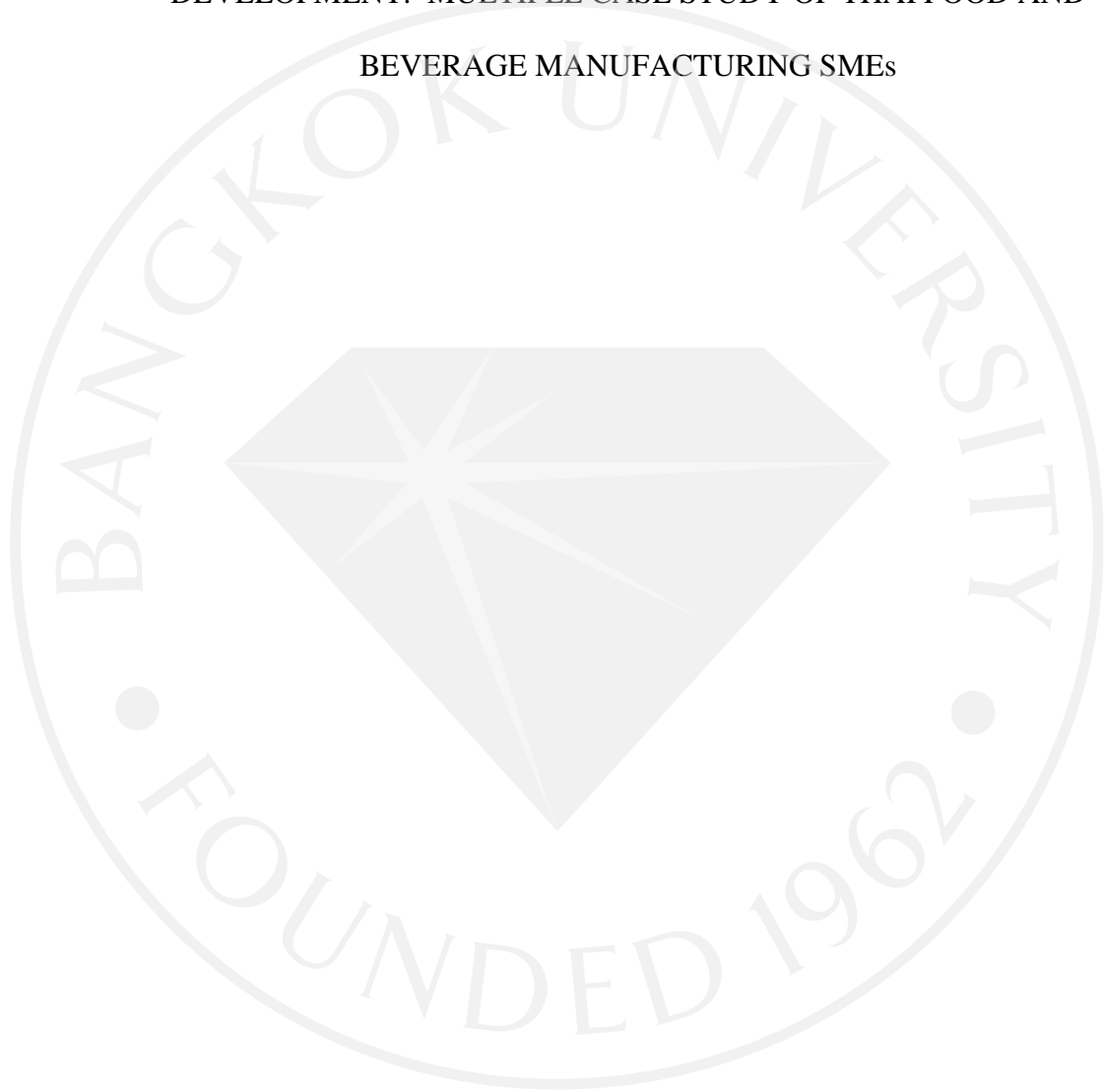


INVESTIGATING INNOVATION STRATEGIES OF NEW PRODUCT
DEVELOPMENT: MULTIPLE CASE STUDY OF THAI FOOD AND
BEVERAGE MANUFACTURING SMEs



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BEVERAGE MANUFACTURING SMEs

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The Institute for Knowledge and Innovation Southeast Asia (IKI-SEA)

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Preecha Chaotechuang

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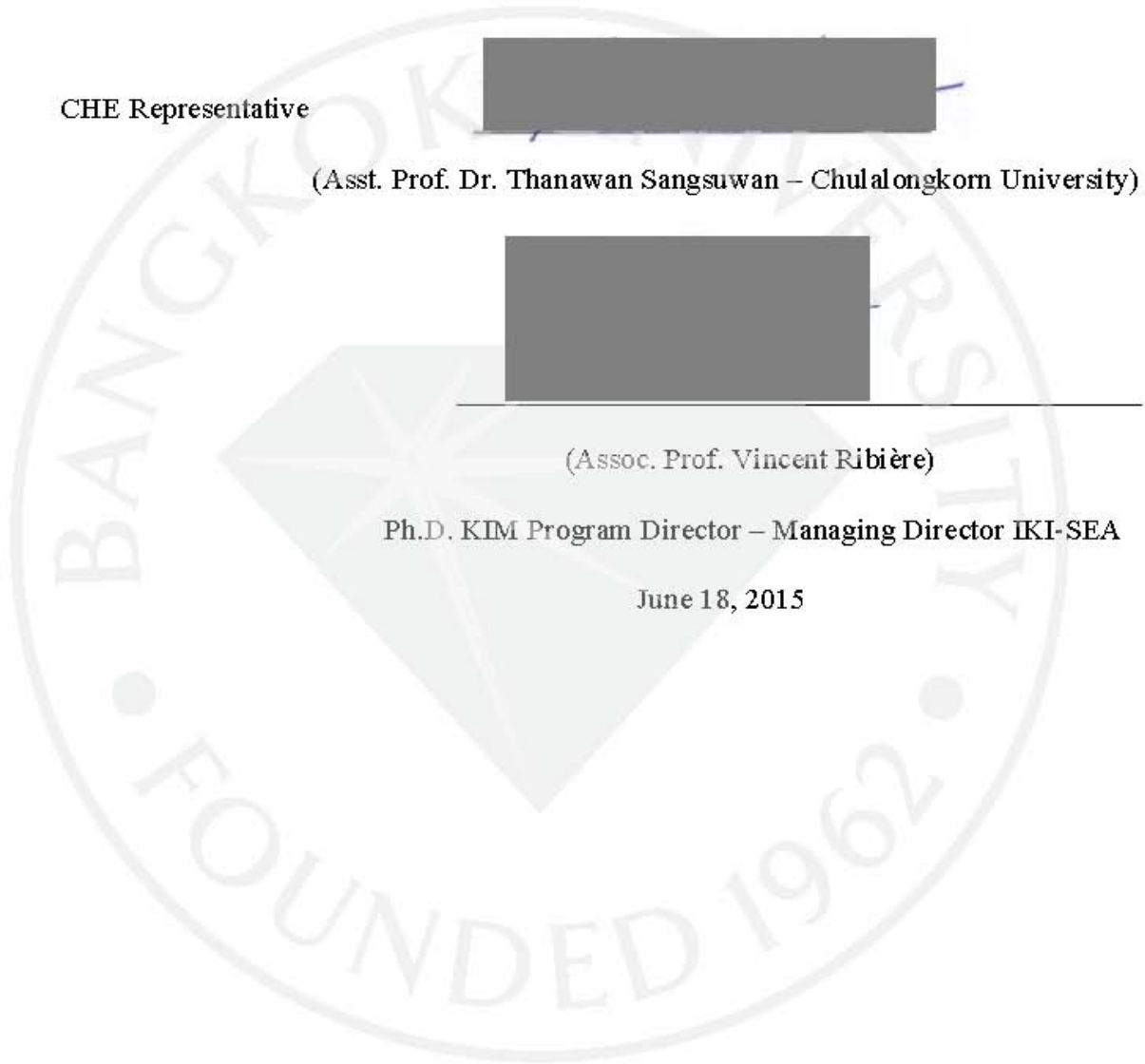
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June 18, 2015



DECLARATION

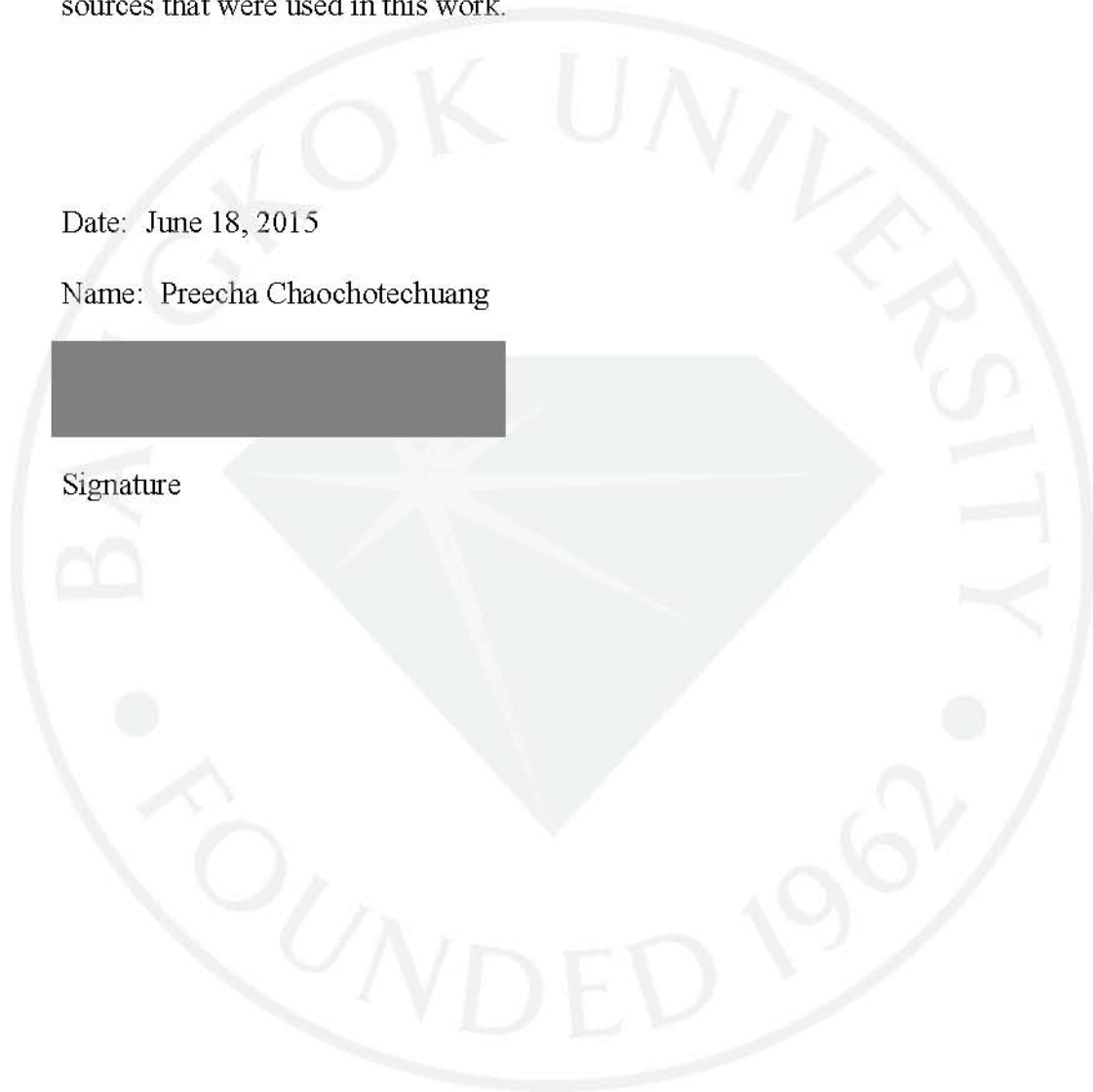
In accordance with the Bangkok University Honor Code, I certify that my submitted work here is my own work, and that I have appropriately acknowledged all external sources that were used in this work.

Date: June 18, 2015

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[Redacted Signature]

Signature



Chaochotechuang, P. Ph.D. (Knowledge and Innovation Management), June 2015. The Institute for Knowledge and Innovation Southeast Asia (IKI-SEA), Business School – Bangkok University, Thailand

Investigating innovation strategies of new product development: Multiple case study of Thai food and beverage manufacturing SMEs (332 pp.)

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ABSTRACT

The ultimate purpose of this study is to provide appropriate guidelines for enhancing product innovation among Thai small and medium enterprises (SMEs) who are involved in food and beverage manufacturing in Thailand. This is achieved by first assessing the current state of product innovation in the new product development (NPD) activities of the SMEs as a precursor to developing the guidelines. The assessment is conducted with a qualitative research strategy guided by a synthesized theoretical framework that integrates several NPD activities and diverse existing product innovation strategies. Focus group, semi-structured interview, and document review methods were utilized for data collection. The context of the data collection is the Thai food and beverage (F&B) SME sector, the latter being represented by 20 case studies sampled from the Thai F&B SME population. The knowledge domains considered for the study are NPD process, product innovation strategies, and food and beverage manufacturing.

The findings reveal that the responsibility for NPD rested with top executives. The NPD process adopted by the SMEs consisted of several activities including idea generation, concept development, product design, prototyping, testing and packaging design. The SMEs identified a number of barriers to developing new products, including restrictive regulations from

government agencies, a lack of technology, lack of employee skills, limited financial resources and a lack of current market data. To overcome these barriers, several actions were taken including establishing networks for technological and business collaboration, management of knowledge, improving R&D capability and developing employee skill levels.

One major limitation of the study is the selection bias as a result of only approaching firms in the greater Bangkok and surrounding areas. It is suggested that future studies extend the data collection scope to cover larger part of the population of F&B SMEs in Thailand. Finally, it is recommended that future studies continue the current study by adopting a method triangulation, and evaluate results from different perspectives.

The study provides contributions to both theory and practice. At a theoretical level it develops a novel integrated framework that links NPD activities to product innovation strategies. Currently no such analytical tool exists that provides explicit pairwise links between the two domains of NPD process activities and product innovation strategies. From a practical perspective the theoretical and empirical outputs of the study can be used by marketing executives facilitating their decision-making process when deciding on the adoption of an appropriate product innovation strategy for all NPD process activities.

Keywords: Product innovation, innovation strategy, new product development, food and beverage industry, small and medium enterprise, Thailand

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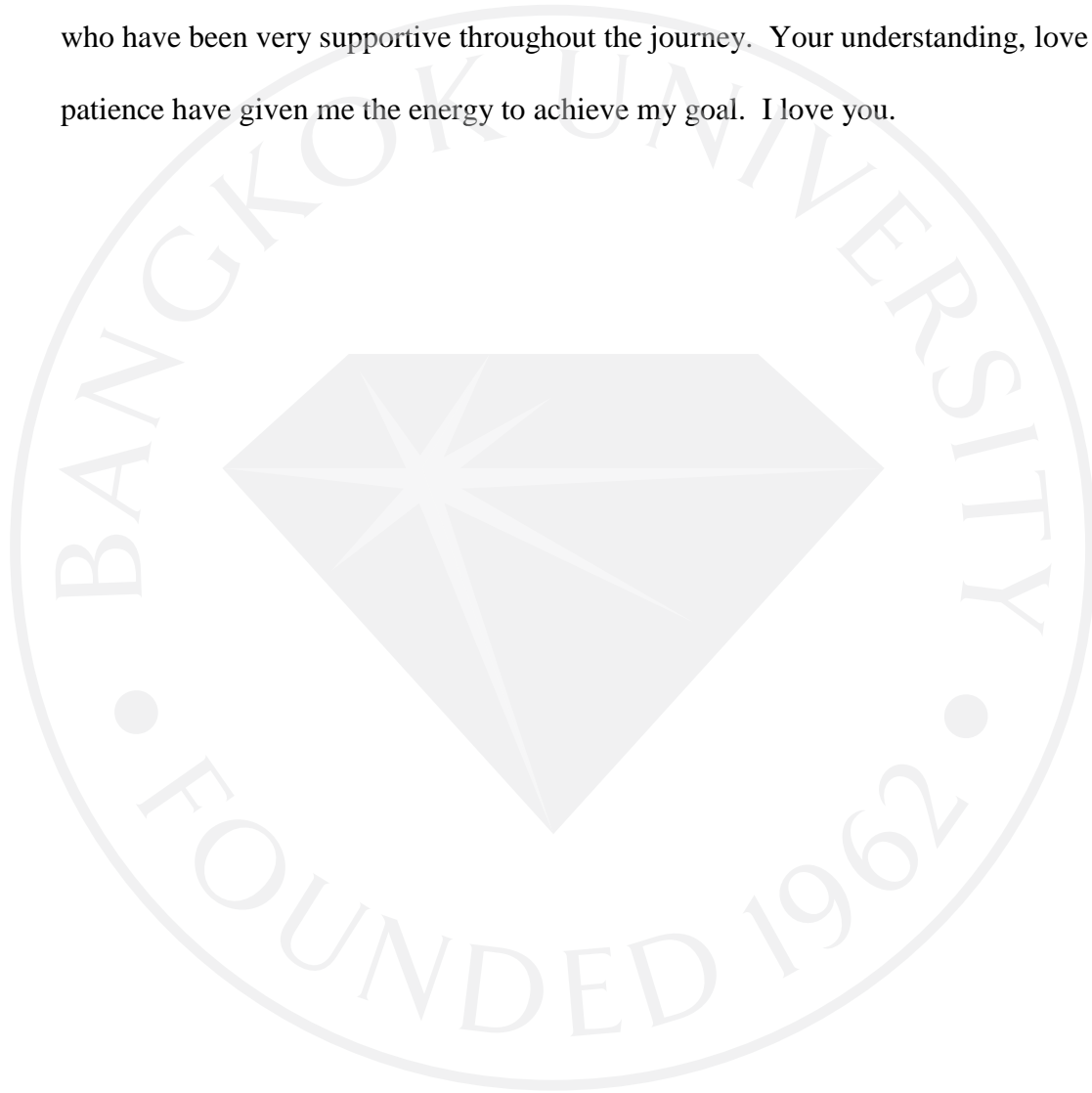


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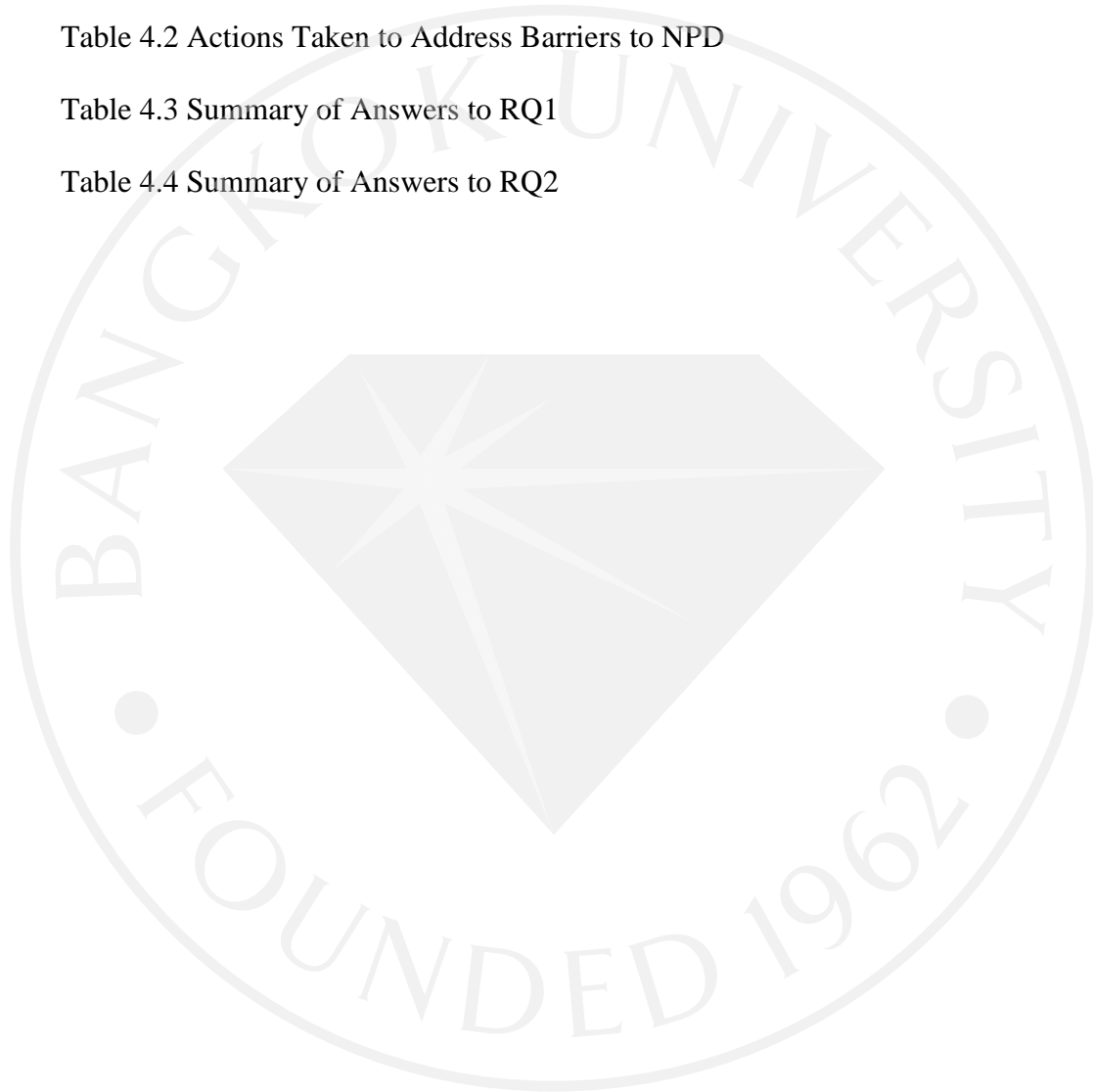
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CHAPTER 1

INTRODUCTION

This dissertation is a study of the innovation strategies for new product development (NPD) in Thai food and beverage (F&B) manufacturing small and medium enterprises (SMEs). The study investigates the innovation strategies that firms adopt in their NPD process, from ideation to concept development, product design, and product testing (Cooper, 2014). The product launch phase, which is the final phase of NPD, is, however, outside the scope of this study. The focus of the study is the strategies adopted during NPD activities in Thai F&B manufacturing SMEs. The study stems from the researcher's wish to contribute to the body of literature on NPD and product innovation, and to provide recommendations that may improve Thai F&B manufacturing SMEs to improve the effectiveness of their NPD initiatives.

This chapter provides an outline of the dissertation, including background and objectives of the study, statement of the problem, purpose of the research, research questions, overview of research methodology, rationale and significance of the research, theoretical scope of the study, definition of key terminology, researcher's assumptions, limitations of the research, and expected contributions of the research.

1.1 Background and Objective of the Study

New product development (NPD) has been widely recognized as a key contributor to firms' survival, competitiveness, financial performance, long term growth and sustainability (Bhuiyan, 2013). However, the success rate of NPD is very low (Cooper & Edgett, 2008). Studies have shown that one of the most important factors contributing to

NPD success is the applications of appropriate innovation strategies (Aagaard, 2012). Innovation is crucial to the success of firms and to the development of the national economies (OECD, 2010).

The food and beverage industry in general is characterized by a large number of SMEs that manufacture a wide variety of products, and capture a large fraction of the market (Ju, 2012). The large varieties of products which are primarily created by the firms in response to the consumer needs are a key characteristic that contributes to the role of product innovation in the F&B industry. The core activities of the food and beverage include manufacturing, logistics, distribution and retailing. The F&B industry is under constant changes (Ju, 2012).

