepreneurial opportunities, entrepreneurial team, entrepreneurial resources, and strategic - organizational fit and NTV performance. Song et al.'s meta-analysis proposes eight major predictors as determinants to a NTV's new product success which are suggested to be involved as factors impacting first product success (Song et al., 2011) for further empirical research. The eight factors include: (1) supply chain integration; (2) market scope; (3) firm age; (4) size of founding team; (5) marketing and R &D resources; (6) marketing experience (i.e. founder's capability); (7) industry experience; and (8) patent protection. However, the proposed model by Song et al. (2008) does not indicate how product focused assets such as marketing and R&D can be translated to improved first product performance. Further, literature analysis indicates the lack of attention towards examining effective asset exploitation mechanisms for first product commercialisation.

The first study on the first product was done by Schoonhoven et al. (1990) who explored the speed by which a new venture introduces its first product to the market. While this research has identified several antecedents, it had several shortcomings reported by the authors. First, the sample is limited to the semiconductor industry, and the authors have argued about the importance of generalizing the findings to other industries. Second, conclusions about financial resources and entrepreneurs have been inconsistent with findings in the literature. Third, study has excluded the impact of suppliers and customers (Song & Di Benedetto, 2008),

entrepreneurial attributes (Ireland et al., 2003) and other important product attributes, such as product characteristics, production, product launch, and the most important outcome—product market performance.

As outlined in Table 2.1, Song et al. (2010a), building on Day and Wensley's SPP (source of advantage-positional advantage-performance) model, find positive relationships between technology-based resources and skills, and product differentiation positional advantage with first product performance. They explored the role of capabilities (i.e. skills) of top management teams to manage and undertake technology and marketing-related activities and exercise the resources in the first product project. However their findings did not provide any support for marketing assets influence on first product positional advantage which is in contrast with most of other studies focusing on on-going organisations with established product related processes (see Table 2.1). Although they incorporate both resources and capabilities at the product level, however their work does not address the inter-relation between the resources and capabilities in first product commercialisation process and does not clearly define the exploitation mechanisms for first product success. The way resources are conceptualised and measured is quite vague and does not provide a clear distinction with the level of skills (as capability) measure in the study. Furthermore, drawing on lack of resources as the inputs for first product commercialisation process, it is expected that entrepreneur's pursue cost efficiency strategies (which is neglected) simultaneously with product differentiation to be able to avoid risks. Thus, the study conducted by Song et al. (2010a) does not address the potential tendencies towards cost efficiency in first product commercialisation.

As shown in Table 2.1, Song et al. (2011), tested a model which incorporates marketing and R&D financial resources as sources of advantage and found that first launch quality and supplier involvement (as first product positional advantages) improves first product performance. However they did not find innovativeness as an important factor in increasing first product performance. First, the study does not address whether higher performance of the first

product could be a driver to a new venture's overall growth. Second, the role of resource exploitation processes as capabilities were not clearly articulated and how they interact with product level resources. Third, the study only examines the impact of financial resources in terms of available budget for developing and marketing of the first product while the role of other resources such as market knowledge and physical resources is neglected in the theoretical framework. Fourth, as also addressed by the authors themselves, other aspects of product advantage rather than innovativeness have not been involved in the theoretical model.

As outlined in Table 2.1, three streams of research can be identified, and which adopt different theoretical views in relation to product level (marketing and technology) resource and capability conceptualisation and their engagement strategies. In the first stream, scholars examine the influence of marketing and technology resources (including capabilities) by building on the unique (VRIN) characteristics criteria (Barney, 1991; Crook, Ketchen, Combs, & Todd, 2008) portraying the bundles of resources (including capabilities) as source of product advantage and improved product performance (e.g., Lee et al., 2001; Kotabe, Jiang, & Murray, 2011). In the second stream scholars examine the outcomes obtained by product-related resource deployment processes and skills (i.e. marketing and technology capabilities) which underscore the individual influence of firm capabilities (DeSarbo, Di Benedetto, Song, & Sinha, 2005; DeSarbo et al., 2006) in new product success (e.g., Vorhies et al., 2009; Kim & Atuahene-Gima, 2010). In the third and less empirically examined stream, researchers advance the focus to the combination of synergic product focused resources and capabilities (Slotegraaf et al., 2003; Newbert, 2008; Ngo & O'Cass, 2012a) and combination of capabilities across product focused functional areas (Slotegraaf & Moorman, 1999; Morgan, Slotegraaf, & Vorhies, 2009; Ngo & O'Cass, 2012b) as the antecedents of product-related performance and a factor in enhancing firm efficiency and effectiveness.

2.2.2 Product Level Resources (first stream)

As indicated in Table 2.1, the first stream of research uses Barney's (1991) articulation for asset exploitation. The first stream emphasises the role of product-related resources (e.g., marketing, R&D financial resources, and market knowledge) and their dedication (Penrose, 1959; Wernerfelt, 1984) that could potentially lead to the generation of product positional advantages for the firm (e.g., Li & Zhang, 2007; Song, et al., 2011). This stream of work (see Barney, 1991; Crook et al., 2008) asserting that marketing and technology resources (i.e. capabilities), which meet VRIN (valuable, rare, inimitable and non-substitutable) criteria, have the potential to generate new product positional advantages. As outlined in Table 2.1 studies such as Lee et al. (2001), Li and Zhang (2007), Song et al. (2005), Yam et al. (2011), and Yoo and Frankwick, (2012) have adopted Barney's articulation in the context of new and first product commercialisation which does not provide a clear distinction between product level resources and capabilities .

Lee et al. (2001), Li and Zhang (2007), Song et al. (2005), Yam et al. (2011), and Yoo and Frankwick, (2012) argue that product level resources comprise all assets, capabilities, organisational processes, information, knowledge, firm attributes, etc. controlled by a firm to be able to conceive and implement strategies. According to Table 2.1, findings of these studies provide support for influence of technology related and product development resources (i.e. capabilities) on financial and non-financial aspects of firm performance. This view explains that for marketing and technology resources (i.e. capabilities) to be a source of positional advantage they first must be valuable in a sense that they enable the firm to exploit opportunities and /or neutralize threats in the business environment. Second, Barney's view implies that product-related resources must be rare among the company's existing and potential competitors. Third, they ought to resist imitation by existing and potential competitors and fourth they should not have more suitable substitutes (see also Fahy, 2000). Therefore, possessing these valuable, rare, non-imitable resources is a source for positional advantage (see Barney, 1991; Fahy, 2000).

2.2.3 Capabilities ‘contribution to commercialisation process (second stream)

In contrast to those who build on Barney’s view, another perspective suggested by RBT scholars such as Grant (1991), Amit and Schoemaker (1993), Miller and Shamsie (1996) and Makadok, (2001) considers a more distinct functionality for product-related resources. These scholars conceptualise resources as stocks of available factors that are owned by the firm (including new ventures) across product-related functional areas. Scholars who advocate this view identify two categories of product level resources which include tangible resources as quantifiable and observable; and intangible resources (Capron & Hulland, 1999). Table 2.1, for example, shows a range of work focusing of resources. For example, Newbert (2008) extending the same perspective articulates distinct roles for product level resources and capabilities as processes for resource exploitation. In this sense, Newbert (2008) categorises resources as knowledge (e.g., knowledge about market) physical (e.g., machinery), human capital, financial capital, relational, and organisational needed to be used by firm’s capabilities. Following the same approach, scholars such as DeSarbo et al. (2006), Chen (2009), Gruber et al. (2010) and Song et al. (2010a) adopt the view that resources exist to be used and exploited as inputs for the marketing and technology capabilities of the first and new product.

2.2.3.1 Resources exploited by capabilities for commercialisation

Literature review shows that information and intelligence has been categorised into two general categories: (1) market knowledge and (2) technological knowledge in marketing and new product development literature. Jaworski and Kohli (1993) view market knowledge as a key marketing tacit resource. More specifically scholars categorise this type of knowledge into four areas: knowledge about customers, channel members, competitors and regulations (Song et al., 2010a; Morgan, 2012). Marketing scholars extend this conceptualisation and introduce market knowledge as a significant raw material for marketing capabilities such as selling pricing,

advertising, and marketing planning (e.g., Day 1994; Morgan et al. 2009, Song, Wang, & Parry, 2010c) and market-related decision-makings.

Market knowledge is characterised in the marketing literature in two major ways. One view focuses on the level of acquired knowledge about competitor actions, customers taste and market trends (see Gruber et al. (2010) and Song et al. (2010a) from Table 2.1). In a more in depth analysis scholars focus on the dimension and characteristics of market knowledge in relation to competitors' strategies and customers (De Luca & Atuahene-Gima, 2007) in enhancing the effectiveness of knowledge integration mechanisms and product innovation performance. Works on this stream of research introduce four main dimensions for market knowledge including (1) breadth, (2) depth, (3) tacitness, and (4) specificity. Breadth is defined as the number of diverse knowledge fields with which the firm is affiliated (Bierly & Chakrabarti, 1996). Zahra, Ireland, and Hitt (2000) define "Market knowledge breadth" firm's understanding of a wide range of diverse customer and competitor types and factors that describe them. Market knowledge depth reflects the level of complexity of a firm understands of its competitors' strategies and customers. It actually captures the level of complexity by which the venture can link the interdependent connections among the factors that define important issues about customers and competitors' behaviours (De Luca & Atuahene-Gima, 2007). "Market knowledge tacitness" represents the extent that market knowledge is not obvious but relatively is hard to be coded and communicate (e.g., Nonaka, 1994). And finally "Market knowledge specificity" determines how much the firm's knowledge is adapted to the requirements of particular contexts in which it is outstandingly usable but may lose its functionality in other contexts (Rodan & Galunic, 1998).

In the domain of new product commercialisation, physical resources (e.g., Newbert, 2008) are often recognised as resources related to both marketing and R&D manufacturing (Day & Wensley 1988; Hunt & Morgan 1995; McKelvie & Davidsson, 2009) exploited by product related capabilities. Within the literature different types of physical resources are identified

across service and product focused areas. For example, the services marketing literature underscores the role of tangible service-related facilities in affecting customer perceptions of service outcomes (e.g., Bitner, 1992). In the context of R&D and technology-oriented firms, the importance of machinery and production plant has been highlighted in the successful implementation of the innovation strategies (Zahra & Bogner, 2000).

Analysis on the literature shows that scholars such as Gruber et al. (2010) and Song et al. (2011) emphasize the accumulation and injection of financial resources to commercialisation processes for new and first product commercialisation activities. They discuss that access to an adequate budget is vital in determining a firm's aptitude to successfully be involved in product related activities (Morgan, 2012). This is supported by research such as the ones linking the exploitation of financial resources on marketing functions like advertising to aspects of firm performance (e.g., McAlister, Srinivasan, & Kim, 2007).

2.2.3.2 Emergence of Capability-based view

Second stream is consistent with RBT's advancements as scholars argue that tautological view of using the RBT theory observed to be inconclusive (Priem & Butler, 2001; Sheehan & Foss, 2007). Most notably, Priem and Butler (2001) put forward an argument much of the later literature-including the new product commercialisation has been static in the way they conceptualise exploitation mechanism for product level assets. They contend that in Barney's interpretation of the RBT, the processes through which particular resources provide positional advantage remain a black box (Sirmon et al., 2007; Vorhies et al., 2009) and there is a need to shift from considering simple link of product level resources and capabilities and performance criteria (Ketchen, Hult, & Slater, 2007). In relation to the missing link between resource custody and resource deployment, Mahoney and Pandian (1992) initially argue that firms might generate wealth not because of having better resources, but rather the firm's distinctive capabilities involves making better use of its resources. They also suggest that organisations that

make the best use of their resources are those that allocate them in such a way that their productivity and or financial outcome are maximized. Similar arguments are made by Peteraf and other scholars, who contended that to confer a product market positional advantage to a given firm, its bundles of valuable product level resources must be accurately leveraged (Peteraf, 1993) or managed (Henderson & Cockburn, 1994). In line with this view Ketchen et al. (2007) argue that resources have potential value and capabilities are needed to effectively use and integrate them to generate market positional advantage.

As a result, some argue that merely possessing the product level resources that meet Barney's criteria despite its benefits, cannot fully guarantee the achievement of positional advantage (Barney & Arikan, 2001; Priem & Butler, 2001; Sirmon et al., 2007). Despite the contributions of the capability-based view, Newbert (2007) in his meta-analysis on RBT argues that only half of the hypotheses tested in studies based on the capability-based view have been supported. This has led marketing and product development scholars to assert that more understanding is required regarding how organisational capabilities and in particular product level capabilities operate in the context of new product commercialisation (Morgan et al., 2009; Ngo & O'Cass, 2012b).

Scholars such as Srivastava, Fahy and Christensen (2001), Gruber et al. (2010), and Sirmon et al. (2007), assert that RBT is gradually shifting the consideration of key resources beyond the classical enquiry of which a firm has unique resources to include how these resources are exploited. As outlined in Table 2.1, scholars such as Deeds et al. (1999), Weerawardena (2003), DeSarbo et al. (2006), Wang et al. (2006), Vorhies et al. (2009) and Eng and Spickett-Jones (2009) argue that while having product level resources meeting VRIN criteria may be beneficial; firms also need complementary operational capabilities to exploit product level resources in a way to meet the market conditions and generate product-related positional advantages. As indicated in Table 2.1, findings of all the mentioned studies provide support for the role of marketing and technology capabilities in enhancing product related

performance. However few of them such as DeSarbo et al. (2006) have involved the simultaneous effect of marketing and product development capabilities. In this stream of research Morgan et al. (2009) adopts a different view and introduce product development as a sub-function of marketing organisation of entities. As a consequence, the second theme recognises a distinctive role for marketing and technology capabilities. What is referred to by some as the capability-based view (Barney & Mackey, 2005) provides a different view and underscores that the processes and actions (i.e. capabilities) by which new product resources are employed and converted into value creating offerings (such as a first product) are the main sources for better product performance and enhance new product performance.

Advocates of this view assert that a firm's ability to deploy and exploit resources via capabilities is more significant than absolute resource levels in driving performance (e.g., DeSarbo et al., 2006). This view stresses the role of capabilities in developing product positional advantages (Slotegraaf et al., 2003; Nath et al., 2010). The same line of thought can be seen in the context of NTVs and product/technology commercialisation as Chen (2009) (Table 2.1) addresses the determinant role of technological capabilities as the major driver of product and NTV's overall performance. However, in some studies focusing on first product commercialisation (Song et al., 2010a; Song et al., 2011), founders' skills and experience have been scrutinised as antecedent to first product outcome which does not fully reflect the impact of processes and the ability of all the members in enhancing first product commercialisation activities.

Within the RBT literature, scholars conceptualise product level capabilities in different ways. Grant (1996) and Zott (2003) define capabilities as a collection of operating routines which are employed in the process of new and or first product commercialisation. They specifically identify routines as regular patterns of activities (such as product-related activities) including a sequence of coordinated actions by the members of the firm to respond to variegated, external or internal stimuli (e.g., Sok & O'Cass, 2011). By adopting a different perspective

scholars such as Day (1994) and Atuahene-Gima (2005) characterise product related capabilities as knowledge, skills, and related routines that constitute a firm's ability to create and deliver new product. Further some scholars have tried to link the function of resources with capabilities in the domain of new product commercialisation. DeSarbo et al (2005; 2006), Vorhies et al. (2009), Helfat and Peteraf (2003) and Parnell (2011) characterise product related capabilities as bundles of skills, knowledge and related processes to deploy associated product level resources to coordinate and undertake product-related activities. Considering the various views on defining and measuring product level capabilities, the last characterisation seems to be the most comprehensive one involving all aspects of capabilities. However, it is in contrast with the view which portrays knowledge as a resource and as an input to be exploited by other capabilities. In the recent study by Song et al. (2010a) focusing on first product commercialisation, knowledge has been involved and measured separately from skills and resources as an asset used by founders in developing and marketing of the first product.

Analysis on the literature shows that different types of capabilities have been identified and addressed as sources of product positional advantages. Capabilities such as marketing (Vorhies & Morgan, 2005), technology (Lee et al., 2001; DeSarbo et al., 2006), information technology (Day, 1994; Bharadwaj, 2000), managerial capabilities (DeSarbo et al., 2006), and human resource capabilities are identified as the key capabilities enhancing the new product commercialisation. However, in the context of technology-oriented firms' commercialisation, while technology is identified as a vital element to product development, technology-related capabilities and marketing-related capabilities have received significant attentions (see Table 2.1: DeSarbo et al., 2006; Song et al., 2005; Song et al., 2010a).

Reviewing the literature (Table 2.1) shows that scholars in the new product commercialisation domain define marketing-related capabilities in different ways based on the functions and type of marketing-related activities. For example, in research by DeSarbo et al. (2006) and Song et al. (2005), marketing capabilities have been characterised and measured

based on the marketing mix functions including promotion, price, place and product positioning. In the same stream of research a separate marketing-related capability is identified with function of maintaining and establishing effective relationship with customers, distribution channels and suppliers, labelled as marketing linking capabilities. The same view in conceptualising marketing capabilities has been adopted in the first product literature by Song et al. (2010a) but they have defined the capability at the founder level because of the small size of the new ventures. Nevertheless the more comprehensive operationalization for marketing capabilities by Morgan (2012) and Vorhies and Morgan (2005) is extensively adopted by scholars in new product development and marketing research (e.g., Morgan et al., 2009; Vorhies et al., 2009; Vorhies, Orr, & Bush, 2011).

They define marketing-related capabilities as bundles of knowledge, skills and related processes to undertake marketing planning, sales, pricing, communication, product launch and market linking. Scholars define planning as activities such as market segmentation, studying customers and rivals, market targeting, and foreseeing needed value propositions (e.g., Menon, Bharadwaj, Adidam, & Edison, 1999). According to Brown, Cron and Slocum (1998) selling contains the abilities of employees involved in selling tasks. It includes identifying customer requirements, offering information, and interacting with both current and potential customers. Also selling concerns the systems needed to facilitate effectual and effective supervision of the sales staff (Challagalla & Shervani, 1996). Pricing has been identified as an important element of the new product proposed to customers (Vorhies & Morgan, 2005; Morgan, 2012). It is argued that price can affect both the (1) cost and (2) perceived quality and the ability to manage pricing is so vital in commercialising the product (Morgan, 2012). Communications concerns essential marketing-related tasks including promotion and advertising, public relations, and corporate image management (Vorhies & Morgan, 2005).

DeSarbo et al. (2006) find market linking as the skills to efficiently and effectively manage relationships with channel members (e.g., suppliers and distributors) and has been

identified as a vital marketing-related capability and supportive in product-related processes (Song & Di Benedetto, 2008) in new ventures. Literature contends that it is associated with the efforts to support channel members and establishing and maintaining mutually beneficial relationships (Anderson & Narus, 1990). More importantly, some scholars argue that market linking contains the ability to detect customers and prospects, commence and retain relationships with them, and translate these relationships into profits for the firm (Reinartz, Krafft, & Hoyer, 2004). Vorhies and Morgan (2005) and Greenley and Oktemgil (1997) contend that products launch is an important function in the product management activities includes the process of adapting, maintaining, and communicating product offerings to satisfy customer needs. It is noted that to be effective and efficient, product launch efforts concentrate on understanding the needs of the targeted segments (e.g., Dickson & Ginter, 1987).

Scholars have used different labels to characterise the capabilities associated with product development. Some have integrated the functions of research and development with manufacturing to collectively measure product development capabilities (Moorman & Slotegraaf, 1999). Further those who focus on technology-oriented firms such as NTVs, use the term technology-related capabilities as the ability of a firm to create impactful innovations in terms of market-creating and breakthrough products (Moorman & Slotegraaf, 1999; Lee et al., 2001). They include activities that engage in idea generation, designing, realising, using, adapting, transforming and developing new technologies and products (Wong, 1995). These activities are done through different capabilities within the product development (convergence of R&D and manufacturing functional) area (Dutta et al., 1999). Within the literature of new product commercialisation technology-related capabilities consist of the abilities in new product/technology design, engineering, formulation, development, manufacturing processes, forecasting technological changes and quality control (Moorman and Slotegraaf, 1999; Lee et al., 2001; Song et al., 2005; DeSarbo et al., 2006).

2.3 Simultaneous deployment of product level assets (third stream)

As indicated in Table 2.1, the third and less empirically tested theme of research advances the previous two views by addressing the inter-relation between the resources and capabilities within product-related functional areas (e.g., Ngo & O’Cass, 2012a). This recently emerged perspective suggests that both product-related resources and capabilities can be significant (Chen, 2009; Song et al., 2010a) in attaining superior product performance (Sok & O’Cass, 2012) and they have to be employed in combinations such as complementary attributes (Milgrom & Roberts, 1990; 1995). Newbert (2008) extends this work by suggesting that resources and capabilities are more effectively deployed in synergistic combinations and must interact effectively. Synergy in this context denotes an objective gain in performance that is attributable to group interaction of assets (Bharadwaj, 2000; Song et al., 2005). Hence some scholars involve the notion of complementarity and fit between the resources and capabilities in each functional area (Morgan, Kaleka, & Katsikeas, 2004; Slotegraaf et al., 2003; O’Cass & Sok, 2011) by building on a premise that the strength or weakness in one (resource or capability) could affect the value of the other (Moorman & Slotegraaf, 1999) which consequently impacts the level of efficiency and effectiveness of the firm. The notion of complementarity is about “fit”. It is an outcome of the contingency theory implications (Whittington, Pettigrew, Peck, Fenton, & Conyon, 1999). Contingency theory deliberates performance as dependent on the fit or alignment between organizational variables (Schoonhoven, 1981).

It is argued that complementarity enables scholars to explore the specified theoretical relationship among the distinct organizational practices which are considered to be mutually independent (Huang et al. 2004) and are often conceptualized as pair-wise co-alignment (Venkatraman & Prescott, 1990). So based on this perspective scholars conclude that resources and capabilities in each functional area of the firm must effectively create synergy and support one another (Slotegraaf et al., 2003; Ngo & O’Cass, 2012a) to increase efficiency and effectiveness and make it hard for rivals to duplicate. Building on the notion of

complementarity some scholars extend this view by investigating the influence of complementarity between cross-functional capabilities such as innovation - marketing and technology - marketing and their influence on customer and product-related performance (Moorman & Slotegraaf, 1999; Ngo & O'Cass, 2012b). This group by building on the significance of capabilities contribution (similar to capability-based view) to the commercialisation process contend that the cross functional complementarity is the major determinant of new product outcomes.

Consistent with the above perspectives, a stream in strategic management and RBT contends that both resources and capabilities should be deployed simultaneously across the value chain to undertake manufacturing and marketing activities and to generate and sustain positional advantages (Miller & Shamsie, 1996; Priem & Butler, 2001; Gruber et al., 2010). In congruence with this premise some RBT scholars have clearly identified the distinctive functionality of resources and capabilities (Grant, 1991; Amit & Schoemaker, 1993), and asserted that these two attributes are highly related to each other as resources are static factors and need to be employed by the capabilities to enable firm develop and market a value offering (Amit & Schoemaker, 1993). As a result, scholars drew attention towards depicting the mechanisms (including both resources and capabilities) for positional advantage generation that should be empirically scrutinised in further studies (Priem & Butler, 2001).

A group of scholars applied the configuration theory in conjunction with RBT to explore how firms develop positional advantage (Gruber et al., 2010). This theory suggests that meaning is the outcome of the dynamic interplay among individual elements and the whole of any organization (Meyer, Tsui, & Hinnings, 1993). Further, configuration signifies inter-dependent elements (e.g., cultures, processes, structures, leadership and strategies) inside or outside the organization that work together within a unifying theme to achieve organisational objectives (Meyer et al. 1993; Vorhies & Morgan, 2003). Advocates of configuration theory argue that it

can offer insights that would be unachievable or at least would be out of the scope of research that concentrate only on the effects of individual elements (Fiss, 2007; Gruber et al., 2010).

Configuration theory conceptualizes organisational attributes such as product-related resources and capabilities as inter-related members of a unified system (Fiss, 2007). This view in studying the interdependence and interplay among the organisational attributes (such as resources and capabilities) provides a more holistic understanding as each element is associated to all the elements in the system of activities (Miller, 1996; Wiklund & Shepherd, 2005). The work by Gruber et al. (2010) is among a very few studies which examined inter-related resources and capabilities of a specific functional area (sales and distribution) associated with product marketing in the NTV context. By applying the RBT and configuration theory, authors identify clusters of resources and capabilities, which reflect the degree of a firm's emphasis on each of inter-related elements (resources and capabilities). However, according to authors (Gruber et al., 2010), their study suffers from significant limitations in some areas. First, it is limited to a developed context and the specific group of technology ventures in Germany. Second, the implications are limited to a single functional area by considering specialised capabilities and resources in the sales and distribution. Notably, this perspective has not been applied to settings such as new product commercialisation.

2.4 NTVs' challenges in their first product commercialisation

In relation to accumulating and deploying product-related resources and capabilities at the start-up stage, some scholars consider the factors that cause challenges for NTVs during their first product commercialisation. These challenges differentiate NTVs' experiences from established manufacturing firms throughout their first product commercialisation. Stinchcombe (1965), Gruber (2004) and Newbert (2005) categorise the challenges associated with commercialisation in NTVs in three groups: (1) the liability of newness; (2) the liability of smallness; and (3) high levels of environmental turbulence during commercialisation.

The work on the liability of newness underscores the issues with defining and allocating tasks and roles in relation to first product commercialisation activities, which can be associated with high start-up costs in time, inefficiency, and conflict (Lee et al., 2001). Further in this context, scholars address the challenges to create exchange relationships to accumulate complementary product-related assets (Lee et al., 2001; Li & Zhang, 2007). Accordingly researchers raise the issue of lacking the reputation, legitimacy, and experience of established technology firms, and their challenges to communicate among strangers in the business environment (Newbert, 2005; Atuahene-Gima & Murray, 2007). Also Shepherd, Douglas, and Shanley (2000) identify the issue of the increased mortality risk that NTVs encounter in their liability of newness.

The research on liability of smallness focuses on the small size at the start-up phase as well as the limitations in financial resources and employees for first product commercialisation (Song & Di Benedetto, 2008; Song et al., 2011). Those who identify asset limitations as a critical issue affecting the effectiveness of commercialisation argue that most of NTVs face limitations in issues in raising capital. Hence they conclude that resource shortages may make small firms such as NTVs vulnerable due to an inability to survive economic and market turbulence (Gruber, 2004; Song et al., 2008). Further a group of scholars who highlight the issue of liability of smallness discuss the existence of gaps in required product-related skills and processes (i.e. capabilities) due to lower skill diversity and are disadvantaged when competing with larger firms for employees (Delmar & Shane, 2006). In addition, some researchers bring up scarcity of organizational slack in NTVs as a resource that could be used for innovative purposes in new product commercialisation (Gruber, 2004).

As the third challenge, scholars note the issue of high environmental turbulence which increases the level of uncertainty for NTVs especially in emerging economies (Li & Atuahene-Gima, 2001; Atuahene-Gima et al., 2006). They identify two reasons for uncertainty. First, they address the role of economy system which is evolving from centrally controlled economic

systems to market-based economic system (Li & Zhang, 2007). Then in this body of work discusses the government control over market and business policies which slowly decreases while institutional infrastructures are developed to create the regulatory structures for a market-based economy (Li & Zhang, 2007; Acquaaah, 2007). This creates uncertain regulatory, market and technology environments for a NTV in an emerging economy (Li & Atuahene-Gima, 2001). At the same time, the growth and maturity of technology-based industries in emerging markets is raised by scholars (Lau & Bruton, 2011). The life cycle of products, is found relevant with the frequent changes of customer's preferences in technology-based markets (Upadhyay, Jahanyan, & Dan, 2011); and has led to a high level of competitiveness (Li & Atuahene-Gima, 2001; Atuahene-Gima et al., 2006).

2.5 Source of advantage-Positional advantage-Performance: Conceptual model for commercialisation process

While a body of research work has examined the direct link between product level assets and different aspects of performance (Table 2.1), an interest has emerged among product development and marketing scholars to examine how the deployed product development and marketing capabilities resources and capabilities are translated into new product performance (e.g., Song & Parry, 1997; Weerawardena, 2003; Wang et al., 2006; Song et al., 2010a; Song et al., 2011). In this sense scholars made efforts to understand through which mechanisms product level (i.e. marketing and technology-related) resources, capabilities or both influence the product related outcome, first product and new product development. According to literature, the concept of positional advantage was first introduced via the conceptual framework proposed by Day and Wensley (1988). In contrast to source of advantage(S) - positional advantage (P) – performance (P) concept and its application, majority of scholars in the strategic management and new product development literature have used the generic “competitive advantage” term to signify advantages that firms achieve over competitors that consequently enable them to outperform rivals (e.g., Sirmon & Hitt, 2003; Ireland et al., 2003; Sirmon et al., 2007). In this

vein, competitive advantage has been characterised as the greater utility provided by firms via their value offering (i.e. new product) in comparison to the rivals (e.g., Powell, 2001). However, what is sometimes measured as competitive advantage, is superior performance criteria which in reality can be identified as the outcomes from achieving a competitive position in the market (Hult & Ketchen, 2001; Ketchen et al., 2007).

In this regard, Day and Wensley's (1988) work has been adopted by marketing and management scholars to provide a clearer understanding of competitive advantage structure in a new product development context. To describe the essence of advantage seeking behaviours in the firms (including new ventures), Day and Wensley's (1988) argue that strengths and unique traits in capabilities and resources might reflect the capacity of an organisation to do "more" and "better" in product commercialisation in comparison to the competitors. Consistent with the RBT's perspective, Day and Wensley in their source of advantage-positional advantage-performance model which depicts the structure of competitive advantage, note that the mixture of resources and capabilities (as sources of advantage) leads to achievement of positional advantages in the market. And finally scholars argue that positional advantages influence the product market outcomes (Day, 1990; Day & Nedungadi, 1994).

A significant body of work has been developed in the service marketing and new product development literature by building on Day and Wensley's (1988) model. For example, Zhao, Song and Storm (2012) adapted the S-P-P framework for new ventures in service industries and examined an empirical framework studying the relationship between the capabilities of the founding team, positional advantages (service scalability and protectability), and new service venture performance. Atuahene-Gima and Wei (2011) examined the impact of problem-solving capabilities as a source of advantage on product positional advantages (product quality and product advantage) and the influence of positional advantages on new product performance. The SPP framework has been found as an influential tool to help realise how first product improved performance can be attained in new venture (e.g., Song et al., 2010a; Song et al., 2011)

Day and Wensley (1988) and Morgan et al. (2004) argue that product-related positional advantages signify the relative (to alternatives available to customers) value actually proposed to target markets as a result of the firm's commercialisation efforts, and the cost of accomplishing this to the firm. Value proposition involves the selection of the particular product offering (such as the first product) to be delivered into the target market (Slater, 1997). According to Zeithaml (1988), the value of a product (such as the first product) to a customer is the difference between what the customer recognizes as total benefit gained from the product, and perception of the customer about the product's total purchase costs. To create superior value for customers, Day and Wensley (1988) and Porter (1991) contend that firms must exploit their sources of advantage (i.e. product level assets) to obtain a positional advantage (differentiation and cost-efficiency) in comparison to rivals in the market. In investigating new product positional advantages (including first product), practitioners and scholars consider the achievements of the firms in meeting two important objectives; effectiveness and efficiency in the commercialisation process (Harmancioglu et al., 2009). It is theoretically argued that product positional advantage represents a differentiation and or low cost advantage in comparison to the main rivals (Porter, 1991; Langerak, 2003; Atuahene-Gima & Wei, 2011). Scholars argue that cost efficiency can be achieved by performing most operational (i.e. commercialisation) activities in the value chain at a lower cost than rivals. To translate a cost-efficiency advantage into improved product performance, ventures pass their cost advantage on to customers by lowering what the customer notices as the product's total procurement costs, while sustaining necessary profit margins (Narver & Slater, 1990). A firm possess a value-offering differentiation advantage when some value adding features are provided in a way that leads to perceived superiority along benefits that are valued by the buyers.

As part of the SPP concept, literature has seen new product performance to be conceptualised as ultimate outcome of firm (including a new venture) to commercialise a new product successfully (Griffin, 1997). There is a view that any new product performance such as

the first product performance reflects the quality of the project (first product commercialisation) outcome or effectiveness of the launched first product (Mitchel, 2006). According to Wallace, Keil , and Rai (2004), product performance represents the extent of success of the product (such as the first product) in the target market and addresses whether the commercialisation process has led to the delivery of an offer that is attractive, high quality, functional, and reliable. As a result new and first product performance refers to a product's market performance, as indicated in literature by the level of customer-based / non-financial aspects such as customer satisfaction, and financial criteria associated with that specific product in terms of the achievements in sales and profitability (Griffin & Page, 1993; Song & Parry, 1999; Lau et al., 2010). Two perspectives in conceptualising the new product performance have emerged in the extant literature. One group of scholars compare the outcomes gained from commercialisation relative to other major competitors (Griffin & Page, 1997; Langerak, Hultink, & Robben, 2004; Calantone, Kim, Schmidt, & Cavusgil, 2006), and the other group assess the product outcomes based on fulfilling the goals that has been set by the firms in relation to their new products (e.g., Song & Parry, 1999; Lau et al., 2010). The Literature of first product has seen scholars using the profit and sales related aspects as objective items to measure the first product performance (Song et al., 2010a; Song et al., 2011).

In the literature of marketing and new product development, new product performance had been indicated as an important determinant of the organisational performance and or firm overall performance (Griffin, 1997; Langerak et al., 2004). New ventures' performance like any other firm's performance should reflect the ultimate outcomes that result from the function of firm's attributes including strategies, resources, capabilities and positional advantages (such as product-related positional advantages). Firm (including new ventures) performance is recognised as one of the key indicators of firms' achievements in organisational effectiveness, economics and finance. In marketing, management and entrepreneurship literatures, researchers adopt a more narrowed view to conceptualise firms (i.e. new ventures) performance. Literature

has seen that scholars (e.g., Langerak et al., 2004; Richard, Devinney, Yip, & Johnson, 2009) often utilise indices such as financial, market, customer-centric, innovation-centric, shareholders' outcome and growth and development of the business to measure the performance (e.g., Ngo & O'Cass, 2012b). Based on the unique characteristics of the new ventures and in particular NTVs at the start-up stage, the growth and development have been identified as the major concern for both practitioners and scholars while assessing new venture's performance (Gruber et al., 2010; Cavazos, Patel, & Wales, 2011). However, usually when a study tests the influence of different constructs (such as resources and capabilities), the aggregation of different factors that shape the firm performance is recommended.

2.6 Contingency factors for first product commercialisation

Contingency theories demonstrate the significance of alignment or fit among diverse constructs associated with organizations, and explain how the relationship between measures of strategy, resources, capabilities and performance can be moderated by different environmental (e.g., Zahra & Bogner, 2000; De Luca & Atuahene-Gima, 2007) and internal (firm-based) factors. According to Baron and Kenny (1986) moderator refers to a construct that influences the relation between two (or more) other constructs. Dahlgaard-Park (2008) indicates that "organizational effectiveness and efficiency are affected by numerous contingency factors such as size, scale, organizational life cycle, technology, uncertainty, resource dependency, leadership style, organizational culture and organizational structure. Therefore management must be concerned to find out the good fits in relationship with its internal as well as environmental circumstances".

A large body of work in the literature studies the contingency of organizational, managerial and environment factors for differing levels of firm's outcomes in the process of new product commercialisation (e.g., Damanpour, 1996). Much less is known regarding

contingency factors for first product commercialisation by the new ventures. Furthermore, a majority of research works in the product development and product innovation management domains have addressed organizational factors mostly at the corporate or business level (Kotabe & Swan, 1995; Song & Swink, 2007). Considering the current literature of first product success, less attention has been paid towards the product level research and examining other capabilities and resources as contingencies that govern the effectiveness and efficiency of the first product commercialisation process. Moreover, although the recent work by Song et al. (2010a) and Song et al. (2011) address the link between first product assets and first product positional advantage, their research do not address how these influences occur for NTVs. Nor does it address which contingency factors (internal or external) enhance and or impede the examined relationships.

2.6.1 Supplier and customer integration in first product project

RBT and new venture literature have asserted that entrepreneurs as founders of NTVs, follow strategies that concentrate on the accumulation of resources and capabilities and at the same time pursue strategies to establish networks with external resource holders which may lead to successful technology and marketing alliances (Lee et al., 2001; Peng & Luo, 2000; Ireland et al., 2003). External ties with other actors underpin social capital theory (Acquaah, 2007). According to Lin (2001), social capital is the sum of resources, actual or virtual, that ensue to a person or an organisation as an outcome of establishing personal and social networking relationships. Social networks are defined as a set of nodes including persons and organisations connected by a set of social relationships (Laumann, Marsden, & Prensky, 1989). Social capital is the positive effect of social networks on organisational performance (Lee et al., 2001). Granovetter (1985) notes that managerial actions; are often the functions of social networks within and outside the organisational context. External networks have become increasingly important to new ventures as the economic environment becomes more competitive (Li & Zhang, 2007). According to Acquaah (2007) such networks mostly include interactions with

customers, suppliers, and competitors and often extend across industry sectors, political, cultural and geographic boundaries. Networks can provide access to information, resources, markets and technologies (Zaheer, Gulati, & Nohria, 2000). Specifically, great environmental uncertainties (such as technology-oriented markets) force the firms to involve managerial ties to overcome resources shortcomings (Powell, 1990). NTVs typically possess few human, financial and physical resources at the start-up stage regarding their liability of smallness. In addition, their organisational capabilities and resource port-folio are not fully developed in product-related functional areas at the start-up stage (Delmar & Shane, 2006), therefore they may rely on establishment of effective external links with other firms in the business environment to create strategic alliances (Hitt et al., 2001) and integrate their processes into their own operations.

An NTV's internal capabilities and resources allow it to accumulate social capital as other actors such as potential partners become more willing to work with the firms possessing higher level of capabilities and resources such as NTVs (Lee et al., 2001). Furthermore, internal capabilities and social capital are complementary for value creation in new ventures as possessing internal capabilities and internal resources is not enough for new ventures to enjoy superior performance (Hitt et al., 2001). In this regard new ventures need to rely on their abilities to attain complement resources and capabilities (Lee et al., 2001). Hence, to appropriate the full value out of their internal resources and capabilities, they vigorously need to establish external networks through which they will become able to mobilize complementary external resources and recognize more worthwhile opportunities.

In the context of first product, strategic alliances in terms customer and supplier integration have received some attentions in the past few years in terms of asserting that firms are vigorously turning to suppliers and customers to involve them as partners to access product, service and technology innovation (e.g., Lau et al., 2010). Most of the existing literature in this field has focused on large-scale manufacturers and service providers (Song & Di Benedetto,

2008). As new ventures often start-up with the objective of commercialising and developing innovative products (Lodish, Morgan, & Kallianpur, 2001), managers must think of marketing in two directions; both upstream towards investors and suppliers (marketing for reputation) and downstream to the customers and buyers (Lodish et al., 2001; Song & Di Benedetto, 2008). Read, Song, and Smit (2009) have concluded that new ventures seek to establish partnership with actors to who are willing to share the risk of the venture and benefit from the success of the new venture. In relation to this view, scholars in the new venture context have identified supply chain integration as an external asset in determining new ventures success (Song et al., 2008).

The RBT also suggests that effective product commercialisation depends on leveraging of organisational resources and capabilities which are often owned by internal functional departments and other external organisations (Barney, 1991; Lee et al., 2001). Recently, the literature has underscored supplier and customer integration as two valuable assets for a company to improve its new product performance (Ragatz, Handfield, & Petersen, 2002) and also in the context NTVs (Song & Di Benedetto, 2008). In relation to first product commercialisation Song and Di Benedetto (2008) and Song et al. (2011), report the essentiality of supplier's integration to marketing and development operations, which leads to the enhancement of first product innovativeness. However, some related works have asserted that the relationship between the supply chain (suppliers and customers) is complex and that the partners must strive for a level of integration that maximise the performance (Das, Narasimhan, & Talluri, 2006).

Scholars emphasize the importance of resource/capability integration, orchestration, and shared learning through partnerships with customers and suppliers (Sirmon, Hitt, Ireland, & Gilbert, 2011). However, the ways that new ventures work closely with stakeholders such as customers and suppliers remains poorly understood within the organizational literature (Harrison, Bosse, & Phillips, 2010; Cavazos et al., 2011) and in particular new venture's first

product commercialisation process. In this regard, empirical findings on the impact of integrative mechanisms in the context of new product project have been inconclusive and very few researchers have considered both supplier and customer integration simultaneously (Lau et al., 2010). While the impact of supplier and customer integration processes on product performance are not clearly established in the literature and in particular for NTVs (Cavazos et al., 2011), those that are in many cases contain inconsistent findings (Ragatz et al., 2002; Lau et al., 2010). For example, it has been reported in literature that if suppliers were integrated into product commercialisation it would lead to lower commercialisation costs, less engineering changes, advanced quality products with less defects, and shorter time to market (Bonaccorsi & Lipparini, 1994). However, others found that supplier integrated product commercialisation increase commercialisation time (Zirger & Hartley, 1994) and development costs because of the greater coordination requirements. Contradictory findings in the literature report that customer involvement in the early product commercialisation process improves a firm's financial performance (Millson & Wilemon, 2002) and reduces the development and launch cycle time. However, others asserted that extensive customer involvement in product commercialisation could lead to limited strategic choices in product development (Callahan & Lasry, 2004).