Thai F&B manufacturing firms have a long history of NPD initiatives, although larger firms, in general, have been found to be more active and more successful than SMEs in NPD activities (Dhamvithee, Shankar, Jangchud, & Wuttijumnong, 2005). Studies have also found that not all Thai F&B manufacturing SMEs do very much NPD, but some do (Ngamkroeckjoti & Speece, 2008). Based on the researcher's own experience in this industry, some firms have been quite successful in their NPD programs. For example, firm "A" was established in 1977 to manufacture rice bran oil, a product that takes advantage of the exceptional quality of Thai rice. The firm has successfully introduced several new products to the market, with sales in both domestic and international markets. Similarly, in the food industry, firm "B" which was set up in 1988, has successfully introduced many new products to the Thai market including snacks, instant noodles, bakery products, and rice products. The firm has distributed its

products throughout Thailand and across several neighboring countries. Another firm that the researcher has direct experience with is firm “C” which was set up in 1993 to produce beverages. The firm has introduced several new beverage products including fruit flavored drinks, fruit juice with ‘nata de coco’, fruit juice with pulp, fruit juice with yoghurt flavor, and ‘jelly 3 in 1 combination’ which features a dessert consisting of three different layers of jelly. The firm’s products are marketed both in Thailand and overseas markets. However, it is not clear what innovation strategies these and other F&B manufacturing SMEs adopt in approaching their NPD projects.

Innovation capabilities in Thailand are relatively low compared to other Asian countries and economies such as Singapore, Hong Kong, Korea, Japan, China, and Malaysia (Dutta, Lanvin, & Wunsch-Vincent, 2014, p. 428). A survey conducted jointly by the Samuel Curtis Johnson Graduate School of Management at Cornell University, INSEAD, and the World Intellectual Property Organization (WIPO, an agency of the United Nations, UN) in 2014 shows that Thailand ranks 48th, which is below some other Asian countries such as Singapore (7th); Hong Kong (10th); Korea (16th); Japan (21st); China (29th); and Malaysia (33th) (Dutta et al., 2014, p. xxiv). Thai F&B manufacturing SMEs generally lack the ability to innovate new products (Saigosoom, 2012).

The importance of SMEs to the Thai economy is such that they represent 98% of the total number of enterprises, employ 83% of the total enterprises’ workforce, and contribute to 37% of GDP (OSMEP, 2014). The F&B industry comprises more than 116,000 enterprises, 96% of which are SMEs (Mitrchob et al., 2012). Despite the crucial role Thai F&B manufacturing SMEs plays in the development of the national economy,

there are very few studies on innovation management in these SMEs (Saigosoom, 2012), and the current study partly fills the above gap.

The main objective of the current study is to explore areas for improving the effectiveness of the NPD initiatives in Thai SMEs in general and in the F&B industry in particular. To achieve this objective, the study focuses on the current practices of NPD in Thai F&B manufacturing SMEs with the aim of identifying barriers that they are facing, and to relate them to the innovation or lack of it in Thai F&B manufacturing SMEs. More specifically, the current research project investigates the NPD process in Thai F&B manufacturing SMEs in order to identify and explicate innovation strategies that Thai F&B manufacturing SMEs may have adopted during the various phases of their NPD process. This objective is achieved by assessing the relevance of various existing innovation strategies in the literature, mainly used for large companies, to the Thai F&B manufacturing SMEs in order to explore both presence as well as applicability of those strategies to the Thai SMEs. As a result of explicating innovation strategies adopted by Thai F&B manufacturing SMEs, the researcher will be able to identify potential areas to improve the effectiveness of Thai F&B SMEs' NPD initiatives.

To provide more details on the background and context of the study, the following sections address a number of relevant key issues including firms' competitiveness and global competition; NPD; innovation strategies; and NPD and product innovation in SMEs.

1.1.1 Firms' Competitiveness and Global Competition

One of the most widely-recognized theoretical contributions to the study of firm's competitiveness is Porter's Five Forces Model. Competitiveness of a firm is influenced by the bargaining power and threats of the five forces that exist in the environment in which the firm operates (Porter, 2008). The five forces as described in Porter's (2008) model consist of:

1. The bargaining power of buyers;
2. The bargaining power of suppliers;
3. The rivalry among existing competitors;
4. The threat of substitute products or services; and
5. The threat of new entrants.

A visual presentation of the Five Forces Model is provided in Figure 1.1

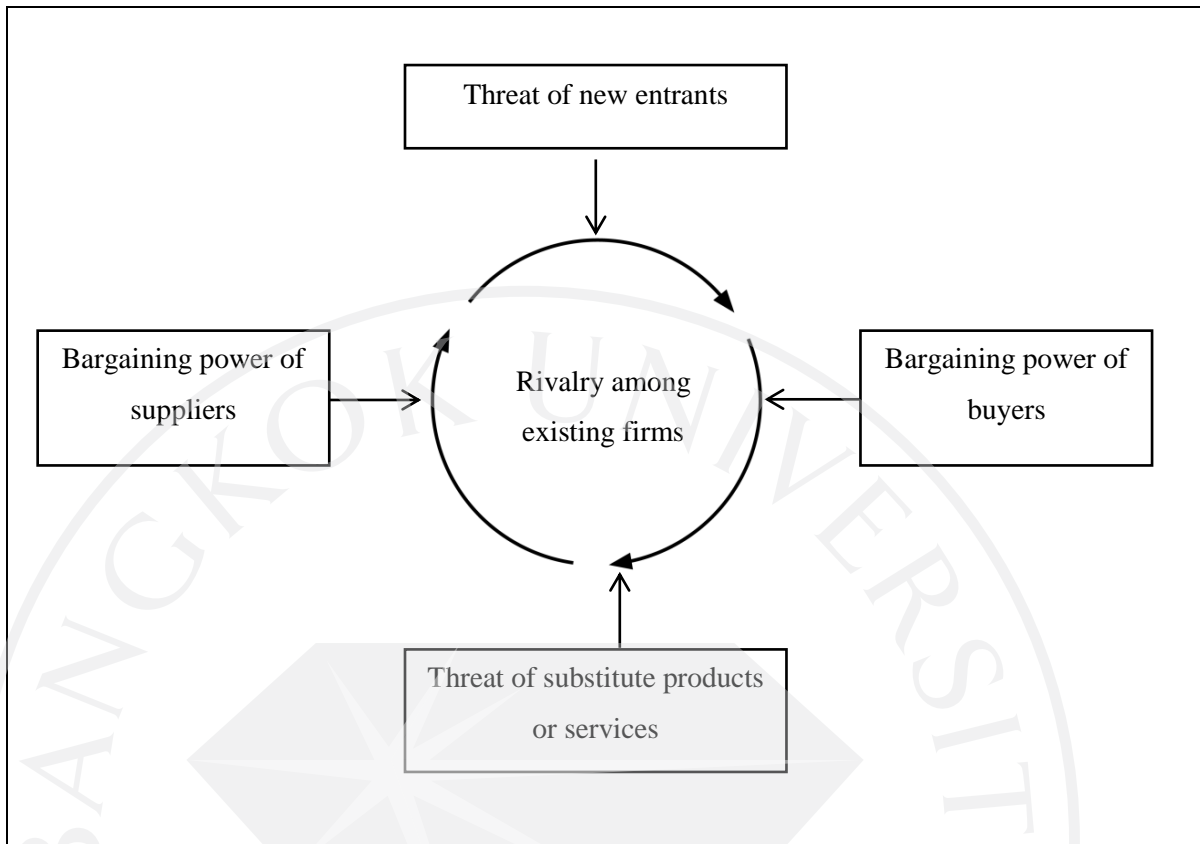


Figure 1.1: The Five Forces Model (Porter, 2008).

Porter (2008) describes the underlying causes of the five forces. Understanding these causes enables a firm to formulate and implement appropriate strategies to manage these forces so that the firm can increase its competitiveness. The strategies suggested by Porter (2008) are illustrated in Table 1.1.

Table 1.1: Strategies for Dealing with the Five Forces. Adapted from Porter, 2008.

Five forces	Strategies for dealing with the five forces	Details
Threat of new entrants	Raising the entry barriers to discourage new entrants	Firms can potentially raise entry barriers by introducing new products with proprietary technology. For example, Microsoft Windows operating systems that make it difficult for new entrants to participate in the PC operating system market.
Bargaining power of suppliers	Reducing switching costs so that firms can switch suppliers more easily and have better bargaining power vis-à-vis their suppliers	Firms can potentially reduce their switching costs by introducing new products whose production process or raw material requirements allow the firms to switch suppliers of those production inputs without incurring high switching costs. For example, Nike shoes that can be sourced from many different countries where production and raw material costs are highly competitive.
Bargaining power of buyers	Increasing bargaining power through product differentiation	Firms can potentially increase their bargaining power vis-à-vis their buyers by introducing differentiated products , e.g. Apple's iPod, iPad, and iPhone products.
	Increasing switching costs for buyers so that buyers find it costly to switch to competitive suppliers	Firms can potentially reduce the bargaining power of their buyers by introducing products that can incur high switching costs for their buyers, such as Bloomberg terminals for the financial professionals market. The high costs of specialized ancillary equipment and training the personnel to use the product make it difficult for buyers to switch suppliers.

(Continued)

Table 1.1 (Continued): Strategies for Dealing with the Five Forces. Adapted from Porter 2008.

Five forces	Strategies for dealing with the five forces	Details
Threat of substitute products	Reducing the threat of substitute products by re-enforcing the product's unique characteristics and distancing itself from the substitute products	Firms can potentially reduce the threat of substitute products by re-enforcing the product's unique characteristics and distancing itself through product innovation, particularly in terms of product performance so that the product still offers an attractive price-performance proposition to the buyer, e.g. weight loss centers (service) defending their market position against supermarket weight loss items (beverages/food products) which promise identical end benefits (losing weight) by adding new features to their services such as physician's supervision, delicious and real food items and recipes, all of which are either not available from, or poorly presented by, supermarket weight loss items.
Rivalry among existing competitors	Increasing competitive advantage through product differentiation	Firms can potentially gain competitive advantage by introducing differentiated products, e.g. Samsung electronics and mobile phones that have outperformed their rivals through highly differentiated products.

It can be concluded that the adoption of appropriate innovation strategies to deal with the five forces can potentially increase a firm's competitiveness which in turns contributes to its market and financial performances and long term sustainability.

On a global basis, many recent studies have focused on the topic of the fast

increasing competition that is spreading all over the world. For example, Hillebrand and Biemans (2004), Madrid-Guijarro, Carcia, and Auken (2009), and Basile (2012) argue that there is a general trend towards the globalization of competition. Similarly, Guan, Yam, Mok, and Ma (2006) highlight the impact of global competition on firms' performance by demonstrating in their empirical study that as much as 75% of innovative industrial firms in China do not achieve satisfactory sales results mainly because of the intensive global competition environment. Competition in many types of industries is no longer confined to any particular geographical area, but is spreading all over the world at an unprecedentedly fast pace. Other researchers argue that firms are facing bigger challenges in this intensive global competition environment which involves rapid changes in technological, managerial and organizational areas (Caputo, Cucchiella, Fratocchi, Pelagagge, & Scacchia, 2002; Guan et al., 2006). Key factors threatening the long term survival of many firms include growing international competition initiated by major global business firms; shifting market demands; fragmenting markets; rapid introduction of new technologies (Dougherty, 1992); the rapidly increasing popularity and adoption of the internet which has fueled the dramatic growth of e-commerce; changes in logistics; and the progressively decreasing trade regulations (Carbone, 2011; Saigosoom, 2012). In addition, firms are also pressured by the rapid changes in technology and consumer demands to accelerate the product development cycle (Liberatore & Stylianou, 1995).

1.1.2 New Product Development (NPD)

Much of the current literature explores the strategies firms choose to manage their businesses in order to cope with the intense competition. Several studies have indicated

that firms are paying more attention to the development of new products so that they are in a better position to survive, grow, and prosper (Bhuiyan, 2013; Mu, Peng, & MacLachlan, 2009; Saigosoom, 2012). The importance of new products to the success of firms has resulted in dramatic increases in the number of new products being introduced in the last few decades (Bhuiyan, 2013). Moreover, research has found that the ability to launch new products with shorter lead times give firms a competitive advantage and enables them to gain a preferred market position relative to their competitors (Guan et al., 2006). Alternatively, firms can gain competitive advantage when they deliver positive values to their customers which exceed that of competitors (Wagner, 2006). In addition, firms that look for future market opportunities treat NPD as a strategic, long-term endeavor (Kahn, Barczak, Nicholas, Ledwith, & Perks, 2012).

However, NPD is a risky business (Bhuiyan, 2011; O'Sullivan & Dooley, 2009) and the rates of failure are high (Cooper & Edgett, 2008; Cozijnsen, Vrakking, & Ijzerloo, 2000). Figures from various sources indicate that NPD failure rates range from 30 per cent to as high as 95% per cent, with an average of 38 per cent (Tidd, Bessant, & Pavitt, 2005). Liberatore and Stylianou (1995) argue that only one out of every seven concepts that enter the NPD process becomes a commercial success, while as much as half of the resources allocated to NPD projects in the U.S. leads to canceled or failed products. Carbone (2011) claims that, based on figures released from Product Development Management Association (PDMA) in the U.S., the success rate of products released to the market is below 60 per cent. The high rates of NPD project failures have motivated several researchers to investigate the reasons behind the failures of NPD

projects. Some of the key findings are presented below.

Cormican and O'Sullivan (2004) identify four important reasons for the failure in NPD activities as follows:

1. Firms tend to focus on internal processes and procedures, instead of focusing on the customers to find out what the customers need or may need in the future.
2. The lack of a shared understanding among NPD team members; who come from different disciplines, or even from different organizations; prevents everyone in the team from working towards a similar end.
3. NPD projects are not aligned to the firm's strategic direction in terms of an optimal investment mix between short term versus long term, maintenance versus growth, and risk versus return within their project portfolio.
4. Ineffective communication and knowledge transfer from project to project, resulting in similar mistakes being repeated and scarce resources being spent reinventing solutions that have been previously found.

In addition to the findings from Cormican and O'Sullivan (2004), Cooper and Kleinschmidt (2007) have found some other factors that contribute to the failures of NPD activities including:

1. Firms tend not to spend sufficient time and resources in the predevelopment stage of the NPD process which involves initial idea screening, preliminary market assessment, preliminary technical assessment, detailed market study and consumer research, and the business and financial analysis;
2. Poor project definition, such as the definition of the project's scope, definition

of the target market, description of the product concept, formulation of the positioning strategy, and definition of the product specifications, that leads to time slippage and higher costs;

3. Product design changes are made as the product is moving out of the development stage and into the production stage, resulting in higher associated costs;
4. Lack of a well-integrated and properly targeted launch plan;
5. The NPD project has taken too much time and, in the meantime, the market situation has changed, depriving the firm of its competitive advantage or putting the firm into a disadvantageous position;
6. Firms run a higher risk of failure when they engage in NPD activities outside of their domains of expertise or competence base, such as when they take the business into new technologies or markets;
7. Poor market conditions, such as small market size, markets with low growth rate, or tough competition;
8. Lack of the necessary resources for NPD activities; and
9. Lack of the right organizational structure, climate, culture, design, and teams.
10. Lack of a multi-stage, disciplined stage-and-gate idea-to-launch system for NPD activities.

On the other hand, Dougherty (1992) argues that the main reasons contributing to the failures of new products are: (i) the lack of understanding of customer needs; and (ii) the lack of regard for the realities of intermediate and end users. Other researchers, however, argue that most of the failures are due to some weakness in the way firms

manage their NPD process (Tidd et al., 2005); lack of a compelling consumer benefit; lack of support during rollout; lack of innovation or duplication; and insufficient product marketing (Lau & Yam, 2010). Conversely, in a series of studies in NPD and innovation, the Product Development & Management Association (PDMA) in U.S.A. has found that the areas of NPD that seriously need improved management are: (i) idea management; (ii) NPD project leadership and training; and (iii) cross-functional training and team communication support (Barczak, Griffin, & Kahn, 2009).

From the above findings, it can be summarized that there are many reasons why a new product fails. While some of the factors contributing to the failures of NPD projects are external factors outside the boundaries of the firm, such as changing market conditions or strong competitors, by far most of the factors contributing to the failures in NPD projects are those within the boundaries of the firm and are potentially under the management's control. The implications for the current study are that firms can potentially achieve better results for their NPD projects through the adoption of appropriate strategies.

1.1.3 Innovation Strategies

In the last 50 years, research has established a clear linkage between innovation and business success (Vyas, 2009). Innovation is widely recognized as a fundamental determinant of a firm's performance and the key to its ability to compete in a global economy (Cheng, 2009). Research has found that innovation is an important issue among most corporate leaders (Scantlebury & Lawton, 2007). While most managers recognize the importance of product innovation, the majority are dissatisfied with the

management of innovation in their organizations (Tidd et al., 2005). The role of innovation in increasing the chance of success for new products and in improving business performance has received much attention from academics and practitioners from different disciplines in the last few decades. The competitive advantage of firms is achieved through innovation in new products (Carbone, 2011). Product innovation is also a key source of corporate renewal (Dougherty, 1992). For example, (Saigosoom, 2012) has found that product innovation and process innovation are two of the most important factors for SMEs, ahead of marketing innovation and organizational innovation. To be successful in new product activities, firms must be able to use innovation to differentiate their products (Tidd et al., 2005a). Product innovation is the most active category of innovation for SMEs (Saigosoom, 2012).

It has been widely recognized that uncertainties are at the heart of NPD activities (Rosenberg, 2004). Firms constantly struggle to come up with an NPD process that will enable them to achieve better new product success rates (Carbone, 2011). This is particularly crucial for SMEs that do not normally possess a great deal of technological capabilities or financial resources compared to their larger competitors (Saigosoom, 2012). Innovation strategies play a crucial role as facilitators of firms' innovation (Aagaard, 2012; Igartua, Carrigos, & Hervas-Oliver, 2010).

Although the volume of scholarly research on the topic of drivers of new product performance has exploded over the past three decades (Tsai, Huang, & Tsai, 2014), much less attention has been paid to the study of the innovation strategies for the NPD process. For example, Zemlickiene and Maditinos (2012) investigate the issue of marketing

strategy formulation for the NPD process, but the researchers do not provide a theoretical framework for achieving this goal. In contrast, Markham and Lee (2013) have conducted a longitudinal study to focus on the use of an innovation board to integrate the front end of innovation (ideation and concept development) with formal NPD processes. However, the study involves only one firm as the case study method is chosen for the study. Although case methods offer a better understanding of complex issues such as change and culture (Brewer, 2000; Eisenhardt, 1989) the nature of ethnographic studies raises issues surrounding the generalizability and validity of the research. Other researchers, such as Goedhuys and Veugelers (2012), only examine the innovation strategies relating to the internal development of technology and external acquisition of technology, and exclude all other dimensions of innovation strategies that may contribute to the success of the NPD process. Another researcher, Suzianti (2012) provides a heuristic-based conceptual framework for the development of product innovation by focusing on the use of conjoint analysis as a tool for identifying and evaluating new product concepts. Although conjoint analysis is a useful technique to incorporate customers' opinions into product innovation (Hauser & Rao, 2002), the number of possible combinations generated by conjoint analysis in terms of preferred product attributes, particularly for high technology products, can be so large that finding a realistic solution within a reasonable time frame can be a real challenge. On the other hand, Clausen, Pohjola, Sapprasert, and Verspagen (2011) focus their study on the premise that differences in innovation strategies are responsible for the different degrees of innovation persistence across firms.

As far as the researcher is aware, no study has as yet explicitly addressed the issue of innovation strategies of NPD by integrating the available innovation strategies to the NPD process. Some researchers, including Lindgren (2012), Cooper and Edgett (2008), Carbone (2011), Aagaard (2012), and Achiche, Appio, McAloone, and Di Minin (2012), focus their attention on the front end of the NPD process, claiming that the front end is the first and most important building block of the NPD process where the failure rates are much higher than that of the back end. Their studies cover a wide range of factors that have explanatory power to shape NPD performance, e.g. personnel selection (Stevens & Burley, 2003); methods and systems to conceive, develop and launch new products (Cooper & Edgett, 2008); critical success factors that highlight new product strategic fit, product definition, project definition, and organizational roles (Carbone, 2011); decision support in assessing the cost of using tools in opportunity identification and opportunity analysis in the front end activities (Achiche et al., 2012).

On the other hand, according to Cooper (2006), it is not enough to just focus on the front end of the innovation process, because commercial success is highly dependent on the remaining activities (development and diffusion). To address the above research gap, the current study extends the above studies by developing an integrated framework in order to investigate innovation strategies for NPD process with explicit links between various NPD process activities and various existing innovation strategies.

1.1.4 NPD and Product Innovation in SMEs

There have been some studies on product innovation and SMEs. For example, Mingmalairaks (2011) has carried out a study on “Innovation adoption in Thai SMEs”

where the researcher investigates the environmental, organizational, and technological factors contributing to successful innovation adoption in Thai SMEs. Although the study provides valuable insights and learning about the technological factors such as design and engineering; capacity of machines, environmental factors such as competition intensity; information intensity, and organizational factors such as size; culture, that influence innovation in Thai SMEs, it covers several different industries, none of which relates to F&B. The researcher uses case studies which concern five industries, including parawood, car materials, handicrafts, leather, and textile. On the other hand, Basile (2012) argues that SMEs can improve their initial innovation process performance through R&D networking. However, the results have neither confirmed any positive impact on the whole innovation process, nor demonstrated the impact on sales of innovation products. In addition, Madrid-Guijarro et al. (2009) have focused their study on the barriers to innovation among Spanish manufacturing SMEs. While the study sheds some light on the different types of barriers to innovation in SMEs, it has not addressed the issue of strategies SMEs can use to overcome those barriers. Similarly, Saigosoom (2012) has studied barriers and opportunities for Thai food SMEs in the context of innovation management. The researcher has made valuable contributions by identifying key obstacles to product innovation, but has not presented any findings on possible solutions. The question about improving the effectiveness of NPD initiatives in the context of F&B SMEs through the adoption of innovation strategies has remained partly unexplored by the management literature.

To fill these gaps, the current study provides an integrated framework as its

theoretical contribution that illustrates the application of various innovation strategies across the different stages in the NPD process.

In conclusion, this section has presented context for the background and objective of the study. The specific topics discussed include: firms' competitiveness and global competition; NPD; innovation strategies; and NPD and product innovation in SMEs. Finally, research gaps have been identified.

1.2 Statement of the Problem

The F&B industry is a key industry that plays a crucial role in the development of Thailand's economy and in strengthening its competitiveness in the global market (Chinda, 2011; Poonpatpibul & Limthammahisorn, 2005). However, Thai F&B manufacturing SMEs have been found to be less capable of creating product innovation than larger F&B firms, and risk falling behind, particularly in the more dynamic F&B sectors catering to the more sophisticated market segments and export markets (Dhamvithee et al., 2005). The lack of product innovation can also adversely affect firms' competitiveness and sustainability (Saigosoom, 2012). This lack of product innovation in Thai F&B manufacturing SMEs (Dhamvithee et al., 2005), coupled with the scarcity in innovation management studies in the food sector (Saigosoom, 2012) suggest that a study of product innovation and NPD in the context of Thai F&B manufacturing SMEs can be of considerable value to both the Thai F&B industry and the body of academic literature. As product innovation is influenced by the adoption of appropriate innovation strategies (Aagaard, 2012; Husig & Kohn, 2003; Morgan & Berthon, 2008), therefore, the current study focuses on innovation strategies of NPD.

1.3 Purpose of the Research

The purpose of this research is to investigate the innovation strategies of NPD in Thai F&B manufacturing SMEs. The researcher argues that by better understanding the current practices of NPD in Thai F&B manufacturing SMEs and investigating the innovation strategies of NPD, if any, the study may provide insights that can potentially enable Thai F&B manufacturing SMEs to improve the effectiveness of their NPD initiatives.

1.4 Research Questions

To achieve the above objectives the following research questions (RQs) need to be answered:

RQ1: What are the current practices and barriers to NPD processes in Thai F&B manufacturing SMEs, and how is innovation addressed in the NPD process?