The integration processes of suppliers and customers in firms such as NTVs can often be studied from two different dimensions (Rosenweig et al., 2003). One is information sharing which refers to the sharing of technological, marketing, inventory and production information with key customers and suppliers (Lau et al., 2010). It has been asserted that every supply chain possesses an information chain that has to be parallel or ahead of the physical flow of products and material (Stock & Lambert, 2001). Also in such integration, information must be timely to avoid any confusion in the product flow (Singh, Smit, & Sohal, 2005). The other dimension is product co-development and commercialisation, which refers to joint product design, process engineering, testing, production operation and planning and marketing (Song & Di Benedetto, 2008). It has been also recognised that it is difficult for firms to manage the entire product

development and commercialisation without involvement of customers and suppliers (Mentzer, 2004). However, according to literature, less is known about how integration mechanisms can contribute to new ventures performance (in first product launch project) and perform as complements to marketing and technology-related activities of the new venture (Song et al., 2008; Song et al., 2010a). Further, most of the studies have considered the direct relationship between integration mechanisms and product related performance; however the moderating role of integration mechanisms on the link between first product assets and first product outcomes hasn't been examined by scholars. Further despite the emphasis on the role of customer involvement in the efficiency and effectiveness of the commercialisation process, no research to-date on first product success has studied the role of customer integration along with the supplier involvement.

2.6.2 Entrepreneurial Orientation (EO) and first product commercialisation

Scholars have underscored the potential impacts of different strategic or managerial orientations (i.e., postures) on firm performance and new product success. Particularly, managerial orientations have been identified as important factors influencing the efficiency and effectiveness of the new product commercialisation process in the of context strategy factors for new product success. According to some researchers, managerial orientations include a firm level aggressive emphasis on innovations (e.g., product and process innovations) meeting both the identified and the hidden expectations of customers. Managerial orientations also encourage the pre-emptive recognition of new market-based opportunities and devising appropriate responses to those opportunities (Kohli & Jaworski, 1990). Hence, managerial orientations also encompass a high level of market intelligence generation and responsiveness (which is called market orientation). Finally, the goal of any business (including new ventures) is to lead or alter the competition. It has been argued that firms adopting proactive strategic (or managerial) orientation not only focus on responding to explicit customer needs but also explore opportunities for developing new products that customers cannot describe (Atuahene-Gima &

Ko, 2001). This perspective is in congruence with the strategic entrepreneurship discipline, which characterise a successful new venture as an entity that pursue both advantage seeking (exploitative) and opportunity seeking (exploratory) behaviours simultaneously. In conjunction with strategic entrepreneurship literature, in the new product domain, a stream of research focuses on the match between technical aspects of new products and market needs. This body of work suggests that to commercialise a new product successfully, firms should assimilate a range of technological inputs into novel combinations, make use of market opportunities afforded by the business environment, and make sure that these new products effectively meet the needs of the market (e.g., Ketchen et al., 2007; Paladino, 2007).

Despite of the substantial role of this research in advancing the knowledge about market, technical and product factors that contribute to new product commercialisation, attention is still needed to explore if and how strategic orientations (i.e. market orientation, EO, networking orientation and technology orientation) can contribute to new product commercialisation (Droge, Calantone, & Harmancioglu, 2008; Mu & Di Benedetto, 2011). In relation to strategic orientations, the entrepreneurship literature has introduced EO as a comprehensive firm level construct (Miller 1983; Covin & Slevin, 1989; Miller, 2011). This organisational propensity characterises the firm's tendency towards innovativeness, risk taking and proactiveness in NTVs which also encompass the opportunity seeking dimension of the strategic entrepreneurship prospective (Lee et al., 2001; Hitt et al., 2001; Ireland et al., 2003; Mu & Di Benedetto, 2011). Innovativeness is a new venture's tendency to get involved in the generation and marketing of new ideas, experimentation, and R&D activities resulting in new products and services (Lumpkin & Dess, 1996). New ventures with an EO usually take a forward-looking pro-active perspective and opportunity-creating or seeking approach via first mover actions like the introduction of new novel products and service ahead of other rivals (Miller, 1983). Furthermore, new ventures possessing EO invariably engage in risk-taking in terms of leveraging resource and capabilities to high-return and high risk projects in uncertain

environments (Miller, 1983; Lumpkin & Dess, 1996). EO includes the organizational processes, methods, and management styles adopted by new venture's founding team (Lumpkin & Dess, 1996). In other words, EO can reflect the strategic posture as exhibited by multiple layers of management in a new venture (Stevenson & Jarillo, 1990). Performance of bundles of resources and capabilities (as sources of competitive advantages) might reflect the strengths of exertion of different strategic mindsets of top managers in new ventures (Birkinshaw, 1997).

The link between EO and new venture performance has been extensively researched (e.g., Zahra & Covin, 1995; Rauch, Wiklund, Lumpkin, & Frese, 2009). However, pertaining to the significance of EO, most of the studies exploring new ventures' resources and capabilities (Griffith, Noble, & Chen, 2006) fail to integrate this managerial orientation, which potentially can drive the accumulation and configuration of marketing and technology-related resources and capabilities for new venture's first product project. Therefore, many of the previous papers examining antecedents of new products in the new venture context fail to address the factors affecting resource accumulation and exploitation. This is particularly limiting to the literature as many of new ventures—especially NTVs—employ EO (Atuahene-Gima & Ko, 2001). There is a body of research work linking EO with market orientation (Miles & Arnold, 1991; Matsuno, Mentzer, & Ozsomer, 2002). As an example, Matsuno et al. (2002) theorized that EO positively influences market orientation, where market orientation was defined as knowledge and responsiveness. While Matsuno et al. (2002) concluded that EO drives market orientation; the study fails to separate the distinct influence of resource accumulation (as resources and capability are aggregated in to the construct of market orientation).

Further, firms adhering to an EO are willing accept risks in their business (Lumpkin & Dess 1996). These risks, while offering opportunities for greater rewards, also present the possibility of greater loss. Given the potential theoretical and practical importance of understanding the differential effects of EO on new venture's accumulation and configuration of resources /capabilities, scholars have pointed out the importance of empirical efforts which

devote more attention to the moderating role (rather than the antecedent role) of EO on resources/capabilities - firm performance link (Wiklund & Shepherd, 2005; Griffith et al. 2006). In this regard, few studies such as Griffith et al. (2006) examined the interaction between knowledge-based resources (competitor, customer, supplier and regulatory information) and EO leading to the development of responsiveness (a dynamic capability). They found that EO interacts with the retailer's knowledge resources to modify the form of the relationship between the knowledge resources and market responsiveness. Hence, they asserted that small retailers with higher levels of EO are more effective at configuring /employing knowledge resources and gaining leveraged outcomes from its knowledge resources. Based on their mindset, retailers implementing a managerial orientation like EO utilise innovative strategies promoted in self-directed environments. Hence they are capable of innovatively configuring knowledge resources to enhance the employment of knowledge resource stocks, thus providing these retailers greater market responsiveness than retailers with similar knowledge resource stocks. Likewise, retailers operating under higher levels of EO are willing to take risks and consequently are more likely to creatively exploit and leverage their knowledge resources, thus enhancing the retailer's aptitude to convert knowledge resources in to market responsiveness.

However, based on the distinct role of resources and capabilities, no study has examined the different impacts of EO on resources / capabilities- performance link in the context-based (e.g., first product in new venture) framework. In addition to considering the role of value creating processes that exploit new product resources (marketing –related and technology–related capabilities) involving other resources in marketing and innovation (e.g., marketing and R & D budget) area can provide a more holistic view on how EO interact with different resources and capabilities allocated to the process of first product project. Further, most of the studies exploring the impacts of EO in new venture performance, have taken developed economies as the laboratory to test their theories (Zhao, Li, Lee, & Chen, 2011; Su, Xie, & Li, 2011). Drawing on inconclusive findings about the EO and new venture performance in

entrepreneurship literature (Su et al., 2011; Mu & Di Benedetto, 2011), integrating this managerial orientation's indirect impact to a context-specific study (Lumpkin & Dess, 1996) may provide clearer insights about EO's role in managing NTVs' marketing and technology resources and capabilities in first product commercialisation.

2.6.3 Political networking capabilities

The role of business ties in managing environmental uncertainty in emerging economies has received lots of attention in the past several years. Scholars have examined different types of business ties such as ties with: (1) universities (George, Zahra, & Wood, 2002); (2) service intermediaries (Li & Zhang, 2010); (3) competitors (Ingram & Roberts, 2000); (4) suppliers (Jap & Ganesan, 2000); and (5) collaborators (Rindfleisch & Moorman, 2001). Scholars researching the role of under-developed institutions in transitioning economies, have suggested that new ventures heavily rely on both business ties and political ties (connections with governmental authorities and politicians) to be able to run their business and manage their exchanges (Peng & Luo, 2000). Because of the lack of market-supporting institutions, governments in emerging economy systems are powerful in regulating industrial development, guiding business policies and influencing corporate operations (Hoskisson, Eden, Lau, & Wright, 2000).

In a transitioning economic system, the government has control over financial institutions as well as the award of major contracts, regulatory and licensing procedures (Acquaah, 2007). Hence, establishing relationships with different government agencies is vital to the survival of new ventures (Peng & Luo, 2000; Li & Zhang, 2007). Therefore, in such a context, top managers at new ventures, rely on their political networking capabilities with government officials to secure access to knowledge, information and financial resources, which provide a buffer against uncertainty in the environment (Acquaah, 2007; Li & Zhang, 2007). However, few studies in the current literature have incorporated the impact of political ties (i.e. and

venture's abilities to establish such ties) while examine the effects of external ties on the process of new product commercialisation (Wu, 2011). In addition, few studies in marketing and strategic management explicitly have considered the role of political ties or recognise the different impacts of political and business ties (Sheng, Zhou, & Li, 2011). Furthermore, most of the empirical works in managerial political networking in transitioning economies has been done using data from China and the literature lacks empirical works in other countries with similar economy structure (Acquaah, 2007). In the specific context of the first product project of new ventures, possessing the competence of establishing networks with governmental institutions and politicians is expected to be vital because provides easier access to regulatory-based knowledge about the industry and market and assists top managers to effectively manage the resource allocation and exploitation of their new product project.

Moreover while significant portions of scarce resources are being controlled by the governments (e.g., in China) the connections with government networks may facilitate the access to these resources which comprise lands, loans and subsidies (Faccio, 2006; Li & Zhang, 2007). However, this perspective has not been explicitly empirically tested in the context of first product launch in new ventures. Developing social ties (i.e. political ties) is a unique and complex capability that is hard to duplicate by rivals: accordingly it can be a precursor of enhanced performance (Peng & Luo, 2000). Some scholars have asserted that the social ties (i.e. political networking capabilities) moderate the association of ventures capabilities and resources with firm's performance (Atuahene-Gima & Murray, 2007). Yet, few empirical supports can be found about the interaction of political networking capabilities and firm's resources and capabilities in the context of new product and the role that this moderating impact can perform in determining the first product performance.

2.6.4 ICT capabilities

The integration of marketing and technology (R&D-manufacturing) has been identified as a key mechanism in new product commercialisation, which represents the joint behaviour towards a goal in new product commercialisation process (Song & Song, 2010). Most of the current research has examined the direct impact of integration on the aspect of new product performance. Some scholars have identified the positive impact of adopting integration systems in new product development projects. For example, Pinto and Pinto (1991), reported that a higher level integration will enhance task outcomes and lead to improved social outcomes. In a meta-analysis approach, Griffin and Hauser (1996) found that integration between the two functions will lead to higher product performance. Later in a similar approach in 2001, Henard and Szymanski- in their meta-analysis found that the correlation between the integration and product performance is positive but not significant. Later some asserted that there seems to be a lack of attention to the conditions that makes integration valuable. This group of scholars asserted that previous studies had scrutinised the impact of integration in isolation and only focused the direct effect of integration on product performance (Leenders & Wierenga, 2008). They reported that integration among product development and marketing groups within a firm can lead to a more effective and efficient usage of the resources and help reduce the coordination issues between product development and marketing during the new product development project.

An emerging literature in the context of cross-functional integration has addressed the issues of barriers to effective integration in terms of communication and knowledge sharing during the new product commercialisation. Scholars have argued that barriers such as the physical separation of product development and marketing and the differences in goals, values, and background between the functions hinder the cross-functional collaboration (Song, Xie, & Dyer, 2000). Because of these barriers, cross-functional teams often end up with nothing but a good idea (Song & Song, 2010). Early research suggested different solutions, such as: (1) co-location

(sharing the office) of the marketing and R&D-manufacturing people; (2) staff movement; (3) informal social systems; (4) structure redesign; (5) joint reward programs, and (6) official integrative management processes (Griffin & Hauser, 1996) to conquer the issues. Some scholars proposed that co-location provides a high level of integration between product development and Marketing (Leenders & Wierenga, 2002; Song & Song, 2010). However, these procedures are often unlikely in reality. For instance, some have asserted that relocation can be costly, and in the current frenzy of globalization co-location has become less feasible and necessary. In addition, although personnel movement helps break-up the functional boundaries, it tends to prevent employees from keeping up with changes in their own specializations (Song & Song, 2010). In spite of the wide spread enthusiasm to get rid of cross-functional conflicts, some barriers have been shown to be imperative for product innovation in firms.

As a result, scholars have proposed that the better path may be to explore moderating factors that reduce the negative impact of these barriers on R&D–marketing integration (e.g., Mithas, Ramasubbu, & Sambamurthy, 2011). Technical gatekeepers have been found to improve R&D–marketing communication in the presence of integration barriers (e.g., Tushman & Katz, 1980). Nevertheless, this approach is not risk free. Open individual communications can cause miscommunication and dysfunctional divergences. (Katz, Tushman, & Allen, 1995). To lessen these issues, scholars have proposed the examination of an alternative factor as information and communication technology-related assets (ICT) (Song & Song, 2010) to enhance the efficiency and effectiveness of the new product commercialisation process (Durmuşoğlu & Barczak, 2011).

ICT includes a broad array of communication media, devices and solutions which link people and information systems through e-mail, voice and video conferencing, voice-mail, databases, file sharing portals, corporate intranets, group wares and so on (Andolsen, 1999). ICT use in firms provides an organisational benefit, assisting product-focused functional areas to be linked via e-mail, databases, file-sharing and tele-conferencing (Dewett & Jones, 2001).

Effective usage of ICT has been introduced as an important factor in easing cross-functional integration in new product projects and their efficiency and effectiveness (Song, & Song, 2010; Kawakami et al., 2012). An important aspect of integration in the context of new product commercialisation is enhancing the level of interaction, communication, knowledge sharing and coordination between cross functional capabilities (Gatignon & Xuereb, 1997; Song & Montoya-Weiss, 2001) and their complementary effect (Kim, Park, & Prescott, 2003). ICT capabilities have been proposed as supporting systems for a firm to acquire, categorise and disseminate technical and market knowledge to be used for commercialisation of new products (Griffin & Hauser, 1992). Firm's ICT capabilities are defined as complex bundles of information technology skills and processes to mobilize and deploy information technology-based resources to manage internal communication among different departments as well as external interactions with other stakeholders (DeSarbo et al., 2006). These capabilities have been identified as of particular relevance for studying positional advantages and long-term success (DeSarbo et al., 2005) in the context of new product commercialisation. However, current literature shows that ICT capabilities by themselves are not regarded as sources of advantage unless they support other capabilities across other functional areas (Dibrell & Miller, 2002; Gibbons & O'Connor, 2003) particularly in new product operations (Baharadwaj, 2000).

In particular, literature shows that ICT has been found as an important success factor for SMEs and NTVs. Recent dramatic advancement of ICT has shifted small firms such as new ventures to more advantageous positions in terms of efficiency, effectiveness and organisational flexibility (Izushi, 2003; Tanabe & Watnabe, 2005). Scholars such as Cooper (1998) argue that because of the advancements in computer technology, "the declining cost of systems and improved software and technological sophistication of the workforce, no longer are adaptations reserved for the technologically elite, which results in opportunities for innovations in small firms such as NTVs".

Based on the view of those scholars who advocate some degree of formalisation and development of knowledge management processes in new ventures, research examining the role of information technology capabilities is needed in the context of first product commercialisation. During the first product project, NTVs try to expedite the process of becoming formalised and developed (Song et al, 2010c). In this regard, the provision of ICT infrastructure to manage the flow of the communication and information among different product team members as well as the effective communication among external integrated processes with internal capabilities is vital. However, up to now, no study has considered the interaction between the information technology and other capabilities (technology-related and marketing-related) in relation to the first product performance in NTVs.

2.7 Conclusion

This Chapter focused on an analysis of the literature to address the roots of the empirical and theoretical gaps identified in Chapter One in relation first product commercialisation by NTVs. As a result, the lack of theoretical convergence in examining the influence of first product antecedents (resources and capabilities) was discussed. In this sense three streams of literature were identified and analysed which had different interpretation of the RBT and the effective deployments of product-related resources and capabilities. Further the concept of SPP, its application and implication for first product commercialisation was discussed. In addition, it was concluded that that much of the current new product commercialisation literature has extensively focused on established firms and how a successful first product is commercialised by NTVs is largely neglected in the literature. Further potential contingency factors including EO, supplier and customer integration, information technology capabilities and political networking capabilities, which can enhance the effectiveness and efficiency of first product resources and capabilities, were identified and analysed. The conclusions drawn in Chapter Two help to build a foundation to further develop a conceptual framework in Chapter Three to

examine specific exploitation mechanisms and contingency factors that drive the first product commercialisation process in NTVs.

CHAPTER THREE

Theory Development and Hypotheses

3.1 Introduction

The survival and growth of new ventures, particularly new technology-based ventures (NTVs) is contingent on the successful commercialisation of their first product (Shoonhoven et al., 1990; Song et al., 2011). Despite the acknowledged importance of successful first product commercialisation research investigating the contributions of marketing and technology resources and capabilities to new product success have largely focused on established firms not NTVs (Song et al., 2010a). As a result, the literature is largely silent about how product-related assets at the start-up stage can be beneficially exploited to enhance first product financial and non-financial outcomes (e.g., sales growth, profit growth and customer satisfaction) and overall NTV performance encompassing growth and development. Responding to the theoretical and empirical gaps outlined in Chapter One and the literature analysis presented in Chapter Two, this Chapter presents the theoretical framework for the study. The theoretical framework is developed based on the logic that a superior first product is one of the most influential drivers of an NTV's overall performance, and is critical to firm survival in emerging economies. The framework is developed in two parts. Part 3.1A sets out the direct effects and interrelations between the main constructs of interest in driving first product success. Part 3.1B depicts the impact of specific moderating effects expected to enhance the first product assets and outcomes set out in Figure 3.1A.

The theoretical framework developed in the study articulates the view that NTVs achieve superior first product performance and improved overall firm performance by deploying configurations of synergistic product-focused resources, capabilities (i.e. skills and processes)

and contingency factors; that allow them to create first product positional advantages (see Day & Wensley, 1988; Miller, 1996; Priem & Butler, 2001; Gruber et al., 2010). Building on configuration and contingency theories, the contention is advanced here that an NTV's available marketing and technology resources and capabilities, must be effectively deployed in a complementary fashion in each respective product functional area. Given the scarcity of first product resources, it is also argued that at a cross-functional level, marketing and technology capabilities should complement each other and will enhance each other's performance to enable NTVs to generate first product positional advantages.

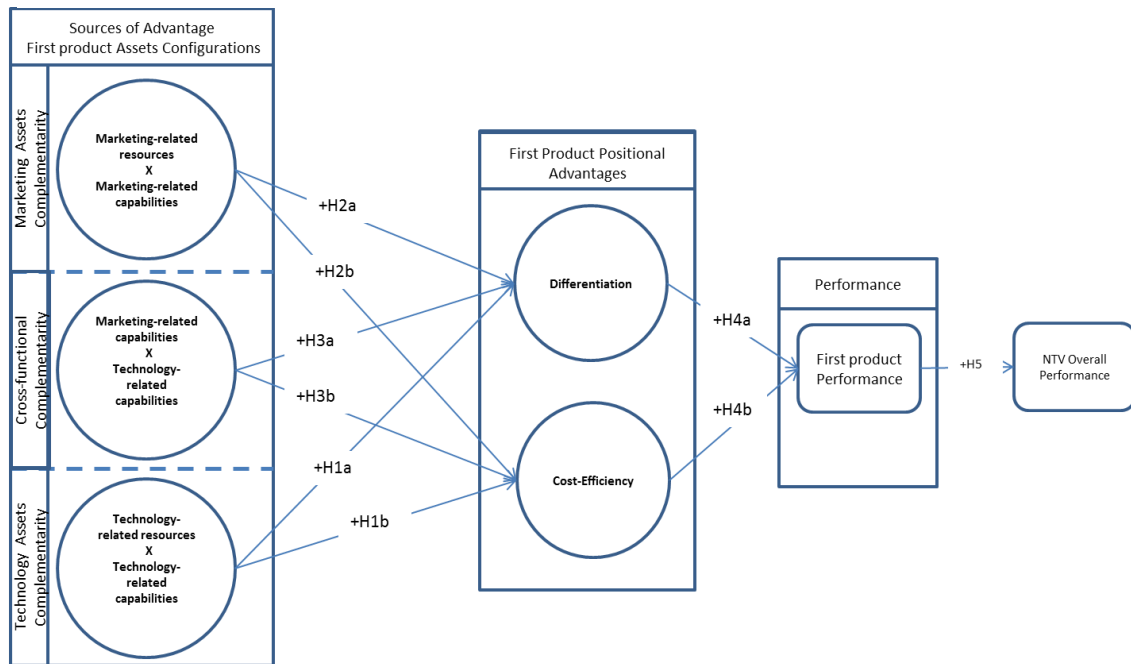
Further, the theoretical framework proposes that the influence of first product resource and capability complementarity is contingent on the level of supplier and customer integration, the founders' political networking capabilities and an NTV's EO. Likewise, it is argued that the influence of the complementarity between marketing and technology capabilities on first product positional advantages is enhanced if an NTV possesses a high level of information and communication technology (ICT) capabilities. Consequently, the outcomes of first product commercialisation are explained by configurations of complementary product level assets in specific areas and specific contingency factors.

This chapter first articulates the conceptual model as shown in Figures 3.1A and 3.1B by focusing on theory development and the characterisation of major constructs including marketing resources, marketing capabilities, technology resources, technology capabilities, first product differentiation, first product cost-efficiency, first product performance and NTV overall performance. Then a series of hypotheses are developed which are consistent with the relationships illustrated in Figure 3.1A (asset configurations for superior first product performance-direct effects). Afterwards contingency factors are discussed and incorporated into the theoretical model and the final series of hypotheses encapsulated within Figure 3.1B (asset configurations for superior first product performance-moderating effects) are provided.

3.2 Theoretical framework and hypotheses

The theoretical framework (Figure 3.1A and 3.1B) developed in this chapter is underpinned by Day and Wensley's (1988) source of advantage - positional advantage - performance (S-P-P) framework which is applied to the first product commercialisation of NTVs. Accordingly, the specific combination of first product resources and capabilities is seen as an important source of advantage that contributes to creating first product positional advantages. As outlined in section 2.5 in Chapter Two, the S-P-P model delineates the link between the source of advantage (i.e. capabilities and resources) and the market position obtained which leads to enhanced market-based performance. Similar to the argument underpinning S-P-P the theoretical contentions advanced by Day and Nedungadi (1994) and Day (1994) see product-related resources and capabilities as sources of advantage that enhance the market value of new products, and eventually create superior product performance (achieving product-related sales growth, profit and customer satisfaction goals). In this sense, heterogeneous and imperfectly mobile combinations of product level resources and capabilities when translated into market-related and product-related advantages enhance financial performance (Hunt & Morgan, 1995). Building on Day and Wensley (1988), the argument is put forward here, that to create new market opportunities and realise first product performance, NTVs have to create first product positional advantages in the form of differentiation and/or cost-efficiency. To achieve differentiation and/or cost efficiency, NTVs need to exploit their product focused resources and capabilities by deploying them in an adroitly coordinated fashion (Day & Wensley, 1988; Hunt & Morgan, 1995; Kim & Atuahene-Gima, 2010).

Figure 3.1A Asset configurations for superior first product performance-direct effects



In conjunction with the SPP concept, configuration theory is used to articulate optimal exploitation mechanisms as sources of advantage for first product commercialisation. Configuration theory provides a holistic view of firm practices and their relationships (Porter & Siggelkow, 2008; Sheehan & Foss, 2007). They are used to characterise first product sources of advantage and their interdependencies. Configuration theorists explain a configuration as “any multidimensional constellations of conceptually distinct characteristics that commonly occur together” (Meyer, Tsui, & Hinings, 1993, p.1175). This theory signifies that attributes (e.g., resources, capabilities, structures, leadership and strategies) both inside and outside the organisation are unified to help to achieve organisational objectives and drive organisational performance (Veliyath & Srinivasan 1995; Vorhies & Morgan, 2003; Wiklund & Shepherd, 2005). Adopting configuration theory helps to articulate the mechanisms that create complementarity among specific attributes of the firm (Black & Boal, 1994; Inkpen & Choudhury, 1995) which may enhance the financial and non-financial outcomes obtained from first product launch. Consistent with this perspective, configurations that are applied to NTVs first product commercialisation are defined as the degree to which a firm’s resources and capabilities and internal/external contingency factors such as those directed toward the product

level are orchestrated by a unified single theme (Miller, 1996). They can be the tactics, assets and management required to achieve first product positional advantages (Miller & Whitney, 1999). In fact, this view conceptualises a configuration as the source of positional advantage (Miller, 1990; 1996). Therefore, the attributes within a configuration can be seen as resources and capabilities engaged in first product commercialisation, that are exploited in a complementary fashion to achieve first product goals (cf. Miller, 1996; Miller, 2011).

This study extends Gruber et al.'s (2010) approach because they are among a small group of scholars who have explored configurations of resources and capabilities in a product-related functional area. Gruber et al. (2010) explored sales and distribution resources and capability deployment among NTVs in Germany and identified which configurations enhanced departmental performance and overall performance. To conceptualise the inter-relationships in the configuration which in this study encompasses the first product's marketing and technology resources - capabilities, a strand of contingency theory is applied which describes the fit between organisational attributes at the product level. Contingency theory is underpinned by the view that aspects of performance such as efficiency and effectiveness are the result of the fit between factors such as strategy and structure (Siggelkow & Levinthal, 2003), assets and environment (Wiklund & Shepherd, 2005).

It is argued that two elements fit well if there are complementarities between them (Huang et al., 2004). For example, a resource and a capability are complements if the function of any one of them increases the returns gained from the function of the other (see Milgrom & Roberts, 1995). The notion of complementarity is underpinned by the contention that separate variables cannot be individually fine-tuned (in isolation) to achieve better outcomes (Huang & Liu, 2005). This is especially so in relation to achieving product positional advantages (Sok & O'Cass, 2011). The theoretical framework brings together two perspectives on the exploitation of product focused assets by considering (1) resource-capability complementarity within each product-focused functional area; technology and marketing (Slotegraaf et al. 2003; Morgan et

al., 2004; Sok & O'Cass, 2011; Ngo & O'Cass, 2012a) and (2) capability-capability complementarity between product-focused functional areas (Moorman & Slotegraaf, 1999; Song et al., 2005; Vorhies et al., 2009; Ngo & O'Cass, 2012b). This indicates that the level of complementarities represented as a configuration acts as a predictor of first product performance. On this basis, the first block of Figure 3.1A depicts two forms of asset exploitation mechanisms for first product commercialisation.

Building on Gruber et al. (2010), a context specific view is applied here to characterise the constructs for sources of first product advantage in Figure 3.1A. This approach is consistent with configuration theorists suggesting that researchers need to select the appropriate domain for the study of configuration (e.g., Fiss, 2007). The key interest in the study is in understanding the nature and effects of resources and capabilities on cost-efficiency and differentiation in first product commercialisation. Building on Day (1994), product commercialisation is characterised as a spanning process by which inside-out (technology) and outside-in (marketing) assets are coordinated to establish a positional advantage generating mechanism. According to the literature, in the context of technology-oriented firms including NTVs, assets in product commercialisation functional areas are labelled as technology resources and capabilities (e.g., Lee et al., 2001; Song et al., 2010a). The logic behind using this term underlies the characteristics of products deployed by technology-based firms. These groups of assets may be associated with adoption and development of technologies as well as R&D and manufacturing activities (DeSarbo et al., 2005; Song et al., 2005).

NTVs' constraints such as liability of smallness and newness imply that they are often unable to survive the failure of their first product. Further, as discussed in Chapter Two, NTVs are at higher risk of early failure due to their shortcomings and limitations in product level skills and knowledge (Shepherd et al., 2000), resources and external ties. They are also vulnerable to business environments where there are strong established competitors (Gruber, 2004; Atuahene-Gima et al., 2006). Therefore, NTVs need to explore exploitation mechanisms to achieve the

greatest benefit from their available resources and capabilities within the start-up stage where first product commercialisation is critical. Achieving first product positional advantages may not lie in the custody of specific resources and capabilities; as these can be imitated and purchased by competitors (Miller, 1996; Gruber et al., 2010). Rather, achieving product-related advantageous positions may reside in orchestrating integrative mechanisms that ensure complementarity among specific resources, capabilities, and departments (between their capabilities) (Inkpen & Choudhury, 1995; Miller & Whitney, 1999). Thus, NTVs need to create configurations encompassing a unique interplay not only among their resources and capabilities in each functional area (Morgan et al., 2004; Ngo & O'Cass, 2012a), but also a highly interactive collaboration between the product focused functional areas (Moorman & Slotegraaf, 1999; Song et al., 2005) to achieve superiority in the level of first product assets. Consequently, they may translate this mechanism into first product positional advantages in the form of differentiation and cost efficiency, and ultimately achieve a superior first product outcome in terms of customer satisfaction, sales growth and profitability. As shown in Figure 3.1A, marketing and technology resources are incorporated into the theoretical framework.

3.2.1 Technology resource-capability complementarity and first product positional advantages

Building on complementarity theory (Milgrom & Roberts, 1995; Huang & Liu, 2005) technology resources and capabilities are expected to enhance each other's contribution to the first product commercialisation process. As outlined in section 2.2.3.2 of Chapter Two, technology capabilities are conceptualised as bundles of skills and related processes in new product/technology design, engineering, development, manufacturing processes, forecasting technological changes and quality control functions to exploit complementary technology resources (Moorman & Slotegraaf, 1999; DeSarbo et al., 2006). Further, building on the discussion provided in section 2.2.3.1 in Chapter Two, technology resources are defined by two dimensions that include physical resources and the R&D budget. Both (budgetary and physical)

resources have been previously found as vital resources for product success in NTVs (Song et al., 2008; Zahra & Bogner, 2000). Physical resources comprise plants, machinery, test and production equipment providing the infrastructure for the development, testing and manufacturing of the new product (Hitt et al., 2001; Sirmon & Hitt, 2009; McKelvie & Davidsson, 2009; Chen, 2009). R&D budget reflects the level of financial resources acquired or possessed to invest in running their product research, engineering, development and manufacturing project (Song et al., 2011). Technology resources are static factors owned by the NTVs and need complementary available technology capabilities to maximize the firm's capacity to design and manufacture a first product.

To execute technical activities effectively and efficiently, technology capabilities are required to exploit the firm's available technology resources (Leenders & Wierenga, 2008; Song et al., 2010a). The usefulness of technology capabilities is only realised by acquiring the funding. The proper allocation of the available R&D budget enables the first product's R&D and engineering team to gain more updated technical knowledge, devote more capacity (more expert people) to the design stage and experiment with different proto-types. At the same time, technology capabilities, which reside in the human capital of R&D and engineering staff, magnify the contribution of financial resources. The technical abilities of people in R&D magnify the contribution of available financial resources by spending the allocated funding in a relevant domain of research and development to anticipate and develop the features expected by the target market. This will enable NTVs product-focused teams to create a lower cost and differentiated first product that meets the market need or has a higher potential to create a market. Access to advanced state-of-art production facilities enhances technology capabilities' contribution to fabricate and assemble prototypes that exactly meets the original design resulting in enhanced features, functions and quality that provides market advantage. Technology capabilities enhance the contribution of machinery and operational facilities through manufacturing processes. Technology capabilities allow NTVs to exploit resources

effectively and efficiently to manufacture innovative products at the lowest possible cost. Through well-designed manufacturing processes, accessible machinery and production facilities can be setup to operate in the most efficient way with lowest defect rate. Therefore, it is expected that:

H1a: *The greater the level of complementarity between technology resources and capabilities the greater the NTVs first product differentiation.*

H1b: *The greater the level of complementarity between technology resources and capabilities the greater the NTVs first product cost-efficiency.*

3.2.2 Marketing resource-capability complementarity and first product positional advantages

The key to attaining advantage in the market through the launch of the new product (i.e. first product), resides in the firm's abilities to understand customers and establish and maintain relationships with customers and channel members (Srivastava et al., 2001). After the development and manufacturing stage, a first product must be effectively marketed by deploying available marketing resources and capabilities (Song et al., 2010a; Morgan, 2012). In the context of new ventures (including NTVs), scholars have addressed the significance of accumulating marketing expertise and marketing resources in the entrepreneurial processes such as new product commercialisation (Smart & Conant, 1994; Shane & Delmar, 2004). As outlined in section 2.2.3.2 of Chapter Two, several key marketing capabilities have been identified in the literature (Vorhies & Morgan, 2005) and more specifically for NTVs (Song et al., 2010a; Zhao et al., 2012). The marketing capabilities encompassed within the theoretical framework in Figure 3.1A denote bundles skills and related processes, which exploit complementary marketing resources to undertake planning, sales, pricing, promotion, product launch and market linking activities (Day, 1994; Vorhies & Morgan, 2005; DeSarbo et al., 2006; Morgan, 2012). Marketing resources are defined collectively (Leenders & Wierenga, 2008)

encompassing two dimensions: (1) market knowledge and (2) marketing budget both identified as critical for new product marketing (Song et al., 2008; Song et al., 2010c; Chen, 2009; Morgan, 2012). Referring to the discussion in section 2.2.3.1 of Chapter Two, market knowledge was referred to as the level of tacitness, specificity, breadth and depth of knowledge acquired and utilised by the firms in relation to customers and competitors during the new product development and launch (Kohli & Jaworski, 1990; De Luca & Atuahene-Gima, 2007). The marketing budget reflects the level of funds (cash flow) acquired or possessed for marketing processes implementation during the product commercialisation (Song et al., 2011).

NTV's limitations including liability of smallness and newness also implies the lack of marketing assets at the start-up stage. Hence, NTVs need to explore ways to achieve the greatest benefit from their available marketing resources and capabilities to be efficient and effective in their first product launch. Marketing resources are static factors of the firm (Makadok, 2001) and need to be paired with complementary capabilities to create synergy to enhance the venture's capacity to identify customer needs and offer a superior value proposition to customers (Slotegraaf et al., 2003; Ngo & O'Cass, 2012a). The optimal deployment of marketing resources and capabilities in a complementary fashion is expected to enhance the first product's commercialisation for NTVs (Slotegraaf et al 2003; Milgrom & Roberts, 1995; Zott & Amit, 2008).

Knowledge about the trends in the market is significant for first product launch; however the way it is utilised is a determinant factor in enhancing first product commercialisation. For example, NTV's existing expertise in marketing may enhance the contribution of available market knowledge through analysing the market knowledge for decision making to devise a launch / promotion plan to inform the target market about the value of the firm's first product. Also depth, breadth, tacitness and specificity of the market knowledge can enhance the contribution of marketing capabilities. Marketing function can be more effective through utilising well documented, specialised and deep market knowledge to be able to execute special

pricing, sales and distribution policies to help customer better realise the exclusive attributes of the first product.

The contribution of marketing resources to the success of the first product is dependent upon capable and skilled people. Through their marketing via advertising and promotion, NTVs try to inform customers about the first product features and lower price. However, an optimal first product campaign is supported by complementary and available marketing budget to make sure that the target market is effectively sold. Further, marketing activities are enhanced through the effective allocation of marketing budget to spend more capacity for market analysis and planning. Marketing capabilities require effective allocation of marketing budget to establish relationships with the customers and channels members for prototypes and market research on test products and develop distribution channels. The occurrence of this complementarity helps the NTV to manage feedback on testing the first product. Also it facilitates further sales and distribution through establishing networks. This leads to (1) better identifying customer needs and (2) effectively make first product available to the market with a competitive price. Therefore it is expected that:

H2a: *The greater the level of complementarity between marketing resources and capabilities the greater the NTVs first product differentiation.*

H2b: *The greater the level of complementarity between marketing resources and capabilities the greater the NTVs first product cost-efficiency.*

3.2.3 Relationship between marketing - technology capabilities complementarity and first product positional advantages

The function of both technology and marketing assets has been emphasised as important in creating customers (Slater & Mohr, 2006; Srinivasan, Pauwels, Silva-Rissoand, & Hanssens, 2009). In particular, the first product literature has addressed the importance of the accumulation and effective exploitation of marketing assets along with technology resources

and capabilities to communicate with customers and promote the product (Song et al., 2011). However, often in technology-oriented firms such as NTVs' marketing is not effective due to the founders' lack of attention and interest in marketing (Mohr & Sarin, 2009). The unique technical features of a first product by itself, cannot guarantee long-term success for the firm, rather effective marketing of this innovative offering is essential for commercial success.

Scholars such as Dutta et al. (1999), Mohr and Sarin (2009) and Hult and Ketchen (2001) have found that technology-based firms are not able to appropriate value from their technology capabilities unless they can concurrently leverage their marketing capabilities to effectively market the product to the customers. Hence, NTVs must effectively market the first product to the target market (Song et al., 2011; Zhao et al., 2012). Despite the significance of marketing activities for NTVs, it is realised that the marketing communications of technology-based firms with their target market is often unsuccessful because of the lack of attention given to the marketing function at the early stage of start-up (Mohr & Sarin, 2009). Customers of new technology-based products often face hurdles in expressing their needs and understanding the exact advantages that a new product offers (Leonard-Barton & Rayport, 1997). In this regard NTVs may often find it difficult to work with customers during first product commercialisation, when acquiring customer input is vital (Reid & Brentani, 2004). This difficulty also continues for NTVs during the sales and after-sales service phases of the relationship (Mohr & Sarin, 2009).

Some argue that marketing should be a guiding process within NTVs as they lack marketing skills to successfully bring their product to the market (Hisrich, 1992). Failures could be decreased if marketing techniques are applied along with product development abilities to effectively communicate with the market and prevent over-engineering their innovative products (Hills & Sarin, 2003). Achieving complementarity only within each product functional area may not be sufficient to generate first product positional advantages (Ngo & O'Cass, 2012b). Given the fact that product-focused structures, processes and procedures are

often not well established and under development at the start-up stage in NTVs, it is important to ensure that available product level capabilities are effectively co-aligned and coordinated during commercialisation. Scholars have noted that marketing and technology capabilities contribute to the processes that generate product-related positional advantages (Kim & Atuahene-Gima, 2010; Atuahene-Gima & Wei, 2011). In particular, NTVs need to accumulate and deploy capabilities that enable them to conquer their resource shortcomings and compete through developing and marketing a unique first product (Chen, 2009). Complementarity among product focused capabilities can be vital for NTVs because they cannot endure any new product failure resulting from poor deployment and execution of first product commercialisation tasks (Gruber, 2004).

During their first product commercialisation project, NTVs often rely heavily on the abilities and experiences of the founding team and a limited number of employees (Li & Zhang, 2007) to undertake product commercialisation activities (Song et al., 2010a; Marion et al, 2012). In such cases, the recruitment and maintenance of well-trained staff, whose experience and skills serve as a driving force for improving the commercialisation of the first product is vital (see also Leonard-Barton, 1995 for similar argument). If NTVs develop a breakthrough innovative product embedded with advanced technologies and features, but poorly market it, the customer will not capture the proposed value. Likewise, if the first product has no significant advantages in terms of novelty, marketing may only generate temporary and short-term gains. Achieving first product positional advantages may not only lie in the achievement of complementarity within marketing and product development, rather acquiring product advantageous positions may also depend on the alignment and coordinating mechanisms that ensure complementarity among first product focused functional areas and their capabilities.

The complementarity between product focused capabilities in NTVs implies that a weakness in one of the areas can affect the function of the other in pursuing efficiency and effectiveness (Zott & Amit, 2008). Both marketing and technology capabilities can facilitate or

hinder each other's effect in first product commercialisation. While technology capabilities are oriented towards the design, development and manufacture of a first product, marketing capabilities support technology capabilities by orienting action toward informing the market about the value of a differentiated first product. While technology capabilities capitalise on developing a first product with a competitive price, marketing capabilities complement technology capabilities by communicating and informing the market about the competitive price of the first product and making it available to the customers. Therefore it is expected that:

***H3a:** The greater the complementarity between marketing and technology capabilities, the greater the first product differentiation.*

***H3b:** The greater the complementarity between marketing and technology capabilities, the greater the first product cost-efficiency.*

3.2.4 Relationship between positional advantages and first product performance

Positional advantages signify the relative value proposed to target markets as an outcome of the firm's commercialisation efforts (Morgan et al. 2004; Morgan, 2012). As shown in Figure 3.1A, product positional advantages resulting from product-level resources and capabilities are either based on cost-efficiency or product differentiation (Day & Wensley, 1988; Prahalad & Hamel, 1990; Day, 1994; Kim & Atuahene-Gima, 2010). New product differentiation denotes the distinct attributes of the new product that offers a unique value proposition to the target market. This value could consist of higher quality and design, extended features and functions, reliability, long lasting and technical performance of the product compared to competitors (Day & Wensley, 1988; Day, 1994). The other source of new product advantage is through delivering the lowest cost to customers, attained through undertaking new product development and marketing operations at a lower cost than competitors, while offering a comparable product (Day & Wensley, 1988). Cost efficiency denotes distinct characteristics of the first product

encompassing low cost information processing, production, manufacturing and distribution (Kim & Atuahene-Gima, 2010).

There are two reasons behind examining both differentiation and cost-efficiency as positional advantages in first product commercialisation. First, for NTVs in emerging economies like India (and other BRICS markets), buyer power and the customer's ability to pay a high price is a determining factor to business success (Sheth, 2011). Hence, NTVs in emerging economies often need to emphasize operational efficiency (which reduces the final production cost) along with a product advantages (e.g., unique features and functions) to be able to offer prices that are attractive to customers in technology-based markets. A second reason underpinning the co-existence of both cost based and differentiation based positional advantages is the product category and the market where the product is launched (Kim & Atuahene-Gima, 2010). In the context of niche markets, a new product might be highly innovative and meet a very specific need of a particular group of customers. On the other hand, in more mature markets, some NTVs may only capitalise on price-based competition.

First product performance is incorporated as the third block of Figure 3.1A. Theoretically, it is expected that a first product's performance is enhanced by the influence of its product positional advantages including cost-efficiency and differentiation (Day & Wensley, 1988; Hunt & Morgan, 1995). Building on the new product development literature in conceptualising new product performance, especially Song and Parry (1999) and Lau et al. (2010), sales growth, customer satisfaction and profit related are incorporated as the key factors reflecting the outcomes of first product commercialisation introduced here as first product performance (see also section 2.5 of Chapter Two). Further, as depicted in Figure 3.1 A; first product performance is linked to NTV's overall performance. Building on the literature identifying physical and financial development as one of the major objectives for SMEs such as NTVs (Davidsson & Klofsten, 2003), overall NTV performance is defined as the extent that an

NTV has attained its objectives in growth and development of its businesses (Gruber et al., 2010).

Product positional advantages are seen as direct antecedents to product performance (i.e. sales growth, profit and customer satisfaction) because the superiority of a new product determines customer's buying behaviour (e.g., Narver & Slater 1990) and the economic return of this behaviour to the firm (Morgan, 2012). Founders of NTVs like many other firms possess limited assets and as such may be challenged to make trade-offs in pursuing either effectiveness (differentiated features) or efficiency (lowest cost) (Morgan, Clark, & Gooner, 2002). From a customer perspective, Rogers (1995) argues that new product advantage, trialability, compatibility and observability are positively associated with acceptance of the product, whereas complexity and embedded risks are negatively associated with adoption (Gatignon & Robertson, 1985). The relative advantage of a novel first product (in terms of its uniqueness and features), is positively related to its rate of adoption (Rogers, 1995). Nevertheless, product advantage consistently appears in the literature as the most significant product feature in describing the adoption and success of new products (Montoya-Weiss & Calantone, 1994; Henard & Szymanski, 2001; Langerak et al., 2004; Kim & Atuahene-Gima, 2010). At the same time the product's affordability is vital in emerging markets (Sheth, 2011). In emerging markets there is often a large percentage of the population living below the official poverty level (e.g., Government of India, 2007). Therefore, it is expected that:

H4a: *The greater the first product differentiation the greater the first product performance in NTVs.*

H4b: *The greater the first product cost efficiency the greater the first product performance in NTVs.*

3.2.5 First product performance and overall NTV performance

Some studies within the new product development literature report that new product performance is positively related to overall firm performance (Griffin & Page, 1996; Montoya-Weiss & Calantone, 1994; Langerak et al, 2004). The justification for new product performance becoming progressively more significant to firm (including NTVs) performance is that firms face high levels of competition, quickly changing market environments, increasing rates of technical obsolescence, and shorter product life cycles (Griffin 1997). The same logic exists for the particular context of NTVs in emerging countries (Gruber, 2004; Atuahene-Gima et al., 2006; Lau & Bruton, 2011). In such circumstances, new products (or first products) might serve to accommodate the uncertainties a firm confronts in an entrepreneurial environment particularly in emerging economies. Empirical research discloses the implication of new product performance for overall firm performance. For instance, Griffin (1997) argues that firms acquire 49 percent of their sales revenue from products deployed in the last five years and those new products outcomes are one fourth of the variability in firm overall financial achievements. Likewise, Terwiesh, Loch, and Niederkofler (1998) report that based upon the market type, new product outcomes generate 30 to 70 percent of the firm's profit. Similarly scholars have confirmed the co-relation between the first product outcomes and NTVs survival across some contexts (Song et al., 2010b).

Building on the above reasoning, in the early stages, NTVs need to achieve reputation, legitimacy, resources and external ties to be able to expand their business. Desired sales profit and customer satisfaction can result from a successful first product commercialisation and aid a NTV to garner more financial resources and enhance its reputation to become able to adopt new technologies and run other product projects (Shoonhoven et al., 1990; Atuahene-Gima et al., 2006). Furthermore, a successful first product launch helps entrepreneurs establish external linkages with actors in business environment to build-up reputation and obtain legitimacy (Song et al., 2011). Acquiring cash flows through high sales of the first product provides chances for

recruiting professional employees and attract reputable partners and business investors which can guarantee NTVs growth (Song et al., 2011). Therefore, it is expected that:

H5: *The greater the first product performance, the greater the NTVs overall performance.*

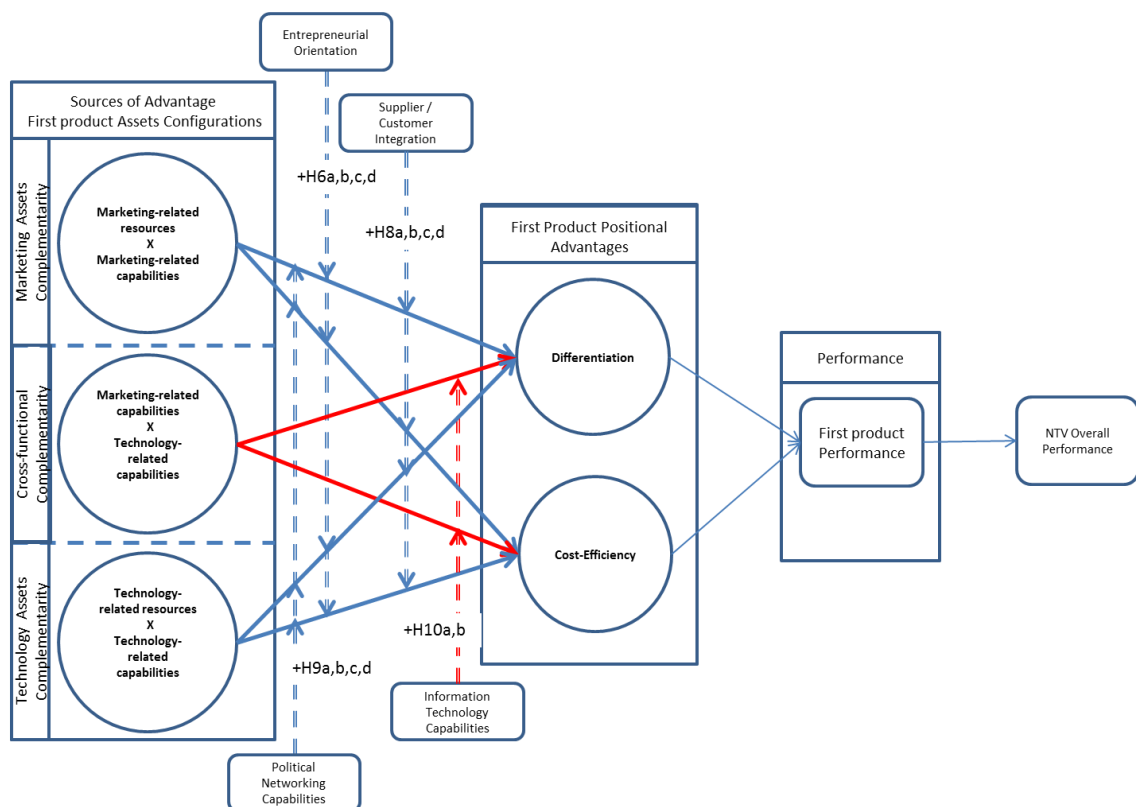
3.3 Moderating effects

As outlined in section 2.7 of Chapter Two, contingency theory asserts that there is no optimum way to create strategy. Instead, the best strategy is contingent upon the internal and external situations (Donaldson, 1996). Contingency factors have been studied extensively in the literature investigating how aspects of the environment and organisational structure (Miller, 1988), technology (Dowling & McGee, 1994), and marketing choices (Claycomb, Germain, & Droege, 2000) interact with strategy variables to determine different dimensions of performance. Contingency theory introduces the notion of strategic “fit-as-moderation” perspective (Venkatraman, 1989). Thus, a contingency factor can be characterized as a moderator when it affects the strength of the association between an independent variable and a dependent variable (Baron & Kenny, 1986). First product advantage is attributable to the interaction between the first product complementary resources and capabilities and other capabilities as contingency factors.

Building on contingency theory and the literature review in section 2.7 in Chapter Two, specific moderator variables (other capabilities) are incorporated into the theoretical framework of first product success which is proposed as Figure 3.1B. Accordingly, the argument is put forward here that NTV’s first product positional advantage achievement (differentiation and cost-efficiency) can be attributable to a match between its resources/capabilities and internal and external (environment) conditions. The occurrence of the effects outlined in the framework (Figure 3.1B) such as, the impact of the interplay among of technology and marketing assets on first product positional advantages can be contingent over other internal and external

resources/capabilities possessed and exploited by NTVs during the first product project. Hence, contingency factors might either augment or hamper the influence of marketing and technology complementary resources-capabilities on first product positional advantages. Incorporating the contingency factors including environmental elements and other inter-organisational factors leads to a better understanding about why and under which conditions the optimal deployments of first product resources and capabilities within and between product functional areas can be translated into positional advantages. As shown in Figure 3.1B, the focus is on contingency factors within the NTV including inter-firm capabilities (i.e. information and communication technology, political networking and EO), which are expected to moderate first product assets and positional advantages relationship. In addition, supplier and customer integration have been incorporated as contingency factors which represent external mechanisms interacting with NTV's internal first product assets.

Figure 3.1B Asset configurations for superior first product performance-moderating effects



3.3.1 Entrepreneurial Orientation (EO)

EO signifies an organisations strategic orientation involving explicit entrepreneurial aspects of decision-making and practices. As such, EO as used in this study relates to how an NTV operates (Lumpkin & Dess, 1996). Based on this view a contention is put forward that EO signifies how an NTV is organized in order to explore and exploit opportunities such as first product commercialisation. Based on RBT, the way that a NTV is organized, when combined with complementary product level resources and capabilities can enhance the positive relationship between assets and first product performance. An argument is put forward that EO captures NTV's organisation toward entrepreneurship and can augment the impact of first product assets.

Wiklund and Shepherd (2003) argue that possessing high level of EO enhances the impact of resources and capabilities on performance. Similarly, Eisenhardt, and Martin (2000) and Griffith et al. (2006) contend that in addition to the resources and capabilities, the EO encompassing strategic behaviours and processes of the firm are critical because they identify the roadmap for an optimal deployment of resources and capabilities when implementing strategies in areas such as product innovation. As discussed in section 2.7.2 of Chapter Two, EO is characterised as a capability (behaviours and decision making activities) emphasizing innovativeness, proactiveness and risk taking in the business (Covin & Slevin, 1989; Miller, 2011); and as a factor in determining how first product resources and capabilities are exploited during the first product commercialisation. Extending Wiklund and Shepherd (2003) work into the context of first product commercialisation, it is argued that while an NTV is endowed with a configuration consisting of marketing resources-capabilities complementarity and technology resources-capabilities complementarity it achieves product differentiation and cost-efficiency positional advantages if it has an EO. EO promotes the ability to capitalize on available marketing and technology complementary resources and capabilities to engage in entrepreneurial activities such as first product commercialisation. In this sense innovativeness

reflects an NTV's tendency towards encouraging new ideas, novelty, radical changes and creative processes hence departing from traditional established technologies and procedures (Covin & Miles, 1999).

Without innovativeness (as an aspect of EO), NTVs would have to pursue traditional ways of doing business; traditional products, traditional distribution channels, etc. Head-to-head competition with established players may result in failure due to resource shortcomings, scale diseconomies, and questionable reputation (Lee et al., 2001). NTVs need to reflect behaviours towards pursuing innovativeness in commercialising breakthrough and low cost market-creating first product. In this sense, founders of NTVs would set procedures and structures for assets exploitation, which encourage NTV's skilled people for idea generation and innovative actions in first product commercialisation (Miller, 2011). Proactiveness reflects a NTV's tendency to pre-empt competition by meeting emerging market needs (Lumpkin & Dess, 1996) through effectively configuring first product resources and capabilities as complementary deployment in product-focused functional areas. Proactiveness denotes NTVs' approach to market opportunities through vigorous market research and first mover actions such as commercialisation of new products/technologies ahead of rivals (Lumpkin & Dess, 1996). Risk-taking behaviour is illustrated by high tolerance of NTVs for taking risks in relation to their business and specifically for the development and marketing of the first product. Risk-taking might result in resource / capabilities commitments to high-risk and high-return projects such as a market creating first product. The willingness to accept risk by the NTVs is illustrated by their decisions to make commitments to uncertain and novel projects (Lumpkin & Dess, 1996; Miller, 1983). Therefore, it is expected that:

H6a: *EO positively moderates the relationship between marketing resource-capability complementarity and first product differentiation.*

H6b: *EO positively moderates the link between marketing resource-capability complementarity and first product cost-efficiency.*

H6c: *EO positively moderates the link between technology resource-capability complementarity and first product differentiation.*

H6d: *EO positively moderates the link between technology resource-capability complementarity and first product cost-efficiency.*

3.3.2 Supplier Integration and Customer Integration

Due to their liability of newness, NTVs may suffer from scarcity in product level assets that help to successfully commercialise the first product and convert the product into an ongoing business (Atuahene-Gima et al., 2006; Song & Di Benedetto, 2008). In this sense, to enhance efficiency and effectiveness in first product commercialisation, NTVs may not rely exclusively on their own complementary resources and capabilities (Lee et al., 2001; Song & Di Benedetto, 2008; Larrañeta, Zahra, & Galán González, 2012). Hence, they may also rely on leveraging assets within their network to obtain complementary assets and access external processes to aid in their own first product commercialisation (Lodish et al., 2001; Song & Di Benedetto, 2008; Cavazos et al., 2012).

Social ties with government, suppliers and customers in business environment may have roots in the context of social capital theory (Nahapiet & Ghoshal, 1998; Acquaah, 2007). Social capital denotes the goodwill available to individuals or groups (Adler & Kwon, 2002). The literature has introduced different dimensions of social capital (e.g., Coleman, 1988; Nahapiet & Ghoshal, 1998). The structural dimension of social capital explains the impersonal pattern of relationships between people or units and is referred to the overall pattern of connections between actors that includes who you reach and how you reach them (Burt, 1992). Among the most important facets of this dimension are the presence or absence of network ties between actors. Establishment of social ties with actors in the business

environment is a vital precursor to the formation of a new product project alliance (Li & Atuahene-Gima, 2001; Atuahene-Gima & Murray, 2007). Building on structural dimension of social capital, it is suggested that social capital networking can lead to integration of suppliers and customers (Rindfleisch & Moorman, 2001; Krause, Handfield, & Tyler, 2007; Zhang & Wu, 2012) in the process of first product commercialisation in NTVs.

Integration can occur through information-knowledge sharing and product co-commercialisation (Lau et al., 2010). Because of limitation in technical and market knowledge in NTVs during the first product project, sharing the knowledge across supply chain (customers and suppliers) provides the chances for product knowledge combination and enhancement of product differentiation (e.g., innovativeness). Further, informal information exchange among suppliers and customers and firms' product development and marketing teams, provide synergy to develop and commercialise successful innovative products and lower the costs of marketing and development operations by increasing efficiency (McDermott & Handfield, 2000). Moreover, scholars have identified suppliers and customers as the key sources of innovative ideas for arousing novel products that can gain high profits for firms (including NTVs) (Baldwin & Hanel, 2003). Real time information about market and technology changes provided by customer and suppliers aids NTVs to obtain an updated knowledge base and aids them to effectively deploy their resources and capabilities for the new product project (Lau et al., 2010). Effective information sharing prevents information asymmetries and consequently leads to higher profit on the new product because development and marketing processes are configured and orchestrated efficiently based on accurate and reliable information sources (Rosenzweig et al., 2003).

The integration of external product focused assets of suppliers and customers into the operations of NTVs may facilitate product commercialisation processes. Integration and cooperation can be transactional and involve NTVs working closely with suppliers and customers to jointly meet cost, quality, and delivery goals (Goffin, Lemke, & Szejczewski,

2006). Supplier and customer integration into firm processes can lead to better product design, reduced operation costs and shorter time to market (Primo & Amundson, 2002). Integrating suppliers and customers operations reduces the risks associated with rapidly changing technology and market needs (Johnston et al., 2004), balance demand, and develop flexibility, and help further the ideals of collaborative problem solving (Goffin et al., 2006). Early joint production can be a foundation for collaborative product commercialisation with other actors (customer and supplier) to increase the chance of developing and marketing radical innovations to capture the market and generate high sales (Song & Di Benedetto, 2008). Early integration assists market linking capabilities to establish close ties with key actors to accumulate knowledge about the market and actively deal with enquires from the demand side. Integration of marketing processes leverages an NTV's marketing assets with the specialized resources and capabilities of its suppliers to produce a more competitive offering in the marketplace (Bucklin & Sengupta, 1993).

It is expected that customer integration into the first product commercialisation process enhances the impact of marketing and technology-related assets in NTVs. During the first product commercialisation process, customers express their point of view about expectations; suggest improvement possibilities and new features use the prototypes that all provide deep knowledge about their needs to the firm. Profound knowledge about customer's expectations helps the firm better meet customer needs in terms of price and product characteristics (Von Hippel, 1988). Moreover, customers by providing diverse knowledge can help to increase the speed of learning, adaptation and development process which then can lead to higher innovative products encompassing specification that comply with customer needs. Market information provided by customers at early stages, helps NTVs to devise effective pricing, sales strategies also arrange effective launch and promotion tactics to introduce product to the market. Therefore, it is expected that:

H7a: *Supplier integration positively moderates the link between marketing resource-capability complementarity and first product differentiation.*

H7b: *Supplier integration positively moderates the link between marketing resource-capability complementarity and first product cost-efficiency.*

H7c: *Supplier integration positively moderates the link between technology resource-capability complementarity and first product cost-efficiency.*

H7d: *Supplier integration positively moderates the link between technology resource-capability complementarity and first product differentiation.*

H8a: *Customer integration positively moderates the link between marketing resource-capability complementarity and first product differentiation.*

H8b: *Customer integration positively moderates the link between marketing resource-capability complementarity and first product cost-efficiency.*

H8c: *Customer integration positively moderates the link between technology resource-capability complementarity and first product cost-efficiency.*

H8d: *Customer integration positively moderates the link between technology resource-capability complementarity and first product differentiation.*

3.3.3 Political Networking Capabilities

Institutional theory contends that politicians administer regulations and consider implementation systems that ease market exchanges and interactions (Fligstein, 1996). The institutional environment includes regulations, norms, rules and codes of conducts and their implementation via legal sanctions. Institutions perform an important role in regulating firms and providing stable intuitions for the organisation's initiatives (Sheng et al., 2011). In the context of firms, governments dictate regulations over entities including their pricing rules, licences,

environmental laws, labour rules etc. that all provide structure and guideline for market transactions (Hillman & Hitt, 1999). On the other hand, political networking capabilities as the social capital of NTVs' founders in emerging economies enhance NTVs' environmental fit that leads to securing valuable product-related resources such as loans and rewards from governments for product and technology innovation projects (Hillman & Hitt, 1999; Li & Zhang, 2007).

Further, the founder's political networking capabilities (as their social capital) enable NTVs to overcome their shortcoming in accessing external sources for financial resources (Li & Zhang, 2007) and attain tax exemption, subsidies and R&D research funding (Faccio, Masulis, & McConnell, 2006). Further, in the context of intuition and social capital theories scholars have asserted that political networking capabilities can provide a conduit of market and regulation information which increase the level confidence for the NTV in investing and leveraging its resources and capabilities in product commercialisation projects. This confidence implies that NTVs may commercialise new products and technologies that government prefer. As a result, NTVs may enjoy exemption of paying –off external resources investment in their product and technology innovation projects. Finally, political networking capabilities may provide NTVs with legitimacy and this will encourage customer to buy their innovative products because of trust (Suchman, 1995). Focusing on the specific period of first commercialisation, an argument is advanced that possessing high level political networking capabilities (social capital) by the founders, secure the space of innovation and breakthrough developments by NTVs, hence they will have the chance to better organise their first product assets portfolio and to some extent acquire legitimacy which facilitate their later marketing actions. Hence, in relation to the first product, political networking capabilities provide freedom to NTVs to capitalize on market creation and launching products with exclusive value such as competitive prices and unique features. Therefore, it is expected that:

H9a: *Political networking capabilities positively moderate the link between marketing resource-capability complementarity and first product differentiation.*

H9b: *Political networking capabilities positively moderate the link between marketing resource-capability complementarity and first product cost-efficiency.*

H9c: *Political networking capabilities positively moderate the link between technology resource-capability complementarity and first product differentiation.*

H9d: *Political networking capabilities positively moderate the link between technology resource-capability complementarity and first product cost-efficiency.*

3.3.4 Information and Communication Technology (ICT) Capabilities

For marketing and technology capabilities to complement each other and reach a synergy, a systematic collaboration between the two functional areas is required in terms of knowledge management and communication (Pinto & Pinto, 1991; Song & Song, 2010). An argument is raised that first product capabilities cannot fully benefit from their complementarity unless they achieve a high level of integration through exploitation of ICT capabilities during the first product commercialisation process. Scholars have underscored the importance of cross group collaboration for first product projects within NTVs (Marion et al., 2012). The ability to adopt ICT-based solutions has been proposed as a mechanism by which internal and external communication is facilitated to support inter-firm capabilities (DeSarbo et al., 2005; 2006; Mithas et al., 2011). ICT capabilities refer to accumulated skills and processes, which exploit computer-based applications across the firm to ease communication and knowledge management during the new product project (Day, 1994; DeSarbo et al., 2005; 2006).

Knowledge exchange is not limited to the new product functional areas within the firm, rather ICT capabilities can enhance external communication and knowledge sharing with customers and suppliers and other members throughout the value chain channel (DeSarbo et al.,

2006; Song & Song, 2010). Leveraging ICT capabilities leads to flexibility of the processes, efficiency of the operations and expediting the processes and novel idea generation during the first product development and commercialisation (Bharadwaj, 2000). An argument is raised that NTVs need high levels of coordination (attained by ICT capabilities) between their internal capabilities as well as among internal and external operations involved in the first product project.

During new product commercialisation, new information and knowledge is being generated and analysed from the internal teams and external partners for the purpose of decision-making and essential changes in relation to new product commercialisation processes (Durmuşoğlu & Barczak, 2011). In this regard, ICT capabilities operate as a facilitator in knowledge management processes during new product development (Song et al., 2010a; Grover & Kohli, 2012). According to Song and Song (2010), the ability to effectively utilise computer-based applications such as e-mail, file sharing and web-based video meetings can lead to expanding the level of interaction among the employees in new product teams (marketing and technology) and with the external partners. Exploiting ICT capabilities to utilise these applications ease more frequent communication, keep the system more updated as it enhances the level of information sharing and finally leads to reduced costs in the operations (Hameri & Nihtila, 1997; Baharadwaj, 2000). Further, new product teams and external partners by using computer-based application will acquire higher level of coordination and will be informed about the progress of different inter-dependent tasks. Sharing files, information and presentation can help all the involved areas to get familiar with customer taste, which then leads to the design and development of a more attractive product. Sharing views (by ICT systems) among marketing and product development people about different market opportunities and capacities to create market may lead to generation of unique concepts /ideas and finally leads to highly differentiated products (Durmuşoğlu & Barczak, 2011).

Exploitation of ICT capabilities in establishing databases and file sharing portals, allow members of the product team, as well as external partners easy access to the information in rapid time and easier manner (Song & Song, 2010). Further, through ICT having access to a list of potential customers / suppliers could provide access for the marketing people to effectively keep communication with channel members who are key sources for innovative ideas and then provide valuable information for the R&D team (Harrigan, Ramsey, & Ibboston, 2011). Technical documents can be easily updated and circulated among different engineering, design and manufacturing people and prevent information asymmetry at different levels and help to keep the consistency in the operations (internally and externally). Easy access to information will decrease operation costs as it shortens the time to access market-technical data and ease decision makings and eventually update other departments about the changes. Therefore, it is expected that:

H10a) *ICT capabilities positively moderate the relationship between the marketing and technology capabilities complementarity and first product differentiation.*

H10b) *ICT capabilities positively moderate the relationship between the marketing and technology capabilities complementarity and first product cost-efficiency.*

3.5 Conclusion

Theory development is a vital constituent element of any research. A theory encompasses an interrelated set of statements, consisting of some law like generalization that can be empirically examined. Configuration, contingency, complementarity and positional advantage theories were utilised to address the gaps in the first product literature with aim of establishing a theory to unpack the first product commercialisation process. Two series of hypothesis were provided including the direct and moderating effects set out within the proposed conceptual model (in two parts: 3.1A and 3.1B), articulating the view that NTVs achieve superior first product

performance and improved overall performance by accumulating and deploying configurations of product-focused assets (marketing and technology) deployed in a complementary fashion.

Further, building on contingency theory, studies' theory was developed articulating that achieving complementarity between resource-capability in each of product-focused functional areas and between the capabilities of product-focused functional areas is highly contingent on the adoption of other capabilities and mechanisms. Therefore, supplier integration, customer integration, ICT capabilities, EO and political networking capabilities were incorporated to the model in Part 3.1B. By building on social capital theory, supplier and customer integration were introduced to the model as involvement mechanisms (in the form of information exchange and product co-commercialisation) and expected to support NTV's commercialisation processes. EO was characterised as a significant managerial capability (encompassing orientation towards innovativeness, proactiveness and risk taking) to support the effective orchestration and exploitation of first product assets. To manage the uncertainty in the environment of emerging markets, the theoretical framework was informed by the moderating role of political networking capabilities as a facilitator in commercialisation process providing the chance for founders to secure resources from external environment to enhance efficiency and effectiveness. Building on the role of new product cross-functional integration and the significance of knowledge exchange/communication during the first product commercialisation, ICT capabilities (i.e. ability to use computer-based applications) were hypothesised to enhance the influence of complementary marketing-technology capabilities on first product positional advantages.

CHAPTER FOUR

Research Design

4.1 Introduction

Chapter Three focused on developing the theoretical framework, labelled the “asset configurations for NTV’s superior first product commercialisation” which was presented in two parts encompassing direct effects in Part A and the contingency effects in Part B (Figure 3.1A and 3.1B). In addition, in Chapter Three, hypotheses were developed to test the theory outlined in the theoretical framework. The theory proposed that NTVs need to accumulate and deploy a specific configuration of requisite product level resources and capabilities at the start-up stage to be able to achieve market place advantages through their first product commercialisation. Within the theory, the inter-dependence of configuration elements in terms of resource-capability and capability-capability complementarity was argued to enhance the effectiveness and efficiency of NTVs and provide first product differentiation and cost-efficiency. Furthermore, the theory proposed that the outcomes achieved from the first product could significantly influence the overall NTV’s performance. In addition, the theoretical framework illustrated the role of contingency factors, which enhance or impede the impact of complementary between first product assets and NTV’s first product positional advantages.

Two groups of hypotheses underpinning the theoretical framework were developed in Chapter Three. Hypotheses 1 to 5 focus on the relationships among the primary constructs, first product resources and capabilities, first product positional advantages, first product performance and overall NTV performance, based on the “source of advantage - positional advantage - performance” framework (Day & Wensley, 1988). Moreover, hypotheses 6 to 10 focus on the influence of the contingency factors supplier and customer integration, EO, ICT capabilities and

political networking capabilities (Figure 3.1B) and how these moderate the relationships proposed in the first group of hypotheses (1 to 5: Figure 3.1A).

This chapter focuses on the research design and provides a discussion of the implementation of the research. Chapter Four elaborates on the methods and processes implemented to complete the study to gather the data for theory testing. Chapter Four continues as follows, section 4.2 describes the research paradigm of the study and identifies which approaches are used in the study. Sections 4.3 to 4.6 outline the research design process including planning, design and implementation. The discussion of each of the stages includes detailed elaboration on the steps and procedures. Then data collection method, measurement protocol, sampling, data analysis techniques to be employed, project budget and timeframe are discussed.

4.2 Research Paradigms

The choice of a suitable research paradigm provides guidance on how the research should be designed and implemented (Coffey & Atkinson, 1996). It refers to patterns of beliefs and practices that regulate inquiry within a discipline by providing lenses, frames and processes through which investigation is accomplished (Weaver & Olson, 2006). Choosing the research paradigm depends on the objectives of the research and the phenomenon under investigation (Denzin and Lincoln, 2000; Cavana, Delahaye, & Sekaran, 2001). While there are a range of research paradigms, especially in the social sciences, research paradigms can be placed into two broad groups: positivism and interpretivism (Weber, 2004; Aaker, Kumar, & Day, 2004). Positivism underpins quantitative research, which denotes the systematic empirical study of social phenomena by means of statistical, mathematical or computational techniques (Fife-Schaw, 2012). The purpose of quantitative research is to develop and utilise mathematical models typically to test theories and hypotheses. Quantitative research is argued to be an objective, deductive approach, which commences with theoretical assumptions and uses

evidences to support or reject a particular hypothesis (Cavana et al., 2001; Goertz & Mahoney, 2012). Interpretivism underpins qualitative research. Qualitative methods are defined as “any type of research that produces findings not arrived at by statistical procedures or other means of quantification” (Strauss & Corbin, 1998, p. 11). A qualitative approach refers to an interpretive study of a specified issue or problem in which the researcher is central to the sense that participants make (Banister, Burman, Parker, Taylor, & Tindal, 1994). Qualitative research includes exploratory or descriptive studies which seek to reveal the experiences of people and entities, their perceptions and the meaning people attribute to these experiences (Denzin & Lincoln, 1994), which finally leads to theory development in data systematically collected and analysed (Strauss & Corbin, 1994). Hence, qualitative research applies a subjective and inductive perspective (Smith, 1983) and pays more attention to verbal analysis than the statistical analysis.

The literature review in Chapter Two identified that research in the marketing and new product development domains focusing on the antecedents of product success has often adopted a positivistic approach, utilising quantitative methods (e.g., Langerak et al., 2004; Kim & Atuahene-Gima, 2010; Song et al., 2010a; Song et al., 2011; Atuahene-Gima & Wei, 2011; Ngo & O’Cass, 2012a). Since the major intent of the study was to examine a series of hypotheses predicting relationships among specific constructs outlined in Figures 3.1 A and 3.1 B, the positivism paradigm suits the study.

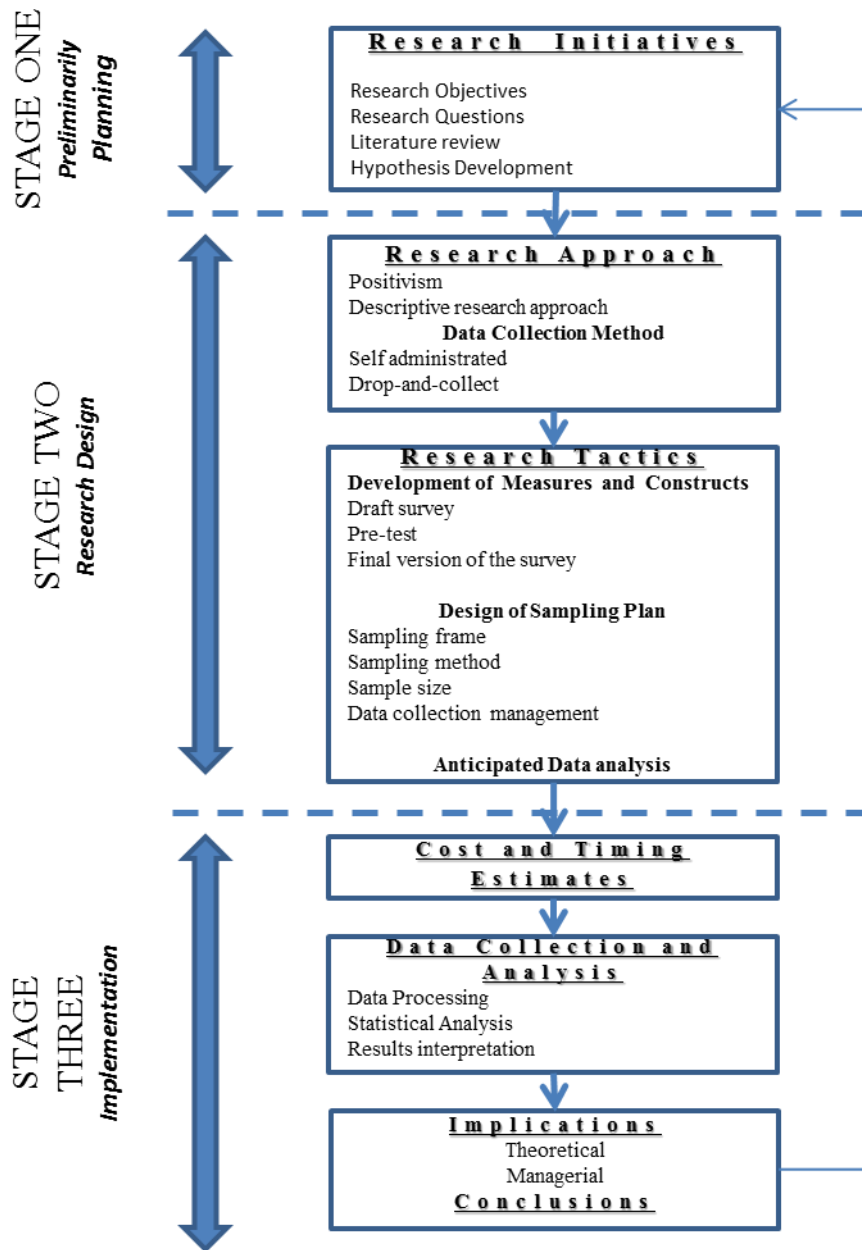
After identifying the appropriate research paradigm, the focus turned to identifying an appropriate research framework. To this end the work of Hair et al. (2002) and Aaker et al. (2004) was followed to develop a research design to link the research questions and data to test the theory. Drawing on the approach outlined by Aaker et al. (2004), four questions were identified as important in designing the study:

- 1- What are the research questions?

- 2- What is the population of interest?
- 3- What is the research and sampling design?
- 4- How will the data be analysed?

Based on the research design frameworks of Hair et al. (2002) and Aaker et al. (2004) the process outlined in Figure 4.1 was developed. Figure 4.1 outlines three major stages with stage One encompassing the preliminary planning stage including problem identification, research questions and conceptual framework development. Stage Two (research design) encompasses the research approach, data collection method, development of measures, sampling plan and data analysis methods. Stage Three (implementation) includes the budget, time frame of the project, data collection, analysis, implications and conclusions.

Figure 4.1 The research design process



Developed from Hair et al. (2002) and Aaker et al. (2004)

4.3 Stage One: The preliminary planning stage

According to Aaker et al. (2004), the preliminary planning stage includes several tasks covering the problem identification, development of the research questions, articulation of the theoretical framework, and justification of the research. Chapter One identified the research objectives and the justification for the study. Moreover, the literature review provided in Chapter Two and the theory developed in Chapter Three provided the theoretical grounding that directed the development of the methods designed to examine the interrelationships reflected in the theoretical framework (Figure 3.1A and 3.1B) of the study. The tasks outlined as part of the preliminary planning stage were accomplished through the work undertaken in Chapters One, Two and Three. This section elaborates how problem identification, development of the research questions and the theoretical framework were accomplished.

4.3.1. Problem identification and research questions development

Punch (2005) and Ridenour and Newman (2008) suggest a hierarchical approach that helps identify the research domain and develop general and specific research questions in that domain. Hierarchical approach is a deductive process for developing research questions, organising the research (in terms of general research objectives) and directing the empirical processes (specific research questions). The research domain outlined within the theoretical framework (Figure 3.1 A and B) encompasses configuration of product-level resources and capabilities, product positional advantages, product performance and overall firm's performance in the context of first commercialisation by NTVs. The research domain is a prerequisite to generate general research questions. General research questions capture research objectives which were outlined in Chapter One. Afterwards, specific research questions were developed to capture general research questions.

The general questions are as following: how important is marketplace performance of the first product to NTVs growth and development in India? What are the optimal exploitation

mechanisms of product level resources and capabilities for successful first product commercialisation by NTVs in India? Seven specific research questions are developed based on general research questions as following:

- 1- To what extent does marketing resource-capability complementary enhance first product positional advantages: product differentiation and cost-efficiency in NTVs?
- 2- To what extent does technology resource-capability complementarity enhance first product positional advantages: product differentiation and cost-efficiency in NTVs?
- 3- To what extent does the complementarity between marketing and technology capabilities enhance first product positional advantages: product differentiation and cost-efficiency in NTVs?
- 4- To what extent do first product positional advantages in the form of product differentiation and cost-efficiency enhance first product performance in NTVs?
- 5- To what extent does first product performance influence overall NTV performance?
- 6- To what extent is the relationship between product-level resource-capability complementarity and first product differentiation and cost efficiency contingent on political networking capabilities, supplier integration, customer integration, and EO in NTVs?
- 7- To what extent is the effect of cross-functional capability complementarity on first product differentiation and cost-efficiency contingent on the deployment of ICT capabilities in NTVs?

In Chapter Three, ten hypotheses were proposed to explain the theoretical relationships among the constructs of interest in the theoretical model (Figure 3.1A and 3.1B). The hypotheses developed in chapter Three link the theory and the empirical data and help answer the research questions.

4.4 Stage Two: Research design stage

According to Hair et al. (2002), Stage Two refers to the development of a plan including the methods and procedures used for data collection, measures and analysis of the data (Figure 4.1). The research design stage includes two major parts, (1) the research approach, and (2) the research tactics. The research approach pertains to issues associated with identifying the research paradigm and the data collection method used. Research tactics focus on the issues associated with the processes of measure development, design of the sampling plan and anticipated data analysis method.

4.4.1 The research approach

As indicated in Figure 4.1, the research approach outlined in Stage Two indicates how the information should be acquired. As previously discussed in section 4.2 the study adopted a positivist approach (using quantitative methodology). Quantitative research methods can be categorised into three main approaches: casual, exploratory and descriptive (Aaker et al., 2004). Causal research is the testing of a hypothesis premised on the cause and effect of one variable or variables on another. In fact, casual research tries to deduce causation of identified relationships (Cavana et al., 2001; Herbst & Coldwell, 2004). Exploratory research is a type of research conducted for a problem that has not been clearly defined (Hair et al., 2002). This type of research does not provide conclusive outcomes from which a specific course of action can be recommended. Descriptive research is utilised when the research objective is to determine the extent to which a specific variable is related to actual phenomenon. This approach describes the extent that a hypothesised relationship or specific effects exists (Malhotra & Grover, 1998; Hair et al., 2002). Based on the formulation of the hypotheses developed in Chapter Three which underpin the relationships outlined in Figure 3.1A and Figure 3.1B, descriptive research is an appropriate approach for the study. To examine the theory

underpinning the framework, hypotheses were proposed, outlining a specific set of direct and moderating effects and in this regard descriptive research is appropriate.