RQ2: What are the potential areas for improving the effectiveness of NPD initiatives in Thai F&B manufacturing SMEs?

1.5 Overview of Research Methodology

The current study is shaped by the post-positivist paradigm. Post-positivism represents the thinking after positivism, believing that we cannot be “positive” about our claims of knowledge when studying human’s actions and behavior, and that claims made in research can be subsequently refined or abandoned when new claims are made (Creswell, 2009a, pp. 6-7). The main objective of post-positivist enquiry is understanding rather than explanation, and the significance of reflexivity in research practice and the role of the researcher as interpreter of data are highly recognized (Fox, 2008).

The research methodology adopted for the study is qualitative methodology. Qualitative research is a means for understanding and exploring the meaning individuals ascribe to a human or social problem (Creswell, 2009, p. 4), and contributes insights into existing or emerging concepts that may help to explain human social behavior (Yin, 2011). In the current study, the researcher seeks to contribute insights into the concepts of innovation strategy and NPD. Therefore, qualitative research is appropriate for the aims of the study.

The approach chosen for this study is “multiple case study” which is a variation of case study. This study is about NPD practices in Thai F&B manufacturing SMEs, and it cannot be considered without a context for data collection. Case study approach emphasizes the study of a phenomenon within its real-world context and favors the collection of data in natural settings (Yin, 2012, p. 5). Multiple case studies enable the researcher to explore differences within and between cases. The objective is to replicate findings across cases. The researcher can predict similar results across cases, or predict contrasting results based on a theory (Yin, 2003). The approach of multiple case study is to collect data from a limited number of sources in a relatively large amount of cases at one point in time (Drongelen, 2001). The aim of the strategy is to broadly explore phenomena in a real-life context and develop tentative explanations based on the fact that the cases have been selected based on theoretical replication (Drongelen, 2001). The unit of analysis (UoA) of the study is the Thai F&B SME. Two main attributes of the UoA that are relevant to the current study are (i) the UoA’s innovation strategy and (ii) the UoA’s NPD process activities.

The current study adopted two main research methods including semi-structured interviews and focus group. Three phases of data collection were planned as follows:

Phase 1: Focus groups. The objective of the focus group in the first phase of the study was to assess the suitability of the proposed framework and associated concepts. There were two focus groups for phase 1. The participants in the first group were academics, where the participants in the second group were SME executives.

Phase 2: Individual interviews. The objective was to address the two research questions. Participants were F&B manufacturing SMEs.

Phase 3: Focus group. The third phase of the study was a sense-making analysis to check the link between the research objective and the research results. Participants were a panel of academics.

The overall method for analyzing the data in the current study was based on an integration of the methods proposed by van den Hoonaard and van den Hoonaard (2008) and Rabiee (2004) with minor modifications. The researcher's methods involved writing notes during and after data collection, simultaneous data collection and analysis, the use of coding, and the development of concepts and connection of the researcher's analysis to the related literature.

To bring rigor to the study, the research process of the study mandates the use of a scientific method (Bhattacharjee, 2012) including a systematic review of the literature. Care has been taken to minimize biases that could distort responses (Patton, 2002; Neuman, 2011). The researcher paid particular attention to the wording of interview questions so that they were not preordained to elicit biased responses.

For this study, the researcher used purposive sampling because it involves selecting “information-rich and illuminative” cases for study in depth. Information-rich and illuminative cases allow the researchers to learn a great deal about the issues of greatest significance to the aims of the research (Aune & Gressetvold, 2011; Uz Kurt et al., 2013). The researcher adopted criterion sampling for this study as it involves searching for individuals or cases which meet a certain condition (Palys, 2008).

The issue of ethical considerations has been addressed. Steps were taken to ensure that participants’ confidentiality was well protected and that they had been properly informed about the research’s specific purpose.

The role of the researcher in a qualitative research study is that of a primary data collection instrument, and the researcher’s contribution to the research setting can be positive and useful (Creswell, 2009, p. 196).

1.6 Rationale and Significance of the Research

The importance of SMEs as one of the key drivers for sustainable economic growth in Thailand has been well recognized in the wake of a major economic crisis that took place in 1997 (Poonpatpibul & Limthammahisorn, 2005). Recognition of the significant contribution by SMEs to the development of the national economy led the Thai parliament to pass into law the Small and Medium Enterprises Promotion Act (SMEPA) in 2000.

Both the competitiveness of Thai SMEs and the F&B industry are key priorities for the current and past governments. In spite of the support from the government and the concerned agencies, SMEs are still plagued with problems and weaknesses that need

to be addressed. One of the major weaknesses of SMEs is the lack of NPD capabilities which has negatively affected SMEs' competitiveness (OSMEP, 2007).

Regarding the F&B industry, the government and the National Economics and Social Development Board (NESDB) have placed F&B high on their policy agenda (Mittrchob et al., 2012). Similarly, the Board of Investment (BOI), in recognition of the important role F&B has played in the development of the national economy, has provided incentives to prospective investors interested in engaging in the F&B industry.

The current research is expected to (i) contribute to current theories and frameworks on NPD and innovation strategies, (ii) provide a learning platform for Thai F&B SMEs by gaining insights into this sector and identifying common areas for improvement; and (iii) to positively impact the Thai economy by increasing the quality of F&B products which are expected to be major export items in the future.

1.7 Theoretical Framework of the Study

As stated before under Section 1.1.3, the researcher aimed to develop an integrated framework for strategized NPD process by combining two theoretical domains: innovation strategies and NPD process. These domains were reviewed in order to develop an integrated framework for the current research. Figure 1.2 shows the theoretical framework of the study.

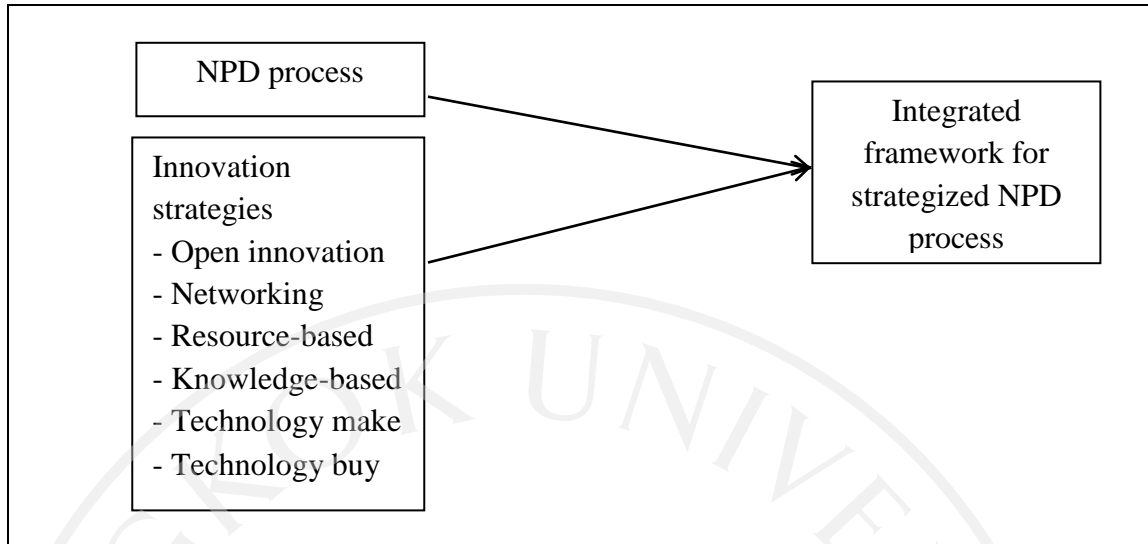


Figure 1.2: Theoretical Framework of the Study.

As can be seen from Figure 1.2, the composite concepts of innovation strategies and NPD process were used to develop an integrated framework for product innovation.

1.8 Definition of Key Terminology

This section defines a number of key terms that are used repeatedly in this study in order to convey their meaning. The following terms are defined and discussed.

Best practice: Best practice is defined as “a technique, method, process, or activity that is more effective at delivering a particular outcome than any other technique, method, process, or activity” (Kahn et al., 2012, p. 180).

Competitive advantage: The definition of this term follows that of the Business Dictionary.com (Competitive, 2014) which reads: “Superiority gained by an organization when it can provide the same value as its competitors but at a lower price, or can charge higher prices by providing greater value through differentiation. Competitive advantage results from matching core competencies to the opportunities.”

Critical success factor (CSF): CSF, also called key success factors (KSF), is defined by Business Dictionary.com (Critical, 2014) as: “Limited numbers (usually between 3 and 8) of characteristics, conditions, or variables that have a direct and serious impact on the effectiveness, efficiency, and viability of an organization, program, or project. Activities associated with CSF must be performed at the highest possible level of excellence to achieve the intended overall objectives.”

Food and beverage (F&B): The food and beverage industry is all firms that engage in processing, packaging, and distributing fresh foods, prepared foods, packaged foods, alcoholic and nonalcoholic beverages. Any product intended for human consumption, besides medical products, passes through this industry (GlobalEdge, 2014).

Globalization: The definition of this term follows that of the Oxford Learners’ Dictionaries (Globalization, 2014) which defines globalization as: “The fact that different cultures and economic systems around the world are becoming connected and similar to each other because of the influence of large multinational companies and of improved communication.”

Innovation: A number of concepts and characteristics are associated with the term “innovation”, such as, introduction of a new method, process, device, concept, idea, or service that can add value for people; the results of implementing something new to improve productivity, efficiency, market share, or quality. The current study uses the definition of innovation as defined by (OECD, 2005): “The implementation of a new or significantly improved product (good or service), or process, a new marketing method, or a new organizational method in business practices, workplace organization or external

relations” (p. 46).

Innovation network: “A territorial agglomeration of small firms, normally specialized by product type, product components or process phases, held together by inter-personal links, by common ‘social culture’ among the workers, entrepreneurs and politicians and enveloped by an “industrial atmosphere” (Freel, 2003). However, the definition adopted for the current study includes extra-regional links, firm-institution, and firm-individual collaboration.

New product development (NPD): The definition of NPD used in this study follows the one provided by Zhao (2001), i.e. “The set of activities beginning with the perception of a market opportunity and ending in the production, sales, and delivery of a new product.” The rationale for the selection of this definition is presented in Section 2.4.1 of this research.

Process: A review of the literature shows that process is used in three ways: (i) a chain of incidents that explain how things develop over time; (ii) a grouping of concepts that indicate actions of organizations or individuals; and (iii) a rationale adopted to describe a causal relationship in a variance theory (Van de Ven, 1992). The current study uses the term “process” to connote the sequence of activities and events associated with product innovation and NPD.

Product innovation: This study adopts the definition suggested by Alegre and Chiva (2008) which states that “Product innovation is a process that includes the technical design, R&D, manufacturing, management and commercial activities involved in the marketing of a new (or improved) product.” Rationale for the selection of this

definition is presented in Section 2.3.1 of this research.

Small and medium enterprise (SME): According to the Institute of Small and Medium Enterprises Development (ISMED, 2014) the definition for SMEs in Thailand is based on two criteria, namely the value of total fixed assets (excluding land) and the number of employees. The two criteria differ among four types of business sectors: retail, wholesale, service, and manufacturing. Table 1.2 illustrates the definition of SMEs for the four business sectors.

Table 1.2: Definitions of SMEs. Adapted from ISMED, 2014

SMEs by business sector	Number of employees		Fixed assets (excluding land)	
	Small	Medium	Small	Medium
Retail sector	<15	16-30	<30 mil. baht	50< mil. baht<60
Wholesale sector	<25	26-50	<50 mil. baht	50< mil. baht<100
Service sector	<50	51-200	<50 mil. baht	50<mil. baht<200
Manufacturing sector	<50	51-200	<50 mil. baht	50<mil. baht<200
(32 baht equals to US1 in December 2014)				

Enterprises are classified as small enterprises or medium enterprises if either one of the two criteria (fixed assets and number of employees) meets the requirement of a

smaller class.

Strategy: There are a number of characteristics and concepts associated with the term “strategy” in the business management context. These include: long term direction; scope of an organization’s activities; gaining competitive advantage; dealing with business environment; developing and exploiting firm’s resources and competences; and influences of key stakeholders. In order to address all these characteristics and concepts in the definition, the current study uses the definition for “strategy” that is proposed by G. Johnson, Scholes, & Whittington (2005, p. 1014) which states that “Strategy is the direction and scope of an organization over the long term, which achieves advantage in a changing environment through its configuration of resources and competences with the aim of fulfilling stakeholders expectations”.

1.9 Researcher’s Assumptions

Based on the researcher’s own thirty years of experience and established beliefs prior to the study, it was assumed that the SMEs in general and Thai F&B SMEs in particular were in drastic need for more structured and formalized NPD procedures supported by an overarching innovation strategy.

1.10 Limitations of the Research

There are a number of limitations in this research. Firstly, the study was limited to four of the five activities in the NPD process. The fifth activity of the NPD process, namely product launch, was not included in the study because it involves the discipline of marketing, which was outside the theoretical scope of this research. The recommendations made in this study for improving the effectiveness of NPD initiatives

are applicable only to the four activities in the NPD process – ideation, concept development, product design, and product testing, and do not apply to the final activity – product launch, of the NPD process. Secondly, due to the time and resource constraints, the study was limited to F&B manufacturing SMEs located in Bangkok and the Central region of Thailand, which may not necessarily face the same set of challenges and problems in NPD activities as those in other regions of the country. Any generalization of the research findings to other industries, large size firms, or geographical areas of Thailand should be done with care. Thirdly, the suggestions for improving the effectiveness of F&B manufacturing SMEs NPD initiatives presented in this study are made by the researcher with additional inputs from a panel of experts; these suggestions have not been put to test in an actual business environment, and they need to be tested to determine their applicability and effectiveness. Finally, there is a possibility of bias from the researcher in interpreting the findings through the lens of the researcher's own experiences, perspectives and background as a practitioner in the business management discipline for over 30 years. These biases will be minimized by the presence of the researcher's supervisor(s) in the interpretation of the results, as well as by conducting the focus group in phase 3 of the research, to make sure that the above biases have been reduced.

1.11 Expected Contributions of the Research

This study contributes to the understanding of NPD by investigating the current practices and barriers in NPD in Thai F&B manufacturing SMEs and identifying areas for improving the effectiveness of their NPD initiatives. Such understanding is expected

to be realized at both theoretical and practical levels. The research addresses one major gap in past research, and explores another gap that has already been identified by others. The latter gap, as initially identified by Mingmalairaks (2011), concerns the scarcity of research in the area of product innovation in Thai F&B manufacturing SMEs. The former gap, identified by the researcher through the literature review, concerns the identification of innovation strategies in the NPD process. Specifically, this research can benefit the following stakeholders: researchers in the fields of NPD and product innovation; F&B manufacturing SMEs owners and managers; government agencies responsible for promoting SMEs' competitiveness; educational and training institutes engaged in developing and providing training programs to SMEs. Table 1.3 below shows the expected contributions of the research and the beneficiaries.

Table 1.3: Expected Contributions of the Research

Contributions of the research	Beneficiaries
1. Theoretical contribution	-Researchers in the fields of NPD and product innovation; - Government agencies responsible for promoting SMEs' competitiveness.
2. Practical contribution	- Government agencies responsible for promoting SMEs'; - F&B manufacturing SMEs owners and managers.
3. Pedagogical contribution	- Educational and training institutions engaged in providing training programs to SMEs.

1.12 Organization of the Dissertation

This dissertation is organized and presented in five chapters. The summary of each

chapter is as follows:

Chapter 1 – Introduction

This chapter is a framework of the research. It presents background and objective of the study, statement of the problem, purpose of the research, research questions, overview of research methodology, rationale and significance of the research, theoretical scope of the study, definition of key terminology, researcher's assumptions, limitations of the research, expected contributions of the research, and organization of the dissertation.

Chapter 2 – Literature Review

This chapter starts with the goal of the literature review, the plan of the literature review, and the method of the literature review. This is followed by an extensive review of the literature focusing on (i) innovation; (ii) product innovation, including definition, types of product innovation, key concepts influencing the success of product innovation, product innovation strategies, product innovation process, product innovation best practices; and (iii) new product development including definition, product characteristics influencing the success of new products, critical success factors, NPD strategies, NPD process models, and NPD best practices. In addition, this chapter also identifies knowledge gap, and proposes an integrated framework for product innovation.

Chapter 3 – Research Methodology

This chapter presents the research paradigm that guides this study, the adopted research design, the research approach, the research methods including phases of data collection and data analysis. In addition, the chapter also discusses the approaches taken

to enhance the rigor of the study, the criteria adopted for the selection of participants, the steps taken with respect to ethical considerations, and the role of the researcher.

Chapter 4 – Data Collection and Analysis

This chapter provides results obtained from three phases of data collection throughout the study. The chapter presents description of the 20 cases in the study; results of the initial focus group, results of the interviews; and results of the final focus group. Results of the initial focus group were used to modify the questionnaire of the semi-structured interviews. The final focus group was a sense-making study with the aim of presenting the results from the previous phase (semi-structured interviews) to the audience and asking them to comment on the results based on the expected outcome of the thesis.

Chapter 5 – Conclusion

This chapter presents conclusion of the study. The implications for theory and practices are also discussed. The chapter also presents limitations and delimitations of the study. Future research directions are also discussed. Figure 1.3 illustrates the structure of this dissertation on a chapter-by-chapter basis.

Structure	Description	Output
Chapter 1	i) Introduction of the dissertation ii) Developing the research problem	i) Research purpose ii) Research questions
Chapter 2	i) Theoretical background ii) Discussion about the knowledge gap	i) Literature review ii) Integrated framework for strategized NPD process
Chapter 3	Research paradigm, design, approach & methods	Methodological steps in this study
Chapter 4	i) Data collection ii) Data analysis	Interpretation of the research results
Chapter 5	i) Conclusion ii) Limitations & future research directions	Summary of the dissertation & suggestions for future research

Figure 1.3: Summary of the dissertation structure.

1.13 Summary

This chapter has presented the background of the study. It has also presented the statement of the problem, the purpose of the research, the research questions, an overview of the research methodology, the rationale and significance of the research, limitations of the research, and expected contributions of the research. Finally, this chapter has presented an outline of the organization of the dissertation.

CHAPTER 2
REVIEW OF THE LITERATURE

2.1 Introduction

This chapter provides a review of literature on product innovation, new product development (NPD) and innovation strategies in order to develop a synthesized theoretical background for the study. Generally speaking, the literature review is a synthesis of the literature on the research problem (Creswell, 2009a). It is conducted to help establish a benchmark for comparing the findings with other works (Bhattacharjee, 2012; Creswell, 2009). The literature review enables the researcher to situate the research within the body of literature, define the research problem, develop a conceptual framework, establish objectives and determine the methods and procedures for the research (Ethridge, 2004).

This chapter proceeds as follows: Section 2.1 introduces the chapter, discusses the goal of the literature review, provides the plan of the literature review and describes the method of the literature review. The actual review is presented in Sections 2.2, 2.3 and 2.4. Section 2.2 discusses the concept of innovation. Section 2.3 discusses the topics of product innovation, key definitions of product innovation in the literature, types of product innovation, key concepts influencing the success of product innovation, product innovation strategies, product innovation process and product innovation best practice. Section 2.4 discusses the topics of NPD including definitions of NPD, product characteristics influencing the success of new products, critical success factors, NPD strategies, NPD process models and NPD best practice. Section 2.5 discusses the

knowledge gap. Section 2.6 presents an integrated framework for strategized NPD process. Section 2.7 provides refined research questions. Finally, section 2.8 summarizes the chapter. A conclusion is made to compare and contrast key concepts on product innovation, innovation strategies, and NPD in the current literature, and to relate the existing knowledge to the topic of this research.

2.1.1 Goal of Literature Review

In conducting the literature review in the present study, the goals are:

1. To identify key findings, theories, and articles in the areas of innovation, product innovation, key concepts influencing the success of product innovation, product innovation strategies, product innovation process, product innovation best practice, NPD, product characteristics influencing the success of new products, NPD critical success factors, NPD strategies, NPD process models and NPD best practice.
2. To identify knowledge gaps and justify the positioning of the researcher's study
3. To synthesize a theoretical framework to guide the study. This is done by developing research questions and providing discussions on the relevance of the literature review findings to new product development practice in the context of Thai F&B manufacturing SMEs.

2.1.2 Plan of Literature Review

Details of each element are presented as follows:

1. The topic of study is: "Investigating innovation strategies of new product development: Multiple case studies of Thai food and beverage manufacturing SMEs". It serves to guide the literature review whilst developing relevant ideas, concepts, and

research questions sought from the literature.

2. Timeline: The literature review is a key part of the dissertation. As such, a considerable amount of time is allocated to this task to ensure that the review thoroughly determines what is known and not known about the topic of the study.

3. The search strategy includes deciding what are the keywords, period of research, appropriate sources for the review and type of review. The keywords to be used for the search are: product innovation, innovation strategy, new product development, new product development strategy, plus combinations of the above. Additional keywords include concept, definition, best practice, success, failure, SMEs, food and beverage. The review includes English sources from the year 2000 to present. However, exceptions are made for earlier major works that have been widely recognized and cited, for example, two of Schumpeter's seminal books: "The Theory of Economic Development" in 1934, and "Capitalism, Socialism, and Democracy" in 1942. The key sources for the review include online data bases of EBSCO, Emerald, ProQuest, Science Direct, and Google Scholar.

4. Quality of sources: The literature selected for the review is mainly peer-reviewed journal articles. In addition, a number of relevant dissertations, books, working papers and selected conference papers are also included to broaden the scope of the review.

5. Two major knowledge domains are reviewed including (i) product innovation and (ii) new product development. Although the innovation process involves all four types of innovation, namely, product, process, organizational, and marketing innovations,

the literature review will focus solely on the product innovation process as relevant to the current study.

The review on product innovation has been organized in six parts. First, the definition of product innovation is discussed. Second, the types of product innovation are examined. Third, key concepts influencing the success of product innovation are investigated. Fourth, the concept of product innovation strategy is discussed and various product innovation strategies are investigated. Fifth, various types of the product innovation process are examined for example, sequential and non-sequential processes. Finally, the topic of best practice for product innovation is presented.

The review of NPD has also been organized in six parts. First, the definition of NPD is discussed. Second, product characteristics influencing the success of new products are examined. Third, critical success factors for NPD are investigated. Fourth, NPD strategies are discussed. Fifth, NPD process models are reviewed. Finally, the topic of best practice for NPD is discussed. Table 2.1 presents more details of the topics and sub-topics of literature review.

Table 2.1: Topics and Sub-topics of Literature Review

Product innovation	New product development (NPD)
<p>Definition</p> <p>Types of innovation</p> <ul style="list-style-type: none"> • Radical product innovation • Incremental product innovation <p>Key concepts influencing the success of product innovation</p> <ul style="list-style-type: none"> • Firm size • Cannibalization • Organizational learning capability • Absorptive capacity • Firm orientation • Institutional context <p>Product innovation strategies</p> <ul style="list-style-type: none"> • Open innovation strategy • Networking strategy • Resource-based strategy • Radical vs. incremental product innovation strategies • Technology make vs. technology buy strategies • Exploitative vs. explorative innovation strategies • Knowledge-based strategy <p>Product innovation process</p> <ul style="list-style-type: none"> • Sequential process • Non-sequential process <p>Product innovation best practice</p>	<p>Definition</p> <p>Product characteristics influencing the success of new product</p> <p>Critical success factors</p> <p>NPD strategies</p> <ul style="list-style-type: none"> • Outsourcing NPD activities • R&D and marketing integration strategy • External organization cooperation strategy • Information and communication technologies strategy <p>NPD process models</p> <p>NPD best practice</p>

2.1.3 Method of Literature Review

A systematic review is adopted for this study because of the complexity of the issues involved. Systematic reviews expose studies to rigorous methodological scrutiny (Tranfield, Denyer, & Smart, 2003) and are designed to identify as many relevant studies as possible to ensure they are not lost in the growing body of research (Jones, 2004). Systematic reviews utilize scientific strategies that limit bias of the selection, assembly, critical evaluation, and synthesis of all relevant primary studies on a specific topic (Cook, Greengold, Ellrodt, & Weingarten, 1997), and the scientific vigor of this process is what distinguishes systematic reviews from the traditional literature reviews (Magarey, 2001). Systematic reviews aim to reduce the elements of arbitrariness in the traditional narrative reviews, giving details of the review process so that the reviews can be replicated by any other researchers (Abalos, Carroli, Mackey, & Bergel, 2001; Hallinger, 2013). In spite of the increasing popularity of systematic reviews, systematic reviews are not without criticism (Hallinger, 2013). The reviews never eliminate the need for some critical appraisal of the original studies to understand the populations, interventions, and outcome evaluated and, the results of the individual studies (Cook et al., 1997).

The steps in the systematic review are: (i) problem definition; (ii) searching the literature to identify relevant research studies on the chosen topic; (iii) selecting studies to be included in the review; (iv) analyzing and synthesizing data; and (v) reporting of the results (Jones, 2004; Magarey, 2001; Tranfield, Denyer, & Smart, 2003b). The literature review for this study is conducted by adopting the steps prescribed by Jones (2004),

Magarey (2001), Tranfield et al. (2003). The following sections cover each of the steps in detail.

Step 1: Problem definition. The general problem is that for many firms it is difficult to develop successful new products (Zemlickiene & Maditinos, 2012) and it takes a considerable amount of time and financial resources to develop successful new products (Zemlickiene & Maditinos, 2012). NPD is also a high risk activity (Li & Atuahene-Gima, 2001). Studies have demonstrated that as much as 46% of firms' resources allocated to NPD are wasted on unsuccessful NPD projects (Cooper, 2006). The success rate of new products is generally below 25% (Evanschitzky, Eisend, Calantone, & Jiang, 2012). The challenge is to identify advanced strategies that help make new products more innovative. The components of the problem are: (i) innovation strategy and (ii) new product development (NPD). These will be used to direct the subsequent steps of the literature review.

Step 2: Searching the literature to identify relevant studies. Based on the problem definition in the preceding step, the next step is to develop keywords for the literature search. In this regard, the keywords selected to ensure good representation of the core concepts of the study are: (i) product innovation; (ii) innovation strategy; and (iii) new product development (NPD). It is important that the search is comprehensive so as to avoid bias (Magarey, 2001). The main objective is to identify all relevant studies on the chosen topic. For this purpose, four research databases are used to search the literature. Three of the databases, namely: EBSCO, Emerald, and Science Direct are for peer-reviewed journal articles, and one database, ProQuest, is for dissertations. In terms of

quality, peer-reviewed research papers are regarded as having greater quality than doctoral dissertations because peer-reviewed journals are considered validated and established knowledge having been subjected to rigorous scientific method (de Medeiros, Ribeiro, & Cortimiglia, 2014). The inclusion of doctoral dissertations to the review serves to broaden the scope of the search and ensures that the chosen topic of study is not identical to an existing study whilst making an original contribution to the body of knowledge. The search limits are set for papers published during the period 2000 to 2014, in English, with titles containing any one of the three key words. Searches are restricted to published material. Details of the search results are shown in Table 2.2.

Table 2.2: Search Results of the Systematic Review of the Literature Conducted between October 1, 2013 and December 28, 2014

Key word	Databases				Total
	EBSCO	Emerald	Science Direct	ProQuest	
Product innovation	375	27	100	21	523
Innovation strategy	101	7	33	7	148
New product development	949	79	214	75	1,317
Total	1425	113	347	103	1,988

As shown in Table 2.2 above, with the search results totalling 1,425 papers, EBSCO provides the highest number of papers for the three key words searched. This is followed by Science Direct with 347 papers, Emerald with 113 papers, and ProQuest with 103 papers respectively. The total number of papers retrieved is 1,988. In terms of the number of papers retrieved by key words, “new product development” ranks top with 1,317 papers. This is followed by “product innovation” with 523 papers, and “innovation strategy” with 148 papers. The retrieved papers then pass to the next step for the selection process.

Step 3: Selecting studies to be included in the review. The retrieved references go through a sifting process which consists of four stages, plus one adding stage, as follows:

Stage 1: review by title. At this stage, the papers are judged by their titles to determine if they are relevant to the topic of the study. Out of the total number of 1,988 papers sifted at this stage, 573 papers are found to be relevant to the topic of the study and are selected for the next step with unidentified number of repetitions.

Stage 2: review by abstract. All the abstracts of the papers are reviewed at this stage to judge their relevance to the topic of the research. The number of papers selected at this stage is 381.

Stage 3: review by academic rankings of the journals. All the 381 papers are checked against databases, references, and information retrieved from several sources namely, SJR SCImago Journal & Country Rank (SCImago, 2014); a ranking conducted by Yang and Tao (2012) among leading innovation management, management, and marketing journals during the period of 1991-2010; a ranking of leading technology and

innovation management specialty journals carried out by Thongpapanl (2012) from the years 2006-2010; Journal Citation Reports Year 2012 (JCR, 2012); and IDEAS/RePEc Simple Impact Factors for Series and Journals (IDEAS/RePEc, 2014). A few papers are excluded at this stage because some of the journals' rankings are questionable, and some of the journals are no longer published. The number of papers selected at this stage is 363.

Stage 4: review by full text. The whole content of the 363 papers that passed stage 3 are now reviewed. Those that are deemed irrelevant are deleted. The number of papers remaining after this stage is 278.

Stage 5: adding papers: In addition to the relevant references selected from all the papers passing through sifting process stage 4 above, when the full text of the 363 papers are reviewed their references are also reviewed. Interesting and relevant references are selected and added to the list of the chosen literature. This increases the total number of chosen papers to 393.

In summary, the final set of papers selected for the review consists of the papers retrieved from the search engines and pass through the four-stage sifting process, plus the relevant references selected from those papers that are reviewed at stage 3 which provides a final total of 393. Table 2.3 shows the numbers of papers passing the different stages of the selection process.

Table 2.3: Numbers of Papers Passing the Different Stages in the Selection Process

Periods	Sifting and adding activities	Number of papers
Oct. 1, 13 – Dec. 28, 14	Total references retrieved	1,988
Oct. 1, 13 – Dec. 28, 14	Rejected at title: (1,415)	573 remaining
Oct. 1, 13 – Dec. 28, 14	Rejected at abstract: (192)	381 remaining
Oct. 1, 13 - Dec. 28, 14	Rejected at academic rankings of the journals: (18)	363 remaining
Oct. 1, 13 – Dec. 28, 14	Rejected at full text: (85)	278 remaining
Oct. 1, 13 – Dec. 28, 14	Added at full text review: 115	393

In reviewing the literature, recurring ideas or patterns that have emerged are grouped into themes. The relevant literature under each theme is then critically reviewed. While the themes are kept discrete, they are linked together in the literature review by the evidence of their commonality.

2.2 Innovation

The concept of innovation has attracted a great amount of interest in academia since the 1930's (Schumpeter, 1934, 1939). The importance of innovation to the development of the economy, the quality of life, and in solving environmental and social issues such as climate change, health and poverty, have been well accepted (OECD,

2010). Innovation drives economic developments through a dynamic process in which new technologies supersede old technologies, a process Schumpeter (1934) called “creative destruction”, and helps firms gain competitive advantage (Schumpeter, 1942).

The rapid advances in science and technology have made innovation a key concept in today’s society (Knight, 1967). Innovation plays a key role in the highly competitive global business arena (Badawy, 2011), and, is associated with firm performance in terms of revenue and growth (Thornhill, 2006). Innovation capability is related to firms’ long term survival (Carbone, 2011; Francis & Bessant, 2005; Uzokurt, Kumar, Semih Kimzan, & Eminoglu, 2013). Innovation is regarded as an element of firms’ strategy for competitive advantage (Crossan & Apaydin, 2010; OECD, 2010), as well as a critical success factor for a firm’s endurance in the current competitive environment (Cornell, 2012; Dervitsiotis, 2010), and is an important tool for managing corporate social responsibility activities (Ferauge, 2012). At regional level, innovation helps promote the region’s competitiveness and economic growth (Frenkel, 2001). At national level, innovation has a vital role in the economic development of a country (Cheng, 2009; Zakic, Jovanovic, & Stamatovic, 2008).

In spite of all the favorable effects attributable to the development and diffusion of innovation, some authors argue that, at firm level, innovation does not necessarily lead to growth or achievement of the firm’s goals (Serra & García, 2013; Unger & Zagler, 2003). Over the past several decades, many authors have come up with different definitions for innovation causing a lack of a universally accepted designation (Reid & de Brentani, 2004). Schumpeter (1939, p 84) defined innovation as “the setting up of a new

production function". By "production", (Schumpeter, 1939, p 84) meant "combining productive services". Therefore, "a new production function" can mean a new commodity, a new form of organization such as a merger, or opening up of a new market. More recently, however, the Organization for Economic Co-operation and Development (OECD, 2005) has given a much broader definition for innovation to reflect the many roles innovation plays in modern day business. The definition given by OECD (2005) is as follows: "An innovation is the implementation of a new or significantly improved product (good or service), or process, a new marketing method, or a new organizational method in business practice, workplace organization or external relations" (p. 46). In comparing the OECD's definition to Schumpeter's definition, the former is a better reflection of the present day's reality in the business world. However, the basic concept of innovation has not fundamentally changed since Schumpeter's work.

Similar to the evolution of the definition for innovation, the classification of the types of innovation has also evolved over the years. Schumpeter (1934) classifies innovation into five types as follows:

1. Introduction of new products.
2. Introduction of new production methods.
3. Opening of new markets.
4. Development of new sources of supply for raw materials.
5. Creation of new market structures in an industry.

Out of the five types of innovation proposed two of them, "introduction of new products" and "introduction of new production methods" are still widely used at the

present time in both academic and business circles. They are referred to as “product innovation” and “process innovation” respectively. The remaining three types of innovation proposed by Schumpeter are not commonly found in current literature. In contrast, (Tidd et al., 2005, p 10) propose four types of innovation, as follows:

1. Product innovation: changes in the products or services that a firm offers.
2. Process innovation: changes in the methods in which the products or services are made and delivered.
3. Position innovation: changes in the context in which the products or services are launched.
4. Paradigm innovation: changes in the underlying mental models which frame what a firm does.

The first two types of innovation (product and process) as proposed by (Tidd et al., 2005) are very prevalent in the innovation literature, but the last two types (position and paradigm) are not so widely present.

Based on Schumpeter’s (1934) contributions and OECD’s (2005) work in the area of innovation in several countries, OECD (2005) developed a list of types of innovation that have been widely referred to in current literature. Essentially, OECD (2005) divides innovation into two main categories of (i) technological innovation and (ii) non-technological innovation. There are two types of innovation under technological innovation, namely, product innovation and process innovation. In a similar manner, there are two types of innovation under non-technological innovation, namely, marketing innovation and organizational innovation. Figure 2.1 illustrates the types of innovation as

proposed by OECD (2005) and highlights the “product innovation” that is the main focus of this dissertation.

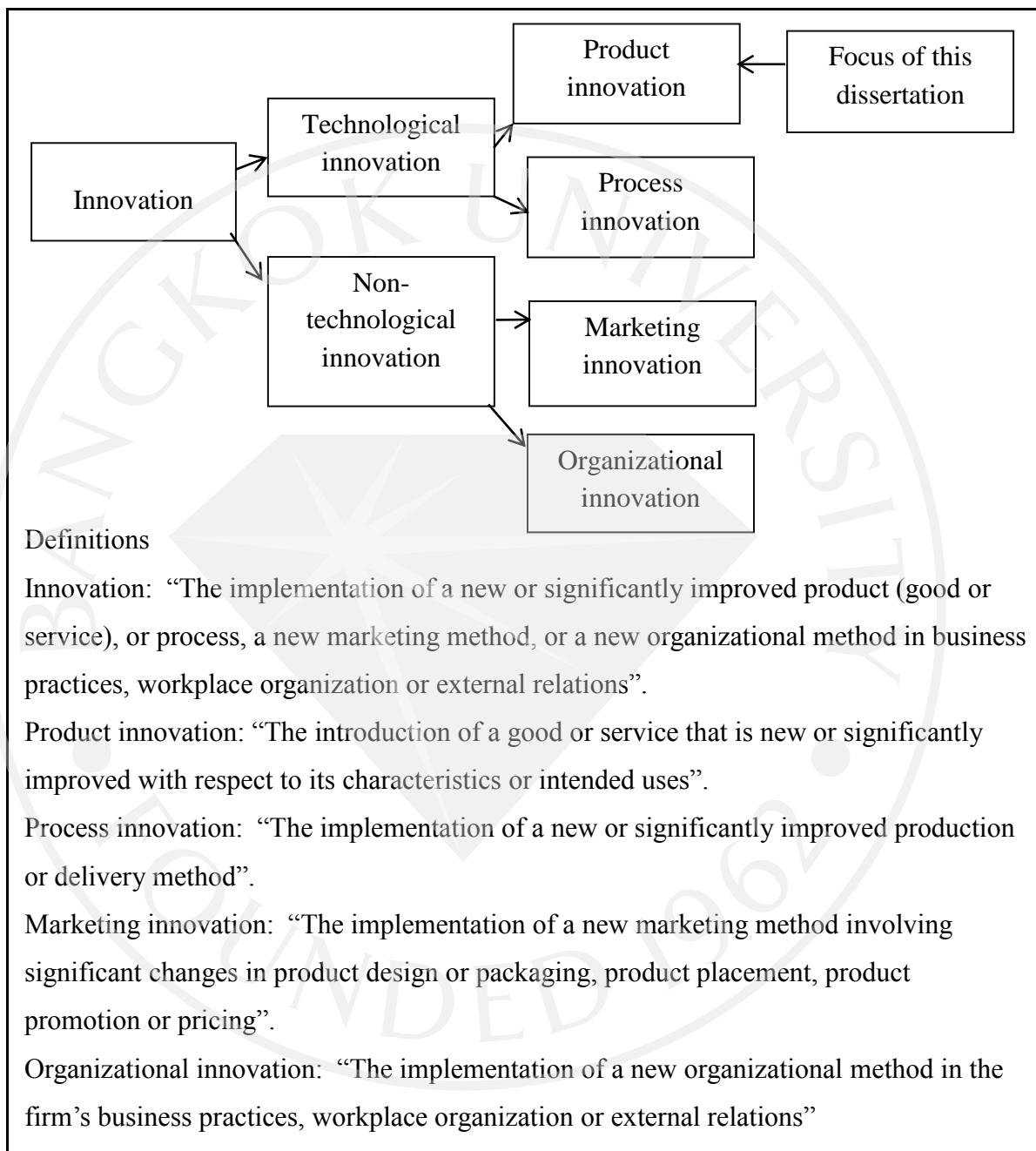


Figure 2.1: Types of Innovation (OECD, 2005, p 47).

A comparison of the types of innovation by different authors is provided in Table 2.4.

Table 2.4. Types of Innovation Presented by Different Authors

	Schumpeter (1934)	Tidd et al. (2005)	OECD (2005)
New product	x	x	x
New production method/process	x	x	x
Opening of new markets	x	-	-
Sources of supply for raw materials	x	-	-
Creation of new market structures	x	-	-
Position	-	x	-
Paradigm	-	x	-
Marketing	-	-	x
Organizational	-	-	x

As stated, although the basic concept of innovation has not fundamentally changed since the time of Schumpeter (1942), the classifications of the types of innovation have undergone some changes. This is not unexpected given the numerous changes that have taken place during the same period, particularly in the areas of science, technologies, economic development, organizational development, commerce, and globalization.

It can be concluded that, at a macro level, innovation is crucial for the growth of the economy and an improved standard of living. At a micro level, innovation provides firms

with competitive advantage. There are several types of innovation as illustrated above. Furthermore, the level of innovativeness in an innovation is classified into “radical innovation” and “incremental innovation”.

2.3 Product Innovation

Product innovation is a key source of firms’ competitive advantage and a driver of firms’ marketing and financial performance (Calisir, Altin Gumussoy, & Guzelsoy, 2013; Cooper, 1990; Cormican & O’Sullivan, 2004; Corso & Pavesi, 2000; de Jong & Vermeulen, 2006; Govindarajan & Kopalle, 2006; Hoonsopon & Ruenrom, 2012; Zakic et al., 2008); a major element of a firm’s strategy (Francis & Bessant, 2005) and a key element of the sustainable success of a firm’s operations (Henard & Szymanski, 2001). Product innovation helps firms to improve market share, increase levels of both customer satisfaction and profitability (Artz, Norman, Hatfield, & Cardinal, 2010; Cheng, 2009; Huston & Sakkab, 2006; Lau & Yam, 2010), serves as barriers to competitors, enables firms to utilize resources efficiently, allows renewal and transformation of an organization (Clark & Wheelwright, 1992). This is particularly important because there is a general trend towards the globalization of competition (Tidd, 2006). In addition, some scholars argue that for firms to achieve sustained competitive advantage, single project of product innovation is no longer sufficient (Corso & Pavesi, 2000). Firms must focus their innovation efforts on families of related products so that synergy among various projects can be realized in the form of sharing key components and assets, commonality in technologies and marketing, and re-use of design solutions over time (Corso, Martini, Paolucci, & Pellegrini, 2001; Corso & Pavesi, 2000). However,

engaging in several innovation projects can be counter-productive (Clark & Wheelwright, 1992) because firms have limited resources. Firms need to stay focused on key projects so that resources can be allocated in an efficient manner.

2.3.1 Definition of Product Innovation

The literature on product innovation is vast, varied and fragmented (Brown & Eisenhardt, 1995). It is difficult to define innovation because of the value judgments attached to the term (Knight, 1967). A table showing some examples of the various definitions is presented below:

Table 2.5: Summary of Some of the Definitions of Product Innovation

Author/s (Year)	Title	Definition of Product Innovation	Key Words/ Concepts
Schumpeter (1934)	The theory of economic development	The introduction of a new good—that is one with which consumers are not yet familiar—or a new quality of a good.	New or improved products.
Knight (1967)	A descriptive model of the intra-firm innovation process	The introduction of new products which the organization produces, sells, or gives away.	Introduction of new products.
Rogers & Everett (1983)	Diffusion of innovations	An innovation is an idea, practice, or object that is perceived as new by an individual or another unit of adoption.	New ideas, practices, objects. Individuals or units of adoption.

(Continued)

Table 2.5 (Continued): Summary of Some of the Definitions of Product Innovation

Author/s (Year)	Title	Definition of Product Innovation	Key Words/ Concepts
Van de Ven (1986)	Central problems in the management of innovation	Innovation is the development and implementation of new ideas by people who over time engage in transactions with others within an institutional order.	New ideas, people, transactions, and institutional context.
Unger & Zagler (2003)	Institutional and organizational determinants of product innovations	Innovation is defined as an increase in the variety of goods and services.	Increase in variety of goods and services.
Cormican & O'Sullivan (2004)	Auditing best practice for effective product innovation management	Product innovation is the process of transforming business opportunities into tangible products and services.	Process, transforming business opportunities into products.

(Continued)

Table 2.5 (Continued): Summary of Some of the Definitions of Product Innovation

Author/s (Year)	Title	Definition of Product Innovation	Key Words/ Concepts
OECD (2005)	Oslo Manual, 3 rd Edition	A product innovation is the introduction of a good or service that is new or significantly improved with respect to its characteristics or intended uses. This includes significant improvements in technical specifications, components and materials, incorporated software, user friendliness or other functional characteristics.	New or significantly improved merchandise or service. Its characteristics or intended use.
Alegre and Chiva (2008)	Assessing the impact of organizational learning capability on product innovation performance: An empirical test	Product innovation is a process that includes the technical design, R&D, manufacturing, management and commercial activities involved in the marketing of a new (or improved) product.	A process that includes various steps in the marketing of a new or improved product.
O'Sullivan & Dooley (2008)	Applying innovation	Product innovation is about making changes to physical products.	Changes, physical product.

(Continued)

Table 2.5 (Continued): Summary of Some of the Definitions of Product Innovation

Author/s (Year)	Title	Definition of Product Innovation	Key Words/ Concepts
Zakic, Jovanovic & Stamatovic (2008)	External and internal factors affecting the product and business process innovation	Product innovations are improvements of existing products and development and commercialization of new products.	New or improved products Development Commercialization
Baregheh, Rowley & Sambrook (2009)	Towards a multidisciplinary definition of innovation	Innovation is the multi-stage process whereby organizations transform ideas into new- improved products, services or processes, in order to advance, compete and differentiate themselves successfully in their marketplace.	Multi stage process Organizations Transformation of ideas into improved or changed entities. Products, services, or processes Advancing successfully Competing and differentiating

(Continued)

Table 2.5 (Continued): Summary of Some of the Definitions of Product Innovation

Author/s (Year)	Title	Definition of Product Innovation	Key Words/ Concepts
Zheng (2009)	A correlational study of organizational innovation capability and two factors: innovation drivers and organizational culture	Innovation is the application of resources to create and deliver value for the enterprise and the customers by developing, improving, and commercializing new and existing products, services, and processes	Application of resources Create and delivery values Improving and commercializing new and existing products
Crossan & Apaydin (2010)	A multi-dimensional framework of organizational innovation: a systematic review of the literature	Innovation is the production or adoption, assimilation, and exploitation of a value-added novelty in economic and social spheres; the renewal and enlargement of products, services, and markets; the development of new methods of production; and the establishment of new management systems. It is both a process and an outcome.	Production or adoption, assimilation, and exploitation of value-added novelty. Renewal and enlargement of products, services, and markets. New methods of production and new management systems.

(Continued)

Table 2.5 (Continued): Summary of Some of the Definitions of Product Innovation

Author/s (Year)	Title	Definition of Product Innovation	Key Words/ Concepts
Artz, Norman, Hatfield, and Cardinal (2010)	A longitudinal study of the impact of R&D, patents, and product innovation on firm performance	Innovations are considered the development of commercially viable products from creative ideas.	Development of commercially viable products
Parkey (2012)	Assessing the national innovation system in a developing country context: a framework and evidence from Thailand	Innovation is the act of bringing something new into use, including a new product, process, or method of production.	Bringing something new into use Product Process Method of production

This study adopts the definition presented by Alegre and Chiva (2008, p 317) which reads: “Product innovation is a process that includes the technical design, R&D, manufacturing, management and commercial activities involved in the marketing of a new (or improved) product”. This particular definition is considered appropriate for this study because (i) it explicitly describes product innovation as a process that involves a series of activities including technical design; R&D; manufacturing management; and

commercial activities, all of which play a major role in the success or failure of a product innovation project; (ii) it puts emphasis on the commercialization aspect of an innovation, an important element that is missing in some other definitions. Since the whole purpose of creating an innovation is to generate commercial benefits from it, it is imperative to regard commercialization as an intrinsic part of innovation; and (iii) it addresses both new and improved products, as all product innovations can be classified into one of these two types of innovation.

2.3.2 Types of Product Innovation

This section discusses the types and characteristics of innovation. The different terms used to describe product innovation usually lead to confusion and ambiguity, making it difficult to reconcile empirical results which are often inconsistent (Gatignon, Tushman, Smith, & Anderson, 2002). Table 2.6 illustrates the numerous terms used to describe types of product innovation in the literature.