4.4.2 Data collection method

As is shown in Figure 4.1, choosing an appropriate data collection method is a critical decision in the research process design. According to the nature of the study, primary data were needed to test the theory and hypotheses. Drawing on Cavana et al. (2001) the study adopted survey based method-among the identified methods- for data collection of acquiring primary data for quantitative descriptive research. A survey denotes “a pre-formulated written set of questions to which participants record their answers, usually within largely closely defined alternatives” (Sekaran, 1992, p. 200). Via the data gathering process of questioning, survey based method provides a quantitative explanation of a segment of the population consisting a sample which can be generalised to a larger population (Creswell, 1994). Surveys are beneficial, in a case that researchers are not able to observe the phenomenon directly. Observation includes recording a behaviour or phenomenon while it is occurring. As a matter of fact a survey permits the researcher to rebuild the phenomena through the knowledge and thoughts of the informants who have witnessed the phenomena. Taking this approach helps to obtain data from a large sample size in the target population at a relatively low cost, using developed measures (Cavana et al., 2001). Further, survey based method has been commonly used within the management and marketing disciplines for a long time. Particularly, survey based methods have been used extensively in studies of new product commercialisation (e.g., Lee et al., 2001; Atuahene-Gima, 2005; Song et al., 2005; Atuahene-Gima et al., 2006; Li & Zhang, 2007; De Luca & Atuahene-Gima, 2007; Gruber et al., 2010; Song et al., 2010a; Song et al., 2011) with good outcomes. As a result, the decision was made in the study to adopt a survey-based approach.

Survey data can be collected through (1) person-administered and (2) self-administered methods. These methods can be executed through paper and pencil, computer and telephone

procedures (Robson, 2002; Wong & Ramsaran-Fowdar, 2012). The person-administered method includes paper-based and phone-based approaches and can be implemented through interviews while both the researcher and respondent(s) are involved and interact (Vallaster & Hasenohrl, 2006; Roster, Rogers, Hozier, Baker, & Albaum, 2007). This approach increases the possibility of a higher response rate, but may increase the financial and time costs of data collection, and may also cause interview bias (Robson, 2002).

The self-administered method includes computer-based and paper-based approaches. Computer-based approach can be executed through e-mail, web-based survey or providing the respondent with the electronic file of the survey. Adopting a computer-based approach provides researchers with advantages such as speed in data collection and reducing interviewer bias, but at the same this approach involves high set-up expenses and confidentiality issue of the information exchanged (Moutinho & Chien, 2007). However, there is also the possibility for low response rates, especially when the survey is long and respondents spend a long time to complete it (Kaplan, Sieber, & Ganiats, 1997). As an example, web-based methods such as “Survey Monkey” may have advantages related to the expenses and speed of data collection plus data quality. Nevertheless, they can be biased by low and selective participation (Heiervang & Goodman, 2011). The self-administered paper-based approach has been identified as one of the cost efficient methods, which may enable the researcher to acquire large amount of data and reduce interviewee bias. However, issues such as the length of the survey may cause issues for the respondents and decrease response rates (Heberlein & Baumgartner, 1978; Steele, Schwendig, & Kilpatrick, 1992).

Considering all the advantages and disadvantages of the survey administration procedures, the study adopted the paper-based, self-administered method. An examination of the literature shows that researchers often utilise two data collection techniques while adopting the paper-based self-administered approach, including a mail survey and drop-and-collect (Ibeh et al., 2004; O’Cass and Sok, 2012). In the mail survey technique, researchers utilise postal

services to mail the survey to respondents', or they might use technology delivery devices such as fax machine. In the drop-and-collect technique, the research team drop and collect the surveys personally (Walker, 1976; Hoinville, 1983). Although the mail survey technique has advantages such as, capturing a wide sample of respondents, its response rate is often reported to be less than the drop-and-collect technique (Chetty, 1996; Brock & Ibeh, 2004).

Utilising the drop-and-collect technique has been effective especially for emerging economies (the context of the study as indicated in section 1.2, Chapter One) because of their collectivist culture which appreciates face-to-face communications for information exchange (Brock & Ibeh, 2004; Li & Zhang, 2007; Ngo & O'Cass, 2009; Soltani & Wilkinson, 2011). In addition, because of the poor postal infrastructure in many emerging countries, researchers have often adopted the drop-and-collect approach (Mytton, 1996; Ibeh et al., 2004; Sok & O'Cass, 2012). Further, Ibeh et al. (2004) argue that drop-and-collect technique increases the response rate compared to other survey delivery procedures and expectations were that a 40 - 90% response rate could be achieved (Balabanis & Diamantopoulos, 2004). Hence, the drop-and-collect technique was deemed most suitable for the present study's data collection.

4.5 The research tactics

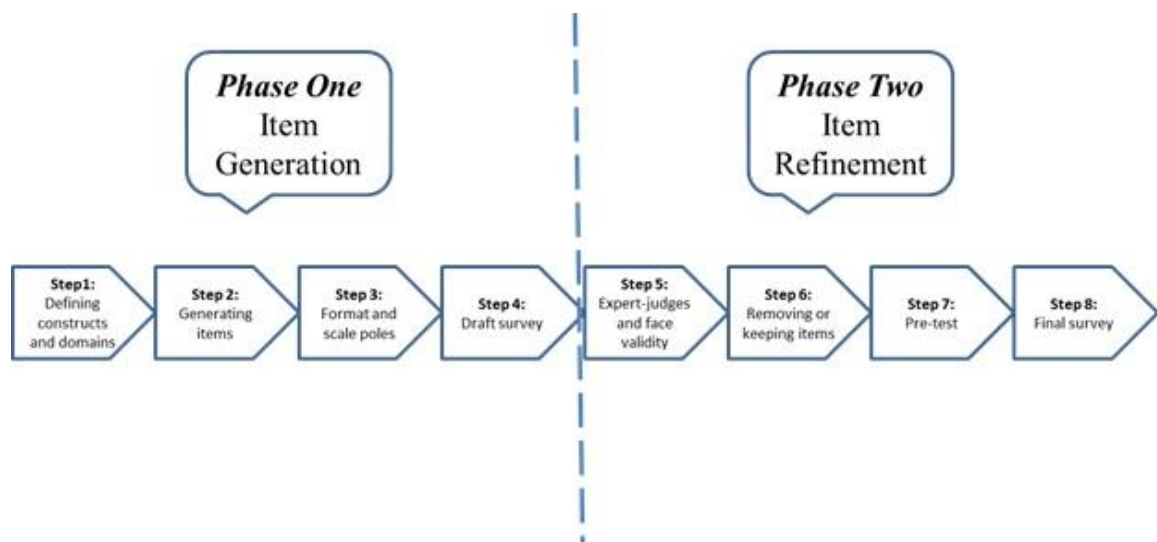
As indicated in section 4.4 of this chapter, the study adopted the descriptive research approach and drop-and collect technique. As indicated in Figure 4.1 the next task in Stage Two was to choose the appropriate research tactics. This task consisted of a) developing measures of the constructs, b) identifying frame, size and methods for sampling and determining data collection method, and c) anticipated data analysis.

4.5.1 Development of the measures of constructs

As indicated in Figure 4.1, the first task in identifying research tactics in Stage Two is generation of the measures. The purpose of measurement in theory testing is to provide an empirical assessment of each theoretical construct. Cronbach and Meehl (1955) define a

hypothetical construct as “a concept for which there is not a single observable referent, which cannot be directly observed, and for which there exist multiple referents, but none all-inclusive”. In particular, latent variables or constructs should be measured before their relationships can be tested. Latent variables refer to variables that are not directly observed but are rather inferred (through a mathematical model) from other variables that are observed (directly measured). The measurement development process consists of set of procedures and steps applied to generate measures for a specific construct. The study adopted the procedures outlined by Churchill (1999) and Churchill and Iacobucci (2009), following the two-phase model including item generation and item refinement illustrated in Figure 4.2.

Figure 4.2 Measurement development procedure



Adopted from Churchill and Iacobucci (2009)

4.5.1.1 Phase One: Item generation

Step 1: defining constructs and domains

As indicated in Figure 4.2, the first step of the measurement development process relates to defining constructs and their domains. The theoretical model (Figure 3.1A and Figure 3.1B) proposed in Chapter Three involves thirteen constructs consisting of: (1) marketing resources, (2) marketing capabilities, (3) technology resources, (4) technology capabilities, (5) first product-differentiation, (6) first product-cost efficiency, (7) first product performance, (8) overall NTV performance, (9) information technology capabilities, (10) EO, (11) political networking capabilities, (12) supplier integration and (13) customer integration. Definitions of all the constructs of interest were derived through the literature review presented in Chapter Two (sections 2.2.3.1 and 2.2.3.2) and Chapter Three (sections 3.2.1, 3.2.2, 3.2.4 and 3.3) and are presented in Table 4.1.

Table 4.1 definitions of constructs

Construct	Definition
Marketing resources	<ul style="list-style-type: none">• Refer to the level of static marketing assets possessed by NTVs for first product commercialisation including the marketing budget and market knowledge.<ul style="list-style-type: none">○ Marketing budget refers to the financial resources (cash flow) possessed for marketing processes implementation during the first product commercialisation (Song et al., 2011; Gruber, Heinemann, Brettel, & Hungeling, 2010).○ Market knowledge refers to the depth, breath, tacitness and specificity of information utilised by the NTVs in relation to customers, competitors' strategies and regulations of the market environment during the first product development and launch (Kohli & Jaworski, 1990; De Luca & Atuahene-Gima, 2007).
Technology resources	<ul style="list-style-type: none">• Refer to the level of static technology assets possessed by NTVs for first

Construct	Definition
	product commercialisation including financial and physical.
	<ul style="list-style-type: none"> ○ R & D budget denotes the financial resources (cash flow) acquired or possessed by NTVs to invest in running their first product research, engineering, development and manufacturing project (Song et al., 2011). ○ Physical resources refers to the plants, machinery, test and production equipment providing the infrastructure for the development, testing and manufacturing of the first product in NTVs (Sirmon & Hitt, 2009; McKelvie & Davidsson, 2009; Zahra & Bogner, 2000).
Marketing capabilities	Refers to the accumulated bundles of skills and related processes to undertake and coordinate marketing planning, sales, pricing, promotion, product launch and market linking functions (Vorhies & Morgan, 2005; DeSarbo et al., 2006; Song et al., 2010a).
Technology capabilities	Refers to the accumulated bundles of skills and related processes to undertake new product and technology design, engineering, formulation, development, manufacturing processes, forecasting technological changes and quality control functions (Lee, Lee, & Pennings, 2001; Moorman & Slotegraaf, 1999; Song et al., 2005; DeSarbo et al., 2006).
First product differentiation	Refers to distinct attributes of the first product that presents a superior value proposition to the target market consisting of attributes including superior quality and design, extended features and functions, reliability, long lasting and technical performance of the offered product comparing to competitors (Day, 1994; Day & Wensley, 1988; Kim & Atuahene-Gima, 2010).
First Product cost-efficiency	Refers to distinct attributes of the first product that presents the commercialisation operations at a lower cost than its competitors (Day & Wensley, 1988). Operations encompass (information processing, production, manufacturing and distribution processes) during the commercialisation process (Kim & Atuahene-Gima, 2010).
First product performance	Refers to the extent that a first product meets the objectives in terms of profitability, sales growth and customer satisfaction (Lau et al., 2010).
NTV overall performance	Refers to the extent that a NTV has met its overall goals in terms of growth, development, products / services performance, operations profit since its

Construct	Definition
	establishment comparing to strongest rivals (Gruber et al., 2010).
ICT capabilities	Refers to the level of skills and process in adopting and integrating ICT-based solutions to first product commercialisation (Day, 1994; DeSarbo et al., 2006).
Political networking capabilities	Refers to the abilities in NTVs to establish close ties with government and politicians (Xin & Pearce, 1996; Li & Atuahene-Gima, 2001; Li & Zhang, 2007).
Entrepreneurial orientation (EO)	Refers to the strategic proclivity of NTV leaders (i.e. founders) reflecting particular entrepreneurial aspects of practices, methods and decision-making styles (Miller, 2011). Includes sets of distinct behaviours that have the qualities of innovativeness, proactiveness and risk taking (Covin & Slevin, 1989).
Supplier integration	Refers to sharing information regarding production processes as well as working (in terms of processes integration) with suppliers (Rosenzweig et al., 2003).
Customer integration	Refers to sharing information regarding production processes as well as working (in terms of processes integration) with customers (Rosenzweig et al., 2003; Lau et al., 2010).

Step 2: Generating the items

As indicated in Figure 4.2, step 2 in the item generation process includes the development of items to measure the constructs. Theoretical (or latent) constructs cannot be directly observed nor measured; hence they are measured or estimated indirectly by generating a set of items to tap the domain (Bianconcini & Cagnone, 2012). Constructs are seen as “phenomena of theoretical interest which cannot be directly observed and have to be assessed by manifest measures” (Diamantopoulos, Rife, & Roth, 2008). Latent constructs can be incorporated into and be evaluated in measurement models and structural models. Structural models detail relationships among latent constructs (Tomarken & Waller, 2003). Measurement models denote relationships between latent constructs and their measures (i.e. items or indicators) (Tomarken & Waller, 2003). Measurement models differ in accordance with the assumed path of causality between the latent construct and its measures (MacKenzie, 2003). Latent constructs can cause

their measures or they can be assumed to result from the measures. When the direction of causality is from the construct to its measures, reflective measurement models are used and found suitable (Jarvis, MacKenzie, & Podsakoff, 2003). The measures in such models are also called reflective indicators. In cases that the direction of causality is from the measures to the construct, formative measurement models are fitting (Jarvis et al., 2003). The measures in such models are usually defined as formative indicators.

Rather than the direction of causality reflective and formative measurements have other characteristics that separate them. For instance, in reflective measurement models the measures are assumed to reflect the same, unitary latent construct and interchangeable with one another. Hence high correlations between the measures are desirable and internal consistency is expected (MacKenzie, Podsakoff, & Jarvis, 2005; Covin & Wales, 2011). On the other hand, in formative measurement the measures are not interchangeable, and each is taken to signify a vital part of the conceptual domain of the latent construct (Jarvis et al., 2003). Based on the conceptualisation of the constructs of interest provided in Table 4.1, Chapter Three and this Chapter (Table 4.1), both reflective and formative modelling are used for the constructs of interest. More details in relation to the application of reflective measurement and structural models is provided in Chapter Five (data analysis) in sections 5.4.1 and 5.4.2 as part of the analysis discussion.

Models can be pure models (containing only formative or reflective constructs) or mixed models (containing both formative and reflective constructs). First-order measurement models postulate relationships between one-dimensional latent constructs and their indices (MacKenzie et al., 2005). Higher-order measurement models postulate relationships between the levels of multidimensional constructs and their measures. A multidimensional construct consists of a number of inter-related dimensions. In case of multidimensional constructs, it is essential to separate (at least) two levels of analysis; (1) the level linking manifest indicators to (first-order) dimensions, and a second level linking the each dimensions to the (second-order) latent

construct (Jarvis et al., 2003; MacKenzie et al., 2005). If the first-order dimensions and second-order latent construct within the measurement model are both reflective, with causality flowing from those factors to their measures or both formative with causality flowing from the measures to those factors, the measurement model is a pure reflective or pure formative higher-order factor model. Otherwise, the higher-order model is mixed. Based on Jarvis et al. (2003), four types of measurement models can be identified and employed. (1) Type I model which signifies reflective first-order and reflective second-order configuration. (2) Type II model which signifies reflective first-order and formative second-order configuration. (3) Type III which signifies formative first-order and reflective second-order configuration and (4) Type IV which signifies formative first-order and formative second-order configuration.

Based on the model configuration and theoretical conceptualization of the constructs of interests, marketing capabilities, EO, supplier integration and customer integration which contain reflective first-order dimensions and a formative second-order configuration were operationalised as a first-order—second order (type II) model. Similarly marketing and technology resources have been operationalised as first-order—second order type II model. The remaining constructs were operationalised as first-order reflective constructs including first product positional advantages, first product performance, technology capabilities, information technology capabilities, political networking capabilities and NTV overall performance.

The literature review undertaken in Chapter Two indicated that the measures used for marketing capabilities in first product literature were vague and not comprehensively capturing the critical sub-functions of marketing in NTVs. In addition, technological physical resources had never been measured in the context of first product and none of the measures used in literature had captured all critical aspects of physical resources for a technology firm such as NTV. Following Churchill's model, a deductive item generation approach was applied to generate a pool of items for marketing capabilities and physical resource component of the technology resources construct (Hair et al., 2002). To create the pool of items, a comprehensive

literature review was undertaken following Netemeyer, Bearden, and Sharma (2003). Based on the conceptualisations and measures found in chapter Two, an item pool for physical resources and marketing capabilities was developed. Researcher judgement was applied to select the items and refine them to suit the context of the study following the arguments of DeVellis (2003) and Worthington and Whittaker (2006). Details about the studies used for the item pool and the chosen items are provided in the following sections. Furthermore, all the measures used for the study have been provided in terms of Survey A and Survey B as Appendix II and Appendix II.

Measures for core constructs

Technology capabilities

Focusing on the conceptualisation of technology capabilities as bundles of skills and related processes which exploit complementary technology resources to undertake and coordinate product development activities, six items were adopted from DeSarbo et al. (2006) and Song et al (2005). The items captured the level of NTV's abilities in design, engineering, and development, manufacturing processes, forecasting technological changes and quality control functions (DeSarbo et al., 2006; Lee et al., 2001; Moorman & Slotegraaf, 1999; Song et al., 2005) during the first product commercialisation project. Following DeSarbo et al.'s (2005; 2006) approach, technology capabilities were measured with reference to the major competitors of NTVs. Examples of the items in this scale are:

In relation to your firm's first product launch project and comparing your firm to your major competitors, rate your firm in the following areas. In...

...new product (or service, if applicable) development capabilities, we are

...manufacturing processes, we are

Technology resources

A pool of items was created by using measures from a number of studies including Sirmon and Hitt (2009), Hitt et al., (2001), McKelvie and Davidsson (2009), (Zahra & Bogner, 2000), Dollinger (2003), Gruber et al. (2010) to capture the physical resources specifying the firm's plants, machinery, test and production equipment providing the infrastructure for the development, testing and manufacturing of the first product in NTVs (Hitt et al., 2001; Zahra & Bogner, 2000; Sirmon & Hitt, 2009; McKelvie & Davidsson, 2009). By identifying the major technological physical resources for product development, four items were created based on Zahra and Bogner (2000) and McKelvie and Davidsson (2009) capturing the level of physical resources in terms of standard and quality, and adapted to the theory and context (technology firms) of the study. Examples of the items in this scale are:

In relation to our first product launch...

...we accessed / acquired state -of -art production and manufacturing machinery

...we accessed / acquired high standard production plant in terms of facilities

As indicated in section 3.2.1 and Table 4.1, technology resources (second order) were conceptualised to include two dimensions: (1) R&D budget and (2) physical resources as first order constructs. R&D budget denoted the allocated financial resources for new product engineering, design and development. Building on the discussion provided in section 2.2.3.1, two items were adapted from Gruber et al. (2010) as metrics for the R&D budget: (1) a relative comparison of the level of financial resources with other departments in the firm; and (2) a relative measure of the department's financial resources with competitors in the industry. A subjective approach was applied (Gruber et al., 2010) and articulated in a manner to fit the context of the study. An Example of the items in this scale are:

In relation to our first product launch...

...our R & D department had substantial financial resources available in our firm

Marketing capabilities

Following the rational or logical approach argued by Brown (1983), Friedenberg (1995) and Worthington and Whittaker (2006), scale developer's judgment was used to identify items that are clearly associated with the characteristic being measured. Prior to choosing the items, following DeVellis (2003) and Churchill (1999) recommendation, a deductive approach was undertaken for item generation. First step was to define the construct clearly and properly, utilising both current theory and research to provide a comprehensive conceptual basis. Building upon the previous literature on marketing and capabilities (section 2.2.3.2) marketing capabilities for first product commercialisation were defined as bundles of skills and related processes, which are deployed, with marketing resources in a complementary manner to undertake and coordinate marketing activities. In the next step, an items pool was created based on the current measures available in the literature capturing marketing capabilities. The items were drawn from the measures developed by Vorhies and Morgan (2005), Vorhies, Orr and Bush (2011), Morgan et al. (2009), Morgan et al. (2004), DeSarbo et al. (2005; 2006), Song et al. (2010a). Based on the researcher's assessment, items that were worded in a poor way or were not central to the conceptualisation of core construct were eliminated as sources of error variance (Quintana & Minami, 2006). The same approach was taken for each marketing function (e.g., pricing, sale etc.) to increase the strength of correlations among items in each first-order variable. Twenty six items were selected (based on researcher judgement) from the item pool to capture the level of NTV's abilities in marketing planning, sales, pricing, communication, product launch and market linking. The selected items were adapted and modified to fit (1) the conceptualisation of the study and (2) the context of first product commercialisation in NTVs. Items were written and structured in a brief, clear and distinct fashion to reflect the measure's objective. Following Vorhies and Morgan (2005) and DeSarbo

et al.'s (2005) approach the study measured marketing capabilities with reference to the NTV's major competitors. Examples of the items in this scale are:

Comparing your firm to your major competitors, rate your firm in the following areas in relation to your first product project. In...

...advertising and promotion, we are (communication)

...segmenting and targeting the market, we are

...pricing strategies, we are (pricing)

Marketing resources

Marketing resources were conceptualised collectively as second order formative construct (section 3.2.2) including two dimensions constructs as first order including: (1) marketing budget and (2) market knowledge. Building on the literature on marketing resources discussed in section 2.2.3.1, and focusing on the conceptualisation of market knowledge referring market information of the firms in relation to its customer and competitors, strategies (Kohli & Jaworski, 1990), fourteen items were adopted from De Luca and Atuahene-Gima (2007) capturing the level of market knowledge dimensions including depth, breadth, tacitness and specificity of the customer and competitors strategies associated with the first product project. Examples of the items in this scale are:

Since the launch of our first product, our firm's knowledge about our...

...competitors' strategies has been (rate from a narrow to broad in a continuum)

...competitors' strategies has been (rate from a limited to wide-ranging in a continuum)

In the context of marketing resources (Table 4.1), marketing budget (first-order construct) reflects the cash flow allocated for marketing activities during new product commercialisation

project (Gruber et al., 2010; Song et al., 2011). Scholars follow two approaches to measure the financial resources; objective and subjective. In the objective approach, financial resources are measured directly by acquiring the financial statements of the respondent firms. However, according to literature because of the confidentiality of the inter-firm information it is often impossible to undertake objective measurement (Gruber et al., 2010). Hence, many studies undertake a subjective approach to measure the level of financial resources.

The items used by Gruber et al. (2010) for the sales department budget were adapted. They used two items: (1) a relative comparison of the level of financial resources with other departments in the firm; and (2) a relative measure of the sales department's financial resources with competitors in the industry. By adapting Gruber et al.'s (2010) two items were developed for subjective measurement of the marketing budget in the context of first product. An Example of the items in this scale are:

In relation to our first product launch...

... considerable financial resources were allocated to the marketing area in comparison to our major competitors

First product positional advantages

Five items were adopted to capture the product differentiation construct from Song et al. (2010a) which denote the distinct attributes of the first product that present unique value to the target market. The items adopted were designed to capture the level of first product superiority in terms of quality and design, extended features and functions, reliability, long lasting and technical performance of the offered product comparing to competitors

Four items were adopted from Kim and Atuahene-Gima (2010) to capture the conceptualisation of new product cost-efficiency denoting the capacity of a firm to undertake new product development and marketing operations at a lower cost than its competitors while

offering a comparable product (Day & Wensley, 1988). The items capture the level of first product attributes in terms of operations (i.e. manufacturing, delivery and raw materials) cost during the product development and commercialisation process compared to main competitors (Kim & Atuahene-Gima, 2010). Examples of the items in this scale are:

Our first product ...

... compared to competitive products, has offered some unique features and attributes to the customer

... has been clearly superior to competing products in terms of meeting customers' `needs

Compared with other competing products in our industry, the first product we introduced was developed to incorporate: ...

... minimum manufacturing and delivery costs

...cost advantages in raw material procurement

First product performance

Drawing on the literature on aspects of product success and performance (section 2.5 of Chapter Two) and focusing on the conceptualisation of first product performance denoting the extent that a first product achieves success in terms of its financial and non-financial goals, four items were adopted from Song and Parry (1999) and Lau et al. (2010). The items capture the extent that the first product met its profitability, sales growth and customer satisfaction goals (Song & Parry, 1999; Langerak et al., 2004; Lau et al., 2010).

Perceptual measurements were used to measure first product performance because in most cases firms are reluctant to share objective performance data because of the confidentiality issues. Further, according to Ledwith (2000), subjective measurement allows coherent comparisons among firms operating in different market situations. In addition, using perceptual

measures is common in the literature and current research have found that objective and subjective measures are correlated, although signifying different variables of firm performance (Murphy & Callaway, 2004). Examples of the items in this scale are:

Since its launch, our first product has ...

...achieved its sales goals

.... has had great profitability

NTV overall performance

For NTV overall performance, denoting the extent that a NTV has met its general organisational goals; four items were adopted from Gruber et al. (2010). Drawing on Pelham (1999) and Gruber et al. (2010), two items for each the financial and growth aspects of NTV performance were adopted. The items capture NTV's level of satisfaction (Brush & Vanderwerf, 1992) in terms of growth, development, products performance and operations profit since its establishment comparing to strongest rivals (Gruber et al., 2010). An objective approach was not followed for measurement of overall NTV performance as prior research has indicated that respondents favour perceptual performance measures because objective measures such as profit or revenues are regarded as confidential (Song et al., 2005). Examples of the items in this scale are:

Since our firm started its operation, we are satisfied with...

...its development in comparison with other firms in our industry

...our growth rate in comparison with our strongest (i.e., major) competitors

Measures for contingency factors (moderators)

Entrepreneurial orientation (EO)

The nine items from Covin and Slevin's (1989) scale were used to measure EO. Among the items adopted, three items are used to measure each of the three EO dimensions including: (1) innovativeness, (2) proactiveness and (3) risk taking. The items capture the level of distinct behaviours and managerial capabilities that have the qualities of innovativeness, proactiveness and risk taking (Covin & Slevin, 1989). Examples of the items in this scale are:

Since the launch of our first product, our firm has

...had a strong emphasis on R & D, technological leadership and innovations(innovativeness)

...had a tendency to initiate actions for competitors to respond to (proactiveness)

Supplier and Customer integration

The study built on two key integration mechanisms, information sharing and product co-commercialisation to measure supplier integration and customer integration (business-to-business context). Information sharing captured the extent of coordination in terms of sharing operations, inventory and market knowledge. Co-commercialisation captures the extent of coordination and integration (joint production) in terms of engineering, design and operations. Four items were used to measure information sharing for both supplier and customer integration constructs, adopted from Narasimhan and Kim (2002) and Lau et al. (2010). Four items (supplier integration) and three items (customer integration) for co-commercialisation were adopted from Lau et al. (2010) and Song and Di Benedetto (2008). Examples of the items in this scale are:

Rate your firm in the following areas representing the extent your firm integrated and coordinated activities with the CUSTOMERS during your first product launch project. Our firm engaged in...

Sharing production plans

Sharing technological information

Rate your firm in the following areas representing the extent your firm integrated and coordinated activities with the SUPPLIERS during your first product launch project. Our firm engaged in...

Joint process engineering

Joint marketing operations

ICT capabilities

DeSarbo et al (2006) provided five items designed to capture information technology capabilities (Table 4.1). The measures captured NTVs abilities in adopting and integrating ICT-based solutions to first product commercialisation tasks (DeSarbo et al., 2006; Day, 1994) such as product development, technology development, knowledge sharing and communication (DeSarbo et al., 2005; 2006). Building on DeSarbo et al. (2006) assessment of the ICT capabilities was based on a relative comparison with major competitors in the industry. Examples of the items in this scale are:

Since your firm's establishment, rate your firm in the following areas in comparison to your major competitors. Our...

...ICT systems for new product projects (or services, if applicable) has been

...ICT systems for external communication with customers, suppliers and channel members has been

Political networking capabilities

Building on the work of Xin and Pearce (1996), Peng and Luo (2000) and Li and Zhang (2007), six items were adapted and reworded to fit the theory and context of the study. The six items captured the extent that NTVs devote effort and resources to cultivate and establish relationships with politicians, government officials and agencies. Examples of the items in this scale are:

Since our first product launch, our firm has...

... spent considerable time and effort in cultivating personal connections with officials of government and its agencies

...maintained good relationships with political leaders in various levels of the government

Step 3: Scale construction

Researchers use different scaling techniques based on their respondents characteristics, information they seek for and the means of administration. Scaling techniques are generally categorised in two groups: comparative and non-comparative scales (Cavana et al., 2001). In non-comparative scaling the respondent is asked to evaluate a single object. In contrast, in comparative scaling the respondent is asked to compare one object with another. Among the various types of scaling techniques in both categories, Likert scales are common scaling used in marketing and management literature (Aaker et al., 2004). Likert scales fit within the category of non-comparative scales. In Likert scales, respondents are usually asked to indicate the extent they agree or disagree with a group of statements which are addressing an issue. Thus, Likert scales aim to measure the strength of an attitude. Rather than using the “Strongly disagree-Strongly agree” Likert scale, some scholars in marketing and product innovation domains have used different scales poles such as “Much worse-Much better”, “Not at all-Extensively” and

“Never-Always” (De Luca & Atuahene-Gima, 2007; Atuahene-Gima, 2005; DeSarbo et al., 2005; 2006; Song et al., 2005; Lau et al., 2010).

The study adopted the Likert-type scaling technique for measuring the constructs of interest and control variable. The rationale for choosing this technique is its usefulness in administration and interpretation, and its effective communication with the respondents. Moreover, the study used the seven Point Likert-type scales, because it has been recognised as the most appropriate to capture the intensity and direction of response (Cavana et al., 2001; Robson, 2002). In addition, seven point Likert scales have been extensively utilised in marketing, management and product innovation literatures (e.g., De Luca & Atuahene-Gima, 2007; Atuahene-Gima et al., 2006; Vorhies & Morgan, 2005; Gruber et al., 2010). Table 4.2 provides examples of scale poles used for measuring the constructs. Among the scale poles shown in Table 4.2, the “much worse-much better” scale pole is utilised for capabilities including marketing, technology information and technology capabilities. The “Strongly disagree-Strongly agree” is used for EO, political networking capabilities, market knowledge, overall NTV performance, first product performance, marketing resources, technology resources, product differentiation, product cost-efficiency and respondent’s level of confidence. The “Not at all-Extensively” scale pole is used for measuring supplier and customer integration constructs. Finally, the “Narrow-Broad”, “Limited – Wide ranging” and “Shallow-Deep” seven point scales are used for market-knowledge dimensions.

Table 4.2 Scale poles and research constructs

Marketing resources (marketing budget and market knowledge : specificity and tacitness), technology resources, first product differentiation, first product cost-efficiency, first product performance, overall NTV performance, political networking capabilities and EO						
Strongly Agree						Strongly Disagree
1	2	3	4	5	6	7
Supplier integration and customer integration						
Not at all						Extensively
1	2	3	4	5	6	7
Marketing capabilities, technology capabilities and information technology capabilities						
Much Worse						Much Better
1	2	3	4	5	6	7
Market knowledge depth						
Shallow						Deep
1	2	3	4	5	6	7
Basic						Advanced
1	2	3	4	5	6	7
Market knowledge breadth						
Narrow						Broad
1	2	3	4	5	6	7
Limited						Wide-ranging
1	2	3	4	5	6	7
Specialised						General
1	2	3	4	5	6	7

Step 4: Draft survey

Step 4 pertains to the development of draft surveys containing items measuring the constructs and firm and respondent demographics. As presented in Table 4.3, 105 items were developed to measure the eight main constructs (marketing capabilities, technology capabilities, marketing

resources, technology resources, first product differentiation, first product cost-efficiency, first product performance, overall NTV performance) and six contingency constructs (EO, political networking capabilities, supplier and customer integration and information technology capabilities). A sample survey was provided to a group of respondents for reading and responding to in the presence of the researcher. Drawing on previous studies (e.g., Atuahene-Gima et al., 2005), the study used a group of six PhD candidates (in the marketing field) to check the timing, flow, readability and format of the survey. As a result, no critical issues were found in relation to item clarity and readability, except for a few formatting and wording changes which were suggested by the respondents to improve the readability of the survey.

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

Constructs	Number of Items
Marketing capabilities	<i>26</i>
Marketing resources	<i>18</i>
Technology capabilities	<i>6</i>
Technology resources	<i>7</i>
Product differentiation	<i>5</i>
Product cost efficiency	<i>4</i>
First product performance	<i>4</i>
Overall NTV performance	<i>4</i>
ICT capabilities	<i>6</i>
EO	<i>9</i>
Political networking capabilities	<i>6</i>
Supplier integration	<i>7</i>
Customer integration	<i>6</i>
TOTAL	<i>108</i>

4.5.1.2 Phase Two

Step 7: Pretesting survey

Given that the study uses well-grounded measures for most of the constructs of interest and only some of the measures (i.e. marketing capabilities, technology resources and political networking capabilities) were adapted through the researchers' judgment to fit the context and theory of the study, no expert judge evaluation was executed. Hence the fifth and sixth steps depicted in Figure 4.2 encompassing expert judge evaluation and further refinements were not undertaken. In line with Figure 4.2, in step 7, a pre-test was implemented before launching the final version of the surveys. Pre-testing can be implemented in two ways: quantitative and qualitative. Drawing on various marketing scholar's recommendation (Zhou, Yim, & Tse, 2005; DeSarbo et al., 2005) the study conducted a qualitative pre-test for constructs of interest through face to face interviews with a small sample of respondents including experts and scholars in marketing.

Step 8: Final survey

Building on the procedure followed and recommended by De Luca and Atuahene-Gima (2007), Li and Zhang (2007) and Wei and Lau (2008), the study utilised multi-informant approach for data collection. This approach involved two individuals from two different levels (top management and operational) for each of the NTVs. The main reason for applying this method was to limit common method bias (see Wanger, Rau, & Lindemann, 2010). According to some scholars (e.g., Podsakoff, MacKenzie, Lee, & Podsakoff, 2003), the major reason for common method variance is acquiring the measures of both predictor and criterion constructs from the same rate of source (participant). One way of controlling this issue, was to gather data by measuring the constructs from different sources within each NTV.

Further, other reasons for applying the multi-informant approach pertains to the theory of the study and constructs of interest, According to Figure 3.1A and Figure 3.1B illustrating the

theoretical framework, some of the constructs of interest pertains to top managerial level (corporate level) of NTVs. As an example, the CEO and top management team are more likely to be knowledgeable about the NTV's strategic posture (EO) or the overall NTV performance including growth and in financial criterions. On the other hand, mid-level managers in R&D, operations, technology and marketing management are more involved with the routines and activities at the operational level of the NTV. Hence, mid-level senior managers undertook assessing the level of capabilities at product level.

Based on the above reasons, the study needed two respondents from each NTV to respond to two separate surveys (A and B). Survey A shown in Appendix I contains the measures related to EO, political networking capabilities, overall NTV performance, marketing resources, technology resources and demographics. Survey A was distributed to top managers including CEOs and managing directors of NTVs. Survey B shown in Appendix II contains the measures related to marketing capabilities, technology capabilities, supplier integration, customer integration, information technology capabilities, first product performance, first product positional advantages and demographics. Middle level managers of NTVs responded to Survey B. The selection procedure for each respondent has been explained in Section 4.5.2.3.

4.5.2 Design for the sampling plan

The design of the sampling plan elaborates how the participants are chosen and data collection managed. According to Burns and Bush (2006), the sampling process contains three steps: identifying the sampling frame, determining the sample size and managing the data collection process.

4.5.2.1 Identifying the sampling frame

According to Särndal, Swensson and Wretman (2003) a sampling frame includes a list of members of the population which sample is drawn. In other words, a sampling frame consists of those members within a population who can be sampled, and may include individuals or firms.

Indicating the sampling frame encompasses the selection of empirical setting, drawing the sampling frame and identifying the key respondents (Cavana et al., 2001). Pertaining to the selected sampling frame (India), a local Indian professional research firm was engaged to conduct the research. They were used because of their local knowledge and access to the technology sector of India (adopting the approach by Sun, Horn, & Merritt, 2004; Neelankavil, 2007).

A master list of NTVs was acquired by the research firm through accessing a reliable directory provided by the research firm (Siddharthan and Nollen, 2004) consisting of 3600 manufacturing and technology-oriented firms categorised by the type of industry across five major industrialised districts in India. A systematic technique was applied to draw a list of 650 NTVs by ordering and sorting the firms based on their age, size and the type of the industry they belonged to. Initially NTVs were defined as firms younger than eight years old, independent, small- medium sized (based on number of employees), R&D orientated with people holding backgrounds in science and engineering (see Li & Atuahene-Gima, 2001; Lee et al, 2001; Li & Zhang, 2007). Hence, NTVs were extracted based on their age (to be established after 2004), ownership (private) and number of employees (less than 150).

In addition, targeted industries included biotechnology, pharmaceutical, telecommunication, electronics, information technology and industrial machines to make sure they were technology-oriented (Lee et al., 2001; Kakati, 2003; Atuahene-Gima & Murray, 2007). All 650 NTVs were telephoned by the research firm to check their information and characteristics (reflected in the definition of NTVs) also to make sure that they have already launched their first product to the market at least a year before the data gathering (Song et al., 2011). After the preliminarily telephone interview, 300 NTVs were found eligible and agreed to participate in the study (see for similar procedure Atuahene-Gima & Murray, 2007). As outlined in Section 4.5.1, the study adopted a multi-informant approach and gathered data from two members of each NTV including the CEO and a senior manager who had been heavily engaged

with the commercialisation of the first product. These people were identified as the most knowledgeable in relation to NTV strategic posture, resources, capabilities and business environment. Prior research has found that managers provide valuable and reliable data (Zahra & Covin, 1993; Miller, Cardinal, & Glick, 1997; Li & Zhang, 2007).

4.5.2.2 Determining the sample size

The sample size for a study depends on several factors including the (1) collection method, (2) response rate and (2) data analysis method (Morse, 2000; Robson, 2002). As noted previously in this chapter, the study adopted the drop-and-collect method. It has been observed that this technique functions more effectively in an emerging economies context due to the importance of personal interactions and the lack of a trustworthy postal system. Based on previous observations on the drop-and-collect method, a response rate of 40 to 50 percent is expected to be acquired for NTVs (Li & Zhang, 2007, Chen, 2009). Even in some cases it is reported by the scholars that drop-and-collect methods response rate is relatively high and is reported above 40 percent (De Luca & Atuahene-Gima, 2007; O'Cass & Pecotich, 2005; Sok & O'Cass, 2012).

According to Cavana et al (2001), sample size is an important factor in relation to the robustness of the data. McQuitty (2004) suggested that it is important to determine the minimum sample size required in order to achieve a desired level of statistical power with a given model prior to data collection. Some scholars argue that a sample size of less than 200 is suitable for studies using Partial Least Square (PLS) - Structural Equation Modelling (SEM) for data analysis (Chin, Marcolin, & Newsted, 2003; Hair, Ringle, & Sarstedt, 2011). Furthermore, a number of studies in marketing and management use sample sizes in the range of 120-200, especially when using PLS-SEM techniques (e.g., Navarro, Losada, Ruzo, & Diez, 2010; Slotegraaf & Atuahene-Gima, 2011; Florence, Guizani, & Merunka, 2011). Given the identified analytical benefits of PLS-SEM (see also Chapter Five section 5.4), the study used PLS-SEM for data analysis.

4.5.2.3 Managing the data collection process

Based on Li and Zhang (2007) and De Luca and Atuahene-Gima (2007), the study followed the steps outlined below for data collection management:

- 1- All details, procedures and documents were provided to the Indian research company in relation to the data collection administration.
- 2- All the 650 new technology firms were contacted by phone. A description of the study and its purpose was provided to them. They were asked about their interest for participation. Afterwards the eligibility criteria was checked by asking questions about the company's background, age, size, number of technical people and orientation towards R & D based projects. Finally, a group of 300 NTVs expressed their interest and were found eligible to participate in the study.
- 3- Those who expressed their interest for participation and met the eligibility criteria were asked for an appointment to receive the set of survey.
- 4- The first key informant who was the CEO or MD (managing director) of the NTV received the package including two surveys with enclosed information sheets labelled as Survey A and Survey B in two separate envelopes. The first informant was provided with an information sheet enclosed to Survey A explaining the aim of research, the procedures for filling out the survey also description about the confidentiality of the responds provided by participants. Besides, the CEO/MD required passing the Survey B to one of the senior managers who was knowledgeable about internal firm processes and had been engaged in the first product launch who has agreed to participate. CEO/MD selected the second respondent to receive the survey B and delivered the survey to the respective senior manager.
- 5- When dropping off the survey package, an appointment was made to collect the completed surveys from CEO/MD's senior manager offices.