Table 2.6: Terms Used to Describe Types of Product Innovation in the Literature

Author/s (Year)	Title	Type of innovation
Chandy and Tellis (1998)	Organizing for radical product innovation: The overlooked role of willingness to cannibalize	Incremental innovation Radical innovation Market breakthrough innovation Technological breakthrough innovation

(Continued)

Table 2.6 (Continued): Terms Used to Describe Types of Product Innovation in the Literature

Author/s (Year)	Title	Type of innovation
Veryzer (1998)	Discontinuous innovation and the new product development process	Continuous innovation Commercially discontinuous innovation Technologically discontinuous innovation Technologically and commercially discontinuous innovation
Tidd (2001)	Innovation management in context: environment, organization and performance	Disruptive innovation Radical innovation Complex innovation Continuous incremental innovation
Gatignon et al.(2002)	A structural approach to assessing innovation: Construct development of innovation locus, type, and characteristics	New competence acquisition innovation Competence enhancing/destroying innovation Core innovation Peripheral innovation Incremental innovation Radical innovation Disruptive innovation Discontinuous innovation Architectural innovation Generational innovation Innovations that involve changes in core subsystems

(Continued)

Table 2.6 (Continued): Terms Used to Describe Types of Product Innovation in the Literature

Author/s (Year)	Title	Type of innovation
OECD (2005)	Oslo manual: Guidelines for collecting and interpreting innovation data	New to the firm innovation New to the market innovation New to the world innovation Disruptive or radical innovation Incremental innovation
Grunert et al. (2008)	User-oriented innovation in the food sector: relevant streams of research and an agenda for future work	User-oriented innovation Technology-oriented innovation

From Table 2.6, it can be seen that the classification of the types of product innovation varies among authors. An examination into the details of each type of product innovation reveals that there are many overlapping areas among them. In addition, the study indicates that one product innovation can fall into one or several categories, and therefore can be classified under several types. There is no clear boundary for each type of product innovation, and, the types of product innovation are not mutually exclusive.

The classification of the types of innovation is mainly based on two key dimensions: (i) technology—the extent to which the new technology is different from the existing technologies, and (ii) market—the extent to which the new product satisfies the customer needs better than the existing products (Chandy & Tellis, 1998). Although

there are several types of product innovation as discussed above, two of them: radical product innovation and incremental product innovation have surfaced prominently in the literature (Hoonsopon & Ruenrom, 2012; Ritala & Hurmelinna-Laukkanen, 2013; Herrmann et al., 2007; Albetti, 2000; Chandy & Tellis, 1998; Tidd et al., 2005; Gatignon et al., 2002; OECD, 2005). The current study focuses mainly on these two types of product innovation, but provides a brief description for other types of product innovation.

2.3.2.1 Radical product innovation. Radical innovation is defined broadly from two different perspectives: (i) the market perspective; and (ii) the technology perspective. The market perspective refers to the extent to which the impact of the innovation has on the market (Groenewegen & de Langen, 2012; Veryzer, 1998). Radical innovation creates so high an impact on the market that it makes the existing products obsolete or unnecessary. It can threaten to destroy the existing market (O'Sullivan & Dooley, 2009), or it can even create new industries (Schoenmakers & Duysters, 2010). Radical innovation is characterized by the technology which is substantially different from existing technology, and it can create new technological systems (Schoenmakers & Duysters, 2010). As the new technology is so different from the existing technology, it is also called discontinuity technology (Abetti, 2000; Chandy & Tellis, 1998; Herrmann, Gassmann, & Eisert, 2007).

It can be concluded that radical innovations are completely new products from a technological perspective that have the potential to either change the balance of power in the existing markets, or create new markets that have not existed before (Herrmann et al., 2007). Radical innovation becomes a crucial basis for subsequent innovations around the

original innovations (Schoenmakers & Duysters, 2010). Successful radical innovations can make firms grow dramatically, while failed radical innovations can cause major setbacks for firms (Chandy & Tellis, 1998; Veryzer, 1998). Whilst radical innovations can create a high return on investment for firms, they also demand much higher risk level, more resources and efforts (Iyer, LaPlaca, & Sharma, 2006; Serra & García, 2013; Zakic et al., 2008). Firms with radical product innovations have performance better than firms with incremental product innovations (Lau & Yam, 2010). The management of radical innovation is significantly different from the management of incremental innovation (Bodewes, 2002). Radical innovation has a major impact on the global economy, industrial, technological and societal change (Schoenmakers & Duysters, 2010) and firms' performance such as efficiency or revenue (O'Sullivan & Dooley, 2009). Radical innovation must also account for environmental and market factors that are beyond the control of the firm (Iyer et al., 2006). In addition, Iyer et al. (2006) argue that new firms may use radical innovation to enter a market.

2.3.2.2 Incremental product innovation. There are several definitions for incremental innovation in the literature. In general, the definitions stress the minor changes in the product or technology with limited impact on the technological system, and low incremental customer benefit to distinguish it from radical innovation (Chandy & Tellis, 1998; Schoenmakers & Duysters, 2010). Most of the initiatives are incremental in nature and are the main source of productivity growth (Schoenmakers & Duysters, 2010). Incremental innovations utilize less efforts and resources, are less ambitious in their scope, are less risky and are generally more successful than radical innovation (Zakic et

al., 2008). But, incremental innovation tend to have lower impact on growth (O'Sullivan & Dooley, 2009). Some manufacturing firms rely entirely on incremental innovation and use tools such as "Total Quality Management", "Lean Manufacturing", and "Continuous Improvement" to make many small changes to the organization. O'Sullivan & Dooley (2009) argue that innovative firms typically have a few radical innovations and many incremental innovations in the same planning period. On the other hand, Iyer et al. (2006) claim that incremental innovations contribute to strengthening the financial performance of radical innovations.

The possibility to realize incremental product innovations is high for market niches where the size of the market is small and does not warrant big investments, and customers are conscious of their requirements so they can provide valuable feedback to help in the design of the product (Zakic et al., 2008). Firms can gain substantially in the long term if they continuously introduce incremental and semi-radical product and process innovations (Zakic et al., 2008).

A comparison between the characteristics of radical product innovation and incremental product innovation is provided in Table 2.7.

Table 2.7: Comparison between the Characteristics of Radical Product Innovation and Incremental Product Innovation

Characteristics	Radical product innovation	Incremental product innovation
The extent to which the technology is different from the existing technology	Technology which is substantially different from existing technology and can create new technological systems or completely new products	Minor changes in technology Limited impact on technological systems Minor changes in product
The extent to which the impact of the innovation has on the market	High impact on market. Makes existing products obsolete or unnecessary Threatens to destroy existing market Creates new industry High degree of customer benefit Can either change the balance of power in the existing market, or create a new market that has not existed before	Low impact on market Low incremental customer benefit
Risk level	High	Low

(Continued)

Table 2.7 (Continued): Comparison between the Characteristics of Radical Product Innovation and Incremental Product Innovation

Characteristics	Radical product innovation	Incremental product innovation
Outcome for firms	<p>The crucial basis for subsequent innovations around the original innovation.</p> <p>Successful innovation can make firms grow significantly.</p> <p>Failed innovation can cause major setbacks. It can create high return on investments.</p> <p>Can use radical innovation to enter a market.</p>	<p>In case of market niche, firms can realize incremental innovation relatively easily.</p> <p>Firms can gain substantially in the long term if they continuously introduce incremental innovations</p>
Requirements	More resources and efforts are needed.	Less resources and efforts are needed
Impact on environment	A high impact on the global economy. Industrial, technological and societal change.	Low impact on global economy, industrial, technological and societal change
Other aspects	There are lower numbers of radical innovations than incremental innovations	<p>Most innovations are incremental innovations.</p> <p>Main source of productivity growth.</p>

From Table 2.7, it can be concluded that radical product innovations are higher risk, demand more resources and effort produce higher impacts on the environment,

technology, and market spheres; have the potential to provide higher returns on investment; offer better chances of reaching out to new customers and new markets; and occur less frequently than incremental product innovations. In short, the differentiation between radical and incremental product innovations is made in terms of the degree of novelty associated with the product and/or the impact it has on the market.

2.3.2.3 Technology-oriented, market-oriented and technology/market oriented product innovations. This section discusses other types of product innovation. To facilitate the discussion, each type of product innovation is categorized under one of three groups: (i) technology-oriented; (ii) market-oriented; and (iii) technology/market oriented. The rationale of adopting the concepts of technology and market in the groupings is that technology and market are the two dimensions that distinguish a product innovation. A short description of each type is presented below:

2.3.2.3.1 *Technology-oriented product innovation.* Technological breakthrough innovation is a product innovation that is high on originality of technology, and low on customer need fulfillment in currency terms (Chandy and Tellis, 1998). Firms use significantly different technology to manufacture products that do not offer superior customer benefit for its cost. For example:

Technologically discontinuous innovation is a product that customers perceive as essentially the same as current products even though the product utilizes new technology (Veryzer, 1998).

Continuous incremental innovation is closely linked to the concept of continuous improvement (Tidd et al., 2005) in which firms improve quality and productivity through sustained incremental change.

Complexity innovation refers to the number of technologies and their interaction (Tidd, 2001). Complex innovation concerns the coordination of all activities, such as basic science, technologies, manufacturing, and marketing within and across organizations so individuals can integrate their knowledge to design, develop, and launch new products (Camisón & Monfort-Mir, 2012).

New competence acquisition innovations are innovations that involve fundamentally new concepts or principles for firms; that require firms to develop many new skills which they do not possess; to learn from completely new or different knowledge bases; to adopt different methods and procedures and, to carry out significant retraining (Gatignon, et al., 2002).

Competence enhancing/destroying innovations. The characteristics of competence enhancing or competence destroying innovation are independent of the radical or incremental dimension of innovation (Gatignon et al., 2002). A particular innovation can be competence enhancing to one firm, and competence destroying to another firm.

Core/peripheral innovations. The concept of core/peripheral innovation is based on the argument that products are made up of hierarchically ordered subsystems and linking mechanisms (Gatignon, et al., 2002). An innovation can be classified as either a core innovation or a peripheral innovation depending upon the locus of the innovation in a product's hierarchy.

Discontinuous innovation. Discontinuous innovation involves long development times, a sequence of innovations, a high degree of technological uncertainty, a greater distance from the market in terms of customer familiarity and time, and the uncertainty of suitable applications for the technology (Veryzer, 1998).

Architectural/Generational Innovations. Architectural innovation is innovation that concerns changes in linking mechanisms between existing subsystems, whereas generational innovation is innovation that concerns changes in subsystems (Gatignon, et al., 2002).

Innovations that Involve Changes in Core Subsystems. Core subsystems drive innovations at system level and innovations that involve changes in core subsystems are introduced more rapidly than innovations that involve peripheral subsystems (Gatignon, et al., 2002). Core subsystems are strategic bottlenecks, while peripheral subsystems are less interdependent with, or are weakly coupled to other subsystems.

Technology-Oriented Innovation. Technology-oriented innovation is innovation that is a result of new high-tech advances in order to gain competitive advantage and increased welfare (Grunert, et al., 2008).

2.3.2.3.2 Market-oriented product innovation. This includes the following types of product innovation:

Market breakthrough innovation. Market breakthrough innovation is a product innovation that is high on customer need fulfillment from a cost perspective, but low on the newness of the technology (Chandy and Tellis, 1998). Firms use their existing core technology to manufacture products that offer significantly higher customer benefits.

Commercially discontinuous innovation. Commercially discontinuous innovation is a product that customers perceive as new regardless of whether or not the product is manufactured by new technology (Veryzer, 1998).

Disruptive Innovation. Disruptive innovation is a product innovation that provides a set of functions that is different from those available in existing products (Tidd, 2001).

New to the Firm/Market/World Innovations. A new to the firm product innovation is a product that is new to the firm, even though it may have already been manufactured by other firms; a new to the market product innovation is a product that a firm introduces to the market or industry before any other firm; and a new to the world product innovation is a product that a firm introduces the innovation for all markets and industries, domestic and worldwide (OECD, 2005).

User-Oriented Innovation. User oriented innovation is a process towards the development of a new product in which an analysis and understanding of the users' wants and needs play an important role (Grunert, et al., 2008). In developing user-oriented innovations, firms involve customers and end-users in the innovation process that may include early customer integration, user-centered development and participatory design (Grunert, et al., 2008).

2.3.2.3.3 Technology/market-oriented product innovation. This includes the following types of product innovation:

Continuous innovation. Continuous innovation involves the same technological capability and product capability (Veryzer, 1998). Technological capability refers to the degree to which the product involves expanding technological capabilities, whereas

product capability refers to the degree to which the product functions are performed beyond existing boundaries (Veryzer, 1998).

Technologically and Commercially Discontinuous Innovation. Technologically and commercially discontinuous innovation is a product that uses new technology and is perceived by customers as offering new benefits (Veryzer, 1998).

This study will focus on radical innovation and incremental innovation as they are widely used in the literature and can cover all the dimensions of product innovation described above.

2.3.3 Key Concepts Influencing the Success of Product Innovation

Several concepts critical to the success of product innovation have started to emerge since the pioneering work of Schumpeter in 1942. . This section examines key concepts presented in the literature.

2.3.3.1 Firm size. Schumpeter (1942) describes the phenomenon in which economic wealth is created through radical innovations as the “creative destruction” process. Firms that rely on old technologies are destroyed by firms with new technologies. In attempting to identify key factors behind firms’ success in innovation, Schumpeter argues that a firm’s ability to innovate is positively related to its size, therefore, larger firms are more able to produce innovations than smaller firms. This argument is supported by recent findings of Cheng (2009) who conducted a study on the relationship between firms’ characteristics and the ability to innovate among pharmaceutical and semi-conductor firms in China. Large firms are found to be more innovative than small firms, particularly in process innovation because of the

comparative advantages of size, while small firms are more inclined to invest in product innovation (Cheng, 2009). However, there have been mixed results from other studies on firm size and the ability to innovate (Chandy & Tellis, 1998). Chandy and Tellis (1998) argue that small firms have been found to be more innovative than large firms in a number of cases. Similarly, in a study commissioned by OECD in 1996 it was concluded that there was little support for the hypothesis of a more than proportionate effect of firm size on innovation performance (Syrneonidis, 1996). The study found that to a certain threshold a positive relationship existed between firm size and innovation performance, after which innovation performance tapered off. Furthermore, considerable differences in the tested relationships were found across industries (Syrneonidis, 1996). The findings seem to suggest that, as far as the relationship between firm size and innovation performance is concerned, large size is an advantage for some industries but not for the others. It can be concluded from the existing literature that further study is needed to identify specific contexts in which either large or small size of a firm can be an advantage in its innovation activity.

As the current study focuses on SMEs, it is important to address the issue of size in the study to investigate if size is a factor that restricts or enhances Thai F&B manufacturing SMEs' ability to innovate, and whether it has influenced their choice of the NPD process and innovation strategies

2.3.3.2 Cannibalization. Another concept influencing product innovation that has been studied is the firm's willingness to cannibalize (Chandy & Tellis, 1998). This concept is based on the premise that firms with successful products tend to resist new

technologies that can potentially harm their existing products' market positions. However, in a number of cases, cannibalization may be unavoidable when new products are launched (van Heerde, Srinivasan, & Dekimpe, 2012). The cannibalization of existing products can weaken the growth effect. Firms that are prepared to cannibalize their investments are more likely to come up with radical innovations (Chandy & Tellis, 1998). In contrast, Govindarajan and Kopalle (2006), who make a distinction between radical innovation and disruptive innovation, argue that willingness to cannibalize is not related to radical innovation, but is positively related to disruptive innovation, claiming that there is no need to cannibalize existing investments for radical innovation. For firms that seek to enhance their innovation performance, they have to foster an organizational culture that seeks to always create better products and encourages risk taking (Chandy & Tellis, 1998). As the fear of cannibalization can potentially derail the innovation efforts or compromise the efficacy of a product innovation program, the new product development team may need to build a coalition of supporters that can help it when the innovation project is being reviewed by the firm's management (Chandy & Tellis, 1998). Product innovation may also be introduced to cannibalize and replace obsolete products, without aiming at increasing market share or firm's performance (Thoumrungrroje & Racela, 2013).

Chandy and Tellis' (1998) argument that firms' willingness to cannibalize is instrumental in enhancing the firms' ability to innovate is interesting. However, their study has been conducted with three high-tech industries and this may raise the issue of generalizability to other less technology-driven industries, such as food and beverage or

costume where cannibalization of investment as a result of new technologies rarely takes place. Willingness to cannibalize as a key management trait seems to be more relevant in situations where technologies advance rapidly and product life cycles are relatively short, such as those in the mobile phone and information technology industries.

2.3.3.3 Organizational learning capability. The interest in organizational learning among researchers has increased considerably since the publication of the paper “An organizational learning framework: From intuition to institution” (Crossan, Lane, & White, 1999). Organizational learning occurs through four general processes; intuiting, interpreting, integrating, and institutionalizing processes, abbreviated as the 4I processes (Crossan, Maurer, & White, 2011). The intuiting process is the process in which individuals develop insights based on their experience to ascertain patterns; the interpreting process is the process in which individuals insights or ideas are explained and related to other ideas or external domains; the integrating process is the process in which individuals develop shared understanding and take coordinated action; and the institutionalizing process is the process in which learning that has occurred at individual and group levels is embedded into organizations through procedures, structures, systems, and strategy (Crossan et al., 1999; Lawrence, Mauws, Dyck, & Kleysen, 2005).

The concept of organizational learning capability as a predictor of product innovation performance has been widely examined in recent years (Eiriz & Barbosa, 2013). Alegre and Chiva (2008, p 317) claim that organizational learning capability consists of five factors as follows:

1. Experimentation: the extent to which a firm is willing and able to explore and pursue new ideas.
2. Risk taking: the extent to which a firm is able to tolerate ambiguity, uncertainty, and errors.
3. Interaction with the external environment: the extent to which a firm maintains the relationships with its environment both from the market perspective and the technology perspective.
4. Dialogue: an inquiry into the processes and assumptions that compose everyday experience.
5. Participative decision making: the extent to which employees are allowed to join in the decision making process.

Alegre and Chiva (2008) argue that as innovation involves finding new ways to solve problems through the successful implementation of creative ideas, the firm's capability to learn new knowledge so that it can be effectively developed, shared, and used, is important to its innovation performance. In contrast, Calisir et al. (2013) consider only open-mindedness, shared vision and commitment to learning as the components of organizational learning, and argue that only open-mindedness predicts product innovation efficacy and efficiency. The need for organizational learning becomes more acute for firms that experience high complexities in such areas as customer inter-face, technology, product, and process (Chapman & Hyland, 2004). Organizational learning also plays an important role in the management of product families as opposed to the management of single projects because organizational learning

focuses on transferring knowledge or embedding it into organizational routines or processes (Corso et al., 2001). Chapman and Hyland (2004) argue that to encourage learning, firms should make use of human resource management policies, because learning is a social activity. However, (Paladino, 2007) argues that organizational learning plays a key role in influencing firms' resource orientation as well as market orientation, both of which have a direct impact on product innovation.

2.3.3.4 Absorptive capacity. Absorptive capacity involves three learning process: exploration, assimilation, and exploitation (Revilla, Sáenz, & Knoppen, 2013). Organizational learning facilitates absorptive capacity which in turn creates innovative performance (Knoppen et al., 2011). Research on the concept of absorptive capacity suggests that firms can improve their innovation capabilities with their absorptive capacity (Cohen & Levinthal, 1990). Absorptive capacity can be further explained as a firm's ability to identify, acquire, assimilate, transform (Leavy, 2012) apply, integrate (Roberts, Galluch, Dinger, & Grover, 2012), and exploit external knowledge based on its prior related knowledge, including basic skills, a shared language, and the most recent technological developments (Cohen & Levinthal, 1990). Zahra and George (2002) argue that absorptive capacity consists of two subsets of capacities, namely, potential capacity which comprises knowledge acquisition and assimilation; and realized capacity which comprises knowledge transformation and exploitation. In addition, Zahra and George (2002) re-conceptualize the absorptive capacity construct proposed by Cohen & Levinthal (1990) by adding the concepts of social integration mechanisms, activation triggers, and transformation; relocating the influence of the regimes of appropriability;

and substituting the component “recognizing the value” with “acquisition” in an attempt to reduce ambiguity in empirical studies (Todorova & Durisin, 2007). In response to Zahra and George’s (2002) reconceptualization of the absorptive capacity, Todorova and Durisin (2007) argue that the reconceptualization does not build on key insights from Cohen and Levinthal’s (1990) conceptualization and that it fails to fully integrate the substantial body of research on learning and innovation accumulated since Cohen and Levinthal’s (1990) original work. In contrast, Todorova and Durisin (2007) propose feedback links, an investigation of the role of “power relationships”, an elaboration of the impact of “socialization mechanisms”, a clarification of “potential absorptive capacity”, an alternative understanding of “transformation”, and a reintroduction of “recognizing the value” in a dynamic model of absorptive capacity.

The rapid development in information technologies has enabled firms to enhance their absorptive capacity considerably (Roberts et al., 2012). The information and knowledge that a firm receives from external sources provide the firm with the necessary capabilities to innovate (Yam, Lo, Tang, & Lau, 2011). Absorptive capacity has a positive causal relationship with a firm’s innovation and financial performance but in different time spans (Kostopoulos, Papalexandris, Papachroni, & Ioannou, 2011). Small firms with employees who have higher education levels and clear growth objectives have been found to have superior absorptive capacity (Gray, 2006). However, in a subsequent study it has been found that absorptive capacity moderates the impact of vertical collaboration on the performance of new products (Tsai, 2009). Absorptive capacity contributes to firm’s innovation performance by enhancing the benefits and lessening the

costs of increasing product portfolio complexity, a precursor to increased sales growth and competitiveness (Fernhaber & Patel, 2012). In addition, absorptive capacity enables firms to engage in more offshore outsourcing activities which lead directly to better product innovation outcomes (Bertrand & Mol, 2013). Firms with absorptive capacity can also benefit from collaborating with their competitors through, cooperation in the area of incremental innovations (Ritala & Hurmelinna-Laukkanen, 2013).

2.3.3.5 Firm orientation. While some of the studies have focused on individual factors affecting the success of product innovation, other studies have investigated the effect of the alignment of different factors on firm's product innovation performance. For example, the concept of alignment between entrepreneurship orientation and market orientation has been investigated (Atuahene-Gima & Ko, 2001). Market orientation refers to a firm's orientation towards the generation, dissemination and responsiveness to market intelligence on a company-wide basis (Kohli & Jaworski, 1990). Market orientation occurs when firms develop and refine their core organizational competencies to maintain competitive advantage within the target market (Morgan & Berthon, 2008). On the other hand, entrepreneurship orientation refers to a firm's orientation towards undertaking aggressive product-market innovation, engaging in risky ventures, and initiating proactive innovations (Revilla et al., 2013). It has been found that firms that align market orientation and entrepreneurship orientation have achieved better product innovation performance (Atuahene-Gima & Ko, 2001). Similarly, Hult, Hurley, and Knight (2004) have found that market orientation, entrepreneurial orientation, and learning orientation are key antecedents to innovativeness. Conversely, a lack of market

orientation is consistently cited as a major reason for new product failure, particularly among firms in the industrial products and high technology products (Cooper, 1990).

Contrary to the above mentioned studies, some scholars, for example, Serra and Carcia (2013), argue that neither entrepreneurial orientation nor market orientation bring about positive innovation outcomes. Serra & Carcia (2013) also argue that not only entrepreneurial orientation and market orientation but also learning orientation and technology orientation have not guaranteed innovation outcomes. Instead, they found that the networking among members of the value chain from manufacturers to distributors to retailers enables firms to gain valuable knowledge to ensure the success of the innovation outcomes. However, it should be noted that Serra & Garcia's (2013) research covers only three firms in the aesthetic industry which is a niche market. No other supporting evidence has been found in the literature to empirically conclude that entrepreneurial orientation, market orientation, learning orientation, and technology orientation do not explain the success of innovation outcomes. This suggests that further research is needed to investigate the relationships between entrepreneurial orientation, market orientation, learning orientation, technology orientation and the success of innovation outcomes to find out if and how they differ from industry to industry.

2.3.3.6 Institutional context. As innovation is the development and implementation of ideas by individuals who make transactions within an institutional context, four key concepts are vital to the success of innovation: ideas, people, transactions, and context (Van de Ven, 1986). Firms must understand the role each of these concepts plays in the management of innovation, and be able to take appropriate

actions to ensure the success of innovation. Van de Ven (1986) argues that a key measure of innovation success is the currency of the idea. But only a small number of ideas gain good currency, so further research is needed to investigate how people turn ideas into good currency. Van de Ven (1986) further argues that people do not necessarily want to generate or accept new ideas, unless they are confronted with problems, threats, or opportunities. As innovation projects always involve many people from different disciplines working together, the idea of getting everyone working together to achieve the same goal can be a challenge. People tend to work from their own perspective, and lose sight of the big picture (Van de Ven, 1986). This calls for designing the innovation process in such a way that it fits the individual parts undertaken by each person. Firms also need to create an institutional context that fosters innovation so that each operating unit can relate to the overall organizational vision and strategy. This means that firms must create an infrastructure that supports innovation and organizational learning (Van de Ven, 1986). In addition, Gao et al (2014) argue that firms' macro-institutional environment, defined as the social context in which a firm is located, positively moderates relationships between the transferred knowledge and firms' product innovation performance.

It can be concluded that, since Schumpeter's work in the 1940's, several studies have focused on the concepts influencing the success of product innovation. In the early literature, researchers paid attention to size (Schumpeter, 1942) as the key determinant of innovation performance. Not only has the argument been proven inconclusive (Chandy & Tellis, 1998), the ever changing environments in the business landscape also warrant

investigation into other concepts such as cannibalization, organizational learning capability, absorptive capacity, firm orientation, and institutional context.

The study on the effect of the alignment between market orientation and entrepreneurship orientation on product innovation helps to broaden the understanding on how combining the two orientations can help firms boost their innovation capabilities. However, the classification of firms into different types of orientations can be a challenging task. In Atuahene-Gima & Ko's (2001) study, firms are classified into four types: (1) market/entrepreneurship oriented firms (ME), (2) entrepreneurship oriented firms (EO), (3) market oriented firms (MO), and (4) conservative firms (CO). The classification is based on how a firm is ranked, from low to high, in the two dimensions of market orientation and entrepreneurship orientation. This is rather judgmental as the measurements of market orientation and entrepreneurship orientation are not done quantitatively. It is questionable if firms can be classified fairly without bias. If the classification is not valid, then the results are not meaningful.

A study from Van de Ven (1986), presents useful perspectives on key problems relating to the management of innovation in an institutional context, and proposes solutions to these problems. However, the problems and their implications are speculative in nature, without any empirical support. This suggests that further empirical study is necessary if the proposed solutions are to be used in a business environment.

2.3.4 Product Innovation Strategies

The influence of product innovation strategies on the performance of NPD has been well recognized (Aagaard, 2012; Husig & Kohn, 2003). To fully support

innovation, firms must have an explicit innovation strategy (Morgan & Berthon, 2008). An innovation strategy should set the objectives of the innovation and align them with the corporation's objectives; define the target markets; stipulate the necessary organization structure for the implementation of the innovation activities; promote coordination and synergy among different functional teams; and describe the activities to be carried out in order to execute the innovation programs (Aagaard, 2012; Cooper, 1999; Cooper & Kleinschmidt, 1995; Igartua et al., 2010).

There are several benefits that firms can gain from the applications of innovation strategies. For instance, firms can achieve synergy between parallel innovation projects when the projects are strategically planned (Adams, Bessant, & Phelps, 2006); innovation strategies provide firms with guidelines and direction in managing key issues such as choosing which markets to enter and what skills to develop (Lester, 1998); and firms that assign R&D teams to multiple innovation projects obtain better productivity than firms that assign R&D teams to single projects (Cooper & Kleinschmidt, 1995).

Although the subject of product innovation strategies has been widely studied, the literature is characterized by a diversity of typologies of innovation strategies. Individual authors or groups of authors propose their own typologies. For example, Eiriz et al. (2013) and Lyer et al. (2006) refer to radical innovation and incremental innovation as innovation strategies for firms to choose when making their strategic choices. On the other hand, other authors, notably Chesbrough and Brunswicker (2014), Chesbrough and Chen (2013), Chesbrough and Garman (2009), and Sarkar and Costa (2008) focus upon the concept of "open innovation" as a key strategy for firms to enhance their innovation

performance. The main argument here is to distinguish between sourcing knowledge and skills for innovation processes exclusively from inside corporate boundaries, broadly designated “closed innovation”, and sourcing knowledge and skills for innovation processes from both inside and outside corporate boundaries, termed “open innovation” (Sarkar & Costa, 2008). Others, such as Serra & Garcia (2013) and Hansen and Birkinshaw (2007), emphasize networking as a key strategy to enhance firms’ innovation performance. Because of the lack of uniformity in the classification of innovation strategies, there are overlapping areas between different strategies. This section presents key product innovation strategies from the current literature.

2.3.4.1 Open innovation strategy. Chesbrough and Brunswicker (2014, p. 18) define open innovation as “the purposive use of inflows and outflows of knowledge to accelerate innovation in one’s own market, and expand the use of internal knowledge in external markets, respectively”. The main focus of this strategy is to highlight the benefits of sourcing external knowledge to enhance firms’ own innovation capabilities. At the same time, the benefits of knowledge outflows to exploit firms’ expertise in other markets are also emphasized.

In a study conducted in 2013 among major firms in the US and Europe (Chesbrough & Brunswicker, 2014, p 16), it was found that the top five key activities for inbound open innovation practice were:

1. Co-creation with customers and consumers by engaging the customers or consumers in the generation, evaluation, and testing of new ideas for products or business models.

2. Informal networking with other organizations to access external knowledge.
3. Funding of research projects carried out by universities' researchers and scientists to gain external knowledge.
4. Participating in R&D projects sponsored by governmental organizations.
5. Contracting with external specialized R&D service providers.

In the same study, it was also found that the top five activities for outbound open innovation practice were:

1. Investment in joint venture partnership.
2. Selling of market-ready products to other firms for sale to their customers.
3. Participating in public standardization programs through formal or informal standardization organizations.
4. Corporate incubators to develop new ideas and provide support to entrepreneurs inside the organization to identify new business opportunities.
5. Selling or licensing of intellectual property to other organizations.

Firms rated inbound practice as more important than outbound practice, even though there was a growing interest in outbound practice among firms (Chesbrough & Brunswicker, 2014).

From the above findings, it can be concluded that the open innovation strategy has been gaining much more acceptance among firms since 2003 when the concept of open innovation was first introduced by Chesbrough (2003) in his highly influential book "Open Innovation: The New Imperative for Creating and Profiting from Technology". In addition, the scope of activities for open innovation has expanded a great deal during

the ensuing years. Open innovation practice are no longer confined to the use of inflows and outflows of knowledge to enhance innovation performance, but they have proliferated to include several other activities such as active participation in government-sponsored R&D projects; funding R&D projects for university researchers; strategic and financial investments in joint venture businesses; selling and licensing of intellectual property; taking active roles in standardization activities with formal and informal organizations; and selling of market-ready products to third parties.

2.3.4.2 Networking strategy. A key strategy firms can use to enhance their product innovation performance is to engage in networking (Hansen & Birkinshaw, 2007; Serra & Garcia, 2013). One networking strategy is to collaborate vertically with firms in the same industry, from manufacturers to distributors to retailers to leverage market information and technological capabilities (Serra & Garcia, 2013). When a manufacturer works in collaboration with its distributors and retailers, the firm can have access to valuable market information that enables it to develop new products that meet the exact needs of the consumers, without spending many years of trial and error, wasting resources and time (Serra & Garcia, 2013).

Another networking strategy is to collaborate with actors from several different groups. Firms can enhance their innovation capabilities by sourcing ideas from actors beyond the firms' boundaries such as users, suppliers, end users, scientists, competitors, inventors, universities, investors, and independent entrepreneurs (Hansen & Birkinshaw, 2007). Hansen and Birkinshaw (2007) argue that there are two different approaches to building external networks, for two different purposes. The first approach, called

“external solution network” is aimed at finding a solution to a specific problem. For example, a firm can send out a technical brief to many contact points outside of the firms, either physically or virtually, or both, to find out if someone, somewhere, can come up with a solution. Monetary rewards are usually offered for the selected solutions. The second approach, called “external discovery network” is aimed at discovering new ideas within a product or technology domain. For example, a firm can set up a team to develop relations with scientists, governmental laboratories, Ph.D. students, entrepreneurs, venture capitalists, and company research centers to identify business ideas and new technologies. In such a case, the team is in a discovery mode, the objectives being to explore and to learn (Hansen & Birkinshaw, 2007). Firms should build both open and proprietary networks whose members may possess promising ideas (Huston & Sakkab, 2006).

2.3.4.3 Resource-based strategy. For firms that have diversified into several industries, a product innovation strategy that can be deployed to improve their product innovation outcomes is the resource-based strategy which makes use of the excess resources in production capacity, pooled knowledge, combined research, technologies, marketing, talents, and other resources (Cheng, 2009). Similarly, Paladino (2007) argues that resources-based strategies drive innovation. Resources-based strategies are internally oriented strategies that focus on the development and utilization of unique bundles of firm resources (Paladino, 2007). Firm resources refer to knowledge, assets, information, capabilities, firm attributes, organizational processes, etc. controlled by a firm that enable the firm to formulate and execute strategies that enhance its effectiveness

and efficiency (Barney, 1991). Barney (1991, p 101) classifies firm resources into three categories, as follows:

1. Physical capital resources. Physical resources refer to a firm's plant, equipment, technology, its access to raw materials, and its geographic location.
2. Human capital resources. Human capital resources refer to a firm's managers' and workers' insights, relationships, intelligence, judgment, experiences, and training.
3. Organizational capital resources. Organizational capital resources refer to a firm's planning, controlling, and coordinating systems, reporting structure, and internal and external relations.

Barney (1991) argues that to determine if a resource is a source of sustained competitive advantage, four questions must be addressed:

1. Is it valuable?
2. Is it rare?
3. Is it imperfectly imitable?
4. Are there substitutes for the resource?

In contrast, Collis and Montgomery (1995) argue that a resource can be tested to see if it is a source of sustained competitive advantage in the following areas:

1. The test of inimitability: the degree to which the resource is hard to copy.
2. The test of durability: the length of time in which the resource depreciates.
3. The test of appropriability: to identify the party who captures the value of the resource.

4. The test of substitutability: the ease with which the resource can be replaced by a substitute.

5. The test of competitive superiority: to assess the resource relative to competitors.

In essence, both Barney (1991) and Collis & Montgomery (1995) emphasize that for a resource to provide sustained competitive advantage, it must be unique, difficult to imitate, and offer value. Firms should invest in developing their resources, including human resources to enhance their innovation capabilities. Firms can leverage their resources to exploit market opportunities, and use innovation to influence the market context in which they operate (Paladino, 2007).

2.3.4.4 Radical vs. incremental product innovation strategies. The difference between radical product innovation and incremental product innovation in terms of market impact, technological impact, rate of return, and degree of risks involved suggests that firms must carefully choose which innovation strategy to adopt under a given circumstance (Lyer et al., 2006). The choice of which type(s) of product innovation firms should pursue is a matter of strategic significance (Eiriz & Barbosa, 2013; Lyer et al., 2006). Lyer et al. (2006) argue that in emerging economies, firms should use incremental product innovation strategy rather than radical product innovation strategy, given the speed of economic liberalization, market dynamism, increased environmental volatility, and rapid changes in political and economic policies that prevail in these countries. The high degree of uncertainty that exists in these markets makes it difficult to

make accurate predictions of the future. However, Lyer et al. (2006) claim that in developed countries firms could benefit from radical product innovation strategy.

In contrast, Eiriz et al. (2013) argue that distinct patterns of innovation strategy development are likely to emerge over time and across firm's growth stages. The authors classify the firm's growth stages into 5 stages, namely, (i) start-up; (ii) expansion; (iii) maturity; (iv) diversification; and (v) exit, and identify four innovation strategies: (i) product development (incremental product innovation); (ii) learning by experience (incremental process innovation); (iii) discovery (radical product innovation); and (iv) restructuring (radical process innovation) for firms in each stage of their growth stages. However, Eiriz et al.'s (2013) theoretical contribution has yet to be empirically tested.

2.3.4.5 Technology make vs. technology buy strategies. Firms can choose where to source their technologies; to develop the technologies internally (technology-make strategy); or to purchase the technologies (technology-buy strategy); or a combination of both technology make and technology buy (Goedhuys & Veugelers, 2012). Firms that use the technology buy strategy, mainly through the purchase of machinery and equipment, or firms that use the combination of technology buy strategy and technology make strategy, are more successful in their innovation endeavors than firms that rely entirely on their internal resources to develop the technologies (Goedhuys & Veugelers, 2012). It has also been found that the success of innovation is dependent upon the skills of both the workforce and management, along with access to finance (Goedhuys & Veugelers, 2012).

However, it should be noted that Goedhuys & Veugelers's (2012) research was carried out in Brazil where the level of innovation is relatively low. Brazil ranks 61st on the list of the Global Innovation Index rankings, compared to that of the more developed countries such as Switzerland (ranks 1st), UK (rank 2nd), Sweden (ranks 3rd), Finland (ranks 4th), and the Netherlands (ranks 5th) (Dutta et al., 2014). It would be interesting to find out if the same phenomenon exists in the more advanced markets where business corporations, particularly large corporations, are normally well staffed and well equipped to do their own technological development. By developing their own technologies, these corporations ensure that they have exclusivity and full protection for the key proprietary technologies.

Another factor worth mentioning is that although the research was undertaken in 2010 and the paper was published in 2012, the data which the authors use is from the World Bank ICS 2000-2002. It would be interesting to find out if they are still relevant today, or if the data has changed in such a way that another research exercise is warranted.

2.3.4.6 Exploitative innovation vs. explorative innovation strategies. Innovation strategies can be classified as exploitative innovation and explorative innovation (Aagaard, 2012; He & Wong, 2004; Morgan & Berthon, 2008; Smith & Tushman, 2005). Exploitative innovation strategy is aimed at safeguarding against competition by focusing on basic learning and knowledge and adjusting to technological practice, whereas explorative innovation strategy is aimed at obtaining leadership in the market by taking a more aggressive approach in technology policy, and is a riskier strategy than exploitative

innovation strategy (Aagaard, 2012; He & Wong, 2004; Morgan & Berthon, 2008; Smith & Tushman, 2005). Exploitative innovation strategy and explorative innovation strategy are not mutually exclusive but complementary (Morgan & Berthon, 2008).

Figure 2.2 illustrates the exploitative innovation strategy and explorative innovation strategy in a strategy map.

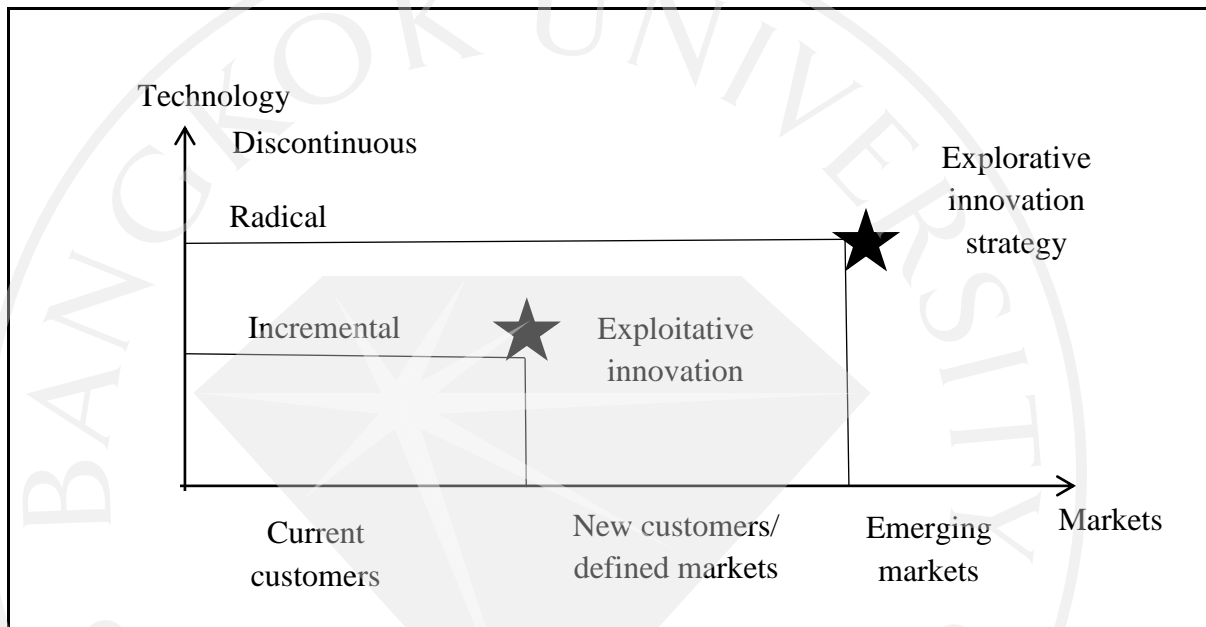


Figure 2.2: Innovation strategy map. Adapted from Morgan and Berthon (2008).

It is suggested that firms who balance the applications of both exploitative innovation strategy and exploratory innovation strategy achieve positive sales growth, while firms that do not balance the applications of these two strategies experience negative sales growth (He & Wong, 2004).

2.3.4.7 Knowledge-based strategy. In the increasing intensity of competition in many product markets, knowledge has emerged as the most strategically significant resource of the enterprise (Grant, 1996). Knowledge has been classified in a number of

ways by scholars. For example, Kaya and Patton (2011), classify knowledge in three categories, namely, technological knowledge, market-related knowledge, and procedural knowledge. Technological knowledge includes ways of utilizing and maintaining tools, facts and is crucial for product design, functionality, reliability, and costs. Market-related knowledge includes information about sales techniques, supplier relationships, or capital equipment requirements that vary within different markets, and is important in identifying customer needs, handling customer problems, predicting changes in the market place, and determining how to serve in the market (Shane, 2000). Procedural knowledge is the ability to understand and generalize processes and serves to illustrate the procedures of performing tasks and how to use the skills gained (Lin, Becker, Byun, Yang, & Huang, 2013). On the other hand, other scholars such as Nonaka and von Krogh (2009), Hardie and Newell (2011), and Kim, Im, and Slater (2013) classify knowledge into (i) knowledge tacitness, or tacit knowledge and explicit knowledge, defined as the degree to which knowledge can be codified for transfer, (ii) knowledge complexity, defined as the number of bundles of interdependent knowledge involved, (iii) knowledge that is observable/non-observable in use, e.g. product technology is more observable than process technology, (iv) positive/negative knowledge, both kinds of knowledge, such as knowledge about product success and product failure, are valuable to the firm, (v) autonomous/systematic knowledge refers to knowledge that yields value without major modifications of systems versus knowledge that requires modification to other sub-systems as a prerequisite to value generation, and (vi) intellectual property regime, defined as knowledge that can be protected by the intellectual property laws.

Product innovations are associated with knowledge that may be embedded and stored in the individual employees, routines, operating procedures, organizational systems, equipment, and tools (Gopalakrishnan, Bierly, & Kessler, 1999). Innovations are the result of the application of new knowledge, or the reconfiguration of existing knowledge (Grant, 1996). A firm's knowledge base is crucial for the development of any radical product innovation (Zhou & Li, 2012). Tacit knowledge plays a key role in every stage of the innovation process (Kotsemir & Meissner, 2013). Tacit knowledge is rooted in emotions, values, ideals, commitment, routines, procedures, action and is tied to the senses, intuition, skills, and tactile experiences (Nonaka & von Krogh, 2009). Firms can improve their innovation performance by promoting knowledge sharing within their organizations (Seidler-de Alwis & Hartmann, 2008). Knowledge from external sources plays an important role in enhancing the firms' ability to innovate and that firms with greater absorptive capacity, defined as the firm's ability to identify, acquire, assimilate, transform, apply, integrate (Leavy, 2012; Roberts et al., 2012) and exploit external knowledge based on its prior related knowledge, including basic skills, a shared language, and the most recent technological developments have greater innovation capacity than firms with lesser absorptive capacity (Cohen & Levinthal, 1990).

In addition to the topics of product innovation strategies discussed above, a review of the literature has revealed that firms that use science-based innovation strategy, or R&D intensive innovation strategy, or market-driven innovation strategy have higher probability of innovating again in the future (Clausen et al., 2011). For firms that operate in emerging economies, incremental product innovation strategy is more appropriate than

radical product innovation strategy. Conversely, for firms that operate in developed economies, the reverse is the case (LIyer et al., 2006). However, it should be noted that the Iyer et al.'s (2006) study is conducted in India which is one of the largest and most rapidly developing countries in the world. India has very unique characteristics in terms of culture, population profile and diversity, basic infrastructure, economic, social, political, and technological development. It is hard to generalize the findings from India to other emerging economies without taking India's unique characteristics into account. This is a topic for future research to investigate the phenomena in other countries of interest.

It is argued that when firms mature through their life cycle stages, distinct patterns of innovation strategy development are likely to emerge (Eiriz et al., 2013). Eiriz et al. (2013) categorize innovation strategies in terms of the degree of novelty (radical and incremental) and the type of innovation (product and process) and offer a typology of innovation strategy consisting of (i) product development; (ii) learning by experience; (iii) discovery; and (iv) restructuring. The researchers claim that as a firm matures through its growth stages, i.e. start-up, expansion, maturity, diversification, and exit, its decisions on innovation change overtime, and each of the four strategies develop over that period. However, there is no empirical evidence to support this argument yet but as the focus of the current study is on product innovation, this classification will not be relevant to the study.

It is evident from the above that all product innovation strategies share one common goal: to enhance a firm's innovation capabilities so that the firm can create effective innovations with lower costs and within a shorter timeframe.

It is hardly surprising to note from sections 2.3.3 (key concepts influencing the success of product innovation) and 2.3.4 (product innovation strategies) that there are some connections between the concepts and strategies that influence the success of product innovation. Table 2.8 illustrates the connections between some of the key concepts and product innovation strategies.