- 6- Surveys were collected in sealed envelopes initially provided to the participants. The surveys were collected separately from CEO and senior manager offices.
- 7- The Indian research company did a preliminary data check and sent the data file to the researcher.
- 8- After checking the data quality and resolving any errors, surveys were posted to Australia.

4.5.3 Anticipated data analysis technique

As outlined in Figure 4.1, the last task in the Stage Two of the research process is planning and identifying the data analysis techniques. According to Aaker et al. (2004), before actual data collection commences researchers must be aware about the possibility that the data will be inadequate for testing the theory. With these concerns in mind, researcher needs to plan how the data is to be analysed. According to Cavana et al. (2001) and Hussey and Hussey (1997) choice of the analysis techniques depends on the theory that underpins the study and whether the data collected is qualitative or quantitative. The study adopted a descriptive and quantitative research design as such multivariate analysis methods are suitable for analysing the data. According to the nature of the study, which was based on scrutinizing inter-relationships among constructs of interest, Structural Equation Modelling (SEM) was a suitable technique to be adopted (Chin & Newsted, 1999). As noted in section 4.5.2.2, the PLS-SEM technique was used for data analysis. The logic for employing this technique is provided in section 5.2 of Chapter Five.

4.6 Stage Three: The implementation stage

Before starting the data collection in India, the research budget and research schedule were developed. Developing the budget helped to assess the options and develop a financially feasible method for data collection. At the implementation stage, a local professional research firm was employed to undertake fieldwork duties. Total costs involved for distributing and

collecting 300 set of surveys was AUD \$6000. The professional research firm had quoted a cost of AUD 20 for each complete survey including the screening of the participants, coding, print job, transportation and follow up.

4.7 Conclusion

Any type of empirical study may involve at least an implicit, if not explicit, design (Yin, 1994). Since a design is vital, it is essential to make it clear, to elaborate it in details where its strengths, weaknesses, and consequences can be easily understood. An adequate research design helps the researcher to address the right questions and to come up with insightful recommendations. This Chapter detailed the research design as a comprehensive plan supporting the implementation stages which include survey design, sampling and data analysis. Adopting the research framework of Hair et al. (2002) and Aaker et al. (2004) the research design encompassing three stages was introduced as the foundation. The stages for research consisted of preliminary planning, the research design and implementation of the study. By building on the studies in marketing and product innovation management focusing on the antecedents of product success and advantages, the paradigm of the research was identified as positivism and based on that quantitative-based method was specified as appropriate for the study. Afterwards, based on the domain of the study (first product commercialisation) research questions were provided including general and specific research questions. Specific research questions focused on (1) the role of configuration of complementary product level assets in enhancing first product commercialisation (2) identifying the mechanisms translating assets deployments to desired first product outcomes (3) the extent that first product success is important to NTV's overall success and (4) the role of contingency factors in augmenting the influence of first product asset deployments in enhancing the first product commercialisation.

Building on a thorough literature review of the research design literature, well established procedures were identified, justified and adopted to complete the study. Given the

literature analysis, infrastructure, cultural characteristics and expenses of data collection in the target country (i.e. India as an emerging market), a self-administered survey using drop-and-collect was selected and justified for data gathering procedure. Further, in the design stage of the survey, efforts were made to develop a psychometrically sound instrument to operationalise and measure the thirteen constructs used for the study. Drawing on specific literature and taking account of the context of the study, the multi-informant approach was justified as a suitable procedure. A sample of 650 NTVs was drawn systematically from the list provided by the research firm, and finally 300 NTVs were found eligible and consented to participate in the study.

CHAPTER FIVE

Data Analysis and Results

5.1 Introduction

Drawing on configuration theory and the positional advantage concept, Chapter Three presented the theoretical framework underpinning the study and the hypotheses. Ten hypotheses in two groups were developed and presented, explaining the interrelationships among the constructs illustrated in Figure 3.1A and 3.1B. Hypotheses 1-5 concentrated on the links between (1) the configuration of product-focused assets (in form of complementarities) and first product positional advantages, (2) first product positional advantages in the form of differentiation and cost-efficiency and first product performance and (3) the first product performance and overall NTV performance. Hypotheses 6-10 focused on the role of contingency factors by introducing other capabilities encompassing EO, supplier integration, customer integration, political networking capabilities and ICT capabilities that may impact the influence of first product assets on first product positional advantages. Following the theory development in Chapter Three, Chapter Four outlined the research design, discussing the procedures for collecting the data from NTVs in India. Chapter Four provided the foundation to link the theory to the data.

Chapter Five outlines the procedures and statistical techniques employed to analyse the data and present the results. First the results of the preliminary analysis are provided including, the profile of the NTVs which participated in the research and the respective managerial respondents; and the descriptive statistics of the construct measures. Further, drawing on the Partial Least Squares (PLS) statistical analysis technique, the measurement model is assessed to determine the adequacy of the model and the validity of the measures employed to assess the measures psychometric properties. Finally, the strategy and analytical techniques used to test

the hypotheses, including the direct and moderation effects is provided and results are presented.

5.2 Preliminarily analysis

As discussed in Chapter Four (section 4.5.2.1) 300 firms from a sample of 650 NTVs consented to participate in the study and received the survey set. A drop-and-collect method was undertaken for data collection and 150 survey sets were returned (completed survey A and B sets) with 142 being deemed useable for data analysis. The response rate was indicated as 47 per cent (142/300) (following Becker & Knudsen, 2005). After data entry, checking and coding, preliminary analysis was undertaken. This analysis was undertaken in two stages. First the profile of the respondent firms (i.e. NTVs) and managers are reported, based on the characteristics of the firms and the individuals (managers and CEOs) who completed the surveys. The second stage involved computing and presenting the descriptive statistics of the measures.

5.2.1 Profile of the sample

Demographic characteristics of the sample comprise the type of business including NTVs who are manufacturers or manufactures that provide services with their products. This analysis also examined whether NTV operated in the business-to-business or business-to-consumer market, the industry sector that the NTVs operate within, the size of the NTV, the age of the NTV, respondent's position and respondent's level of education. As illustrated in Table 5.1, 58.7% of the NTVs were manufactures and 41.3% were manufacturers who provide supplementary services along with their products. Given the theory underpinning the study and the conceptualisation adopted for supplier integration and customer integration, the study required NTVs which had B2B orientation. As shown in the sample profile, the business focus of the participating NTVs was identified to be equally B2B and B2C for all the respondents. According to the sample profile respondent NTVs consisted of firms from biotechnology

(9.6%), pharmaceutical (14.4%), telecommunication (17.2%), electronics (16.3%), information technology (31.3%), and industrial machine (11.2%) industries. The results indicate that 3.3% of the NTVs had 5-10 full time employees, 64% had 15-50 full time employees and 32.7% had 50-150 full time employees. Among the firms in the sample 74.9% were 5-8 years old and 25.1% were younger than 5 years old. All NTVs participating in the study were established during 2004-2012.

As noted in section 4.5.1.2 of Chapter Four, two respondents from each NTV were approached to participate in the study, requiring one respondent to complete survey A (one senior manager in each NTV) and one to complete survey B (one mid-level manager in each NTV). As indicated in Table 5.1, for survey A, 57.6% indicated their position as the CEO of their firm, 32.4% identified their position as MD (managing director) and 10.2% were CFOs. The respondents to survey B were mid-level managers, consisting of 30.1% marketing managers, 57.3% product managers, 7.2% R&D managers and 7.2% operations managers. In terms of the level of education, among the respondents to survey A, overall, 57.7% held undergraduate degrees, 33.4% held postgraduate degrees and 8.9% were placed in “others” category. Among respondents who completed survey B, 77.6% held undergraduate degrees (e.g., bachelor degree in mechanical engineering) and 22.4 % held postgraduate degrees.

Table 5.1 Sample profile

Construct	Category	Frequency	Percentage
Industry type	Manufacturer	83	58.7%
	Manufacturer with supplementary services	59	41.3%
Business type	Business to Business		-
	Business to Consumer		-
	Equal	142	100%
Industry sector	Biotechnology	14	9.6%
	Pharmaceutical	21	14.4%
	Telecommunication	24	17.2%
	Electronics	23	16.3%
	Information Technology	44	31.3%
	Industrial Machines	16	11.2%
NTV's size	5-10 employees	5	3.3%
	11-50 employees	91	64%
	51-150 employees	46	32.7%

Construct	Category	Frequency	Percentage
NTV's age	5-8 years old	106	74.9%
	Less than 5 years old	36	25.1%
Respondent's position	Respondents		
		Survey A	Survey B
	CEO	82 (57.6%)	
	Managing director	46 (32.2%)	
	CFO	14 (10.2%)	
	Marketing manager		42 (29.6%)
	Product manager		81 (57.0%)
	R&D manager		10 (7.0%)
	Operations manager		9 (6.3%)
Respondents' level of education	High school	-	-
	Undergraduate	(57.7%)	(77.6%)
	Postgraduate	(33.4%)	(22.4%)
	Others	(8.9%)	-

There were two items in each survey measuring the level of knowledge of the respondent about the domain of the research (i.e. first product commercialisation) and the level of confidence in responding to the questions. Table 5.2 outlines the means, SDs, skewness and kurtosis of these two items. As indicated in Table 5.2, the range of means pertained to these items was 5.63 to 6.09, SDs were in range of 0.94 to 1.596, skewness ranged from -2.01 to -0.956 and kurtosis ranged from 0.565 to 2.03 which indicates the normal distribution of these items.

Table 5.2 Descriptive Statistics results of level of knowledge and confidence

Construct	Mean	SD	Skewness	Kurtosis
Survey A				
Level of knowledge	5.87	0.944	-.965	0.565
Level of confidence	6.09	1.256	-1.397	1.891
Survey B				
Level of knowledge	5.63	1.596	-2.01	1.99
Level of confidence	5.89	1.336	-1.461	2.03

5.2.2 Descriptive statistics results

As indicated in Table 4.3 of Chapter Four, in total there were 105 items in surveys A and B capturing thirteen constructs. The constructs measured in survey A included, marketing resources, technology resources, NTV overall performance, EO and political networking capabilities. The constructs measured in survey B included, marketing capabilities, technology capabilities, first product differentiation, first product cost-efficiency, first product performance, supplier integration, customer integration and ICT capabilities.

After data entry and preliminary scanning, eight cases were deleted because of a high rate (over 10 percent in a survey) of missing responses (Hair, Anderson, Tatham, & Black, 1998). To resolve the issue with missing data in the remaining 142 cases, first, the researcher checked for the existence of missing data and if its distribution reveals an apparent pattern. In fact, data was checked to see if the existing missing were either randomly or non-randomly (systematically) distributed (Gold & Bentler, 2000). As an example researcher checked if the missing data were associated with a specific group of items across cases or had randomly been occurred across the dataset. By checking and scanning the data, no systematic pattern for the missing responses was found. Imputation or replacement is among the most common strategies to deal with the missing data. The imputation of the missing data was undertaken through calculating the mean of the entire series using SPSS (Kamakura & Wedel, 2000) which replaces any missing value with the arithmetic average of the observed data for that variable.

The preliminary data analysis was undertaken to evaluate the psychometric properties of the constructs and the individual items. The evaluation comprised computing the mean, standard deviation, skewness and kurtosis of all items. Through the preliminary analysis including the evaluation of psychometric specification of the items, two factors are assessed including the central tendency and dispersion. Central tendency pertains to the mean of the item and dispersion involves computing standard deviation, skewness and kurtosis of items. The study

used kurtosis and skewness values to evaluate the normality of the items. Tables 5.3 and 5.4 outline the summary of the preliminary analysis for the constructs of surveys (A and B). The summary of the means, standard deviation, skewness and kurtosis of measures in surveys A and B is shown in Tables 5.3 and 5.4.

Table 5.3 Results of descriptive statistics of survey A

Construct	Mean	SD	Skewness	Kurtosis
Political networking capabilities				
PN1_spent considerable time and effort in cultivating personal connections with officials of government and its agencies	4.18	1.407	-1.043	1.003
PN2_maintained good relationships with officials of governmental agencies and departments	5.23	1.396	-.950	.805
PN3_devoted substantial resources to maintain good relationships with officials of administrative agencies	5.39	1.341	-.793	.473
PN4_devoted lots of effort in building relationships with top officials in government	5.03	1.419	-.624	.000
PN5_maintained good relationships with political leaders in various levels of the government	4.65	1.498	.873	.014
PN6_dedicated considerable efforts in cultivating personal connections with politicians of the government	5.09	1.624	-.674	-.437
Technology resources				
<u>R&D budget</u>				
RDF1_our R & D department acquired / possessed substantial financial resources in comparison to our major competitors,	4.12	1.003	-1.006	1.681
RDF2_our R & D department had substantial financial resources available in our firm	3.96	1.008	1.016	1.545
<u>Physical</u>				
RDP1_we accessed / acquired State -of -art production and manufacturing machinery	4.54	1.299	-1.217	1.432
RDP2_we accessed / acquired high standard production plant in terms of facilities	5.59	1.222	-1.402	2.192
RDP3_we accessed / acquired well equipped R & D labs for testing operations	3.96	1.262	-.823	.676

Construct	Mean	SD	Skewness	Kurtosis
RDP4_we accessed / acquired advanced technological software(s)	4.07	1.282	.976	.398
Marketing resources				
<u>Marketing Budget</u>				
MB1_considerable financial resources were allocated to the marketing area in comparison to our major competitors	4.50	1.195	-1.175	1.689
MB2_considerable amount of financial resources were invested in the marketing department in our firm	4.75	1.076	-1.140	1.548
<u>Market knowledge</u>				
Breadth				
MKB1_competitors' strategies has been	4.50	1.219	-.775	.193
MKB2_competitors' strategies has been	4.43	1.181	-.759	.396
MKB2_customers has been	4.77	.977	-.481	-.359
MKB4_customers has been	4.63	1.028	-.486	-.292
MKB5_competitors' strategies has been	4.53	1.356	-.856	.401
MKB6_customers has been	4.51	1.362	-.912	.306
Depth				
MKD1_competitors' strategies has been	4.46	1.195	-.645	-.057
MKD2_competitors' strategies has been	4.58	1.106	-.935	.960
MKD2_firm`s customers has been	4.68	1.042	-.537	-.449
MKD4_firm`s customers has been	4.77	1.055	-.567	-.572
Specificity				
MKS1_has been quite specific to our kind of business	4.90	1.061	-.741	-.362
MKS2_has been very difficult for an employee to transfer it (i.e. knowledge) throughout firm and other environment	4.73	1.017	-.918	.899
MKS3_has been tailored to meet the specific conditions of our business	4.86	1.011	-.593	-.352
MKS4_largely depends on the human and physical assets we have dedicated to acquiring information about market conditions	4.86	1.158	-.970	.353
Tacitness				
MKT1_comprehensively document in manuals or reports	3.91	1.090	-1.109	1.716

Construct	Mean	SD	Skewness	Kurtosis
MKT2_comprehensively understand from written documents	4.06	1.171	-1.014	.521
MKT3_identify without personal experience in using them	5.82	.999	-.896	1.009
MKT4_precisely communicate through written documents	5.22	1.140	-.951	.529
EO				
<u>Innovativeness</u>				
EI1_had a strong emphasis on R & D, technological leadership and innovations	5.63	1.302	-1.306	1.616
EI2_marketed several new lines of products (or services, if applicable)	5.51	1.278	-1.333	2.023
EI3_experienced dramatic changes in product (or services, if applicable) lines	4.88	1.375	-1.215	1.548
<u>Proactiveness</u>				
EP1_had a tendency to initiate actions for competitors to respond to	5.82	1.144	-1.521	3.530
EP2_had the tendency to be a market leader, to be the first in introducing new products, technologies (or services, if applicable)	5.40	1.439	-1.124	1.151
EP3_had a tendency to adopt a competitive “undo-the-competitors” posture approach	5.56	1.182	-1.560	3.251
<u>Risk-taking</u>				
ER1_had a tendency for high-risk new product (or service, if applicable) projects	4.87	1.251	-1.172	1.931
ER2_encouraged our people to take calculated risks with new ideas	5.89	1.141	-1.565	3.654
ER3_considered the term “risk taker” a positive attribute for our staff	5.89	1.050	-1.576	3.900
Overall NTV Performance				
VOP1_its development in comparison with other firms in our industry	4.84	1.136	-.935	.339
VOP2_our growth rate in comparison with our strongest (i.e., major) competitors	4.80	1.034	-.776	.546
VOP3_the forecast of our operating profit for upcoming years	4.86	1.060	-1.226	1.871
VOP4_our products (or services, if applicable) success in comparison to our strongest (i.e., major) competitors	4.95	1.158	-.941	1.274

As indicated in Table 5.3, Survey A included items capturing political networking capabilities (PN1-PN6), marketing resources (MB1-MKT4), technology resources (RDF1-RPD4), EO (EI1-ER3) and overall NTV performance (VOP1-VOP4). As outlined in Table 5.3, means were in the range of 3.91 to 5.89 and standard deviations (SDs) were in the range of 0.977 to 1.624. Evaluation of the shape of distribution was examined by considering skewness and kurtosis (DeCarlo, 1997). According to Hair et al. (1998) skewness refers to the asymmetry of the shape of the distribution, and kurtosis refers to the "peakedness" of the distribution relative to the length and size of its tails. Scores generated for skewness and kurtosis of the items are reported in Table 5.3. The range for skewness scores was -1.576 to 1.016 and for kurtosis was -0.572 to 3.9. Several of the items including EP1, EP3, ER2 and ER3 had kurtosis scores out of the range of -2 to +2 which indicates that these items do not have a normal distribution (De Vellis, 1991).

As outlined in Table 5.4, Survey B included the items of ICT capabilities, technology capabilities, marketing capabilities, first product differentiation, first product cost-efficiency, supplier integration, customer integration and first product performance constructs.

Table 5.4 Results of descriptive statistics of survey B

Construct	Mean	SD	Skewness	Kurtosis
ICT capabilities				
ICT1_ICT systems for new product projects (or services, if applicable) has been	4.92	1.585	-1.302	2.114
ICT2_ICT systems for facilitating cross functional integration has been	5.25	1.233	-.643	.116
ICT3_ICT systems for facilitating market knowledge creation has been	5.23	1.259	-.406	-.378
ICT4_ICT systems for facilitating technological knowledge creation has been	5.05	1.210	-1.000	1.436
ICT5_ICT systems for external communication with customers, suppliers and channel members has been	5.44	1.152	-.538	-.241
Technology capabilities				
TRC1_new product (or service, if applicable)	5.36	1.311	-.543	-.520

Construct	Mean	SD	Skewness	Kurtosis
development capabilities, we are				
TRC2_new technology development capabilities, we are	5.60	1.092	-.770	.085
TRC3_manufacturing processes, we are	5.86	1.115	-.902	.441
TRC4_predicting technological changes and trends, we are	5.80	1.069	-.855	.518
TRC5_quality control skills, we are	5.90	1.095	-.931	.178
TRC6_adopting new technologies to current processes, we are	5.84	1.027	-.933	.538
Marketing capabilities				
<u>Planning</u>				
MCP1_segmenting and targeting the market, we are	5.67	1.128	-.640	.236
MCP2_formulating marketing strategies, we are	5.62	1.147	-.842	.226
MCP3_marketing planning, we are	5.67	1.236	-.967	.674
<u>Pricing</u>				
MPR1_pricing strategies, we are	5.68	1.182	-.886	.308
MPR2_pricing accurately, we are	5.61	1.179	-.507	-.330
MPR3_setting prices according to how customer perceives value of the product (or service, if applicable), we are	5.56	1.139	-.579	-.456
MPR4_pricing that is maximum beneficial to customers, we are	5.71	1.029	-.703	.576
<u>Communication</u>				
MCC1_advertising and promotion, we are	4.58	1.815	-.539	-.567
MCC2_developing advertising and promotion programs, we are	4.60	1.783	-.701	-.436
MCC3_public relations, we are	5.80	1.267	-1.000	.491
MCC4_managing corporate image and reputation, we are	5.58	1.186	-1.186	1.683
<u>Sales</u>				
MS1_giving salespeople the training they need, we are	5.58	1.193	-.657	-.227
MS2_sales management skills, we are	5.74	1.159	-.723	-.332
MS3_providing sales support to the sales force, we are	4.62	1.109	-.719	.227
<u>Launching</u>				
MP1_launching new products (or services, if applicable), we are	5.53	1.134	.588	.058
MP2_ensuring that product (or service, if applicable) development efforts are responsive to customer needs, we are	5.60	1.143	-.724	.061

Construct	Mean	SD	Skewness	Kurtosis
<u>Market linking</u>				
MLC1_establishing a “dialogue” with target customers, we are	5.56	1.078	-.436	-.376
MLC2_getting target customers to try our products (or services, if applicable) on a consistent basis, we are	5.51	1.135	-.594	-.201
MLC3_focusing on meeting customers’ long term needs, we are	5.82	1.015	-.863	.819
MLC4_maintaining loyalty among attractive customers, we are	5.84	1.001	-.701	.026
MLC5_enhancing the quality of relationships with customers, we are	5.80	1.019	-.654	.348
MLD1_adding value to our channel members (e.g., distributors, retailers and wholesalers) businesses ,we are	5.63	1.068	-.567	-.049
MLD2_attracting and retaining the channel members in the market, we are	5.70	.976	-.630	.587
MLD3_satisfying the needs of channel members, we are	5.82	1.061	-.763	-.068
MLD4_closeness in working with channel members, we are	5.63	.965	.393	-.797
MSR1_establishing and maintaining close supplier relationships, we are	5.07	.912	-.481	-.227
First product differentiation				
PDI1_ compared to competitive products, has offered some unique features and attributes to the customer	5.73	1.039	-.657	.162
PDI2_ has been clearly superior to competing products in terms of meeting customers’ needs	5.89	.923	-1.034	2.086
PDI3_ has been of higher quality than competing products – tighter specification , stronger, lasted longer , or more reliable	5.35	1.148	-.828	.212
PDI4_ has provided a superior benefit to cost ratio than competing products	5.87	1.078	.744	-.164
PDI5_ has had superior technical performance than competing products	4.77	1.006	-.764	.102
First product cost-efficiency				
PLC1_operating efficiencies (e.g., manufacturing modernization, adopting new technologies).	5.70	1.104	-.624	-.281
PLC2_benefits from economies of scale	5.68	1.013	-.988	.877
PLC3_ minimum manufacturing and delivery costs	5.36	1.077	-.707	.330

Construct	Mean	SD	Skewness	Kurtosis
PLC4_cost advantages in raw material procurement	4.89	.965	.505	-.701
Supplier integration				
<i><u>Information sharing</u></i>				
SII1_Sharing inventory mix/level information	5.87	1.123	-.906	.403
SII2_Sharing production plans	5.82	.999	-1.242	2.365
SII3_Sharing marketing information	5.74	1.201	-.629	-.263
SII4_Sharing technological information	5.80	1.131	-.915	.614
<i><u>Product co-commercialisation</u></i>				
SCD1_Joint product (or service, if applicable) design	5.51	1.201	-1.029	1.926
SCD2_Joint process engineering	5.65	1.272	-1.696	3.786
SCD3_Joint production operations	5.61	1.309	-1.461	2.909
SCD4_Joint marketing operations	5.40	1.294	-1.543	3.220
Customer integration				
<i><u>Information sharing</u></i>				
CII1_Sharing production plans	5.82	1.049	-.867	-.263
CII2_Sharing inventory mix/level information	5.55	.977	-1.047	1.947
CII3_Sharing technological information	6.08	1.096	-1.165	.607
CII4_Sharing marketing information	5.98	1.053	-.870	.053
<i><u>Product co-commercialisation</u></i>				
CCD1_Joint product (or service, if applicable) design	5.37	1.242	-1.244	2.589
CCD2_Joint process engineering	5.72	1.228	-1.677	4.041
CCD3_Joint production operations	5.77	1.217	-1.958	4.109
First product performance				
FFP1_achieved its sales goals	4.96	1.093	-1.119	.796
FFP2_ achieved its profit goals	5.06	1.067	-1.230	1.084
FFP3_has had great profitability	5.32	1.007	-.878	-.212
FFP3_has achieved its goals in customer satisfaction	5.15	1.020	-2.190	3.045

As reported in Table 5.4, means were in the range of 4.58 to 6.08, and SDs were in the range of 0.912 to 1.815. Scores generated for skewness and kurtosis were in the range of -2.19 to 0.744 and -0.797 to 4.109. Several of items including FFP3, CCD1, CCD2, CCD3, SCD2 and SCD4 reflected kurtosis scores that were out of the range of -2 to +2. The computed scores indicate that these items do not have a normal distribution (De Vellis, 1991). Overall, the results

of the preliminary analysis for survey A and B show that some of the items departed from normality.

5.3 Partial Least Squares

This section elaborates the rationale behind using Partial Least Square - Structural Equation Modelling (PLS-SEM) for data analysis and how it fits the current research. Further, sections 5.4 and 5.5 discuss the evaluation of procedures for measurement and structural models underpinning the PLS-SEM technique. PLS-SEM is now increasingly utilised by researchers to test their theories in marketing and new product development domains (e.g., Ngo & O'Cass, 2009; Slotegraaf & Atuahene-Gima, 2011; Yam, Lo, Tang, & Lau, 2011). An important advantage of PLS-SEM permits researchers to run measurement (outer) and structural (inner) models simultaneously (Hair et al., 2012). According to Hair et al (2010), the outer measurement model involves the assessment of reliability and validity of the measures used for the study. The inner model (or structural model) reflects whether the posed relationships between constructs outlined in the hypotheses exist and if the relationships are statistically significant. Drawing on arguments found in the literature, PLS-SEM may be used in preference to other techniques such as CB-SEM (i.e. covariance-based modelling) for a number of reasons (e.g., Chin, 2010; Limayem, Hirt, & Cheung, 2007).

To ensure and validate that PLS-SEM was a suitable statistical method for data analysis in the current study; six specific issues should be assessed. First, the normality of the data is considered (Hulland, 1999). A data is normally distributed when it exposes a curve that is symmetric about its mean. Many of statistical data analysis methods depend on the issue of normality (Chin, 2010). Non-normality which shows deviations from normality, make those statistical methods unreliable, so it is vital to learn if the data is normal. Statistical tests that rely on the assumption of normality are parametric tests. When the data is not normal, then non-parametric tests are employed which do not rest upon the assumption of normality. As

indicated in the previous section of this Chapter, some items did not possess a normal distribution as evidenced by their scores for skewness and kurtosis. In this regard, PLS-SEM method is found to be robust to non-normality and is called a distribution free method (Chin et al., 2003) which suits the current study.

Second, the nature of the research and research paradigm is considered to identify the most suitable analysis approach. The predictive nature of this study implies that the major purpose is to predict the extent that the configuration of first product assets (as complementary elements) influences the enhancement of first product commercialisation through generating first product positional advantages. The PLS-SEM method is usually suggested for predictive research, where the focus is on theory development, while covariance-based approach is suggested for confirmatory analysis and needs a strict obedience to distributional assumptions (Ngo & O'Cass, 2009; Chin, 2010). Further, PLS-SEM is suitable for predictive research- such as the current study- as it focuses on maximizing the variance explained by the endogenous (dependent) variables (Ngo & O'Cass, 2009; Reinartz, Haenlein, & Henseler, 2009).

Third, the measures used were considered to identify a suitable analysis method. When some measures are not completely established in the context of the study, PLS-SEM is argued by some to be an appropriate approach (Cassel, Hackl, & Westlund, 1999; Komiak & Benbasat, 2006). PLS-based and covariance-based analysis might be similar in many respects, however PLS-based SEM methods are more suitable when some of the applied measures are not well established in the literature or are employed in a new measurement context (O'Cass & Sok, 2013). As indicated in Chapter Four, the study developed a pool of items for marketing capabilities and physical components of technology resources to generate new items that fit the context of first product commercialisation in the space of NTVs. The major objective of the current study is the explanation of the model variance for endogenous variables such as first product differentiation and first product cost-efficiency. Given the first product success model

used here has not been tested before and as the current research is interested in maximising the variance explained in dependent constructs, PLS-SEM is found suitable for the current study.

Fourth, complexity of the theoretical framework and theorised inter-relationships were considered to assess possible data analysis methods (Kaplan, 2009). To assess a model containing inter-relationships, numbers of statistical methodologies are required. Especially when the hypothesised relationships are consistent with a theoretical framework which links several latent constructs, each measured via several indicators. In conjunction with the development of disciplines such as marketing and management, theorised interrelationships are becoming increasingly complex (Henseler and Fassot, 2010). Rather than examination of direct effects, researchers are now more interested in examining moderating effects which enhance the complication of the theoretical frameworks (e.g., O'Cass & Sok, 2013). The theoretical framework (Figure 3.1A and 3.1B) encompassed thirteen constructs and ten hypotheses. Further, the theory underpinning the study theorised complex relationships including interaction effects (i.e., complementarity) of product level resources and capabilities in each functional area and interaction between the capabilities of product-focused functional areas. Also as illustrated in Figure 3.1B, the study involved examination of three way interactions including the product terms generated from assets complementarity and moderators incorporated. PLS-SEM is recommended as a suitable approach for testing the moderating effects (Limayem et al., 2007; O'Cass & Sok, 2013). Given the characteristics of the theoretical model, PLS-SEM is found suitable as it include a number of statistical methodologies (Henseler & Fassot, 2010) and facilitates the assessment for the complex relationships among the constructs of the study and the items underlying each construct (Fornell, Lorange, & Roos, 1990; Chin, 2010). According to Wold (1985, p. 589), "PLS comes to the fore in larger models, when the importance shifts from individual variables and parameters to packages of variables and aggregate parameters."

Fifth, size of the sample is considered as a criterion for choosing the analysis method. Marsh and Hau (1998) state that small sample size and inadequate number of indicators per

variable lead to high inadmissibility in the model where the exogenous variables are weakly correlated with one another. Or it can cause enormously biased parameter estimates where the exogenous variables are highly inter-correlated. As a result, unstable coefficients with high standard errors are typically a sign of small and inadequate sample size (Marcoulides & Saunders, 2006). PLS-SEM is reported to possess fewer constraints in relation to accommodating smaller sample sizes (i.e. less than 200) and provides acceptable statistical power (Reinartz et al., 2009; O'Cass & Sok, 2013). In contrast to PLS-SEM, covariance-based SEM methods are reported to have more limitations in terms of handling small sample sizes which may lead to biased test statistics and identification problem. As it was reported in Chapter Four the response rate (47 percent) and number of valid and usable surveys (142 sets) received from the respondents.

Sixth, operationalisation of the constructs can also be an important factor in choosing the best data analysis method. As outlined in Chapter Four and Chapter Three, constructs such as marketing capabilities were operationalised as hierarchal or higher-order variables (type II model) including reflective first order - formative second order configuration. In the past decade, hierarchical latent variable models have presented a growing attention in the domain of PLS-SEM models (Jarvis et al., 2003; Wetzels, ockerken-Schroder, & van Oppen, 2009; Ringle, Sarstedt, & Straub, 2012). Both covariance-based and PLS methods in structural equation modelling are identified useful to approximate the parameters in hierarchical latent variable or high-order constructs models (Wetzels et al., 2009).

Based on the above characteristics of the study and the advantages outlined for the PLS-SEM technique, the study employed PLS-SEM through Smart-PLS software. PLS-SEM was undertaken for data analysis to evaluate the adequacy and validity of the measures as well as for testing the hypotheses provided in Figure 3.1 A and 3.1 B. PLS-SEM provides the opportunity of simultaneous assessment of (a) how good the indices relate to each construct and (b) if the hypothesised relationships based upon the underpinning theory are empirically supported

(Limayem et al., 2007). According to Chin (2010) and Hair et al. (2011), analysis based on PLS-SEM technique includes two stages. These two stages include the assessment of two different models (1) measurement model (outer model) and (2) structural model (inner model). The measurement model links a construct to its respective block of items and the structural model connects constructs based on the defined relationships through hypotheses. In the context of PLS, constructs (i.e., latent variables) are either endogenous or exogenous. Endogenous variables are those which are being explained by other variables (predictors) in the model (Jarvis et al., 2003). According to Figure 3.1 A, first product positional advantages, first product performance and overall NTV performance are endogenous variables. Exogenous variables are those that should have no path as a relationship pointing to them and they cannot be affected by any variables (Jarvis et al., 2003). As indicated in Figure 3.1 A, marketing resources, marketing capabilities, technology resources, technology capabilities and contingency constructs encompassing supplier integration, customer integration, political networking capabilities, ICT capabilities and EO are exogenous variables.

5.4 Model assessment: Measurement model results

The researcher needs to ensure the adequacy of the measures, and then the validity and results of the inner or structural model can be assessed. The first part in assessing a model is to define the measurement model. Reliability and validity of the measures are used to assess the measurement model (Chin, 1998; Chin, 2010). Typically, this stage of analysis assesses how accurate and internally consistent (i.e., reliable) the measures are. This stage also evaluates the convergent validity and discriminant validity of the measures. The reliability of measures denotes their consistency over different conditions (Nunnally & Bernstein, 1994). In PLS-based analysis reliability can be assessed through assessing the average variance extracted (AVE) and the composite reliability (CR) of the constructs (Chin, 1998; 2010). According to Fornell and Larcker (1981) AVE measures the variance that a latent variable captures from its items compared with the amount caused because of the measurement

error. CR is a measure of internal consistency for constructs and refers to the extent to which a group of items designates constantly the latent construct (Hair et al., 2010). According to Churchill (1979) convergent validity refers to the approval of the existence of a trait by independent measures. In other words, convergent validity represents the extent to which different measures reflects the same construct (or are positively correlated). Discriminant validity denotes the extent to which measures of theoretically unrelated constructs do not correlate too highly with one another (Venkatraman, 1989; Clark-Carter, 1997).

5.4.1 Indices for measurement model evaluation

To assess the adequacy and validity of the outer (measurement) model, the loadings of all individual constructs, composite reliabilities (CR), average variance extracted (AVE), bootstrap t-values, and convergent and discriminant validity were assessed. Bootstrapping in statistical technique for allocating measures of accuracy to sample estimates (Hesterberg, Moore, Monaghan, Clipson, & Epstein, 2005). It is a technique that resamples from an original sample to develop a more precise estimate for the measurement model than is found through traditional methods (Hair et al., 2011). The study calculated bootstrapped t-values on the basis of 500 bootstrap runs (resampling) through the smartPLS software. Tables 5.6 through 5.18 illustrate the outer model results including the first order, and reflective constructs for each construct respectively. As discussed in Chapter Four, building on Jarvis et al. (2003), marketing capabilities, marketing resources, technology resources, supplier integration, customer integration and EO were operationalised as type II model constructs. Type II model represents first order reflective-second order formative configuration. Marketing capabilities encompassed the components such as planning, pricing, sales, launching, communication and market-linking. Marketing resources included market knowledge and marketing budget components. Technology resources encompassed physical resources and R&D budget components. Supplier and customer integration constructs both included two components: information sharing and product co-commercialisation. EO included three components: innovativeness, proactiveness

and risk-taking. According to Chin (2010), computing and reporting indices such as CR and AVE for formative constructs (here second order constructs) is meaningless as the inter-relation between the components is not a central concern in formative configurations (Jarvis et al., 2003).

In summary, the first-order factor AVEs including (1) planning, selling, pricing, product launch, communication and market-linking (forming marketing capabilities), (2) marketing budget, market knowledge breadth, market knowledge depth, market knowledge specificity and market knowledge tacitness (forming marketing resources), (3) R&D budget and physical resources (forming technology resources), (4) information sharing and product co-commercialisation (forming supplier integration), (5) information sharing and product co-commercialisation (forming customer integration) and (6) innovativeness, proactiveness and risk-taking (forming EO) were in the range of 0.53 - 0.75.

The AVEs and CRs for the other constructs are: technology capabilities (AVE = 0.66, CR = 0.88), first product differentiation (AVE = 0.50, CR = 0.87), first product cost-efficiency (AVE = 0.62, CR = 0.90), first product performance (AVE = 0.73, CR = 0.90), overall NTV performance (AVE = 0.71, CR = 0.86), ICT capabilities (AVE = 0.67, CR = 0.89) and political networking capabilities (AVE = 0.56, CR = 0.79). As all the computed AVEs are higher than the threshold value (>0.50) (Hulland, 1999) and all the computed CRs are higher than 0.7 (Nunnally, 1978), the reliability for all the constructs of interest is achieved. Further, AVEs higher than .50 also demonstrates the convergent validity of the constructs of interest (Bagozzi & Yi, 1988). The following sections provide the results of outer-model indices for both endogenous and exogenous variables. Outer model results are provided in two separate sections focusing on the constructs measured in survey A and those measured in survey B.

5.4.2 Measurement model results of survey A constructs

5.4.2.1 Marketing resources

The construct was operationalised as a type II model involving second order formative-first order reflective configuration. Marketing resources were measured through two components (marketing budget and marketing knowledge) and totally twenty items. The study measured market knowledge through four components including breadth, depth, specificity and tacitness. Top managers of NTVs responded the statements concerning marketing resources exploited for first product commercialisation. The outcomes of measurement model including the manifest variables are outlined in Table 5.5.

Table 5.5 Results of outer measurement model for marketing resources

Components and manifest variables	Loading	t-value
Marketing resources		
<u>Budget (AVE = .57, CR = .87)</u>		
In relation to our first product launch...		
... considerable financial resources were allocated to the marketing area in comparison to our major competitors	0.82	28.88
... considerable amount of financial resources were invested in the marketing department in our firm	0.84	32.23
<u>Market Knowledge</u>		
Since the launch of our first product / service, our firm's knowledge about our...		
Breadth (AVE = .53, CR = .87)		
...competitors' strategies has been	0.59	11.22
...competitors' strategies has been	0.61	15.43
...customers has been	0.55	9.95
... customers has been	0.59	10.41
...competitors' strategies has been	0.57	13.87
...customers has been	0.63	19.92
Depth (AVE = .55, CR = .88)		

Components and manifest variables	Loading	t-value
...competitors' strategies has been	0.61	16.52
...competitors' strategies has been	0.55	10.21
...firm`s customers has been	0.56	13.39
...firm`s customers has been	0.63	18.87
Specificity (AVE = .63, CR = .89)		
Since the launch of our first product / service, our firm`s knowledge about our customers and competitors...		
...has been quite specific to our kind of business	0.73	14.78
... has been very difficult for an employee to transfer it throughout firm and other environment	0.71	11.92
... has been tailored to meet the specific conditions of our business	0.76	18.43
.... largely depends on the human and physical assets we have dedicated to acquiring information about market conditions	0.74	12.55
Tacitness (AVE = .66, CR = .82)		
... comprehensively document in manuals or reports	0.78	18.88
...comprehensively understand from written documents	0.80	24.65
...identify without personal experience in using them	0.81	26.01
....precisely communicate through written documents	0.79	22.11

As shown in Table 5.5, the AVEs and CRs are over the threshold value identified in literature, which indicates the reliability of the measure. Also the loadings (ranged from 0.55 to 0.84) and t-values of all the items are above than the cut-off values (>0.5 for loadings and >1.96 for t-values) which indicates that the convergent validity is satisfactory.

5.4.2.2 Technology resources

The construct encompassed two components including R & D budget and technology-related physical resources. Technology resources were operationalised as a type II model. The results of the analysis including the manifest variables are presented in Table 5.6. All generated AVEs and CRs are higher than the threshold value identified in the literature indicating the reliability

of the measure. Likewise as it is shown in Table 5.6, the convergent validity is attained all the generated the loadings are positive and significant.

Table 5.6 Results of outer measurement model for technology resources

Components and manifest variables	Loading	t-value
Technology resources		
In relation to our first product launch...		
<u>Budget (AVE = .55, CR = .88)</u>		
...our R & D department acquired / possessed substantial financial resources in comparison to our major competitors,	0.63	8.85
...our R & D department had substantial financial resources available in our firm	0.66	9.32
<u>Physical (AVE = .66 , CR = .91)</u>		
...we accessed / acquired State -of -art production and manufacturing machinery	0.78	21.25
...we accessed / acquired high standard production plant in terms of facilities	0.80	25.59
... we accessed / acquired well equipped R & D labs for testing operations	0.79	16.48
...we accessed / acquired advanced technological software(s)	0.78	14.77

5.4.2.3 Overall NTV performance

The study measured Overall NTV performance through four items including the growth and development aspects of firm performance. The construct was operationalised in a reflective fashion. As indicated in Table 5.7, the scores of t-values and the loadings' range of all the items are more than the cut-off values (>0.5 for loadings and >1.96 for t-values) which demonstrates that the convergent validity is attained.

Table 5.7 Results of outer measurement model for overall NTV performance

Components and manifest variables	Loading	t-value
Overall NTV performance (AVE = .71, CR = .86)		
Since our firm started its operation, we are satisfied with...		
...its development in comparison with other firms in our industry	0.88	37.01
...our growth rate in comparison with our strongest (i.e., major) competitors	0.88	34.53

Components and manifest variables	Loading	t-value
...the forecast of our operating profit for upcoming years	0.76	26.91
...our products (or services, if applicable) success in comparison to our strongest (i.e., major) competitors	0.81	31.98

Furthermore, as shown in Table 5.7, the outcome indices of the measurement model (i.e. AVE and CR) are higher than the threshold documented by scholars, which shows that the measure is reliable.

5.4.2.4 EO (moderator variable)

EO was operationalised as a type II model construct. The construct was measured by three components: 1- Innovativeness 2- Proactiveness ad 3- Risk taking and totally nine items. As shown in Table 5.8 computed AVEs and CRs are higher than the cut-off value identified by scholars, which confirms that the reliability is achieved. Likewise, as indicated in Table 5.8, loadings and t-values of all the items are above the threshold values (>0.5 for loadings and >1.96 for t-values) which shows that the convergent validity of the construct. Results of the measurement model analysis consisting of the manifest variables are provided in Table 5.8.

Table 5.8 Results of outer measurement model for EO

Components and manifest variables	Loading	t-value
EO		
Since our first product commercialisation, our firm....		
<u>Innovativeness (AVE= .61, CR= .83)</u>		
...had a strong emphasis on R & D, technological leadership and innovations	0.78	13.98
...marketed several new lines of products (or services, if applicable)	0.88	23.44
...experienced dramatic changes in product (or services, if applicable) lines	0.83	15.87
<u>Proactiveness (AVE= .66, CR= .84)</u>		
...had a tendency to initiate actions for competitors to respond to	0.80	18.09
...had the tendency to be a market leader, to be the first in introducing new	0.75	11.42

Components and manifest variables	Loading	t-value
products, technologies (or services, if applicable)		
...had a tendency to adopt a competitive “undo-the-competitors” posture approach	0.80	19.35
<u>Risk-taking (AVE= .67, CR= .86)</u>		
...had a tendency for high-risk new product (or service, if applicable) projects	0.83	16.20
...encouraged our people to take calculated risks with new ideas	0.86	20.36
...considered the term “risk taker” a positive attribute for our staff	0.84	15.94

5.4.2.5 Political Networking capabilities (moderator variable)

Political networking capabilities construct was operationalised in a reflective fashion and was measured through five items. As shown in Table 5.9, the measure is reliable and adequate as the reported AVEs and CRs are higher than the threshold documented in the literature.

Table 5.9 Result of outer measurement model for political networking capabilities

Components and manifest variables	Loading	t-value
Political networking capabilities (AVE= .56, CR= .79)		
During out first product project, our firm		
...spent considerable time and effort in cultivating personal connections with officials of government and its agencies	0.73	14.98
...maintained good relationships with officials of governmental agencies and departments	0.71	13.34
...devoted substantial resources to maintain good relationships with officials of administrative agencies	0.69	23.88
...devoted lots of effort in building relationships with top officials in government	0.72	22.35
...maintained good relationships with political leaders in various levels of the government	0.73	18.09

Also as indicated in Table 5.9, the values reported for loadings and t-values of the items are more than the cut-off values (>0.5 for loadings and >1.96 for t-values) which specifies that the convergent validity is attained for political networking capabilities.

5.4.3 Measurement model results of survey B constructs

5.4.3.1 Marketing capabilities

The construct was operationalised as a type II model including Second order formative –first order reflective configuration. The construct was measured through six components and twenty four items. To approximate the second order factors, the method of repeated indicators known as the hierarchical model was used (Chin, 2010). Basically, a second order factor is measured via observed variables for all the first order factors. While this method replicates the number of manifest variables used, the measurement model can be estimated by the standard PLS algorithm. The study presents the results of the analysis including the manifest variables in Table 5.10.

Table 5.10 Results of outer measurement model for marketing capabilities

Components and manifest variables	Loading	t-value
Marketing capabilities		
Comparing your firm to your major competitors, rate your firm in the following areas in relation to your first product project. In...		
<u>Planning (AVE =.66, CR =.88)</u>		
...segmenting and targeting the market, we are	0.77	18.34
...formulating marketing strategies, we are	0.81	22.35
...marketing planning, we are	0.83	25.03
<u>Pricing (AVE = .71, CR = .89)</u>		
...pricing strategies, we are	0.82	24.49
...pricing accurately, we are	0.85	32.67
...setting prices according to how customer perceives value of the product (or service, if applicable), we are	0.84	25.88
... pricing that is maximum beneficial to customers, we are	0.77	20.22
<u>Communication (AVE = .55, CR = .90)</u>		
...advertising and promotion, we are	0.52	4.23
...developing advertising and promotion programs, we are	0.55	6.32
...public relations, we are	0.67	9.41
...managing corporate image and reputation, we are	0.65	10.02
<u>Sales (AVE = .64, CR = .89)</u>		

Components and manifest variables	Loading	t-value
...giving salespeople the training they need, we are	0.73	16.52
...sales management skills, we are	0.71	13.92
...providing sales support to the sales force, we are	0.68	9.85
<u>Launching (AVE = .68, CR = .89)</u>		
...launching new products (or services, if applicable), we are	0.53	4.88
...ensuring that product development efforts are responsive to customer needs, we are	0.54	5.70
<u>Market linking (AVE = .59, CR = .90)</u>		
...focusing on meeting customers' long term needs, we are	0.58	6.75
...maintaining loyalty among attractive customers, we are	0.56	5.95
...enhancing the quality of relationships with customers, we are	0.63	7.33
...adding value to our channel members (e.g., distributors, retailers and wholesalers) businesses ,we are	0.67	8.90
...attracting and retaining the channel members in the market, we are	0.66	7.48
...satisfying the needs of channel members, we are	0.69	10.85
...closeness in working with channel members, we are	0.71	12.55
...establishing and maintaining close supplier relationships, we are	0.72	13.42

As indicated in Table 5.10, AVEs and CRs are more than the cut-off value identified by scholars, which confirm the reliability of the measures used for marketing capabilities. Also the loading of the items of each component are significant and positive (>0.5 for loadings and >1.96 for t-values) and all AVEs are above 0.5 which indicate that the convergent validity is achieved (Bagozzi & Yi, 1988).

5.4.3.2 Technology capabilities

Six items were used to measure technology capabilities as a reflective construct. As indicated in Table 5.11, the loadings and t-values of all the items are more than the cut-off values (>0.5 for loadings and >1.96 for t-values). This shows that the convergent validity is attained for technology capabilities construct. Further, AVE and CR are more than the cut-off value identified in literature, which indicates the adequacy of the measure used.

Table 5.11 Results of outer measurement model for technology capabilities

Components and manifest variables	Loading	t-value
Technology capabilities (AVE = .66, CR = .88)		
In relation to your firm's first product launch project and comparing your firm to your major competitors, rate your firm in the following areas. In...		
...new product (or service, if applicable) development capabilities, we are	0.79	18.56
...new technology development capabilities, we are	0.77	17.57
...manufacturing processes, we are	0.76	15.42
...predicting technological changes and trends, we are	0.71	14.21
...quality control skills, we are	0.69	10.75
...adopting new technologies to current processes, we are	0.80	18.91

5.4.3.3 First product differentiation

First product differentiation was measured via five items. Drawing on the literature, first product differentiation as a positional advantage was operationalised in a reflective fashion. As indicated in Table 5.12, the AVE and CR are more than the cut-off value acknowledged by literature, which indicates that the measure is reliable. Moreover the all the loadings and t-values of all the items as well as the AVE are more than the cut-off values (>0.5 for loadings and AVE and >1.96 for t-values) documented in the literature, which indicates that the convergent validity of the construct is satisfactory.

Table 5.12 Results of outer measurement model for First product differentiation

Components and manifest variables	Loading	t-value
First Product Differentiation (AVE = .50, CR = .87)		
Our first product ...		
... compared to competitive products, has offered some unique features and attributes to the customer	0.54	6.34
... has been clearly superior to competing products in terms of meeting customers' needs	0.63	11.26
... has been of higher quality than competing products —tighter specification ,	0.58	9.71

Components and manifest variables	Loading	t-value
stronger, lasted longer , or more reliable		
...has provided a superior benefit to cost ratio than competing products	0.57	7.32
...has had superior technical performance than competing products	0.62	6.98

5.4.3.4 First product cost -efficiency

First product cost-efficiency was operationalised in a reflective fashion and was measured through four items. As indicated in Table 5.13, the AVE and CR values are more than the cut-off value recognized by scholars, which indicates that the applied measure is reliable. Moreover the loading ranges and t-values of all the items presented in Table 5.13 are more than the cut-off values (>0.5 for loadings and >1.96 for t-values) which indicates that the convergent validity is attained.

Table 5.13 Results of outer measurement model for first cost-efficiency

Components and manifest variables	Loading	t-value
First Product Cost-efficiency (AVE = .62, CR = .90)		
Compared with other competing products in our industry, the first product we introduced was developed to incorporate: ...		
...operating efficiencies (e.g., manufacturing modernization, adopting new technologies).	0.69	12.37
...benefits from economies of scale	0.75	16.93
... minimum manufacturing and delivery costs	0.77	18.21
...cost advantages in raw material procurement	0.78	18.52

5.4.3.5 First product performance

The construct was measured through four items including both financial and non-financial aspects. Table 5.14 outlines the results of the measurement model.

Table 5.14 Results of outer measurement model for first performance

Components and manifest variables	Loading	t-value
First product performance (AVE = .73, CR = .90)		
Since its launch, our first product, has ...		
...achieved its sales goals	0.89	39.21
... achieved its profit goals	0.88	37.55
.... has had great profitability	0.86	35.90
...has achieved its goals in customer satisfaction	0.79	27.58

As shown in Table 5.14, the AVE and CR are higher than the threshold documented by scholars, which shows that the reliability is attained. Furthermore the loading ranges and t-values of all the items measuring first product performance are more than the cut-off values (>0.5 for loadings and >1.96 for t-values) which indicates that the convergent validity is attained.

5.4.3.6 Supplier integration (moderator variable)

Supplier integration was measured through two components (1- Information and knowledge exchange and 2-first product co-commercialisation) and totally eight items. The construct was operationalised as a type II model. The results of the measurement model analysis for supplier integration are shown in Table 5.15.

Table 5.15 Results of outer measurement model for supplier integration

Components and manifest variables	Loading	t-value
Supplier integration		
Rate your firm in the following areas representing the extent your firm integrated		

Components and manifest variables	Loading	t-value
and coordinated activities with the SUPPLIERS during your first product launch project. Our firm engaged in...		
<u>Information sharing (AVE = .66, CR= .88)</u>		
...Sharing inventory mix/level information	0.75	15.96
...Sharing production plans	0.81	17.11
...Sharing marketing information	0.83	18.37
...Sharing technological information	0.85	20.12
<u>Product co-commercialisation (AVE= .73, CR= .91)</u>		
...Joint product (or service, if applicable) design	0.72	12.25
...Joint process engineering	0.79	14.48
...Joint production operations	0.76	13.55
...Joint marketing operations	0.80	17.22

As shown in Table 5.15, the AVEs and CRs are higher than the cut-off value acknowledged by literature, which confirms that the reliability is achieved. Also the loadings range and t-values of all the items are more than the cut-off values (>0.5 for loadings and >1.96 for t-values) which specifies that the convergent validity is also achieved.

5.4.3.7 Customer integration (moderator variable)

The construct was operationalised as a type II model. Customer integration was measured through seven items and two components: information and knowledge exchange; and first product co-commercialisation. The results of the measurement model for customer integration construct are presented in Table 5.16.

Table 5.16 Results of outer measurement model for customer integration

Components and manifest variables	Loading	t-value
Customer Integration		
Rate your firm in the following areas representing the extent your firm integrated and coordinated activities with the CUSOTMERS during your first		

Components and manifest variables	Loading	t-value
product launch project. Our firm engaged in...		
<u>Information sharing (AVE = .66, CR= .88)</u>		
...Sharing inventory mix/level information	0.81	20.33
...Sharing production plans	0.83	26.29
...Sharing marketing information	0.79	19.16
...Sharing technological information	0.84	28.41
<u>Product co-commercialisation (AVE = .75, CR= .88)</u>		
...Joint product (or service, if applicable) design	0.88	36.35
...Joint process engineering	0.88	34.88
...Joint production operations	0.86	31.67

As presented in Table 5.16, the measure is adequate as the AVE and CR are higher than the cut-off values identified by scholars. Also all the loadings are positive and significant (>0.5 for loadings and >1.96 for t-values) which specifies that the convergent validity of the construct is achieved.

5.4.3.8 ICT capabilities (moderator variable)

Five items were used to measure ICT capabilities and the construct was operationalised in a reflective fashion. As indicated in Table 5.17, the factor loadings and t-values of all the items are more than the cut-off values (>0.5 for loadings and >1.96 for t-values) which specifies that the convergent validity is attained.

Table 5.17 Results of outer measurement model for ICT capabilities

Components and manifest variables	Loading	t-value
<u>ICT capabilities (AVE= .67, CR= .89)</u>		
In relation to your firm's first product launch project and comparing your firm to your major competitors, rate your firm's abilities in the following areas. In...		
...ICT systems for new product projects (or services, if applicable) has been	0.71	13.98
...ICT systems for facilitating cross functional integration has been	0.73	15.44

...ICT systems for facilitating market knowledge creation has been	0.82	23.88
...ICT systems for facilitating technological knowledge creation has been	0.79	22.35
...ICT systems for external communication with customers, suppliers and channel members has been	0.73	18.09

As indicated in Table 5.17, the AVE and CR are higher than the threshold documented by scholars, which shows the reliability of the measure used.

5.4.4 Discriminant validity

Two approaches were undertaken to assess discriminant validity. First, the study built on the approach outlined and adopted by Ngo and O'Cass (2009). According to these scholars discriminant validity is achieved when the computed correlation between each of the two constructs is higher than their associated composite reliabilities (CRs). As shown in Table 5.16 none of the correlations are higher than the computed CRs previously reported for each construct. Hence the discriminant validity is satisfactory for the constructs of interest. Second, following Fornell and Larcker (1981) approach, the computed square roots of the AVEs were higher than the off-diagonal correlations, hence verifying the existence of discriminant validity.

Table 5.18- Evidence of discriminant validity for the constructs in Surveys A and B

Variables	1	2	3	4	5	6	7	8	9	10	11	12	13
1- Marketing capabilities	1.00												
2- Technology capabilities	0.33	1.00											
3- Marketing resources	0.41	0.61	1.00										
4- Technology resource	0.25	0.53	0.46	1.00									
5- First product differentiation	0.44	0.56	0.33	0.27	1.00								
6- First product cost efficiency	0.28	0.49	0.29	0.28	0.33	1.00							
7- First product performance	0.51	0.39	0.59	0.41	0.48	0.42	1.00						
8- NTV overall performance	0.23	0.28	0.34	0.30	0.33	0.29	0.37	1.00					
9- Supplier integration	0.12	0.22	0.14	0.32	0.31	0.35	0.14	0.22	1.00				
10- Customer integration	0.15	0.24	0.18	0.31	0.35	0.28	0.31	0.29	0.51	1.00			
11- IT capabilities	0.27	0.21	0.11	0.25	0.38	0.26	0.24	0.26	0.41	0.23	1.00		
12- EO	0.26	0.31	0.19	0.33	0.30	0.21	0.21	0.20	0.19	0.13	0.25	1.00	
13- Political networking	0.13	0.14	0.18	0.11	0.16	0.11	0.15	0.11	0.13	0.13	0.11	0.12	1.00

5.4.5 Common method variance

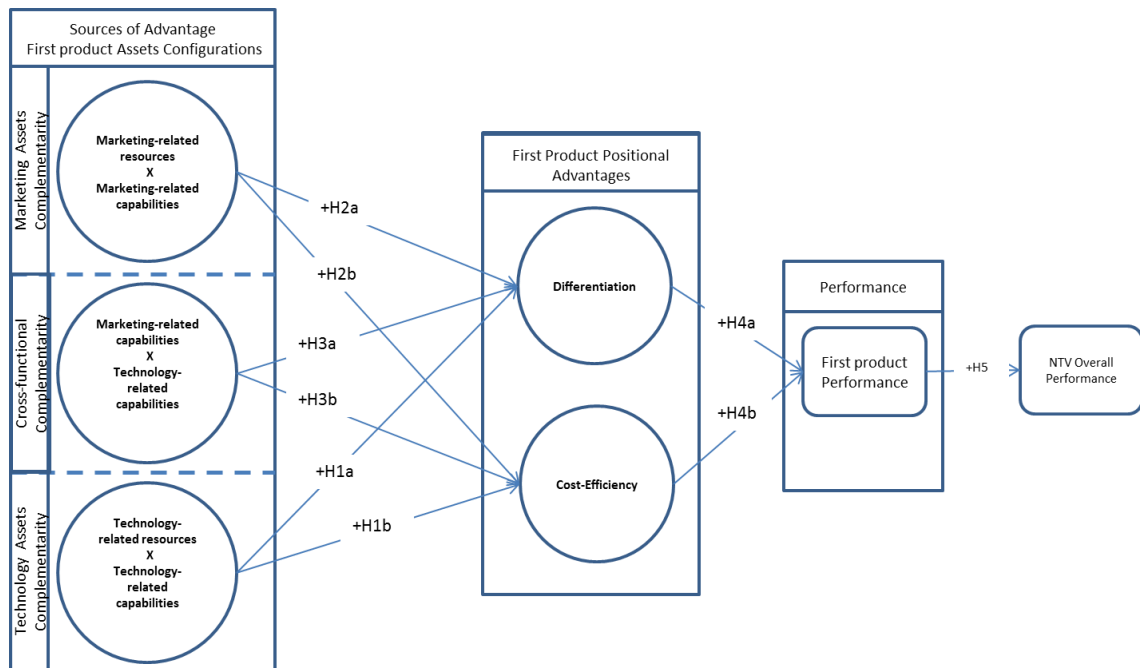
Common method variance (CMV) occurs when all statements and questions are responded to by the same informant in a survey. As a result, common-method variance has the potential to present false relationships among the constructs. To examine the issue of common-method bias, Harmon's single factor test was conducted (Podsakoff, et al., 2003). Exploratory factor analysis (EFA) was conducted to check for the existence of common-method variance. Harmon's single factor test was conducted for the constructs of each survey separately. Six factors were derived from the analysis of all items in survey A and no single factor accounted for the majority of the variance (the first factor accounted for 33.8% of the 66.5% explained variance). For survey B after running the EFA, the first factor accounted for 34.3% of 69.6% explained variance. While five factors were derived from the analysis of all items no single factor accounted for the majority of the variance in survey B. The results indicate that common-method variance is not a concern. Regardless of its application, there are some limitations that need to be considered when using this technique. This technique really does not help to statistically control for method effects. Lately, some scholars applying this technique have used confirmatory factor analysis (CFA) as a more reliable test of the hypothesis that a single factor can represent all of the variance in data (Podsakoff, et al., 2003; Swink & Song, 2007).

5.5 Model assessment: Structural model results

After ensuring that adequacy and validity of the measurement model is satisfactory, the evaluation of structural model commences. As indicated in Chapter Three the theoretical model (Figure 3.1 A and 3.1 B) included two series of hypotheses. Part A articulates the direct effects which explore to identify: 1- to what extent does the configuration of technology and marketing assets as complementary elements enhances the first product commercialisation through generating differentiation and cost-efficiency, 2- to what extent do the first product positional advantages enhance the first product performance and 3- To what extent does the first product

performance enhances overall NTV performance. Part B incorporated the role of contingency factors including other NTV's capabilities to determine to what extent the contingency factors positively moderate the relationship between first product assets and first product positional advantages. Figure 5.1 demonstrates the direct and effects.

Figure 5.1A Asset configurations for superior first product performance-direct effects



According to Chin (2010) and Hair et al. (2011), examination of the structural model consists of (1) identifying the predictive relevance of each path, and (2) identifying the predictive relevance of the structural model. The predictive relevance of individual paths specifies the strength and significance of the relationship between constructs. Strength of an individual path is determined through measuring the path coefficient or path weight (Reinartz et al., 2009). The significance of the relationship is determined through computing the t-value which represents the ratio between estimated and standard errors (Chin et al., 2003; Chin, 2010). To assess for predictive relevance of the structural model, R^2 of endogenous constructs is computed which denotes the percentage of variance explained by the exogenous constructs

directly linked to endogenous construct (Hair et al., 2011). Sections 5.5.1 and 5.5.2 discuss the results of the structural model for direct and moderating effects.

5.5.1 Structural Model: Direct Effects (Hypotheses 1-5)

Following Weerawardena and O'Cass (2004) and Schleimer, Coote, and Riege (2013), to test H1a, H1b, H2a, H2b, H3a and H3b, the mean score of composite variables for marketing capabilities, technology capabilities, marketing resources and technology resources was first computed. To operationalise the complementarity between resources and capabilities in each functional area, and the complementarity between product-focused functional capabilities, the interaction between the constructs was computed by generating the product term of the standardized scores (Venkatraman, 1989; Shaw, Gupta & Delery, 2005; Ngo & O'Cass, 2012a; O'Cass & Sok, 2013). To do so the raw scores of the means of composite variables were mean-centred or centralised. To mean-centre the scores, standardisation was undertaken in SPSS initially. To compute the product term variables (marketing R-C) the generated standardised values for each composite construct were multiplied. The generated product-term variables were finally incorporated to PLS models.

As shown in Table 5.19, all computed path coefficients (β weights) for H1 (a, b), H2 (a, b) and H3 (a, b) the strength of the relationship and all the associated generated t-values are higher than the threshold (>1.96) which indicates that relationships are significant. As shown in Figure 5.1, Hypothesis 1 advances the theory that the greater the level of complementarity between technology resources and capabilities the greater the NTVs (H1a) first product differentiation and (H1b) cost-efficiency. The results shown in Table 5.19 support both H1a and H1b indicating that complementarity between technology resources and capability is positively related to both first product including differentiation and cost-efficiency. Hence, the relationship between technology resource-capability complementarity and differentiation shows a $\beta = 0.25$

(t-value = 3.35). Also, technology resource-capability complementarity is positively related to cost-efficiency with a $\beta = 0.22$ (t-value = 2.95).

As shown in Figure 5.1, Hypothesis 2 states that the complementarity between marketing resources and capabilities is positively related to NTVs first product (H1a) differentiation (H1b) cost-efficiency. The results shown in Table 5.19 support both H2a and H2b indicating that complementarity between marketing resources and capability is positively related to both first product cost-efficiency and first product-differentiation with a $\beta = 0.21$ (t-value = 2.84) and $\beta = 0.29$ (t-value = 3.89). As shown in the first block of Figure 5.1 A, Hypothesis 3 predicted that: the greater the level of complementarity between marketing capabilities and technology capabilities the greater the NTVs first product (H3a) differentiation (H3b) cost-efficiency. The findings shown in table 5.19 support both H3a and H3b indicating that complementarity between marketing and technology capability is positively related to both first product differentiation and first product cost-efficiency with a $\beta = 0.25$ (t-value = 3.21) and $\beta = 0.28$ (t-value = 3.63).

Table 5.19 Path coefficient from partial least squares analysis (direct effects: H1-H5)

Path from	To	Structural model		Outcome
		Path coefficient	t-values	
(H1a) Technology (R-C) (resources X capabilities)	First product differentiation	0.25	3.35	Supported
(H1a) Technology (R-C)	First product cost-efficiency	0.22	2.95	Supported
(H2a) Marketing (R-C)	First product differentiation	0.29	3.89	Supported
(H2b) Marketing (R-C)	First product cost-efficiency	0.21	2.84	Supported
(H3a) Marketing-technology capabilities	First product differentiation	0.28	3.63	Supported
(H3b) Marketing-technology capabilities	First product cost-efficiency	0.25	3.12	Supported
(H4a) First product differentiation	First product performance	0.57	7.76	Supported
(H4b) First product	First product	0.33	4.41	Supported

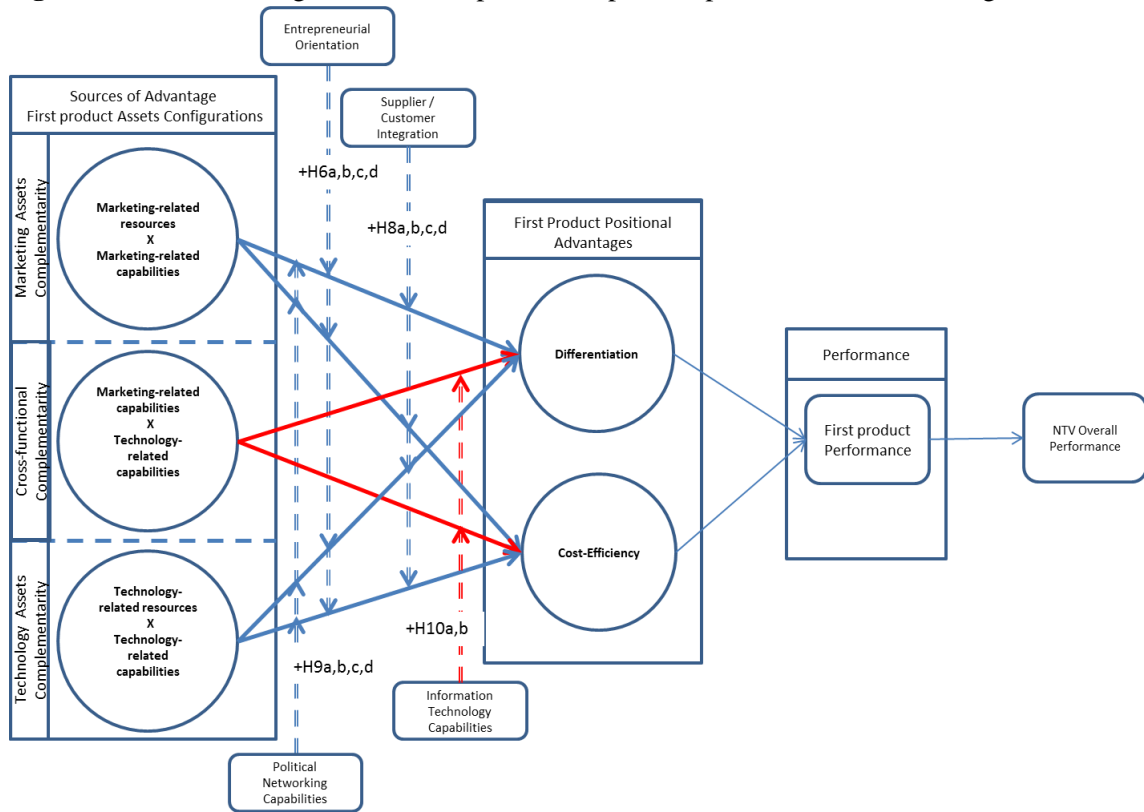
Path from	To	Structural model		Outcome
cost-efficiency	performance			
(H5) First product performance	NTV overall performance	0.38	5.48	Supported

Hypotheses 4 (a, b) states that both first product positional advantaged are positively related to NTVs first product performance. As outlined in Table 5.19, the results provide support for Hypotheses 4a and 4b as both hypothesised relationships are significant and both first product differentiation ($\beta = 0.57$, $t\text{-value} = 7.66$) and first product cost-efficiency ($\beta = 0.33$, $t\text{-value} = 4.41$) are positively related to first product performance. Finally, for Hypothesis 5 it was hypothesised that first product performance is positively related to overall NTV overall performance. The findings shown in Table 5.19 also provide support for Hypothesis 5 with $\beta = 0.38$ ($t\text{-value} = 5.48$).

5.5.2 Structural Model: Moderating effects (Hypotheses 6-10)

To test the moderating effects as set H6 to H10 outlined in Figure 5.1 B, the study computed the models explanatory power which involves evaluating R^2 and exploring the effect size of the model constructs (Andreev, Heart, Maoz, & Pliskin, 2009). Building on Cohen (1988) and Limayem and Cheung (2008), the interaction moderation effect in PLS was computed. To undertake this, the study employed a hierarchal approach (e.g., Chin, 2010; O’Cass & Sok, 2012; O’Cass & Sok, 2013) to compare the R^2 value of the direct effect with that of the interaction effect which excludes the R^2 of interaction effect (Chin, 1998). Hence two models (I and II) should be compared in PLS based on the generated R^2 values on independent variables (i.e. first product differentiation and first product cost-efficiency). Model I should be run encompassing only the direct effects. The product term (multiplication of standardised composite means for interactions between resources – capabilities and capabilities-capabilities) previously generated for complementarities should be used for direct effects in model I.

Figure 5.1B Asset configurations for superior first product performance-moderating effects



The R^2 value generated for model I should be noted and model II should be computed by involving the moderator variable. The R^2 interaction model (model II) is the explained variance of the dependent construct, including both independent (e.g., resource-capability complementarity) and moderator (e.g., supplier integration) constructs. The R^2 direct model is therefore the explained variance of the same dependent construct when the moderator construct is removed from the model. Chin (1998; 2010) reports that the effect size (f^2) of PLS constructs, may be interpreted as small ($f^2 = 0.02$), medium ($f^2 = 0.15$), or large ($f^2 = 0.35$). Hence, the strength of the substantive impact of the moderator construct was calculated through the following formula suggested by Chin (1998):

$$f^2 = [R^2 \text{ interaction model} - R^2 \text{ direct model}] / [1 - R^2 \text{ direct model}]$$

Following the above approach, Models I and II were computed for all the hypothesised moderating relationships. Results are provided in the following sections.

5.5.2.1 Results for EO - H6 a, b, c, d

H6a hypothesises that EO positively moderates the relationship between marketing resource-capability complementarity and first product differentiation. The results shown in Table 5.20 do not support H6a with an insignificant $\beta = 0.073$ (t-value = 1.07) for the moderation effect. H6b advances the theory that EO positively moderates the relationship between marketing resource-capability complementarity and first product cost-efficiency. As shown in Table 5.20, the results do not support H6b with an insignificant $\beta = 0.096$ (t-value = 1.14) for the moderation effect.

Table 5.20 Moderation effect results - H6

Direct relationship	Moderator	Structural model		Outcome
		F ²	(t-value)	
(H6a) Marketing R-C → First product differentiation ($R^2 = 0.16$)	EO ($R^2 = 0.13$)	–	0.073 (1.07)	<u>Not Supported</u>
(H6b) Marketing R-C → First product cost-efficiency ($R^2 = 0.14$)	EO ($R^2 = 0.11$)	–	0.096 (1.14)	<u>Not Supported</u>
(H6a) Technology R-C → First product differentiation ($R^2 = 0.19$)	EO ($R^2 = 0.29$)	0.12	0.19 (2.54)	Supported
(H6d) Technology R-C → First product cost-efficiency ($R^2 = 0.18$)	EO ($R^2 = 0.33$)	0.17	0.18 (2.41)	Supported

Further, H6c predicts that EO positively moderates the relationship between technology resource-capability complementarity and first product differentiation. As outlined in Table 5.20, the result supports H6c as the interaction moderation effect ($R^2 = 0.29$) reflects more explanatory power than the direct effect ($R^2 = 0.19$) and relationship is significant with a $\beta = 0.19$ (t-value = 2.54), and the effect size is determined as 0.12. Further, H6d states that EO positively moderates the relationship between technology resource-capability complementarity and first product cost-efficiency. The results support H6c as the interaction moderation effect ($R^2 = 0.33$) reflects

more explanatory power than the direct effect ($R^2 = 0.18$) and relationship is significant with a $\beta = 0.18$ (t-value = 2.41), and the effect size is computed as 0.17.

5.5.2.2 Results for supplier integration - H7 a, b, c, d

H7a states that supplier integration positively moderates the relationship between marketing resource-capability complementarity and first product differentiation. The results shown in Table 5.21 support H7a as the interaction moderation effect ($R^2 = 0.32$) reflects more explanatory power than the direct effect ($R^2 = 0.16$) and the relationship is significant with a $\beta = 0.15$ (t-value = 2.01) and the effect size is computed as 0.18. Further, H7b predicts that supplier integration positively moderates the relationship between marketing resource-capability complementarity and first product cost-efficiency. As shown in Table 5.19 the results do not support H4b with an insignificant $\beta = 0.065$ (t-value = 0.87) for moderation effect.

Table 5.21 Moderation effect results - H7

Direct relationship	Moderator	Structural model		Outcome
		F ²	(t-value)	
(H7a) Marketing R-C → First product differentiation ($R^2 = 0.16$)	Supplier integration ($R^2 = 0.32$)	0.18	0.15 (2.01)	Supported
(H7b) Marketing R-C → First product cost-efficiency ($R^2 = 0.14$)	Supplier integration ($R^2 = 0.09$)	–	0.065 (0.87)	<u>Not Supported</u>
(H7c) Technology R-C → First product cost-efficiency ($R^2 = 0.18$)	Supplier integration ($R^2 = 0.25$)	0.09	0.14 (1.99)	Supported
(H7d) Technology R-C → First product differentiation ($R^2 = 0.19$)	Supplier integration ($R^2 = 0.26$)	0.09	0.16 (2.15)	Supported

Table 5.21 summarises the results for H7. Hypothesis 7c states that supplier integration positively moderates the relationship between technology R-C complementarity and first product cost-efficiency. The results support H7c as the interaction moderation effect ($R^2 = 0.25$)

reflects more explanatory power than the direct effect ($R^2 = 0.18$) and relationship is significant with a $\beta = 0.14$ (t-value = 1.99), and the effect size is computed as 0.09.

Further, H7d advances the theory that supplier integration positively moderates the relationship between technology R-C complementarity and first product differentiation. The result shown in Table 5.21 supports H7d as the interaction effect ($R^2 = 0.26$) reflects more explanatory power than the direct effect ($R^2 = 0.19$) and relationship is significant with a $\beta = 0.16$ (t-value = 2.15), and the effect size is determined as 0.09.

5.5.2.3 Results for customer integration - H8 a, b, c, d

Hypothesis 8a predicts that customer integration positively moderates the relationship between marketing resource-capability complementarity and first product differentiation. As outlined in Table 5.22, the result supports H8a as the interaction effect ($R^2 = 0.25$) reflects more explanatory power than the direct effect ($R^2 = 0.16$), and the relationship is significant with a $\beta = 0.11$ (t-value = 2.05).

Table 5.22 Moderation effect results - H8

Direct relationship	Moderator	Structural model		Outcome
		F ²	(t-value)	
(H8a) Marketing R-C → First product differentiation ($R^2 = 0.16$)	Customer integration ($R^2 = 0.25$)	0.11	0.15 (2.05)	Supported
(H8b) Marketing R-C → First product cost-efficiency ($R^2 = 0.14$)	Customer integration ($R^2 = 0.18$)	0.05	0.13 (1.97)	Supported
(H8c) Technology R-C → First product cost-efficiency ($R^2 = 0.18$)	Customer integration ($R^2 = 0.23$)	0.06	0.14 (2.00)	Supported
(H8d) Technology R-C → First product differentiation ($R^2 = 0.19$)	Customer integration ($R^2 = 0.28$)	0.11	0.18 (2.06)	Supported

Furthermore, H8b states that customer integration positively moderates the relationship between marketing resource-capability complementarity and first cost-efficiency. The result shown in Table 5.22 supports H8b as the interaction effect ($R^2 = 0.18$) reflects more explanatory power than the direct effect ($R^2 = 0.14$), and the relationship is significant with a $\beta = 0.13$ (t-value = 1.97). The effect size is computed as 0.05.

Hypothesis 8c advances the theory that customer integration positively moderates the relationship between technology resource-capability complementarity and first cost-efficiency. The result outlined in Table 5.22 support H8c as the interaction effect ($R^2 = 0.25$) reflects more explanatory power than the direct effect ($R^2 = 0.21$), and the relationship is significant with a $\beta = 0.14$ (t-value = 2.00). The effect size is calculated as 0.11.

Finally, H8d theorises that customer integration positively moderates the relationship between technology resource-capability complementarity and first product differentiation. The result outlined in Table 5.22 support H8d as the interaction effect ($R^2 = 0.23$) reflects more explanatory power than the direct effect ($R^2 = 0.18$), and the relationship is significant with a $\beta = 0.18$ (t-value = 2.03). The effect size is determined as 0.06.

5.5.2.4 Results for political networking capabilities - H9 a, b, c, d

Hypothesis 9a states that political networking capabilities positively moderate the relationship between marketing resource-capability complementarity and first product differentiation. The result outlined in Table 5.23 supports H9a as the interaction moderation effect ($R^2 = 0.31$) reflects more explanatory power than the direct effect ($R^2 = 0.16$), and the relationship is significant with a $\beta = 0.23$ (t-value = 3.10). The effect size was computed as 0.18.

Further, H9b advances the contention that political networking capabilities positively moderate the relationship between marketing resource-capability complementarity and first cost-efficiency. The results do not support H9b with an insignificant $\beta = 0.092$ (t-value = 1.31) for moderation effect.

Table 5.23 Moderation effect results - H9

Direct relationship	Moderator	Structural model		Outcome
		F ²	(t-value)	
(H8a) Marketing R-C → First product differentiation ($R^2 = 0.16$)	Political networking capabilities ($R^2 = 0.31$)	0.18	0.23(3.10)	Supported
(H8b) Marketing R-C → First product cost-efficiency ($R^2 = 0.14$)	Political networking capabilities ($R^2 = 0.09$)	–	0.092 (1.31)	Not Supported
(H8c) Technology R-C → First product differentiation ($R^2 = 0.19$)	Political networking capabilities ($R^2 = 0.30$)	0.13	0.21 (2.82)	Supported
(H8d) Technology R-C → First product cost-efficiency ($R^2 = 0.18$)	Political networking capabilities ($R^2 = 0.13$)	–	0.088 (1.25)	Not Supported

Hypothesis 9c states that political networking capabilities positively moderate the relationship between technology resource-capability complementarity and first product differentiation. As shown in Table 5.23, the result supports H9c as the interaction moderation effect ($R^2 = 0.30$) reflects more explanatory power than the direct effect ($R^2 = 0.19$), and the relationship is significant with a $\beta = 0.21$ (t-value = 2.82). The effect size is computed at 0.13.

Finally, H9d theorises that political networking capabilities positively moderate the relationship between technology resource-capability complementarity and first cost-efficiency. The results outline in Table 5.23 do not support H9d with an insignificant negligible $\beta = 0.085$ (t-value = 1.25) for the moderating effect.

5.5.2.5 Results for ICT capabilities - H10 a, b

Hypothesis 10a states that ICT capabilities positively moderate the relationship between marketing and technology capabilities complementarity and first product differentiation. The findings support H10a as the interaction effect ($R^2 = 0.35$) reflects more explanatory power than the direct effect ($R^2 = 0.20$) and relationship is significant with a $\beta = 0.24$ (t-value = 3.22) and the effect size is computed as 0.19. Further, H10b states that ICT capabilities positively

moderate the relationship between marketing and technology capabilities complementarity and first product cost-efficiency. The findings support H10b as the interaction (for moderation) effect ($R^2 = 0.28$) reflects more explanatory power than the direct effect ($R^2 = 0.15$) and relationship is significant with a $\beta = 0.22$ (t-value = 2.95) and the effect size is computed as 0.15. Table 5.24 summarizes the analysis for Hypotheses 10.

Table 5.24 Moderation effect results - H10

Direct relationship	Moderator	Structural model		Outcome
		F ²	(t-value)	
(H10a) Marketing-technology capabilities complementarity → First product differentiation ($R^2 = 0.20$)	ICT capabilities ($R^2 = 0.35$)	0.19	0.24 (3.22)	Supported
(H10b) Marketing-technology capabilities complementarity → First product cost-efficiency ($R^2 = 0.15$)	ICT capabilities ($R^2 = 0.28$)	0.15	0.22 (2.95)	Supported

Table 5.25 outlines the summary of the findings on Hypotheses 1-10. They are categorised into two groups: direct effects and moderating effects.