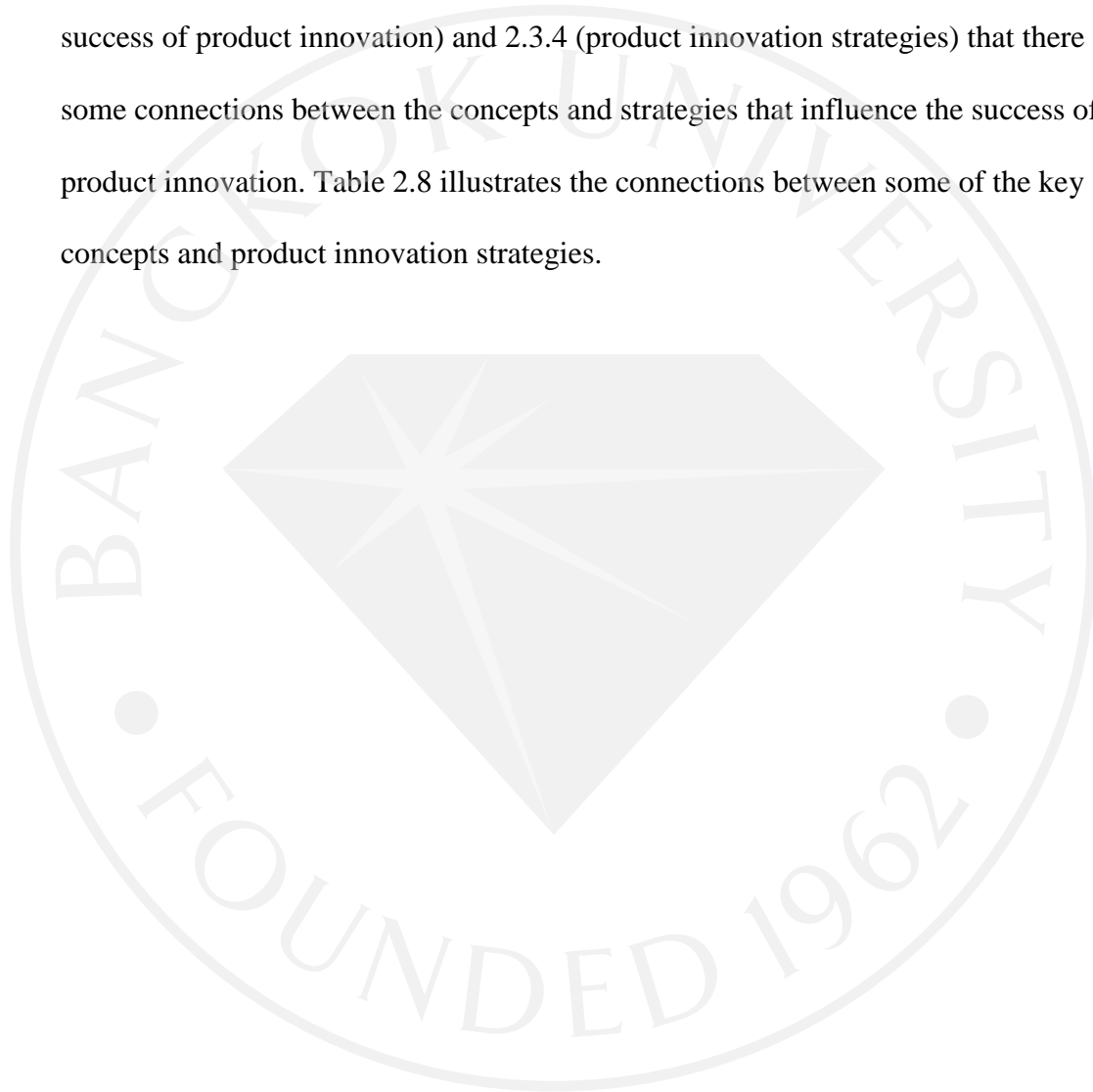


Table 2.8: The Connections between Concepts Influencing the Success of Product Innovation and Product Innovation Strategies

	Concepts influencing the success of product innovation					
	Firm size	Cannibalization	Organizational learning capability	Absorptive capacity	Firm orientation	Institutional context
Product innovation strategies						
Open innovation			A key component of open innovation strategy is to interact with the external environment.	Absorptive capacity is a pre-requisite for open innovation strategy.	Learning orientation can play a key role in open innovation strategy	Institutional context that fosters open innovation can enhance the firm's innovation performance
Networking			Networking involves working with external entities to exchange information and support.	Absorptive capacity is a pre-requisite for networking strategy.	Learning orientation can play a key role in networking strategy	Institutional context that fosters networking can enhance the firm's innovation performance.

(Continued)

Table 2.8 (Continued): The Connections between Concepts Influencing the Success of Product Innovation and Product Innovation Strategies

	Concepts influencing the success of product innovation					
	Firm size	Cannibalization	Organizational learning capability	Absorptive capacity	Firm orientation	Institutional context
Product innovation strategies						
Resource-based			Organizational learning capability can enable firms to develop their resources such as knowledge and human capital resources.	Absorptive capacity can enable firms to develop human capital resources.	Learning orientation can lead to improved human capital resources.	Institutional context that fosters the development of internal resources can enhance the firm's resources.

(Continued)

Table 2.8 (Continued): The Connections between Concepts Influencing the Success of Product Innovation and Product Innovation Strategies

	Concepts influencing the success of product innovation					
	Firm size	Cannibalization	Organizational learning capability	Absorptive capacity	Firm orientation	Institutional context
Product innovation strategies						
Radical vs. incremental innovation strategies		A willingness to cannibalize current investments to contribute to the firm's innovation performance.	Organizational learning capability enables firms to improve their product innovation performance.	Absorptive capacity can lead to improved innovation performance	Market orientation, entrepreneurship orientation, and learning orientation contribute to firm's innovation performance.	Institutional context that fosters the development of product innovation contributes to firm's innovation performance

(Continued)

Table 2.8 (Continued): The Connections between Concepts Influencing the Success of Product Innovation and Product Innovation Strategies

	Concepts influencing the success of product innovation					
	Firm size	Cannibalization	Organizational learning capability	Absorptive capacity	Firm orientation	Institutional context
Product innovation strategies						
Technology make vs. technology buy innovation strategies			Organizational learning capability is important for firms that use either a technology make or a technology buy strategy.	Firms that buy technology need to have absorptive capacity to ensure effective application of the technology.	Learning orientation is crucial to the development of firm's technology.	Institutional context that fosters the development of technology can contribute to firm's technology performance.

From Table 2.8, it can be seen how the various concepts can potentially support the implementation of the various product innovation strategies.

In conclusion, there are several types of innovation strategies. Some of the widely adopted strategies are: open innovation; networking; resource-based; radical product innovation; incremental product innovation; technology make; technology buy;

exploitative; explorative and knowledge-based. As these strategies are conceptualized from different perspectives, there are overlapping areas between some of the strategies. For example, one of the key characteristics of the “open innovation” strategy is “networking”. However, “networking” in itself is regarded as a stand-alone strategy by many authors. Networking strategy can cover several dimensions, such as, networking with people within a work unit, with people across work units, with other firms, with customers, with suppliers, with universities, with R&D organizations, with governmental agencies, and with competitors. In contrast, some researchers regard networking with customers, sometimes called “co-creation with customers” as a stand-alone strategy. The same applies to networking with suppliers or “supplier-based innovation strategy”. On the other hand, exploitative innovation strategy is similar to incremental product innovation strategy, while explorative innovation strategy is similar to radical innovation strategy. Some authors treat knowledge-based strategy as a subset of resource-based strategy, whereas other authors regard absorptive capacity as an element of knowledge-based strategy.

2.3.5 Product Innovation Process

Innovation is the process of growing good ideas and putting them to practical use (Tidd et al., 2005). The process of innovation is defined as “the development and implementation of new ideas by people who over time engage in transactions with others within an institutional context” (Van de Ven, 1986, p 590). It consists of all of the decisions, activities, and their impacts that are the results of recognition of a problem or a need, through research, development, and commercialization of an innovation, through

diffusion and adoption of the innovation by users, to its consequences (Rogers , 1983).

According to Tidd et al. (2005, p 41) the process of innovation consists of four phases, as follows:

1. Scan the internal and external environments to detect signals for innovation.

These could be unmet market needs, new R&D findings, competitors' initiatives, new regulatory mandates, or new technologies.

2. Select from the list of signals detected in the previous stage the things that the firms will develop into an innovation project. In general, priority is given to things that can provide the firm with a competitive edge.

3. Provide the necessary resources to carry out the selected innovation project. The resources may include technologies, knowledge, and skills which may reside inside or outside of the firm.

4. Implement the innovation project, developing it from an idea through different stages to final launch. The final outcome may be a new product or service.

In contrast, Hallstedt, Thompson, and Lindahl (2013) describe the product innovation process broadly as consisting of two major parts, namely:

1. Product development which consists of formulating goals and strategies; generating and selecting ideas; business planning; product designing; and production designing.

2. Realization which consists of production; assembly; distribution and sale; and use.

In the past few decades, the understanding of innovation process has changed considerably among scholars. At the beginning, models of the innovation process were depicted as a linear sequence of activities, but later on more complex and interactive models featuring a multi-actor, coupling and matching process were introduced to address the limitations of the linear models (Tidd, 2006; Veryzer, 1998). Table 2.9 illustrates the progress in conceptualizing innovation as presented by Rothwell in his highly influential “Five generations of innovation process models” (Tidd et al., 2005).

Table 2.9: Rothwell’s Five Generations of Innovation Models. Source: Tidd et al. (2005)

Generation	Key features
First and second	The linear models – need pull and technology push
Third	Interaction between different elements and feedback loops between them – the coupling model
Fourth	The parallel lines model, integration within the firm, upstream with key suppliers and downstream with demanding and active customers, emphasis on linkages and alliances
Fifth	Systems integration and extensive networking, flexible and customized response, continuous innovation

It can be noted from Rothwell’s 1994 innovation models that the first and second generations of innovation models are rather simple linear sequential models. The third generation starts to get more complex and the fourth generation is no longer a sequential model, while the fifth generation is more complex involving many more actors and is increasingly facilitated by IT-based networking (Tidd, 2006).

The evolution of the innovation process model from the first to the fifth generation over the years seems to suggest that new innovation strategies designed to drive product innovations have also emerged to address the changing characteristics of the emergent innovation process models. While the researcher has not found any empirical study on the suitability of adopting any particular innovation strategy for any particular innovation process model, it can be seen from the literature that certain innovation strategies are more appropriate for a particular innovation process model than others because of the intrinsic characteristics of each innovation process model. This is not to imply that only these innovation strategies can be adopted for a particular innovation process model. This is just an attempt to identify the strategies that seem to fit well with a particular innovation process model based on the characteristics of each model. Table 2.10 illustrates the suitability of the innovation strategies for each of the innovation process model.

Table 2.10. Innovation Strategies That Fit Well with Each of the Innovation Process

Model

Innovation process models	Innovation strategy	Characteristics of innovation process models and how some strategies fit them particularly well
First and second generations. The linear models : need pull and technology push	Exploitative innovation strategy Explorative innovation strategy Technology make strategy	The linear models are relatively simple, internal-oriented, focus on exploiting technology discoveries and addressing market demand. Exploitative innovation strategy addresses the use the existing technology. Explorative innovation strategy focuses on increasing market share by taking a more aggressive approach in technology policy. Technology make strategy concerns the development of new technology internally.
Third generation. The coupling or interactive model : interactive between different elements and feedback loops between them	Resource-based strategy Technology buy strategy Explorative innovation strategy	The coupling model divides the innovation process into a series of inter-acting and inter-dependent stages with feedback loops. The process is seen as a complex net of communication paths linking different actors from within and outside of the firm. Resource-based strategy focuses on developing and exploiting internal resources and capabilities beyond the boundaries of the firms. The relevance of explorative innovation strategy is provided above.

(Continued)

Table 2.10 (Continued): Innovation Strategies That Fit Well with Each of the Innovation Process Model

Innovation process models	Innovation strategy	Characteristics of innovation process models and how some strategies fit them particularly well
<p>Fourth generation. The parallel lines or integrated model : Integration and parallel development</p>	<p>Knowledge-based strategy Networking strategy Resource-based strategy</p>	<p>The integrated model emphasizes integration between R&D and manufacturing, close coupling with customers, suppliers and strategic partner. Knowledge-based strategy involves knowledge creation, assimilation, capture and use inside an organization. Networking strategy focuses on collaborating with external parties such as suppliers, customers, government agencies, research centers, and competitors. The relevance of resource-based strategy is provided above.</p>
<p>Fifth generation. The systems integration and networking model : Flexible and customize response, continuous innovation</p>	<p>Open innovation strategy Networking strategy Knowledge-based strategy Resource-based strategy</p>	<p>The model reflects the increase in R&D consortia, corporate alliances, joint ventures, partnership, with emphasis on learning within and between firms, greater flexibility, adaptability, quality and performance features in product strategies, speed and efficiency of NPD. Knowledge to enhance firm's own innovation capabilities, and exploiting firm's knowledge in other markets. The relevance of network, knowledge-based, and resource-based strategies is provided above.</p>

Because of the importance of product innovation to the success of the firm, managers and researchers have given high priority to the subject of effective innovation process (Artz et al., 2010; Cormican & O'Sullivan, 2004). The product innovation process is complex and requires a high level of management capability (Cormican & O'Sullivan, 2004; Tidd, 2006). The innovation processes can be broadly classified into two types: sequential process and non-sequential process. The following sections discuss both of these processes.

2.3.5.1 Sequential processes. Early models of innovation illustrated the innovation process as a linear sequence of activities carried out by different organizational functions (Tidd, 2006). These are models classified in the first, the second, and the third generations of Rothwell's (1994) five generations of innovation models. For example, Roozenburg and Eekels (1995, pp. 53-81) present a sequential process model consisting of 8 activities as follows:

1. Formulating goals and strategies.
2. Generating and selecting ideas.
3. Production development.
4. Product design.
5. Marketing planning.
6. Production.
7. Distribution and sale.
8. Use of the innovation by consumers.

Similarly, Cormican & O'Sullivan (2004) propose another sequential process model which involves five activities, as follows:

1. Analysis of the environment and identification of the opportunities.
2. Generation and investigation of innovations.
3. Project planning and selection of sponsor.
4. Prioritization of project and assigning teams.
5. Implementation of product innovation plan.

The sequential processes of product innovation portray innovation as consisting of separable stages connected by somewhat minor transitions between stages (Van de Ven, 1986). Based on the concept of sequential processes of product innovation, Cooper (1990) develops a model to manage the innovation process called the Stage-Gate systems. The basic idea of the Stage-Gate model is to divide the innovation process into five stages and gates (Cooper 1990). Each stage serves as a work station and each gate serves as a quality control checkpoint. Gates are manned by senior executives who make the go/kill decisions to either push the project to the next stage or end the project. Since its introduction in 1990, the model has gone through some modifications from time to time.

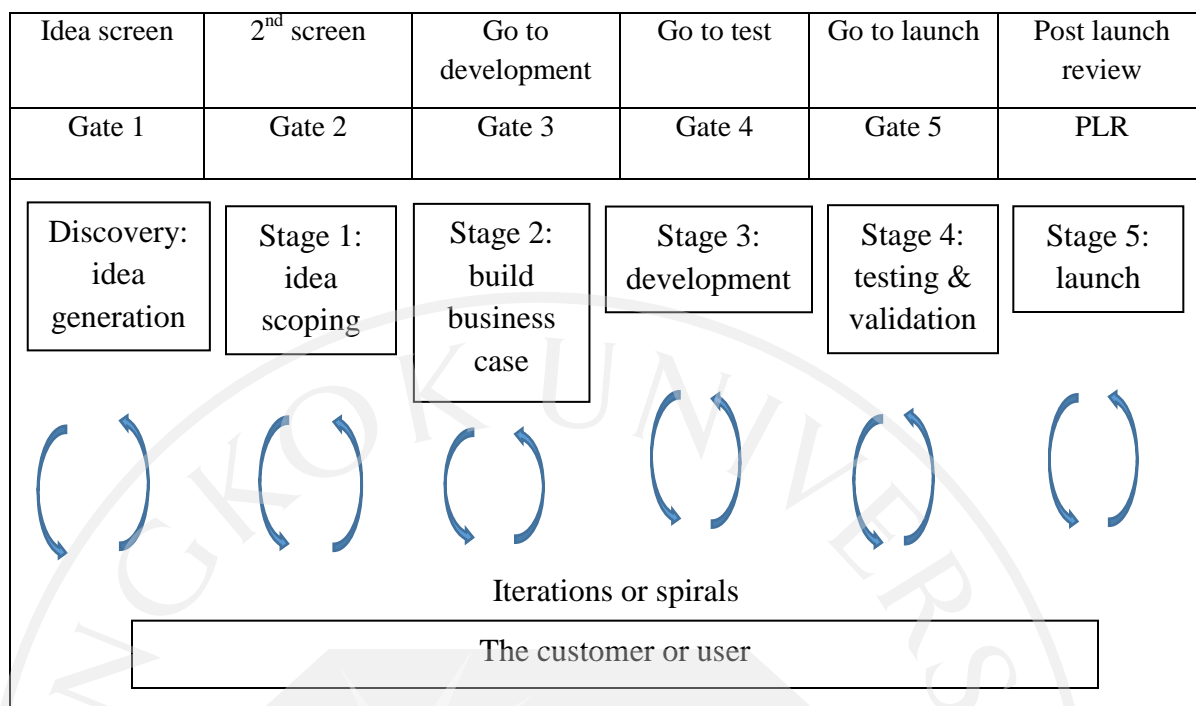


Figure 2.3: The Stage-Gate model. Source: Cooper (2014).

While the Stage-Gate model is a valuable management tool that can assist firms in managing the activities and decisions for developing new products, others have argued that its implementation must be handled with care. The model focuses on management control over the process of product innovation by setting up pre-defined objectives and criteria that must be met at each stage before the project is allowed to proceed to the next stage. Such an approach can inhibit creativity, risk taking, empowerment, flexibility, freedom, and autonomy, all of which are key elements in the product innovation process (Im, Montoya, & Workman, 2013; Jamrog, Vickers, & Bear, 2006; Miron, Erez, & Naveh, 2004; Naranjo Valencia, Sanz Valle, & Jiménez Jiménez, 2010). Another downside is that the gate-keepers may hamper speed to market, another important factor in a product innovation project (Rothwell, 1994).

2.3.5.2 Non-sequential processes. The introduction of non-sequential processes for innovation is motivated by the realization that innovation is a coupling and matching process where interaction is crucial (Tidd, 2006) and the process contains risks and involves uncertainty (Parkey, 2012). Under such conditions, models of sequential process of innovation are considered to have limitations (Tidd et al., 2005). For example, Phillips, Noke, Bessant, and Lamming (2006) argued that the sequential process is not suitable for high-risk discontinuous innovation projects as discontinuous innovation projects normally operate under fuzzy environment, high ambiguity, and with no clear rules. Under such circumstances, firms must develop “ambidextrous” capability to their product innovation process (Phillips, et al., 2006). Ambidextrous capability refers to the ability to handle both ‘steady state’ and discontinuous innovation within the same organization (Phillips, et al., 2006).

As shown in Table 2.10 above, Rothwell’s (1994) five generations of innovation models presentation illustrates that the first and second generations of innovation process models are simple linear sequential process. The third generation model, termed “coupling” or “interactive” model, although still essentially a sequential process, addresses the limitations of the earlier linear sequential process by dividing the process into a series of interacting and interdependent stages with feedback loops. The pattern of the process as a whole is seen as a complex net of communication paths linking different actors from within and outside of the firm (Kotsemir & Meissner, 2013; Rothwell, 1994). This interactive model links the firm’s decision making to the science and technology

community and to the market place (Hobday, 2005). Figure 2.4 illustrates the coupling or interactive model.

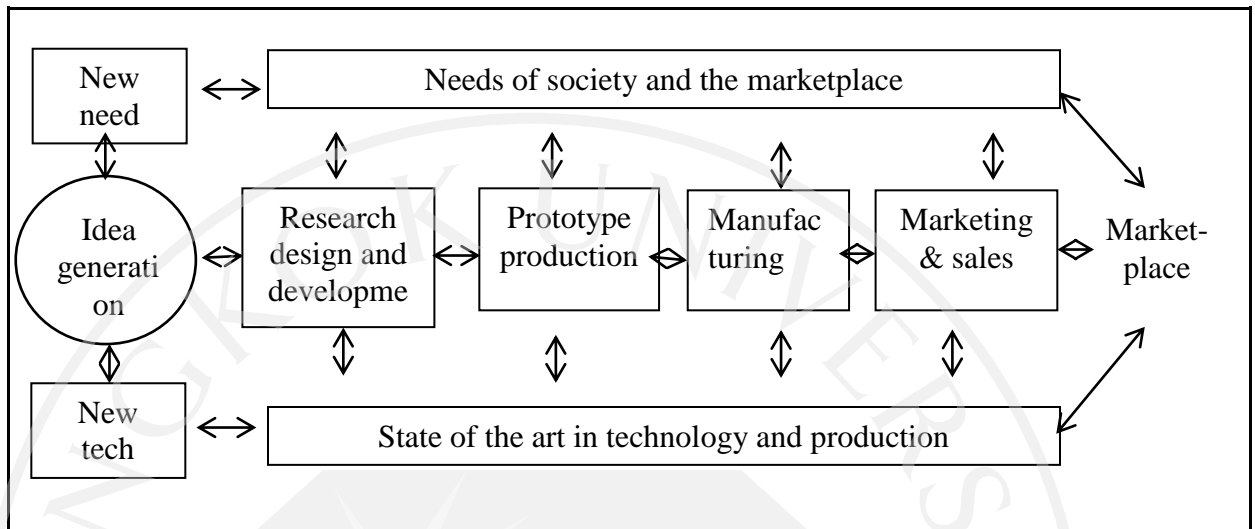


Figure 2.4: The coupling or interactive model of the innovation process (Third Generation). Source : Rothwell (1994).

The third generation model (as shown in Figure 2.4) illustrates a confluence of technological capabilities and market needs within the framework of the innovating firm (Kotsemir & Meissner, 2013).

In the early 1980s, the success of Japanese firms was prominent (Rothwell, 1994), and this was attributed to two features of the Japanese new product development system of integration and parallel development. These two key features formed the basis of the fourth generation model, called integrated innovation process (Rothwell, 1994). The model emphasized integration between R&D and manufacturing, close coupling with key customers, strong upstream supplier partnerships, horizontal collaboration including strategic partnership (Hobday, 2005).

The integrated model (fourth generation) is a non-linear, non-sequential model. The model emphasizes in-parallel integration of activities of different internal departments; integration of suppliers into the NPD process; functional overlap between different work units; and “rugby team” approach with a strong emphasis on cross-functional team running in a staggered fashion (Loch & Terwiesch, 1998) to NPD through the process of design for manufacturability (Kotsemir & Meissner, 2013). In some cases, the external integration includes other entities such as government agencies and universities (Hobday, 2005). The fourth generation model also incorporates the web of external interactions discussed in the third generation model (Rothwell, 1994).

The fifth generation model is an extension of the fourth generation model in which “the technology of technological change is itself changing” (Rothwell, 1994). The model reflects the increase in R&D consortia, corporate alliances, joint ventures, and partnerships during the 1980s and 1990s and emphasizes the learning within and between firms (Hobday, 2005). During the said period, there were concerns about the consequences of innovation activities on the global environment, and firms emphasized on greater flexibility; adaptability; quality and performance features in product strategies; and, in particular, speed and efficiency of NPD (Kotsemir & Meissner, 2013). By being a first innovator, firms can gain several competitive advantages including: higher prices; the opportunity to incorporate the latest technology into the product; shorter time horizons to make more accurate customer needs forecasts; more market share; increased customer satisfaction; improved information flow and trust among various functions in the firm; profits from having a temporary monopoly; and benefits from gaining

experience before other firms (Reiner, 1989). Figure 2.5 illustrates the systems integration and networking model.

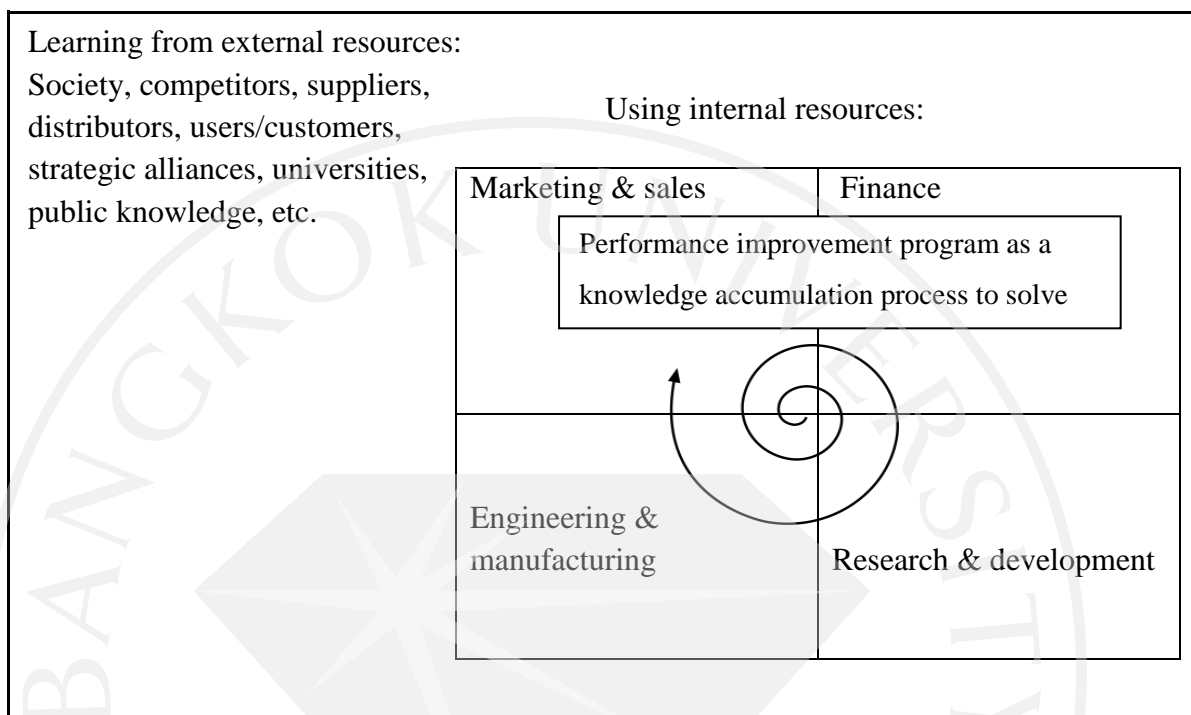


Figure 2.5: The systems integration and networking model of innovation process (Fifth Generation). Source: Hobday (2005).