Table 5.25 Summary on the findings - H1-H10

Hypotheses		Result
Direct effects		
H1a	The greater the level of complementarity between technology resources and capabilities the greater the NTVs first product differentiation.	Supported
H1b	The greater the level of complementarity between technology resources and capabilities the greater the NTVs first product cost-efficiency.	Supported
H2a	The greater the level of complementarity between marketing resources and capabilities the greater the NTVs first product differentiation.	Supported
H2b	The greater the level of complementarity between marketing resources and capabilities the greater the NTVs first cost-	Supported

Hypotheses		Result
	efficiency.	
H3a	The greater the complementarity between marketing and technology capabilities, the greater the first product differentiation.	Supported
H3b	The greater the complementarity between marketing and technology capabilities, the greater the first product cost-efficiency.	Supported
H4a	The greater the first product differentiation the greater the first product performance in NTVs.	Supported
H4b	The greater the first product cost efficiency the greater the first product performance in NTVs.	Supported
H5	The greater the first product performance, the greater the overall NTV performance	Supported

Moderating effects

EO		
H6a	EO positively moderates the relationship between of marketing resource-capability complementarity and first product differentiation.	Not supported
H6b	EO positively moderates the link between marketing resource-capability complementarity and first cost-efficiency.	Not supported
H6c	EO positively moderates the link between technology resource-capability complementarity and first product differentiation.	Supported
H6d	EO positively moderates the link between technology resource-capability complementarity and first product cost-efficiency.	Supported

Supplier integration

H7a	Supplier integration positively moderates the link between marketing resource-capability complementarity and first product differentiation.	Supported
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Hypotheses		Result
<i>H7b</i>	Supplier integration positively moderates the link between marketing resource-capability complementarity and first product cost-efficiency.	Not supported
<i>H7c</i>	Supplier integration positively moderates the link between technology resource-capability complementarity and first product cost-efficiency.	Supported
<i>H7d</i>	Supplier integration positively moderates the link between technology resource-capability complementarity and first product differentiation.	Supported
Customer integration		
<i>H8a</i>	Customer integration positively moderates the link between marketing resource-capability complementarity and first product differentiation.	Supported
<i>H8b</i>	Customer integration positively moderates the link between marketing resource-capability complementarity and first product cost-efficiency.	Supported
<i>H8c</i>	Customer integration positively moderates the link between technology resource-capability complementarity and first product cost-efficiency.	Supported
<i>H8d</i>	Customer integration positively moderates the link between technology resource-capability complementarity and first product differentiation.	Supported
Political networking capabilities		
<i>H9a</i>	Political networking capabilities positively moderate the link between marketing resource-capability complementarity and first product differentiation.	Supported
<i>H9b</i>	Political networking capabilities positively moderate the link between marketing resource-capability complementarity and first product cost-efficiency.	Not supported
<i>H9c</i>	Political networking capabilities positively moderate the link between technology resource-capability complementarity and first product differentiation.	Supported
<i>H9d</i>	Political networking capabilities positively moderate the link between technology resource-capability complementarity and first product cost-efficiency.	Not Supported

Hypotheses		Result
ICT capabilities		
H10a	ICT capabilities positively moderate the relationship between the marketing and technology capabilities complementarity and first product differentiation.	Supported
H10b	ICT capabilities positively moderate the relationship between the marketing and technology capabilities complementarity and first product cost-efficiency.	Supported

5.5.3 Predictive relevance and overall fit of the model

According to Chin (2010) and Hair et al. (2011), predictive relevance of a model can be assessed through checking the magnitudes of R^2 values generated in the measurement model. All computed values for R^2 were higher than the cut-off value (>0.1) suggested in the literature (Falk & Miller, 1992). Hence, the computed R^2 values for first product differentiation ($R^2 = 0.26$), first product cost-efficiency ($R^2 = 0.23$), first product performance ($R^2 = 0.44$) and overall NTV performance ($R^2 = 0.41$) acknowledge the predictive relevance of the model. In contrast to CB-SEM techniques, PLS does not provide statistical indexes such as comparative fit index (CFI) which can indicate the overall fit of the model (Iacobucci, 2010). To address this issues, the GoF (goodness of fit) index proposed by Tenenhaus, Vinzi, Chatelin, and Lauro (2005) and extensively applied by scholars in marketing (e.g., Valette-Florence, Guizani, & Merunka, 2011; Peltier, Schibrowsky, & Nill, 2013) was computed. The objective of the GoF is to assess the PLS models performance including measurement and the structural models with a focus on overall prediction performance of the model. According to Tenenhaus et al. (2005), GoF denotes the geometric mean of the average communality and average R^2 for endogenous constructs. GoF can be computed through taking the square root of product of the average of R^2 of the endogenous constructs and the communality of all constructs: $GoF = \sqrt{\overline{Com} \times \overline{R^2}}$

Wetzels et al. (2009) proposes the GoF criteria as poor (0.1), medium (0.25) and good (0.36) model fit. Average R^2 was 0.34 and average communality was 0.67. Hence the GoF of the model was computed through Tenenhaus et al.'s formula at 0.47, which indicates a good model fit.

5.6 Conclusion

After discussing the methodology for data collection in Chapter Four, Chapter Five presented the outcomes of the statistical analysis undertaken on the data gathered to test ten hypotheses. Hence the process of data analysis was fully elaborated in the content of Chapter Five. The hypotheses were grouped as two categories: a) direct effects involving the relationships between first product assets and first product outcomes (i.e. positional advantages, first product performance and overall NTV performance) and b) moderating effects involving the contingency role of other capabilities including integration mechanisms, ICT capabilities, EO and political networking capabilities.

The data of the study was obtained through 142 sets of valid surveys which had been distributed across six different technology-oriented industries. The outcomes of preliminary analysis indicated that PLS-based technique is justified for the study as some of items did not provide a normal distribution due to the skewness and kurtosis values reported for them. Further by drawing on the complication of the theoretical model, operationalisation of some of the constructs of interests, response rate that was achieved and the predictive nature of the theoretical model underpins the study, PLS –based analysis was identified as the most appropriate method for the study. Analysis of the data based on PLS algorithm includes the assessment of two models. Measurement model was analysed in the first stage which reflects the indices such as AVE, CR, t-values and loading of the items, assisting the researcher to evaluate the reliability and validity of the measures. Building on cut-off values defined in the literature, first researcher assured about the adequacy and validity of the measurement model.

Afterwards the links between the constructs of interests as depicted in Figure 3.1A and 3.1B were assessed in terms of the structural – inner model analysis. At this stage the bootstrap technique was employed to resample the data based on 500 iterations. As the outcome for structural model computation, coefficients and t-values generated for each path were evaluated. As a result all the direct effects were significant providing the evidence that hypotheses 1 to 5 are all supported.

The findings underscore the significant role of achieving an optimal well-coordinated configuration of requisite assets at the start-up stage to enhance first product commercialisation. By drawing on the hierarchal approach, for each moderation effect, two models were assessed: 1) model with direct effect 2) model which incorporates the moderation effect. Evaluation was based on (1) comparison of R² values generated for direct and moderation effects, (2) significance of the interaction path and (3) the generated effect size (f). Results of the moderating effects assessment, reflects interesting outcomes. As indicated in Tables 5.22, 5.23, 5.24 and 5.25; EO, supplier integration, customer integration and political networking capabilities were not fully moderating all the links connecting marketing R-C complementarity and technology R-C complementarity with first product positional advantages (i.e. differentiation and cost efficiency). As an example while the deployment of political networking capabilities was found as a supportive capability to both marketing and technology areas to achieve first product differentiation, yet the findings did not identify political networking capabilities as a significant factor assisting NTVs' exploitation mechanisms to achieve first product cost-efficiency. The next Chapter discusses the findings in detail and provides theoretical and practical implications associated with the findings in the first product commercialisation context.

CHAPTER SIX

Discussion and Conclusion

6.1 Introduction

Building upon the literature review undertaken in Chapter Two, Chapter Three developed the theoretical framework outlining the exploitation mechanisms for product level assets that increase the efficiency and effectiveness of NTVs' first product commercialisation. The hypotheses were developed to articulate the relationships between the constructs depicted in Figure 3.1A and 3.1B. Drawing on the characteristics of the NTVs such as limitations in product level assets and structures, the study examined the extent that an optimal configuration of start-up resources and capabilities in product development and marketing areas enhance first product commercialisation through generating first product differentiation and cost-efficiency. In this sense the study hypothesised the influence of assets (resource-capability) complementarities in product development and marketing, as well as the impact of marketing-technology capabilities complementarity in a cross functional manner as antecedents of NTVs first product performance. Further, it was hypothesised that gaining the desired benefit from complementarities is contingent on exploiting other capabilities in the form of supplier integration, customer integration, EO, ICT capabilities and political networking capabilities.

In Chapter Four the research design was elaborated including the research paradigm underpinning the study, the objectives, and tactics to link the hypotheses with the data. In Chapter Five the data analysis procedures were detailed and the results of the data analysis to test hypotheses were presented. This Chapter builds on Chapters Two to Five as the foundations to interpret the findings and elaborate the theoretical and managerial implications of the study. First the discussion focuses on an initial interpretation of the findings. Afterwards the

theoretical and managerial implications are discussed. Finally a discussion of the limitations, future research avenues and conclusions close the Chapter.

6.2 Summary of the findings

The literature review provided in Chapter Two indicated that there are significant gaps in the literature regarding the antecedents of first product success, and in particular the exploitation mechanisms available for NTVs in the form of first product assets. While there is extensive work investigating the contributions of marketing and technology resources and capabilities to new product success, the majority of the research has focused on established manufacturing firms (Song et al., 2010a), not NTVs. In many respects, the literature is largely silent about how available product-related assets at the start-up stage should be deployed to enhance first product financial and non-financial outcomes (e.g., sales growth, profit growth and customer satisfaction).

The literature on new product commercialisation focusing on established manufacturing firms has investigated issues related to product market positional advantages linking product-related resources and capabilities to new product commercialisation outcomes (e.g., Kim & Atauhene-Gima, 2010; Atauhene-Gima & Wei, 2011). However, the literature does not provide clear insight into the nature of asset exploitation mechanisms used in first product commercialisation. Further, current literature does not clearly identify the first product positional advantages that bridge the gap between first product resource-capability and capability-capability complementarities and first product performance. In addition, current knowledge is scarce regarding the contingency factors that maximize the impact of resource-capability complementarity in new product development and marketing. This is also the case as well when one considers cross-functional complementarity and its impact on first product commercialisation activities. Interestingly, with the increasing importance of emerging economies, it is puzzling that little empirical attention has been paid to first product commercialisation in NTVs in emerging economies, particularly the group of BRICS (Brazil,

Russia, India, China, and South Africa) countries (Bruton, 2009). To address the identified gaps, seven research questions were developed:

- 1- To what extent does marketing resource-capability complementary enhance first product positional advantages: product differentiation and cost-efficiency in NTVs?
- 2- To what extent does technology resource-capability complementarity enhance first product positional advantages: product differentiation and cost-efficiency in NTVs?
- 3- To what extent does the complementarity between marketing and technology capabilities enhance first product positional advantages: product differentiation and cost-efficiency in NTVs?
- 4- To what extent do first product positional advantages in the form of product differentiation and cost-efficiency enhance first product performance in NTVs?
- 5- To what extent does first product performance influence overall NTV performance?
- 6- To what extent is the relationship between product-level resource-capability complementarity and first product differentiation and cost efficiency contingent on political networking capabilities, supplier integration, customer integration, and EO in NTVs?
- 7- To what extent is the effect of cross-functional capability complementarity on first product differentiation and cost-efficiency contingent on the deployment of ICT capabilities in NTVs?

The research questions were grounded in the literature review capturing new product development, first product commercialisation, RBT and NTV theoretical domains. A theoretical framework was developed in Chapter Three in two parts presenting ten hypotheses including the direct effects (Figure 3.1 A) and moderating effects (Figure 3.1 B) which incorporate the role of contingency factors. Figure 6.1 illustrates the hypothesised interrelationships among the constructs presented in Chapter Three (Figure 3.1A and B). As shown in Figure 6.1, extending the theory of positional advantage into the new product development and RTB literature, the

contention is advanced that NTVs generation of first product differentiation and cost-efficiency is contingent on the exploitation of an optimal configuration of marketing and technology resources and capabilities. Hence within the configuration (the first block of the model), two types of relationships are depicted: (1) direct relationships (Hypotheses 1-5) and (2) moderating relationships (Hypotheses 6-10) examining the role of contingency factors.

Hypotheses 1-3 focus on the impact of the inter-relationship between the internal product-focused resources and capabilities in the functional areas of marketing and technology. The inter-relationships are characterised as complementarities and have are examined at two levels. Further, as illustrated in Figure 6.1, Hypotheses 1-3, pertain to the extent that commercialisation in the form of marketing resource-capability (R-C) complementarity, technology R-C complementarity (in each product-focused functional area) and complementarity between marketing and technology capabilities are positively related to first product positional advantages (in the forms of differentiation and cost-efficiency). H1a and H1b represent the relationship between technology R-C complementarity and first product differentiation and cost efficiency. H2a and H2b examine the relationship between marketing R-C complementarity and first product differentiation and cost efficiency. H3a and H3b examine the relationship between complementary technology-marketing capabilities at the cross-functional level and first product differentiation and cost efficiency. Also as depicted in Figure 6.1, H4a and H4b pertain to the extent that first product positional advantages are positively related to first product performance and Hypothesis 5 examines the extent to which first product performance is related to overall NTV performance. The direct relationships including Hypotheses 1-5 address research questions one to five. Table 5.25 in Chapter 5 summarised the results regarding Hypotheses 1 to 10. As shown in Chapter Five, the results support all hypotheses related to the direct effects, including H1a, H1b, H2a, H2b, H3a, H3b, H4a, H4b and H5.

The moderating effects encompass Hypotheses 6-10, and are associated with research questions six and seven. The moderator constructs representing contingency factors in the

theoretical framework focus on EO, supplier integration, customer integration, political networking capabilities and ICT capabilities and their inter-relationships are depicted in the first block (configuration of first product assets) of Figure 6.1. Hypotheses 6 a, b, c, d pertain to the extent that EO moderates the relationship between first product R-C complementarities (i.e. marketing R-C and technology R-C) and first product positional advantages. As shown in Chapter Five, for EO's moderating effect, Hypotheses 6a and 6b are not supported indicating that EO does not moderate the relationship between marketing R-C complementarity and first product differentiation. However, the results provide support for hypothesis 6c and 6d showing that EO enhances the influence of technology R-C complementarity on both first product differentiation and cost-efficiency.

Hypotheses 7 a, b, c, d examine the extent that supplier integration positively moderates the relationship between R-C complementarity (in each functional area) and first product differentiation and cost-efficiency in NTVs. As indicated in Chapter Five, H7b (supplier integration moderating marketing R-C complementarity leading to first product cost-efficiency) is not supported and the results provide support for H7a, indicating that supplier integration in the form of knowledge exchange and product co-commercialisation positively moderates the relationship between marketing R-C complementarity and first product differentiation in NTVs. Further, as shown in Table 5.25 of Chapter Five, Hypotheses 7c and 7d are supported verifying that supplier integration positively moderates the relationship between technology R-C complementarity and first product positional advantages including first product differentiation and cost-efficiency.

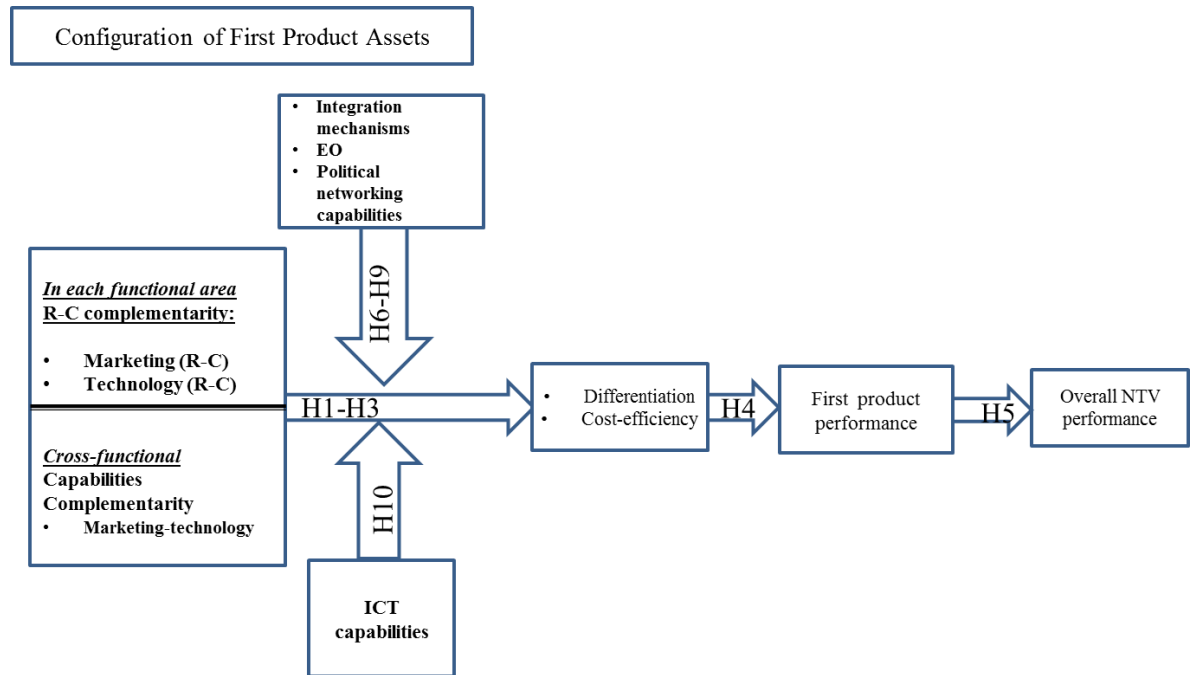
Further, Hypotheses 8 a, b, c, d theorised that customer integration positively moderates the relationship between marketing and technology R-C complementarity and first product positional advantages in NTVs. According to the results presented in Chapter Five, Hypotheses 8a and 8b were supported showing that customer integration enhances the influence of marketing R-C complementarity on first product positional advantages including differentiation

and cost-efficiency. The findings provide support for Hypotheses 8c and 8d. Hence, the findings show that customer integration encompassing information exchange and product co-commercialisation enhances the influence of technology R-C complementarity on first product differentiation and cost-efficiency.

Hypotheses 9 a, b, c, d pertain to the extent that an NTVs political networking capabilities in NTVs moderate the relationship between the R-C complementarities in the area of product development and marketing and first product differentiation and cost efficiency. As shown in Chapter Five, the findings support Hypotheses 9a and 9c showing the effective role of political networking capabilities in enhancing the relationship between marketing and technology R-C and first product differentiation. However the findings do not support H9b and H9d indicating that political networking capabilities does not play a significant role in achieving first product cost-efficiency, which means that marketing and technology R-C complementarities' relationship with first product cost-efficiency is not positively moderated by political networking capabilities.

Hypotheses 10a and 10b theorise that an NTVs ICT capabilities positively moderate the relationship between complementary marketing-technology capabilities and first product positional advantages. As shown in Chapter Five, the results provide support for Hypotheses 10a and 10b confirming the moderating effect of ICT capabilities in enhancing the effect of marketing-technology capabilities complementarity on first product differentiation and first product cost-efficiency in NTVs.

Figure 6.1 Asset configuration for first product success



6.2.1 Discussion of theoretical implications for Hypotheses 1, 2 and 3

The study is among the very few to have specifically concentrated on NTVs exploitation of start-up assets (i.e. resources and capabilities) during first product commercialisation. By extending the application of theory pertaining to configuration, complementarity, positional advantage and RBT, the study examined the impact of start-up technology and marketing resources and capabilities, and their exploitation mechanisms in enhancing first product commercialisation through generating first product differentiation and cost-efficiency. No study to date in the domain of first product commercialisation has investigated the inter-relations between technology and marketing assets. The study extends the literature by studying Indian NTVs and examining theoretically specific mechanisms that are considered critical for the effective exploitation of first product resources and capabilities.

Configurations and first product positional advantages

In the theoretical framework (Figure 3.1A and B), technology R-C complementarities were shown to enhance NTVs first product differentiation and cost-efficiency (H1a and H1b). Likewise, complementarity between first product marketing resources and capabilities improved both first product differentiation and cost-efficiency (H2a and H2b). The findings regarding H1 and H2 advance RBT and contribute to a greater understanding of the resource-performance model in the context of first product commercialisation. In fact the findings regarding H1 and H2 augment RBT theory by marking off the difference between first product resources and capabilities in the area of product development and marketing. The findings imply that in NTVs with asset limitations stemming from their liability of smallness and newness, assets in product development and marketing areas are most beneficial when they are engaged in form of complementary attributes with high level of synergy. In fact, the findings regarding H1 and H2 imply that the way an NTV's available product development and marketing resources and capabilities interact, is vital to their first product's position and performance in the market.

Further the findings regarding H2 and H1 advance knowledge on the link between NTVs first product marketing and technology assets (in the form of complementarities) and first product differentiation and cost efficiency. The study has focused on marketing resources-marketing capabilities complementarity and technology resources-technology capabilities complementarity in the configuration of first product assets in NTVs. However, previous studies adopting RBT and new product commercialisation in established (on-going) firms and NTVs has focused mostly on marketing capabilities (e.g., Eng & Spickett-Jones, 2009), marketing resources (Li & Zhang, 2007), product innovation capabilities and technology capabilities (e.g., Lee et al., 2001; Wang et al., 2006; Parnell, 2011) in isolation, not in a complementary sense as theorised in this study. In this sense existing literature has neglected the point that they can be critical sources of new product advantage and new product performance when seen in a complementary fashion.

In particular current research focusing on first product commercialisation fails to address the nature and impact of exploitation mechanisms (i.e. sources of advantage) involving the interplay and interrelations between resources and capabilities at the level of a specific product, especially the first product. In the same vein, some have incorporated both resources and capabilities in their theoretical models without investigating how their interaction contributes to generating first product positional advantages (e.g., Song et al., 2010a). This view implies that if the deployment of marketing resources such as market knowledge and marketing budget do not lead to desired new product performance, such resources have no value. Similarly, if exploiting technology and marketing capabilities do not lead to enhanced new product performance or new product positional advantages, the custody of such product level capabilities has no value. The findings and theoretical development of this study extends configuration and complementarity theories (especially the work of Milgrom & Roberts, 1995; Zott & Amit, 2008; O’Cass & Sok, 2013) by indicating that indeed R&D budget, marketing budget, physical resources and marketing knowledge possess value in the first product commercialisation. However, marketing and technology-related capabilities are required to exploit those bundles of resources and enhance their functionality. Also, while marketing and technology-related capabilities may have potential value for first product commercialisation, they are not sufficient as some level of marketing and technology resources are required to be exploited to achieve first product positional advantage and meet both cost-related and innovation-related objectives.

The results regarding H3 indicate that complementarity between an NTVs’ marketing and technology capabilities at the cross-functional level contribute to the generation of first product differentiation and cost-efficiency. The findings indicate that not only is the achievement of resource-capability complementarity in functional areas beneficial in developing and launching a superior first product, but the complementarity between marketing and technology capabilities at the cross-functional level enhance an NTVs’ first product’s position as a highly differentiated

– low cost offering in the market. Accordingly, the findings of this study highlight the equal importance of innovation (in product and technology development) and marketing in achieving a desirable first product position in the market. This finding supports the studies' argument that marketing and technology assets should be involved in parallel when scrutinising the impact of first product assets on first product positional advantages in NTVs. This finding extends the view suggested by Dutta et al. (1999), Hult and Ketchen (2001) and Mohr and Sarin (2009) into the context of first product and provides empirical validation of the theory which was not extensively tested. These scholars have suggested that technology oriented firms are not able to appropriate value from their technology capabilities unless they can simultaneously leverage their marketing capabilities to effectively market the product.

The findings and theoretical development of the study indicate that scrutinising the impact of asset complementarity only within a single product focused functional area may not be sufficient (Moorman & Slotegraaf, 1999; Ngo & O'Cass, 2012a) in the context of first product commercialisation. Given the fact that product-focused structures, processes and procedures are often not well established and under development at the start-up stage in NTVs (Li & Zhang, 2007; Song et al., 2011), it is important to also examine frameworks in the context of first product success encompassing the impact of capabilities complementary at the cross-functional level as sources of advantage. In this sense, and considering current theory, the findings regarding H1, H2 and H3 are important as they contradict the current research about the impact of marketing assets in enhancing first product outcomes. In this regard, Song et al.'s (2010a) work on NTVs in China suggested a positive relationship between technology assets and first product differentiation. However their findings reflected a negative effect of marketing assets on first product differentiation. In contrast theoretical development of this study shows the applicability of the capability-based view in first product commercialisation by NTVs. Hence this finding implies that, based on complementarity theory, both technology and marketing capabilities can enhance and hinder each other's' functionality. Hence, If NTVs

develop a breakthrough first product embedded with innovative features, but poorly market it; the customer will not capture the proposed value. At the same time, if the first product has no significant advantages in terms of novelty, marketing may only generate temporary and short-term gains. Hence the findings regarding H1, H2 and H3 suggest that further theoretical models in the context of first product commercialisation, effectively involve the exploitation mechanisms encompassing start-up marketing resources and capabilities along with innovation-related assets. Therefore, the findings confirm the theory in the context of first product commercialisation showing that marketing should be theorised as a guiding process within organisations with high technology orientation (such as NTVs) (Hisrich, 1992). While Song et al. (2010a) do not suggest marketing activities as significant in the process of first product commercialisation, the findings regarding H2 and H3 underscore the critical role of marketing in the form of two vital exploitation mechanisms including marketing resource-capability complementarity and marketing-technology capabilities complementarity in first product commercialisation effectively communicate the technology-based first product to the market. Simultaneous examination of marketing and technology assets in the context of first product is theoretically significant especially when the first product is launched in a highly technology-oriented market and its characteristics make the positioning and launch of the first product a serious challenge (Mohr & Sarin, 2009; Teece, 2010). Such a challenge calls for effective marketing processes readily deployed along with first product development (manufacturing and R&D) activities. In such a market customers of high-tech products usually confront difficulties to express their needs and understanding the exact advantages that a new product offers (Leonard-Barton & Rayport 1997). In this regard NTVs may often find it difficult to work with customers during first product commercialisation, when having customer input is essential (Reid & Brentani 2004). This difficulty also continues for NTVs during the sales and after-sales service phases of the relationship (Mohr & Sarin, 2009).

Further, the findings regarding H1, H2 and H3 contribute to the theoretical convergence of engaging specific assets in first product commercialisation. In fact, the findings advance the literature in first product commercialisation and RBT (e.g., Barney, 1991; Amit & Schoemaker, 1993) by providing a more comprehensive theoretical perspective to better understand the impact of available assets on the efficiency and effectiveness of first product commercialisation. Findings regarding H1, H2 and H3 provide a significant theoretical implication indicating the essentiality of adopting more holistic theoretical views such as configuration and complementarity theories in conjunction with RBT to explore the effective exploitation mechanisms of resources and capabilities in an asset constrained environment such as NTV. The findings show the applicability of the configuration theory to investigate first product success antecedents through suggesting two mechanisms for first product assets exploitation including complementarity between the capabilities (technology and marketing) of product functional areas (Slotegraaf & Moorman, 1999; Ngo & O'Cass, 2012b) and resource-capability complementarity in each product-focused functional area (Sok & O'Cass, 2011; Slotegraaf et al., 2003). Based on the findings, this study extends Gruber et al.'s view (2010) which used the configuration theory to examine the impact of resources and capabilities in one product related functional area (sales and distribution). This study concurrently examined the influence of resources-capabilities in product development and marketing in the context of first product commercialisation. Building on configuration theory (Miller, 1996) this study theorised the elements of first product assets configuration as complementary attributes contributing to one and other's performance.

Adopting this theoretical view permitted to involve the effect of two distinct exploitation mechanisms for technology and marketing resources and capabilities which integrate the benefits of previously used theories (e.g., Slotegraaf et al., 2003; Ngo & O'Cass, 2012a). In this regard, the findings extend RBT and confirm the applicability of configuration theory for first product commercialisation and in particular for characterising sources of advantage. In this

sense, the findings regarding H1, H2 and H3 extend the SPP model (Day & Wensley, 1988) and further views adopting SPP in new product commercialisation context (Day, 1994, Day & Nedungadi, 1994; Hunt & Morgan, 1995; Kim & Atuahene-Gima, 2010). The findings advance knowledge on the application of the SPP model through introducing a more detailed conceptualisation for the sources of advantage for first product commercialisation in contrast to previous studies using this model (e.g., Song et al., 2010a; Song et al., 2011).

Importantly, the findings of the study extend the SPP model by suggesting that to achieve both first product cost – efficiency and differentiation, more detailed exploitation mechanisms should be involved in the theoretical models used for first product commercialisation in emerging economies. Hence the study suggests that while complementarity in the form of R-C is effective in marketing and product development, at the same time, achieving complementarity between marketing and technology capabilities is an essential exploitation mechanism in enhancing first product commercialisation activities at the cross-functional level. As the two exploitation mechanisms of first product assets lead to the two distinctive and important aspects of first product advantage, this study does not suggest to implement each of these exclusively but proposes to use both types in parallel for a first product commercialisation in technology-oriented new ventures.

Interestingly while the trade-off between pursuing differentiation and cost-efficiency for new product commercialisation is a challenge in resource-constrained firms, the findings stem from H1, H2 and H3 indicate that the simultaneous achievement of cost and innovation-related market positions (unique characteristics of the first product) in Indian NTVs, is highly contingent on the optimum utilisation of accumulated resources and capabilities for first product in the spaces of innovation and marketing. In other words the findings of this study show that achieving exploitation mechanisms at the two levels studied, provides NTVs with the possibility to gain an optimum output from their current assets to launch a first product with unique features and high technical performance, while this first product is embedded with low cost

traits that makes it a more appealing offering. Theoretically this finding shows that while NTVs are vulnerable to the competitive technology-oriented markets, through adopting optimum exploitation mechanisms and achieving superior complementarity in product focused assets, they would be able to effectively manage the trade-off between differentiation and cost to meet the need of emerging markets such as India which may consider price as an important factor to accept a product.

6.2.2 Discussion of theoretical implications for Hypotheses 4 and 5

The findings regarding Hypotheses 4 a and b show the concurrent importance of differentiation and cost-efficiency in enhancing first product performance in Indian NTVs. Despite the lack of empirical evidence in the literature, previous research in the domain of innovation and new product commercialisation has seen theoretical emphasis in relation to pursuing both product differentiation and cost-efficiency to realise improved market-based product performance (Day & Wensley, 1988; Day, 1994; Hunt & Morgan, 1995) while there hasn't been a context-specific view investigating the occurrence of such a phenomenon. Extending this premise, the findings regarding hypothesis 4 confirm the necessity of involving both product-related positional advantages in the domain of entrepreneurial processes and in particular first product commercialisation process in NTVs.

The findings show that first product differentiation and cost efficiency are predictors of the NTVs' first product customer satisfaction, sales growth and profit growth. The literature generally concludes a positive relationship between product level capabilities (e.g., exploratory and exploitative marketing) and new product advantages including differentiation and cost-efficiency (Kim and Atuahene-Gima, 2010). The findings of the study which are in contrast with porter's view advance the current literature which has largely targeted firms with fairly established new product structures and processes (Day and Wensley, 1988; Kim and Atuahene-Gima, 2010) by showing the co-existence of differentiation and cost-efficiency in the specific

context of NTVs' first product commercialisation in India. Extending previous research by scholars such as Day and Wensley (1988) and Day (1994), the findings show that concurrent achievement of differentiation and cost-efficiency in first product commercialisation is contingent on how adroitly NTVs deploy their start-up assets in product development and marketing.

The findings regarding Hypothesis 4 extend Day and Wensley's view by showing the nature of adroit exploitation in the context of first product commercialisation. It does this through suggesting optimal exploitation mechanisms of available assets at two levels during first product commercialisation. In addition, the findings highlight the simultaneous contribution of differentiation and cost-efficiency to NTV's first product performance in India. While previous work in the first product domain suggest a positive relationship between new product positional advantages (e.g., differentiation) and first product performance, the study found cost-efficient aspects of the first product as a bridge between the first product resources and capabilities and first product financial and non-financial performance. Hence, the findings regarding H4 provide empirical evidence for the view adopted by some scholars highlighting affordability as an essential trait for technology-based products (i.e. first product) in emerging markets such as India (e.g., Sheth, 2011).

Further, the findings verify the significance of price-based competition for first products in technology-oriented markets in an emerging market. This contribution is significant given the lack of scholarly attention towards the cost efficiency aspects of the first product in conjunction with differentiating features (e.g., Song et al., 2011) while studying the first product positional advantages and in particular in emerging markets such as India. In economies such as India buyer ability to pay a high price is a determining factor to business success (Sheth, 2011). In this sense, NTVs in India need to pursue cost efficiency along with a product advantages to be able to offer prices that are attractive to customers in technology-based markets. Further, in niche markets of emerging economies, a first product might be innovative and meet very

specific needs of a particular group of users. On the other hand, in more mature markets, some NTVs may only capitalise on price-based competition.

The findings regarding hypothesis 5 indicate that first product performance including financial and non-financial outcomes is positively related to the overall NTV performance in terms of growth and development. The findings of the study confirm the influence of first product event on firm's life and empirically identify first product commercialisation as a critical factor for Indian NTV's survival. While extant literature had theoretically contented about the importance of this entrepreneurial event and its outcomes, current study is among the very few, scrutinising the relationship between first product performance and further growth of NTVs in an important emerging context. So the findings of the study extend NTV's success factors literature in a sense that it underscores first product commercialisation as a process for NTVs to overcome the liability of smallness and newness and to get organised at the start-up stage. The result regarding H5 is significant as current literature in NPD examining the impact of new product commercialisation on firm performance have focused on established firms with their highly established product lines and structures (e.g., Griffin, 1997; Langerak et al., 2004). The findings specifically provide insight into the first product commercialisation process and its role in driving NTV's growth and development. Theoretically the findings regarding H5 extend literature on NTV's growth mechanisms by introducing the commercialisation process of the first product and reveals how the growth occurs for new ventures in the space of technology.

6.2.3 Discussion of theoretical implications for Hypotheses 6

The study scrutinised the role of EO (H6 a, b, c, d) as a capability driving resource-capability complementarities through encouraging innovativeness, proactiveness and risk-taking during first product development and launch. Hypotheses 6 pertained to the extent that EO moderates the relationship between: (1) technology resource- capability and first product positional advantages in the form of differentiation and cost-efficiency (2) marketing resource-capability

complementarity and first product positional advantages. The findings regarding H6 (a, b) confirm that a EO enhances the influence of technology resource-capability complementarity on first product's uniqueness and low cost characteristics.

The findings regarding H6, confirm that achievement of first product positional advantages and first product performance can be attributable to a match between the first product's complementary assets and other capabilities such as EO possessed by NTVs. Extending contingency theory, it is implied in the results that while exploitation mechanisms such as complementary R-Cs in marketing and technology are driving factors of first product success, their full advantage is realised if EO is available in NTVs and is effectively engaged in the commercialisation process. This finding extends the view suggested by Wiklund and Shepherd (2003) characterising EO as a capability showing how the firms organise to exploit first product opportunity. This view implies that while synergy between marketing and technology resources and capabilities is crucial in first product commercialisation, the way the process of exploitation is managed can substantially affect the outcomes gain from first product commercialisation. The findings regarding H6 imply the necessity of examining models encompassing contingency factors that affect the assets-performance link in the first product commercialisation process. In this regard, the findings regarding H6 (a, b) extend the literature by showing the existence of a more complex relationship between EO and aspects of first product success by underscoring EO's interaction with exploitation mechanisms in the area of first product commercialisation. This is a significant implication given that the current theoretical models in literature mostly examine the direct links between EO and different aspects of the performance or EO's interaction with other organisational orientations such as marketing orientation.

While current research shows extensive attention towards understanding the nature of the direct link between EO and aspects of firm performance (Zahra & Covin, 1995; Lee et al., 2001; Lumpkin & Dess, 2001; Wiklund & Shepherd, 2003; Rauch et al., 2009;), there has been little

effort in specific contexts such as first product commercialisation to investigate the contribution of this managerial proclivities to the process of new product (Mu and Di Benedetto, 2011). The findings (H6 a, b, c, d) are significant as they address the call by scholars discussing that the nature of EO - performance relationship is more complex than a simple direct link (Lumpkin & Dess, 2001; Wiklund & Shepherd, 2005; Miller, 2011).

Further, the findings regarding H6b indicate that strategic proclivities such as EO should be involved in NTVs' first product commercialisation while theorising that R-C complementarities leading to the development of a breakthrough first product, which is also cost-efficient. However, the findings do not provide support for the role of EO as a capability enhancing the influence of marketing resource-capability complementarity on first product positional advantages, showing that high level of innovative, proactive and risk-taking behaviours at the management level does not enhance the influence of complementary marketing resources and capabilities in first commercialisation process. In other words the findings indicate that while EO is a facilitating capability driving the product development activities to produce a breakthrough first product, it does not facilitate the better communication of the first product to the target market. This is an interesting finding while EO has been previously identified to enhance the market-oriented behaviours and supporting the function of marketing in new product commercialisation domain.

Regarding EO among Indian NTVs, Hypotheses 6c and 6d anticipated a positive moderating effect on the relationship between marketing R-C complementarity and first product positional advantages. Yet, results instead expose a lack of a significant association between these factors. A probable justification lies in the uncertainty of the Indian economy. As an emerging economy in the group of BRICS, India may possess characteristics similar to other emerging economies such as China in which market structure is still evolving. In such a situation, the Indian capital market is not well developed. Indian NTVs in particular, have limited marketing resources and capabilities because of the absence of an efficient capital

market. Under such conditions, adopting a highly innovative, proactive and risky endeavour (which encourages dedication of all the available assets) by NTVs does not enhance the impact of complementary marketing resource-capabilities to effectively communicate the first product to the market.

Specifically the findings of the study are important as little research have identified the moderating role of EO in configuring market-based knowledge (Griffith et al., 2006) and facilitating the exploitation of technical and market knowledge throughout the growth process of the firms (Wiklund & Shepherd, 2003). This study is the only one which has examined whether gaining the highest benefit from first product asset complementary is contingent on the EO which draws a road map on how the available resources and capabilities should be allocated and exploited for first product commercialisation. The findings regarding EO's effect on first product commercialisation are theoretically important as they advance the literature on first product and address the recent call by scholars (e.g., Miller, 2011). They provide significant insights into the nature of interaction between EO with first product resources and capabilities and how this strategic proclivity drives first product assets to effectively get engaged in first product commercialisation activities. Further, the findings extend the strategic entrepreneurship literature as they provide insights into the role of EO in NTVs to effectively discover and exploit a vital opportunity such as first product commercialisation (Hitt et al., 2001; Ireland et al., 2003). For example, Ireland et al. (2003) had previously suggested a theoretical model introducing EO as a capability assisting new ventures to identify the opportunities and as an antecedent to strategic management of resources and capabilities. Specifically focusing on the first product project, the findings extend Ireland et al (2003) theoretical view by introducing EO as a contingency factor directing complementary first product resources-capabilities in technology to generate first product positional advantages.

6.2.4 Discussion of theoretical implications for Hypotheses 7 and 8

The study examined contingency factors such as supplier and customer integration mechanisms to investigate how NTVs manage their internal product level assets limitation. The impact of suppliers and customers' commercialisation operations and knowledge exchange was involved to examine the theory in the context of first product commercialisation. The findings regarding hypotheses 7 (a, c, d) and hypotheses 8 (a, b, c, d) provide evidence for the effect of supplier and customer integration mechanisms in enhancing the contribution of technology and marketing R-C complementarity in generating first product positional advantages.

The findings regarding H7 and H8 enriched RBT and new product development literature by recognising the important role of social ties in the context of first product commercialisation. In this context, NTVs possessing strong social ties may be able to effectively have access and integrate the marketing and technology resources and capabilities of other external actors, such as suppliers and customers. However, the findings reveal the catalyst role of external integration mechanisms to enhance the impact of internal first product assets in first product commercialisation. The findings indicate that the integration of suppliers in terms of knowledge-sharing (i.e. technical and market knowledge) and co-commercialisation (i.e. joint commercialisation operations) contribute to developing and marketing of the first product that meets cost-efficiency and differentiation objectives.

The study finds support for the influence of supplier integration in supporting the marketing complementary assets in achieving first product differentiation (hypotheses 7a); however results show that integrating supplier's marketing processes into NTVs first product marketing operations, does not help NTVs to effectively market the cost-efficient first product (hypotheses 7b). The findings support the influence of customer integration in the B2B market and its influence in achieving cost-efficiency and differentiation for the first product. By incorporating the interaction effect of external integration mechanisms, the study has enhanced

the usefulness of the analysis in the context of RBT by simultaneously examining the role of internal complementary resources and capabilities along with the effect of external integration mechanisms. The results regarding hypotheses 7 and 8 provide insights into how a successful first product is commercialised by illustrating the concurrent impact of internal and integrated external assets throughout the first product commercialisation process.

The findings regarding the moderating effect of supplier and customer integration extends current work that find a positive effect (direct effect) for integration mechanisms on product performance and product innovation performance (e.g., Lau et al., 2010) in the context of ongoing manufacturing firms. Besides, there is some research which finds the singular role of supplier integration (Song & Di Benedetto, 2008) as important to the generation of radical innovations in new ventures. In contrast to the current theoretical views regarding the contribution of supplier and customer integration to new product and first product commercialisation process, the findings of the study suggest a more advanced theoretical perspective regarding the relationship between integration mechanisms and first product outcomes. Due to NTVs' liability of newness and smallness and the need for external complementary operations to enhance the efficiency and effectiveness of commercialisation process, the study extends RBT and first product literature as it sheds light on the existence of more advanced inter-relations (in the configuration of first product assets) including the interaction of supplier and customer integration mechanisms (in terms of contingency factors) with internal complementary first product assets.

The findings of this study regarding Hypotheses 7 and 8 inform the literature about the functionality of two distinctive mechanisms including the co-commercialisation through integration of physical operations as well as the exchange of knowledge showing both are critical to the enhancement of first product commercialisation. Specifically the study sheds lights on the role of customer integration as a significant contingency factor enhancing the influence of complementary assets in each functional area on first product positional advantages

(hypotheses 8 a, b, c, and d). This is an important finding while new venture literature in the domain of first product has less considered the role of customer specifically in the B2B operation and hasn't yet examined if customer integration is as important as supplier integration at the start-up stage. Finally the findings extends the current new venture literature which have enclosed the moderating role of supplier and customer integration interacting with environmental factors to enhance the growth rate of new ventures (Cavazos et al., 2012). The results show that while achieving the complementarity at product level assets is critical to first product commercialisation, however gaining the highest benefit from these exploitation mechanisms is contingent on the effective involvement of integration mechanisms.

6.2.5 Discussion of theoretical implications for Hypotheses 9

Building on the importance of controlling environmental uncertainty in emerging markets (Lee et al., 2001; Li & Zhang, 2007; Atuahene-Gima & Murray, 2007), the findings indicate the critical role of political networking capabilities of Indian NTV's as a facilitating mechanism to provide access to external product level resources which are under the control of governmental organisations. Hypotheses 9 (a, b, c and d) stated that political networking capabilities positively moderate the relationship between: (1) marketing resource-capability complementarity and first product positional advantages and (2) technology resource-capability complementarity and first product positional advantages. While the findings provide support for the moderating effect of political networking capabilities in enhancing the influence of technology and marketing complementary assets on first product differentiation, the results do not provide support for the moderating role of this managerial capability to support cost-efficiency objectives for the first product commercialisation (hypotheses 9 c, d).

Extending the application of contingency and complementarity theories in conjunction with the RBT, the study finds support for the role of political networking capabilities as a conduit for complementary resources including regulatory, financial and market knowledge to

enhance the effectiveness of first product commercialisation operations. The findings related to H9 (a, b), provide support for the contextual view existing in RBT literature emphasizing the importance of involving contextual factors affecting the functionality of firm's internal assets (Priem & Butler, 2001; Li & Zhang, 2007). The findings show the existence of a more complex relationship between political networking capabilities and complementary R-Cs exploited in the first product commercialisation process. In this regard, the findings are theoretically important as the study is implemented in a less studied India which is in the process of transition from a central to market-based system while the government role in such business environment is undeniable (Javagli et al., 2012). While previous research identifies political ties and political networking capabilities critical to the overall performance of new ventures in China (e.g., Li & Zhang, 2007); the current study provides evidence in a different context and the specific domain of first product within a specific frame of time. Findings support the theoretical perspective about the importance of political ties as a separate capability from business ties (Wu, 2011) and the importance of their establishment at the start-up stage particularly during first product commercialisation. Given the scarcity in market-supporting institutions, findings indicate the governments control (e.g., Acquaah, 2007) in a less studied context such as India in regulating industrial development, guiding business policies and influencing corporate operations and specifically first product commercialisation project.

While previous works have mostly reported the positive relationship between political networking capabilities and firm performance (Peng & Lou, 2000; Li & Zhang, 2000; Wu, 2011), the findings of the study extends literature by providing insight into the role of this unique and complex capability in the context of first product and enhancing the effect of optimal first product assets deployment. Further the findings extends first product literature as it shows that while the political ties are strong with government authorities and institutions, NTVs due to the provided supports may not aim to lower their operations cost (hypotheses 9 c, d) and would prefer to devote resources for R&D projects to launch highly differentiated

technology-based first products. Further by extending the current findings in NPD literature linking complementary effects with product outcomes (e.g., O'Cass & Sok, 2013), current study advances the first product literature in a sense that it sheds light on the application of such mechanisms for first product by showing that obtaining highest benefit from complementary resources and capabilities in generating first product differentiation is contingent upon the capacity of the NTVs to establish and retain political ties in their business environment.

6.2.6 Discussion of theoretical implications for Hypotheses 10

As previously mentioned the study scrutinised advanced exploitation mechanisms for first product commercialisation at two levels: (1) R-C complementarity within product development and marketing areas and (2) complementarity between technology and marketing capabilities. The study drew on the significance of maximising cross-group integration by facilitating the communication and knowledge exchange during first product commercialisation. Hence ICT capabilities were incorporated and expected to enhance the influence of complementary cross-functional capabilities on first product differentiation and cost-efficiency (hypotheses 10a and 10b).

The results support both H10a and H10b indicating that ICT capabilities positively moderate the relationship between marketing-technology capabilities complementarity and first product positional advantages. Building on contingency theory and extending the cross-functional integration literature, the finding regarding H10 indicate that achievement of first product positional advantages is attributable to the match between technology-marketing complementary capabilities and ICT capabilities. So findings are in congruence with the view adopted by other scholars in the context of on-going organisations and their new product operations (Pinto & Pinto, 1991; Song & Song, 2010). So the findings imply that marketing and technology capabilities to complement each other and reach a synergy in first product

commercialisation, a systematic collaboration between the two functional areas is required in terms of knowledge management and communication.

In particular, the findings of this study extend this view by showing the substantial importance of the collaboration for NTVs' first product with undeveloped product commercialisation processes and routines. Previous literature in the context of established firms have found positive link between complementary product-focused capabilities and aspects of customer-centric, innovation –centric and brand performance (Moorman & Slotegraaf, 1999; Song et al., 2005; Ngo & O'Cass, 2012b). The view adopted by these scholars is based upon the necessity of achieving synergy and fit in between the capabilities embedded in product-focused functional areas. However their findings did not specifically address how this complementarity impact can be enhanced in resource-constrained contexts such as NTVs and in their first product processes with underdeveloping structures. By drawing on the importance of cross functional and cross group integration research, the findings regarding hypotheses 10 (a, b) show that enhancing the complementarity in first product technology-marketing capabilities is contingent upon the exploitation of ICT capabilities to provide knowledge sharing and communication between the product-focused groups during first product commercialisation .

In line with previous research emphasizing the vital role of ICT investment by SMEs from inception (Izushi, 2003; Tanabe, 2005), the findings regarding hypotheses 10 indicate that the full advantage of complementarity between marketing and technology capabilities may not be realised in the context of first product commercialisation, unless the impact of ICT capabilities (contingency factor) as a supportive mechanism is considered. As a result, the findings advance previous research works which theoretically recognise ICT capabilities as a facilitating organisational capability for cross functional knowledge exchange and integration but not as a direct source of positional advantage (e.g., Gibbons & O'Connor, 2003; DeSarbo et al., 2006). By focusing on NTVs and their first product commercialisation, findings of the study provide empirical evidence for the significance of the interaction between the ICT

capabilities and product-focused complementary capabilities. In this sense, the results shed light on the nature of contribution provided by ICT capabilities to the process of first product commercialisation. Particularly, the results indicate that the effective deployment of ICT –based solutions along with the complementary first product capabilities effectively assists NTVs in commercialising a differentiated and cost-efficient first product in NTVs.

6.3 Discussion of managerial implications

6.3.1. Resources and capabilities configuration for first product commercialisation

The current study provides significant managerial implications for entrepreneurs – as founders of NTVs in relation to first product commercialisation. The findings offer NTV founders with practical guidelines on how to manage the commercialisation of the first product. The findings confirm the positive effect of first product complementary resource-capability on first product positional advantages (Hypotheses 1 and 2). From inception, NTV managers need to devise a plan about how to configure their limited first product assets in product development and marketing functional areas to be able to concurrently meet efficiency (i.e. cost-efficiency) and effectiveness (i.e. differentiation) goals. As a result, the findings suggest that NTVs' founders need to simultaneously pay attention to the accumulation of both resources and capabilities (that complement each other) throughout development and launch phases. Besides, findings verify that at the start-up stage, managers in NTVs need to establish a balanced approach in relation to the configuration of product-focused teams to be able to achieve an optimal cross-functional integration to enhance efficiency and effectiveness of the first product commercialisation. As the major outcomes from resource exploitation mechanisms (i.e. product capabilities) have roots in the skills and experiences possessed by founders and employees, NTVs' founders may need to establish provisions to arrange the most effective (in terms of people's background) product-related groups across marketing and product development functional areas.

A balanced approach not only requires a systematic recruitment procedure to allocate experts in each functional area, also needs paying more attention to the joint effect of marketing and product development functions (rather than their individual impact) in the first product commercialisation process. Achieving complementarity between capabilities in product development and marketing areas can become an important strategic tool for founders to endure resource shortages and lack of external networks at the stage of first product commercialisation. In addition, the study provide some guidance for managers about enhancing and maintaining the alignment between product functional areas and how the product-focused capabilities can more effectively enhance each other's contribution to first product commercialisation. Finally the findings regarding how firstly, Technology R-C leads to positional advantage, and secondly, Marketing R-C leads to first product positional advantages and thirdly, marketing –technology capabilities complementarity lead to first product positional advantages shows that NTV managers should focus on concurrently giving attention to the exploitation of their first product assets at two levels.

Furthermore, the findings suggest that founders of NTVs in emerging economies such as India need to concurrently and equally capitalize on cost-efficiency and differentiation goals for their first products. This finding may be driven by understanding target markets that have low purchasing power but at the same time seek both innovative features and optimal prices in technology-based products. This may be driven also by increasing competition across technology-oriented markets while differences in features of the products are insignificant and price may become an important fact for competition.

6.3.2. Exploration for opportunities (such as first product) and their effective exploitation

The findings regarding Hypotheses 6 provide NTVs managers with guidelines about adoption of strategic orientations. The findings suggest that EO supports innovative activities across first product development stages to enhance the chances for generation and execution of innovative ideas leading to highly differentiated first product. The findings of the study suggest founders

about improving firm's capacities to monitor and track technical and market trends from inception to be able to forecast technological changes and become proactive and move ahead of other rivals for their first product project. Further, findings (hypotheses 6) advise founders to capitalise on some level of risk taking while allocating available stocks of resources and capabilities at the product level for first product commercialisation, which may requires aggressive responses to the trends in the market and investing assets for breakthrough innovations in their first product project. Further, findings advise NTVs' founders about provision of developing formal and informal procedures and structures throughout the first product commercialisation operations to encourage innovative and proactive actions by product-focused teams. Besides the findings show founders that, to be able to launch a unique competitive first product, an optimal configuration of requisite product-related assets requires a clear and well defined strategic orientation at the management level to drive the resources and capabilities in a manner to enhance first product commercialisation activities.

6.3.3. Networking with external actors in the business environment

The results of the study regarding Hypotheses 7 and 8 provide NTVs' founders with insights in relation to the importance of establishing business networks and improving communications with investors such as suppliers and customers from inception. Due to the lack of routines and structures during first product project, strategic alliances with suppliers and customers play an important role as they lead to getting access to complementary resources and capabilities from outside which increases the development and launch speed as well as the flexibility in meeting the demand. Further, findings advise that NTVs' founders need to establish dialogues with customers from the beginning to identify their needs through their feedback on prototypes and first product ideas. Hence, founders of NTVs may need to capitalize more on structuring and improving their customer relationship management systems to gain inputs and exploit them during their first product commercialisation project.

6.3.4. External ties with policy makers of the market

Findings of the study inform founders of NTVs about the importance of establishment and retaining ties with key players in the governmental institutes (hypotheses 9) and in particular in contexts such as India. NTVs require recruiting managers who have had government-related background or those who are affiliated with the organisations owned by government and provide funds for technology-based and R&D projects. Further, the findings advise NTVs managers about having thorough research on key organisations, institutes and people who are counted as significant sources of information and market knowledge in the government structure. As a result the current study advises NTV managers to allocate resources to employ people with superior networking capabilities and strong ties to be able to establish and sustain key relationships, although previous experience of the founders in this area is also vital. The findings show NTV managers that although internal control over the efficient and effective exploitation of first product assets is significant but highest effect of exploitation mechanisms may reside in the capacity of the NTVs to integrate external resources such as knowledge-based resources via the establishment and deployment of political networking capabilities.

6.3.5. Role of ICT

The findings regarding H10, draws managers' attention towards the significance of enhancing cross-functional collaboration from inception and during first product commercialisation. This requires allocation of resources to ensure the communication between R&D-manufacturing and marketing teams is facilitated. In particular in high tech firms such as NTVs dealing with more complicated products, marketing and R&D requires continuous communication and knowledge exchange to operate in a well-coordinated manner. Both marketing and R&D-manufacturing people need also to use ICT-based solutions to get updated and enhance their knowledge about customer needs and market trends. The study provides NTV managers with insights about the significance of applying technology-based systems to facilitate the integration between product-focused functional areas to exchange information and keep an on-going communication during

the first product commercialisation. The results (Hypotheses 10) advises NTV managers about the importance of provisions on adopting appropriate ICT infrastructure by recruiting experts in ICT management to integrate ICT-based solutions to the commercialisation processes of the first product. Due to the lack of clear structure in first product projects (Marion et al., 2012), possessing strengths in ICT management, assist NTVs to more effectively get organized and coordinate activities across product commercialisation functional areas. The literature defines NTVs as entities established by people having strong backgrounds in product research and development, engineering, science and marketing. Findings of the current study confirm that while the effective integration and the achievement of complementarity among product focused groups/departments is critical to achieve first product advantage, at the same time some level of ICT proficiency is required to support commercialisation processes for first product, which had been usually neglected in the context of NTVs. Acquiring competencies in ICT improves the communication portals for information and resource exchange between product focused functional areas and with the supply chain members such as customers and suppliers.

6.4 Limitations of the research and future research avenues

While the current study was designed using well established procedures found in the literature, it has certain limitations that need to be identified and acknowledged. Limitations include: (1) the sampling frame; (2) a cross-sectional methodology; (3) only focusing on one of the BRICS nations; (4) only involving product internal and external capabilities and contingency factors. First, the study focused on NTVs first product for its theory examination. The findings cannot be generalised for new ventures with different characteristics such as service new ventures or new ventures operating in non-tech industries. Future research may consider other types of start-ups to validate the theoretical framework and the hypothesised relations-ships advanced here. Future work may also test the same model in other industry sectors which are not technology oriented to help generalise the findings regarding success factors of the first product in those

contexts. It is proposed that the theoretical model be tested in the context of first service launch to reveal the commonalities and differences across manufacturing versus services.

Second, the empirical relationship between marketing R-C complementarity, technology R-C complementarity, marketing-technology capabilities complementarity and first product positional advantages, first product performance and overall NTV performance reported in this study are tentative as they are based on a cross-sectional data. The cross-sectional approach in research design may not fully address the dynamic relationship between the complementary assets and the positional advantages and first product performance results for NTVs. This is an important issue in the context of first product commercialisation and its outcomes for NTVs growth, as the level of capabilities and resources as well as the outcomes gained from first product launch are likely to change with the passage of time. As a result, the proposed first product success model has limited currency as it examines issues associated with first product launch at a specific period. Therefore, future research may utilise a longitudinal setting as this may assist in assessing the prescribed order of exploitation mechanisms and first product outcomes including first product positional advantages and first product performance.

Third, the current study focused on NTVs in India, an important emerging economy. Due to the differences in economy system, institutional settings and the business environment, findings of this study regarding the first product commercialisation in NTVs cannot be easily generalised to other contexts. Future research may consider selecting other emerging contexts (among BRICS countries) to explore different patterns in relation to the first product commercialisation process. In addition, studying more developed economies may provide insights into the differences in first product process and help to extend this study's work. Future studies can be designed to compare the data gathered from both developed and developing economies to provide the possibility for comparing different contexts and to explore how a successful first product is launched in each economy system. Specifically, it is worth

scrutinising if the co-existence of differentiation and cost-efficiency can occur in the domain first product commercialisation in more developed contexts.

Finally, this study only involved the role of internal and external capabilities as contingency factors affecting the linkage between first product assets complementarity and first product positional advantages. However, as the literature focusing on NTV growth suggests the involvement of environmental factors such as environmental dynamisms and environmental complexity, future research may focus on theoretical models which involve the impact of these environmental conditions on first product commercialisation process. This is an important issue which needs to be addressed in further research as NTVs face numerous challenges stemming from environmental conditions which can substantially impact the development and launch of the first product.

6.5 Conclusion

The social and economic value of new high tech ventures is significant and growing in emerging economics. New technology ventures (NTVs) create wealth, provide employment opportunities, and support the evolution of industries through product and technological innovation. They are young (less than eight years old) SMEs with founders who typically have science and engineering backgrounds. NTVs invest in R&D-oriented products to create new markets or provide a superior value proposition in existing technology-based markets however; the survival rate of NTVs tends to be low. In addition, the success or failure of an initial product launch, or first product, is often a harbinger of the ultimate success or failure of the new venture itself. NTVs face significant challenges during the start-up phase, often suffering from limitations of resources, inefficient routines and un-established processes and structures. These constraints make commercialisation of the NTV's first product a major challenge. The main objective of the study was to explore how a successful first product is commercialised by NTVs and to open the black box of first product commercialisation process. Hence the study explored

to what extent the optimal configuration of internal assets at the product level enhance first product commercialisation via generating first product differentiation and first product cost-efficiency which leads to first product performance and improved overall NTV performance. Further, the current study explored to what extent gaining benefits from exploitation mechanisms employed for first product commercialisation including complementarities in each and between product-focused functional areas, is contingent upon other capabilities.

The results of the study revealed that NTVs from inception and for an effective and efficient first product commercialisation, need to accumulate the configuration of requisite first product assets with optimal level of complementarity within marketing and product development areas, also they need to acquire a well-balanced cross-functional integration through achieving complementarity between the capabilities of product functional areas. The findings on asset deployments were insightful as they provide deeper understanding of how the optimum efficiency and effectiveness can be achieved by integrating two exploitation mechanisms rooted in RBT. Further, the results of the current study provided insights into understanding why such complementary first product assets are positively related to first product outcomes. Through examining the role of external mechanisms as supplier and customer integration the study revealed the significant impact of external complementary processes and resources in enhancing first product commercialisation. Further, the study, through its result underscored the role of strategic orientations such as EO as behavioural actions affecting the functionality of resource-capability complementarities across product focused functional areas. Further by addressing one of the major challenges for NTVs in emerging markets such as India, the study provided insight into the significant impact of political networking capabilities in supporting the complementary deployments to achieve effectiveness goals in first product commercialisation. Finally the contingent role of ICT capabilities was confirmed through the results showing that achieving optimal capabilities complementarities in first product commercialisation is enhanced by the appropriate usage of

ICT solutions for communication and knowledge exchange. The model was tested and validated in India an important but understudied economy. It provides insights for both scholars and practitioners regarding the antecedents that must be effectively configured and utilised to commercialise a competitive first product. The current study verified the importance of first product commercialisation through introducing an influential theoretical model for first product success in NTVs. Findings of the study identified optimal exploitation mechanisms for first product assets to generate first product desired outcomes and introduced first product commercialisation success as the most vital factor in enhancing the overall performance of new ventures in technology-orientated markets with high level of competition.

Appendix I



*The University of
Tasmania*
Australia

*Faculty of Business
School of Management*

Survey A

A study of small and medium size new ventures

ATTN.....

Please read the following

- 1- You are invited to take part in a study focusing on issues associated with new ventures. This project is part of research being carried out by Hormoz Ahmadi and supervised by Professor Aron O'Cass from the School of Management at the University of Tasmania in Australia.
- 2- By completing and returning the surveys, you will be helping me (Hormoz) to complete the research part of my PhD thesis and assist in providing clearer insights to entrepreneurs in developing new ventures and commercialising their products.
- 3- Please read and complete this survey (**Survey A**). Please also nominate **one** of your *Senior Managers* who has been extensively involved with your firm's **first Product launch project**. Please pass along the survey labelled **Survey B** to that manager and have him/her complete that survey. Those eligible to complete **Survey B** can be nominated from positions such as the project, product, marketing manager etc. They should have been heavily engaged with the development and commercialisation of your firm's first product. An appointment will be made during the next week to collect this survey (A) in the envelope (sealed) supplied to you along with the survey package. Survey B will be collected from the assigned senior manager's office directly.
- 4- Be assured that your answers **ARE STRICTLY CONFIDENTIAL**. All returned surveys will be stored in the locked office of Professor Aron O'Cass (Chief Investigator) at the University of Tasmania. No firm names will ever be published and no firm names will be stored as part of this study.
- 5- We understand you are very busy, but we ask for **about 25-30 minutes of your time**. Your knowledge and experience are important, so please do not hurry as this ensures your time is well served.
- 6- Please answer all the questions and statements throughout the survey by circling your response. **PLEASE DO NOT OVERLOOK ANY**. We are interested in your personal opinion, **THERE IS NO RIGHT or WRONG ANSWER**. Please do not select (circle) more than one response in each statement.

This information sheet is for you to keep

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A1- Please specify, the position of the person whom you have nominated and passed on the Survey B to. His / her position is: _____.

Please provide the following information regarding your firm:

F11- Our firm`s name is _____.

F12- Our firm started its operation in the year: _____.

F13- Our firm has _____full time employees.

F14- Our firm launched its **first product** to the market _____years ago.

F15- Our firm`s field of business operation is (please **TICK** one box below which most signifies your field of business).

☐ Telecommunications

☐ Biotechnology

☐ Electronics

☐ Industrial Machines

☐ Information Technology

☐ Others (please specify) _____

F16- Our firm`s major customer base is:

☐ End consumers

☐ Other businesses

☐ Both (equally)

F17- Our business would mostly be seen as a:

☐ Manufacturer who provides product(s)

☐ Manufacturer who provides product(s) with supporting service(s)

Guidance for scales

In this section of the survey we have used the following scale. Please carefully consider the following example to make sure you understand the wording and numbering of the scale.

Strongly Disagree	Moderately Disagree	Slightly Disagree	Neither Agree nor Disagree	Slightly Agree	Moderately Agree	Strongly Agree
1	2	3	4	5	6	7

Think about your understanding of your firm since its establishment and specify the extent you agree or disagree with the following statement.

	Strongly Disagree							Strongly Agree
F01 I am knowledgeable about my firm`s business operations, characteristics, processes, performance, and the business environment (Industry, market, competitors, customers, regulations and so on)	1	2	3	4	5	6	7	

NOW think about **your firm`s strategy.**

<u>Since the launch of our first product, our firm has ...</u>		Strongly Disagree						Strongly Agree
EI1	...had a strong emphasis on R & D, technological leadership and innovations	1	2	3	4	5	6	7
EI2	...marketed several new lines of products (or services, if applicable)	1	2	3	4	5	6	7
EI3	...experienced dramatic changes in product (or services, if applicable) lines	1	2	3	4	5	6	7
EP1	...had a tendency to initiate actions for competitors to respond to	1	2	3	4	5	6	7
EP2	...had the tendency to be a market leader, to be the first in introducing new products, technologies (or services, if applicable)	1	2	3	4	5	6	7
EP3	...had a tendency to adopt a competitive “undo-the-competitors” posture approach	1	2	3	4	5	6	7
ER1	...had a tendency for high-risk new product (or service, if applicable) projects	1	2	3	4	5	6	7
ER2	...believed that owing to the nature of the environment, bold, wide-ranging acts are necessary to achieve the firm`s objectives	1	2	3	4	5	6	7
ER3	...typically adopted a bold, aggressive posture in order to maximize the probability of exploiting potential opportunities	1	2	3	4	5	6	7
ER4	...emphasized both exploration and experimentation to create opportunities	1	2	3	4	5	6	7
ER5	...encouraged our people to take calculated risks with new ideas	1	2	3	4	5	6	7
ER6	...considered the term “risk taker” a positive attribute for our staff	1	2	3	4	5	6	7

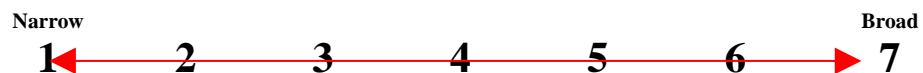
NOW think about **your firm`s relationships with people and organizations external to it.**

<u>Since our first product launch, our firm has...</u>		Strongly Disagree						Strongly Agree
PN1	... spent considerable time and effort in cultivating personal connections with officials of government and its agencies	1	2	3	4	5	6	7
PN2	... maintained good relationships with officials of governmental agencies and departments	1	2	3	4	5	6	7
PN3	... devoted substantial resources to maintain good relationships with officials of administrative agencies	1	2	3	4	5	6	7
<u>Since our first product launch, our firm has...</u>		Strongly Disagree						Strongly Agree
PN4	... devoted lots of effort in building relationships with top officials in government	1	2	3	4	5	6	7
PN5	... maintained good relationships with political leaders in various levels of the government	1	2	3	4	5	6	7
PN6	...dedicated considerable efforts in cultivating personal connections with politicians of the government	1	2	3	4	5	6	7

NOW think about **your firm`s resources.**

<u>In relation to our first product launch...</u>		Strongly Disagree						Strongly Agree
RDF1	...our R & D department acquired / possessed substantial financial resources in comparison to our major competitors,	1	2	3	4	5	6	7
RDF2	...our R & D department had substantial financial resources available in our firm	1	2	3	4	5	6	7
<u>In relation to our first product launch...</u>		Strongly Disagree						Strongly Agree
RDP1	...we accessed / acquired State -of -art production and manufacturing machinery	1	2	3	4	5	6	7
RDP2	...we accessed / acquired high standard production plant in terms of facilities	1	2	3	4	5	6	7
RDP3	... we accessed / acquired well equipped R & D labs for testing operations	1	2	3	4	5	5	7
RDP4	...we accessed / acquired advanced technological software(s)	1	2	3	4	5	6	7
MB1	... considerable financial resources were allocated to the marketing area in comparison to our major competitors	1	2	3	4	5	6	7
MB2	... considerable amount of financial resources were invested in the marketing department in our firm	1	2	3	4	5	6	7

In this section we use the following scales which represent a continuum from 1 to 7. For example, consider the level of knowledge your firm has about competitors strategies, the continuum would starting from “Narrow” (1) to “Broad” (7) you may consider your firm’s knowledge as “ 1 Narrow “or “ 7 Broad” or somewhere in between. **Please note each item has different scale wording.**



NOW think about **your firm’s knowledge of customers and competitors.**

<u>Since the launch of our first product, our firm`s knowledge about our...</u>								
MKB1	...competitors’ strategies has been	Narrow 1	2	3	4	5	6	Broad 7
MKB2	...competitors’ strategies has been	Limited 1	2	3	4	5	6	Wide Ranging 7
MKB2	...customers has been	Narrow 1	2	3	4	5	6	Broad 7
MKB4	... customers has been	Limited 1	2	3	4	5	6	Wide Ranging 7
MKB5	...competitors’ strategies has been	Specialised 1	2	3	4	5	6	General 7
		Specialised						General

MKB6	...customers has been	1	2	3	4	5	6	7
		Shallow						Deep
MKD1	...competitors' strategies has been	1	2	3	4	5	6	7
		Basic						Advanced
MKD2	...competitors' strategies has been	1	2	3	4	5	6	7
		Shallow						Deep
MKD2	...firm's customers has been	1	2	3	4	5	6	7
		Basic						Advanced
MKD4	...firm's customers has been	1	2	3	4	5	6	7

In this section of the survey, we have used the following scale.

Strongly Disagree 1	Moderately Disagree 2	Slightly Disagree 3	Neither Agree nor Disagree 4	Slightly Agree 5	Moderately Agree 6	Strongly Agree 7
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NOW, think about **your firm's knowledge of customers and competitors.**

Since the launch of our first product, our firm's knowledge about our customers and competitors...		Strongly Disagree						Strongly Agree
MKS1	...has been quite specific to our kind of business	1	2	3	4	5	6	7
MKS2	... has been very difficult for an employee to transfer it (i.e. knowledge) throughout firm and other environment	1	2	3	4	5	6	7
MKS3	... has been tailored to meet the specific conditions of our business	1	2	3	4	5	6	7
Since the launch of our first product, our firm's knowledge about our customers and competitors...		Strongly Disagree						Strongly Agree
MKS4	...largely depends on the human and physical assets we have dedicated to acquiring information about market conditions	1	2	3	4	5	6	7
Since the launch of our first product, our firm's knowledge about our customers and competitors has been difficult to...		Strongly Disagree						Strongly Agree
MKT1	... comprehensively document in manuals or reports	1	2	3	4	5	6	7
MKT2	...comprehensively understand from written documents	1	2	3	4	5	6	7
MKT3	...identify without personal experience in using them	1	2	3	4	5	6	7
MKT4	....precisely communicate through written documents	1	2	3	4	5	6	7

NOW think about **your firm's growth and development.**

Since our firm started its operation, we are satisfied with...		Strongly Disagree						Strongly Agree
---	--	------------------------------	--	--	--	--	--	---------------------------

VOP1	...its development in comparison with other firms in our industry	1	2	3	4	5	6	7
VOP2	...our growth rate in comparison with our strongest (i.e., major) competitors	1	2	3	4	5	6	7
VOP3	...the forecast of our operating profit for upcoming years	1	2	3	4	5	6	7
VOP4	...our products (or services, if applicable) success in comparison to our strongest (i.e., major) competitors	1	2	3	4	5	6	7

NOW think about **the extent you disagree or agree with the following statement.**

		Strongly Disagree						Strongly Agree
C01	I am confident that I possessed the appropriate knowledge to respond to the statements asked in this survey.	1	2	3	4	5	6	7

NOW please focus on **your background** and provide the requested information.

PQ1- My gender is (please mark):

☐ Male

☐ Female

PQ2- I was born in the year _____ (please specify the year)

PQ3- I have been in my current position for _____ years.

PQ4- I possess _____ years of start-up business experience (if you do not possess put N/A).

PQ5- I possess _____ years of experience in the current industry which my firm operates within.

PQ6- I possess _____ years of experience in other industries rather than the current industry my firm operates within.

PQ7- I have _____ years of experience in marketing area.

PQ8- I have _____ years of experience in R &D (research & development) area.

PQ9- I have detailed understanding of R & D (circle a number below)

Strongly Disagree	Moderately Disagree	Slightly Disagree	Neither Agree nor Disagree	Slightly Agree	Moderately Agree	Strongly Agree
1	2	3	4	5	6	7

PQ10- I have detailed understanding of marketing (circle a number below)

Strongly Disagree	Moderately Disagree	Slightly Disagree	Neither Agree nor Disagree	Slightly Agree	Moderately Agree	Strongly Agree
1	2	3	4	5	6	7

PQ11- My highest level of education at the time being is (please mark one):

☐ High School ☐ Undergraduate ☐ Post Graduate ☐ Others_____

PQ12- My field of study has been: _____

Thank you for your cooperation and completing this survey

Appendix II



The University of
Tasmania
Australia

Faculty of Business
School of Management

Survey B

A study of small and medium size new ventures

Please read the following

Dear Manager

- 1- You have been nominated by your firm's CEO to take part in this survey. You have been identified as a person who has been extensively involved with the first product launch project in your firm.
- 2- Please read and complete this survey (**Survey B**). After filling out the survey, please put it in envelope (supplied along with the survey) and seal envelope. An appointment will be made during the next week to collect it from your office.
- 3- Please be assured that your responses **ARE STRICTLY CONFIDENTIAL**, and will not be disclosed to anyone including your firm's CEO.
- 4- We realise that you are very busy, but ask for about **20-25 minutes** of your time. Your knowledge and experience are important to us so please do not rush as your accurate responses ensure your time is well served.
- 5- Please respond to all the statements and questions outlined. **PLEASE DO NOT OVERLOOK ANY.**
- 6- Please read and follow all the instructions provided throughout this survey and respond to every item carefully by circling your response. We are interested to have your personal opinion hence **THERE IS NO RIGHT OR WRONG ANSWER**. Please do not select (circle) more than one item in each statement.

This information sheet is for you to keep

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FI1- My firm`s name is _____.

PP- Please specify your current position in the firm

☐ Marketing Manager ☐ Product Manager ☐ Project Manager ☐ Others (please specify)-----

Think about your role and your level of engagement in your firm’s first product launch project and specify to what extent you agree or disagree with the following statement

FP1 I have been heavily involved with my firm’s first product launch project (circle one number below).

Not at all	Not very much	Moderately	Slightly	Somewhat	Quite a lot	Very much so
1	2	3	4	5	6	7

Think about your understanding of your firm since its establishment and specify to what extent you agree or disagree with the following statement.

F01 **I am knowledgeable about** my firm’s business operations, characteristics, processes, performance, and the business environment (Industry, market, competitors, customers, regulations and so on)

Strongly Disagree	Moderately Disagree	Slightly Disagree	Neither Agree nor Disagree	Slightly Agree	Moderately Agree	Strongly Agree
1	2	3	4	5	6	7

In this section of the survey we have used the following scale. The numbers represent a continuum from 1 to 7 determining the strengths of your firm’s abilities (in different areas) by comparing them to your major competitors’. The continuum would start from “Much Worse” (1) to “Much Better” (7). You may consider your firm’s abilities as “1 Much Worse” or “7 Much Better” or somewhere in the range between the end poles.



NOW think about **the role of information technology (IT) in your firm.**

Since your firm’s establishment, rate your firm in the following areas in comparison to your major competitors. Our...		Much Worse						Much better	
		1	2	3	4	5	6	7	
ITC1	...IT systems for new product projects (or services, if applicable) has been	1	2	3	4	5	6	7	
ITC2	...IT systems for facilitating cross functional integration has been	1	2	3	4	5	6	7	
ITC3	...IT systems for facilitating market knowledge creation has been	1	2	3	4	5	6	7	
ITC4	...IT systems for facilitating technological knowledge creation has been	1	2	3	4	5	6	7	
ITC5	...IT systems for external communication with customers, suppliers and channel members has been	1	2	3	4	5	6	7	

NOW think about your firm's capabilities (skills, abilities and processes).

In relation to your firm's <u>first product launch project</u> and comparing your firm to your major competitors, rate your firm in the following areas. In...								Much Worse							Much better
TRC1	...new product (or service, if applicable) development capabilities, we are	1	2	3	4	5	6	7							
TRC2	...new technology development capabilities, we are	1	2	3	4	5	6	7							
TRC3	...manufacturing processes, we are	1	2	3	4	5	6	7							
TRC4	...predicting technological changes and trends, we are	1	2	3	4	5	6	7							
TRC5	...quality control skills, we are	1	2	3	4	5	6	7							
TRC6	...adopting new technologies to current processes, we are	1	2	3	4	5	6	7							

Comparing your firm to your major competitors, rate your firm in the following areas in relation to your first product project. In...								Much Worse							Much better
MCP1	...segmenting and targeting the market, we are	1	2	3	4	5	6	7							
MCP2	...formulating marketing strategies, we are	1	2	3	4	5	6	7							
MCP3	...marketing planning, we are	1	2	3	4	5	6	7							
MPR1	...pricing strategies, we are	1	2	3	4	5	6	7							
MPR2	...pricing accurately, we are	1	2	3	4	5	6	7							
MPR3	...setting prices according to how customer perceives value of the product (or service, if applicable), we are	1	2	3	4	5	6	7							
MPR4	... pricing that is maximum beneficial to customers, we are	1	2	3	4	5	6	7							

Comparing your firm to your major competitors, rate your firm in the following areas in relation to your first product project. In...								Much Worse							Much better
MCC1	...advertising and promotion, we are	1	2	3	4	5	6	7							
MCC2	...developing advertising and promotion programs, we are	1	2	3	4	5	6	7							
MCC3	...public relations, we are	1	2	3	4	5	6	7							
MCC4	...managing corporate image and reputation, we are	1	2	3	4	5	6	7							

MS1	...giving salespeople the training they need, we are	1	2	3	4	5	6	7
MS2	...sales management skills, we are	1	2	3	4	5	6	7
MS3	...providing sales support to the sales force, we are	1	2	3	4	5	6	7
MP1	...launching new products (or services, if applicable), we are	1	2	3	4	5	6	7
MP2	...ensuring that product (or service, if applicable) development efforts are responsive to customer needs, we are	1	2	3	4	5	6	7
MLC1	...establishing a “dialogue” with target customers, we are	1	2	3	4	5	6	7
MLC2	...getting target customers to try our products (or services, if applicable) on a consistent basis, we are	1	2	3	4	5	6	7
MLC3	...focusing on meeting customers’ long term needs, we are	1	2	3	4	5	6	7
MLC4	...maintaining loyalty among attractive customers, we are	1	2	3	4	5	6	7
MLC5	...enhancing the quality of relationships with customers, we are	1	2	3	4	5	6	7
MLD1	...adding value to our channel members (e.g., distributors, retailers and wholesalers) businesses, we are	1	2	3	4	5	6	7
MLD2	...attracting and retaining the channel members in the market, we are	1	2	3	4	5	6	7
MLD3	...satisfying the needs of channel members, we are	1	2	3	4	5	6	7
MLD4	...closeness in working with channel members, we are	1	2	3	4	5	6	7
MSR1	...establishing and maintaining close supplier relationships, we are	1	2	3	4	5	6	7

In this part of the survey we have used the following scale.

Strongly Disagree	Moderately Disagree	Slightly Disagree	Neither Agree nor Disagree	Slightly Agree	Moderately Agree	Strongly Agree
1	2	3	4	5	6	7

NOW think about **your firm’s first product characteristics.**

Our first product ...		Strongly Disagree					Strongly Agree	
PDI1	... compared to competitive products, has offered some unique features and attributes to the customer	1	2	3	4	5	6	7
PDI2	... has been clearly superior to competing products in terms of meeting customers' ` needs	1	2	3	4	5	6	7
PDI3	... has been of higher quality than competing products – tighter specification , stronger, lasted longer , or more reliable	1	2	3	4	5	6	7

	CUI3	studying how our customers use our products (or services, if applicable)	1	2	3	4	5	6	7
	CUI4	holding meetings between our product (or service, if applicable) development people and customers	1	2	3	4	5	6	7

NOW think about your **firm`s cooperation with SUPPLIERS**.

Rate your firm in the following areas representing the extent your firm integrated and coordinated activities with the <u>SUPPLIERS</u> during your first product launch project. Our firm engaged in...		Not at all							Extensively
SII1	Sharing inventory mix/level information	1	2	3	4	5	6	7	
SII2	Sharing production plans	1	2	3	4	5	6	7	
SII3	Sharing marketing information	1	2	3	4	5	6	7	
SII4	Sharing technological information	1	2	3	4	5	6	7	
SCD1	Joint product (or service, if applicable) design	1	2	3	4	5	6	7	
SCD2	Joint process engineering	1	2	3	4	5	6	7	
SCD3	Joint production operations	1	2	3	4	5	6	7	
SCD4	Joint marketing operations	1	2	3	4	5	6	7	

NOW think about the extent you agree or disagree with the following statements in relation to your **firm`s first product characteristics**.

Compared with other competing products in our industry, the first product we introduced was developed to incorporate: ...		Strongly Disagree							Strongly Agree
PLC1	...operating efficiencies (e.g., manufacturing modernization, adopting new technologies).	1	2	3	4	5	6	7	
PLC2	...benefits from economies of scale	1	2	3	4	5	6	7	
PLC3	... minimum manufacturing and delivery costs	1	2	3	4	5	6	7	
PLC4	...cost advantages in raw material procurement	1	2	3	4	5	6	7	

NOW think about the extent you agree or disagree with the following statements in relation to your **firm`s first product performance**.

Since its launch, our first product, has ...		Strongly Disagree					Strongly Agree	
FFP1	...achieved its sales goals	1	2	3	4	5	6	7
FFP2	... achieved its profit goals	1	2	3	4	5	6	7
FFP3	.... has had great profitability	1	2	3	4	5	6	7
FFP4	...has achieved its goals in customer satisfaction	1	2	3	4	5	6	7

NOW think about **your level of confidence in responding to the statements in this survey.**

		Strongly Disagree					Strongly Agree	
C01	I am confident as I possessed the appropriate knowledge to respond to the statements asked in this survey.	1	2	3	4	5	6	7

NOW please focus on **your background** and provide the requested information.

PQ1- My gender is (please mark):

☐ Male

☐ Female

PQ2- I was born in_____ (please specify the year).

PQ3- I have been assigned to my current position_____ years ago.

PQ4- I Possess_____ years of marketing experience (if you do not possess put N/A).

PQ5- I Possess _____years of R & D experience.

PQ6- I have detailed understanding of R & D

Strongly Disagree	Moderately Disagree	Slightly Disagree	Neither Agree nor Disagree	Slightly Agree	Moderately Agree	Strongly Agree
1	2	3	4	5	6	7

PQ7- I have detailed understanding of marketing

Strongly Disagree	Moderately Disagree	Slightly Disagree	Neither Agree nor Disagree	Slightly Agree	Moderately Agree	Strongly Agree
1	2	3	4	5	6	7

PQ8- I Possess _____ years of experience in current industry which my firm operates within.

PQ9- I possess _____ years of experience in other industries rather than the current industry my firm operates within.

PQ10- My highest level of education at the time being is (please mark one):

☐ High School ☐ Undergraduate ☐ Post Graduate ☐ Others_____

PQ11- My field of study has been: _____

Thank you for your cooperation and completing this survey

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