The main difference between the fifth generation model and its predecessor is the use of electronic toolkit to speed up and automate the process of innovation (Hobday, 2005). The end results are higher speed of innovation, lower cost and achievement of market leadership (Rothwell, 1994).

In contrast, Buijs (2003) argues that the process of product innovation is circular, with neither beginning nor end. This is based on the premise that after a product is launched into the market as a result of a product innovation process, the successful

launch of the product will trigger reactions from competitors to launch their new, more competitive products. As a result of the competitors' move, the original innovating firm will embark on a new round of product innovation process to maintain its competitive advantage.

The above investigation of the literature sheds some light on the evolution of the product innovation process in firms of all sizes from past to present. The product innovation process has developed from being a simple, sequential process with few actors who are mainly located in the same organization and geographical area, to become a more complicated, non-sequential process, with many more actors, both within and outside of the organization, who may not necessarily be located in the same area. The implications of the above types of product innovation process for the current research are: (i) innovation strategies that work for one type of product innovation process may not necessarily work for another type of product innovation process, (ii) as the innovation process consists of several phases, different innovation strategies may be required for different phases in the process, and (iii) as firms are different in terms of level of maturity, financial, technical, and managerial capabilities, not every business or company, particularly SMEs, can adopt every innovation process available, especially those processes described as the fourth and fifth generations of innovation process which require the highest levels of capabilities and resources.

2.3.6 Product Innovation Best Practice

Best practice is defined as “a technique, method, process, or activity that is more effective at delivering a particular outcome than any other technique, method, process, or

activity” (Kahn, Barczak, Nicholas, Ledwith, & Perks, 2012, p. 180). As innovation is the key driver of ideas and technologies, regarded as some of the most important assets of world-class firms (Kanter, 1999), it is crucial for firms to be able to innovate in a sustainable manner (Fruhling & Siau, 2007), particularly as the pace of change accelerates (Roucan-Kane, 2010). The imperative to become an innovating firm implies that the firm must be able to create new ways of thinking and working, and to leverage business to new levels of competitiveness, management, and technology (Zheng, 2009). Research on product innovation has consistently identified a set of themes which constitute a recipe for best practice (Phillips et al., 2006; Tidd et al., 2005). Details of each of the best practice are described in Table 2.11.

Table 2.11: Best Practice for Managing Product Innovation

Best practices	Details of the best practices
Coordination and integration	The coordination and integration of internal functions such as R&D and other functions, and between employees in various technical and scientific disciplines (Pavitt, 2002). Integrating external actors such as suppliers and customers into the product innovation process very early (Poolton & Barclay, 1998).
Learning	Learning across professional and organizational boundaries by analyzing and by doing to reduce uncertainty (Pavitt, 2002).
Coordinating external technological resources	The establishment of strategic alliances between firms to exchange knowledge in light of the increasing specialization in knowledge production (Pavitt, 2002).
Coping with systems and simulations	Maintaining a systems integration capability to cope with the uncertainty caused by the growing complexity of the supply systems. Using simulation technology to explore alternative technical configurations; to conduct virtual experiments (Pavitt, 2002).
Adapting to changing technological opportunities	Matching new technologies and organizational practices to ensure that the firm is well positioned to take advantage of the technological advances (Pavitt 2002).

(Continued)

Table 2.11 (Continued): Best Practice for Managing Product Innovation

Best practices	Details of the best practices
Strategy and leadership	Formulating a product strategy that defines the objectives of the product innovation effort, focuses and integrates team efforts, and enables delegation. Leaders have a major impact on product innovation projects because they are the drivers of innovative practice at all levels of the firms, create and communicate a vision, and have the power to make and implement key decisions (Cormican & O'Sullivan, 2004). Some leaders in successful innovative firms spend time working in R&D labs in order to understand problems in R&D work, and provide full support for innovation in a highly visible manner (Poolton & Barclay, 1998).
Advanced innovation technologies support tools and information and communication technologies	Using new digital technologies for visualizing, modelling, simulating and prototyping to promote creativity and innovation (Dodgson, Gann, & Coopmans, 2008). Using information and communication technologies to link people in physically dispersed locations to work in a virtual environment and to coordinate activities (Kayworth & Leidner, 2000).
Structure and performance	An organic, decentralized organizational structure fosters knowledge generation and sharing, and enables faster and better decision making in dynamic environments. Organizational structure and reporting lines are organized around communities of practice, not around functional departments or traditional tasks, so as to promote collaboration among employees (Cormican & O'Sullivan, 2004). Firms set up virtual teams to work on projects so that cycle time, redundancies across organizational units, and travel costs can be reduced (Kayworth & Leidner, 2000).

(Continued)

Table 2.11 (Continued): Best Practice for Managing Product Innovation

Best practices	Details of the best practices
Culture and climate	Creating an organizational culture in which people are willing to create, share, and use knowledge to support innovation; and nurturing an organizational climate with policies, practices and procedures that are conducive to innovation activities (Cormican & O’Sullivan, 2004). The will to innovate is embedded in the corporate culture and serves as a foundation on which innovation policies are based (Poolton & Barclay, 1998).
Planning and selection	Project planning and selection done in a systematic, formal and widespread manner, and linking projects to the new product goals and strategies. Project teams must solicit customer’s opinions and translate them into the product concept (Cormican& O’Sullivan, 2004). Good planning and control procedures contribute substantially to innovative success (Poolton & Barclay, 1998).
Communication and collaboration	Communication and collaboration with external and internal parties, particularly suppliers, technical and scientific establishments, potential and existing customers to gain valuable information and technological inputs are vital to successful product innovation (Chesbrough & Brunswicker, 2014; Cormican & O’Sullivan, 2004; P
After-sales service and user education	Providing good after-sales service and user education can help prevent costly damages that arise because of user ignorance, and safeguard the firm’s reputation (Poolton & Barclay, 1998).

2.4 New Product Development (NPD)

NPD begins with the identification of a market opportunity and ends in the production, sales and delivery of a new product (Zhao, 2001). However, other authors stress that product development is the first, yet very important, phase of product innovation which extends to cover downstream phases such as manufacturing, and after-

sales services (Corso et al., 2001). Firms use NPD as a means to diversify and transform themselves in light of the changing external environment (Schoonhoven, Eisenhardt, & Lyman, 1990). NPD is a major driver of firm growth and sustainable competitive advantage (Mu, Peng, & MacLachlan, 2009). It is crucial to a firm's survival (Shah, 2010), growth and prosperity and is one of the firms' vital competencies (Birou & Fawcett, 1994; Brown & Eisenhardt, 1995; Herrmann et al., 2007; Koufteros, Vonderembse, & Jayaram, 2005; Maidique & Zirger, 1984; Mu et al., 2009; Rogers & Everett, 1983; Zhao, 2001). However, NPD is also a risky (Mu et al., 2009) and costly activity as the rate of NPD failure is high (Cooper, 1990; Cormican & O'Sullivan, 2004), hence the need for better understanding of how to manage NPD efficiently (Mu et al., 2009). This section starts with a review of the literature on the definition of NPD, and provides a discussion on product characteristics affecting the success of NPD. Then the subject of critical factors affecting the success of NPD is examined, to be followed by a discussion on NPD strategies. Next, the topic of NPD process model is discussed. Finally, the section ends with an examination of NPD best practice.

2.4.1 Definition of NPD

The NPD literature provides several definitions for NPD. A summary of the definition is presented in Table 2.12.

Table 2.12: Summary of the Definitions of NPD

Author/s (Year)	Title	Definition of NPD	Key words/concepts
Krishnan and Ulrich (2001)	Product development decisions: a review of the literature	The transformation of a market opportunity and a set of assumptions about product technology into a product available for sale.	Market opportunity Transformation Product technology Product for sale
Zhao (2001a)	Enhancing firm innovation performance through strategic management of new product development	New product development is the set of activities beginning with the perception of a market opportunity and ending in the production, sales, and delivery of a new product.	Set of activities Perception of opportunity Production Sales Delivery of a new product
Zhang, Lim, and Cao (2004)	Innovation-driven learning in new product development: a conceptual model	New product development is essentially knowledge development and knowledge synthesizing activities consisting of a stream of routine and non-routine tasks, performed by an array of individuals and groups	Knowledge development and knowledge synthesizing Routine and non-routine tasks Individual and groups

(Continued)

Table 2.12 (Continued): Summary of the Definitions of NPD

Author/s (Year)	Title	Definition of NPD	Key words/concepts
Ulrich and Eppinger (2007)	Product design and development	The steps and procedures taken to introduce a new product to a market, including sampling, testing, individual market research, and related advertising and promotional campaigns	Steps and procedures Introduce a new product to a market
Trott (2012)	Innovation management and new product development	The process of transforming business opportunities into tangible products.	Transformation Opportunity Product

The definition of NPD used in this study follows the one provided by Zhao (2001), i.e. “the set of activities beginning with the perception of a market opportunity and ending in the production, sales, and delivery of a new product”. The main reason this definition is chosen for the current study is because (i) it sets clear boundaries of the NPD process from the beginning to the end, and (ii) it describes the various stages in the NPD process in very broad terms that allow for diversity in the types of activities to be carried out in the NPD process.

2.4.2 Product Characteristics Influencing the Success of New Products

Firstly it is important to discuss how success of new product is measured. Success of a new product is generally measured by product sales, the lead time to develop the product,

the quality of the product, the product's attractiveness in the market, the cost of the development, and the cost to manufacture the product (Krishnan & Ulrich, 2001; Peeters, 2013). Several researchers have examined the product characteristics that influence the success of new products. Product characteristics refer to elements pertaining to the offering of the product such as innovativeness, price, and the extent to which the product meets the customers' needs. Five key products characteristics have been identified from a meta-analysis that involves 60 studies in the U.S. (Henard & Szymanski, 2001).

The product characteristics identified in the Henard & Szymanski (2001) study as potentially influencing the success of new product are presented in Table 2.13.

Table 2.13: Product Characteristics That Influence the Success of New Products.

Adapted from Vijayan & Suresh (2011) and Henard & Szymanski (2001)

Product characteristics	Definitions
Product advantage	Superiority over competitive offerings from the customer's point of view
Product meets customer needs	Extent to which the product is perceived as satisfying customer's needs
Product price	Perceived value
Product technological sophistication	Perceived technological sophistication of the product
Product innovativeness	Perceived uniqueness/newness of the product

Product superiority is also referred to as the benefits that customers get from the product (Langerak, Hultink, & Rubben, 2004).

In their study, Henard and Szymanski (2001) found that products which meet customer needs, product advantage, and technological sophistication of the product significantly affect the success of new products. Product price and product innovativeness have not been found to significantly influence performance levels of new products. Similarly, other researchers such as Brown & Eisenhardt (1995), and Langerak et al. (2004) also found that product advantage is positively related to new product performance, suggesting that product benefits and the superiority over competitors' products are some of the main reasons why customers purchase the new product. In contrast, an empirical study in India conducted by Vijayan and Suresh (2011) found that product technological sophistication is the only product characteristic that drives new product success, while the other four product characteristics, namely product advantage, product meeting customer needs, product price, and product innovativeness were found to have no meaningful influence over the success of new products. The differences in results between the two studies can be attributed to the different approaches used in the studies and the different contexts in which the studies are carried out. The U.S. study by Henard and Szymanski (2001) is a meta-analysis that covers 60 independent studies that include high technology and low technology industries, while the Indian study conducted by Vijayan and Suresh (2011) involves two firms, one firm in the consumer product industry, and the other in the consumer durable industry. Meta-analysis, which is a quantitative approach that employs statistical techniques to estimate a possible effect between an independent variable and a dependent variable in a population, enables researchers to arrive at conclusions that are more accurate than can be presented in any

primary study (Kock, 2009). However, meta-analysis assesses only individual relationships between independent and dependent variables; it may miss the big picture (Rosenthal & DiMatteo, 2001). In the Indian study, the researchers, Vijayan and Suresh (2011), collect data from a survey among managers of two firms and their customers to examine the causal relationship between 24 predictor variables and new product success. The environments and the contexts in which the two studies are conducted are also different. The search process for the meta-analysis was concluded in 1999 in the U.S., while the other study was carried out in 2011 in India.

2.4.3 Critical Success Factors

The success of NPD is very important to the success of the firm (Alegre & Chiva, 2008; Chapman & Hyland, 2004; Cooper, 2013; Evanschitzky et al., 2012; Galia & Legros, 2004; Herrmann et al., 2007; Shah, 2010). Several studies have been conducted to investigate the critical factors affecting the success of NPD. Table 2.14 illustrates the critical success factors for NPD as presented by several researchers.

Table 2.14: Critical Success Factors for NPD.

Factors	Key features, attributes and characteristics
Clear strategy that is well-communicated	<p>Establishing objectives and formulating an explicit new product strategy in line with the firm's overall objectives and strategy to provide guidance for the NPD effort (Bhuiyan, 2013; Cooper & Kleinschmidt, 2007; Kahn et al., 2012).</p> <p>The new product strategy must be well-communicated so that everyone involved understands the requirements of the NPD project and can communicate effectively with other members of the firms (Bhuiyan, 2013).</p> <p>The firm treats NPD as a long term strategy, reviews NPD projects and programs on a regular basis, and identifies opportunities on an ongoing basis (Kahn et al., 2012).</p>
New product strategic fit	Strategic alignment between the new product and the firm's overall strategy, product portfolio planning, and balancing for risks (Carbone, 2011).
Customer focused idea generation, collaborating with customers	A high level of customer involvement at the idea generation stage of the NPD process increases the rate of success for new products (Bhuiyan, 2013). Collaborating with customers in the NPD process (Füller, Bartl, Ernst, & Mühlbacher, 2006; Zakic et al., 2008).
Project definition	Resource planning, planning for technical and market contingencies, and skill level planning (Carbone, 2011).

(Continued)

Table 2.14 (Continued): Critical Success Factors for NPD.

Factors	Key features, attributes and characteristics
A high quality NPD process that is more adaptive and flexible, agile, and accelerated.	An NPD process that promotes a market orientation, and focuses on quality with sharp and early product definition. The NPD process must be adaptive and flexible so as to accommodate a series of build-test-revise iterations brought about by new information from the market as the NPD project evolves; be agile to promote development, teamwork, collaboration and process adaptability; and be accelerated by removing activities that waste time in the NPD process (Cooper, 2014; Cooper & Kleinschmidt, 2007a). Speed is important as short cycle time minimizes the impact of a changing environment and pre-empts competitors' moves (Bhuiyan, 2013). An NPD process that cuts across organizational groups, is well-documented, and can be circumvented without management approval (Kahn et al., 2012).
Adequate resources of people and money, dedicated resources	Top management to allocate sufficient qualified people and R&D funds to support the NPD project (Cooper & Kleinschmidt, 2007b).
Up-front homework, predevelopment task proficiency	Before a new product project moves from the idea stage to the development stage, it is important to do thorough up-front homework that includes market analysis, financial analysis, customer needs analysis, and technical and operations feasibility studies (Bhuiyan, 2013; Carbone, 2011a; Cooper & Kleinschmidt, 2007a).

(Continued)

Table 2.14 (Continued): Critical Success Factors for NPD.

Factors	Key features, attributes and characteristics
Organization	Establishing a cross-functional team that facilitates inter-departmental interfaces, with an empowered project leader (Cooper & Kleinschmidt, 2007a; Kahn et al., 2012). Interdepartmental integration between marketing and R&D to achieve an optimal collaboration between the two functions (Shah, 2010).
Organizational roles	Project team identified, project manager role, organizational communication processes, and executive sponsorship (Carbone, 2011b).
Culture	An organizational culture that promotes intrapreneurship, risk-taking, autonomy, submission of new product ideas, creativity, and provides rewards and recognition for good performance (Cooper & Kleinschmidt, 2007a; Kahn et al., 2012).
Development cost	The amount a firm spends in developing its new product (Iamratanakul et al., 2008).
Development time	Development time refers to the amount of time it takes before the firm receives economic returns from the efforts of the NPD team, and the firm's responsiveness to competitive forces (Iamratanakul et al., 2008).
Development capability	The ability of the firm to develop new product effectively and economically through knowledge and experience gained from previous NPD projects (Iamratanakul et al., 2008).

(Continued)

Table 2.14 (Continued): Critical Success Factors for NPD.

Factors	Key features, attributes and characteristics
Research	Ongoing market research that identifies or anticipate market needs and problems. Concept, product, and market testing for all NPD projects (Kahn et al., 2012).
Customer feedback	Getting customer feedback throughout the product development stage to ensure that the product design is right (Bhuiyan, 2013; Kahn et al., 2012).
Senior management's involvement, commitment, and accountability	High involvement and strong commitment from senior management in making funds and resources available for NPD projects, sending out clear messages about the importance of NPD, and accepting risks and failures. Senior management's accountability refers to the degree to which NPD performance is measured, and senior management is held accountable for the NPD results (Cooper & Kleinschmidt, 2007).
Product definition	Early definition, specifications/targets, market and technology assessment, and product feature priority (Carbone, 2011a).
Product functionality	Product functionality is essential to ensure that claimed attributes exist in the new product (Bhuiyan, 2013).
Product cost	Product cost refers to both the component and manufacturing costs such as capital equipment, tooling, and incremental costs of manufacturing (Iamratanakul et al., 2008).
Product quality	Product quality concerns the quality of the product relative to the competitive products; its reliability; customer's acceptance; meeting governmental regulations; and other quality standards (Iamratanakul et al., 2008).

(Continued)

Table 2.14 (Continued): Critical Success Factors for NPD.

Factors	Key features, attributes and characteristics
Commercialization	A cross-functional launch team, with a launch process. Customer service and support are part of the launch team. Logistics and marketing work closely together (Kahn et al., 2012).
Customer acceptance	Customer must like the product better than what she or he is currently using so as to establish purchase intent (Bhuiyan, 2013).
Risk management strategies	Risk management strategies targeted at technological risk, organizational risk, and marketing risk (Mu et al., 2009).

The above findings are synthesized from several studies in the last two decades. In a study that involves over 400 firms in Europe, U.S.A., and Canada, it was found that the critical factors affecting the success of NPD are: (i) product advantage; (ii) internal organization; and (iii) market conditions (Brown & Eisenhardt, 1995).

One of the factors in the Brown and Eisenhardt's (1995) study is the customer. Collaborating with the customer is one of the most important activities in new product development (Füller et al., 2006; von Hippel, 1986; Zakic et al., 2008). The customer is increasingly co-creating value with the firm (Prahalad & Ramaswamy, 2004) as they shift from product-centric to customer-centric in their NPD process. Prahalad and Ramaswamy (2004) argue that value has to be jointly created by the customer and the firm and that this is the source of competitive advantage. Communications with customers not only provides firms with valuable information for next-generation product

innovation projects, but also for product innovation within a product life cycle (Chapman & Hyland, 2004).

The way the firm communicates with the customer is greatly enhanced by the use of the internet (Sawhney et al., 2005). The internet allows the firm to communicate with the customer more broadly, more speedily, more cheaply, and more richly. The firm is not constrained by the market or geographic boundaries. Through the internet, the communication becomes two-way, continuous dialogs with the customer taking an active role. The internet enables consumers to create virtual communities which allows firms to engage in community-based innovation (Füller et al., 2006). Online communities present a promising resource for firms' NPD. Another concept relating to the inclusion of the customer in the NPD process is the lead user concept introduced by von Hippel (1986). Lead users are users who are familiar with conditions which lie in the future and who can provide new product concept and design data (von Hippel, 1986). They are ahead of the majority of customers in current market trends (Lau et al., 2010). Lead users are an important resource for NPD as they can offer valuable insights regarding needs for new products, particularly novel products (Zakic et al., 2008). However, not all customers are good source for NPD. Current customers may ask for familiar products and this may not encourage the manufacturers to come up with really innovative product (Lau et al., 2010). Firms should co-develop new products with lead users or new customers.

Another key player is the supplier. Collaboration with suppliers at an early stage of the NPD helps improve product innovation (Lau et al., 2010). Working with suppliers

and other external organizations in the technical field is very important for small firms that do not have sufficient internal R&D resources (Zakic et al., 2008).

A study in the U.S. electronics industry has found that there are eight key areas critical to the success of NPD: (i) knowledge of the market, i.e., market knowledge and deep consumer insights that lead to the development of superior products, cost-wise or performance-wise, (ii) planning of the NPD process, i.e., the ability to effectively plan the NPD activities, particularly, the research and development function, (iii) coordination of the NPD process, i.e., the ability to coordinate and execute the whole NPD process efficiently, (iv) focus on sales and marketing, i.e., the proficiency and the availability of resources to formulate and execute high-impact marketing and sales programs, (v) management support, i.e., the firm commitment from top management to the NPD program from its inception through its launch stage, (vi) product margin, i.e., the product yields an attractive contribution margin to the firm, (vii) first mover advantage, i.e., the product is launched prior to its rivals, and (viii) relative competencies in the new markets and technologies, i.e., the firm can leverage its current technological and marketing competencies in the NPD program (Maidique & Zirger, 1984).

2.4.4 NPD Strategies

Before firms embark on a new NPD project, they must establish the objectives of the project and formulate a clear strategy to achieve those objectives (Bhuyan, 2013).

The importance of strategy to the success of NPD is emphasized in a study conducted by Kahn, Barczak, Nicholas, Ledwith, & Perks (2012) among NPD practitioners from the United Kingdom, United States, and Ireland. Kahn et al., (2012, p 180) found that, among

seven dimensions, “strategy” ranks first in importance, followed by “research”, “commercialization”, “process”, “culture”, “climate”, and “metrics” in that order. By contrast, Cooper & Kleinschmidt (1995) argued that a high-quality NPD process is more important than a NPD strategy. Other authors claim that there are several strategies to enhance the performance of NPD. The following sections discuss the different strategies firms can adopt to enhance their NPD performance.

2.4.4.1 Strategy of outsourcing NPD activities. One of the strategies is to outsource NPD activities or mobilize resources and capabilities beyond the firm’s boundaries (Quinn, 2000; Zhao, 2001). As a firm’s NPD program normally involves doing several inter-related tasks (Schiefer, Capitanio, Coppola, & Pascucci, 2009), the firm is unlikely to possess all the necessary capabilities and resources to do all the tasks effectively (Brown & Eisenhardt, 1995). In order to enhance NPD programs, firms need to utilize external resources and capabilities in addition to their internal resources and capabilities (Zhao, 2001). The main reasons firms choose to outsource innovation are (i) resource limits, i.e., firms do not have all the resources necessary for the innovation tasks; (ii) specialist talents, i.e., firms may not have all the talents and knowledge in the technical fields; and (iii) multiple risks, i.e., it may be too risky for the firm to take all the financial risks associated with the innovation project, while outsource suppliers can spread the risks across many current and potential customers (Quinn, 2000). Inherent to the outsource innovation strategy is the issue of determining which tasks to be outsourced. Empirical studies conducted by Zhao (2001) reveal that the less the importance of the tasks, the more the outsourcing of those tasks. The studies further

illustrate that the impact of outsourcing of NPD tasks on NPD capability increases as the importance of NPD tasks decreases. It is also argued that firms should internalize important tasks because firms need to safeguard, enhance, and exploit core competencies to make growth possible (Prahalad & Hamel, 1990).

2.4.4.2 R&D and marketing integration strategy. The cooperation between two key internal functions, namely, R&D and marketing, is vital to the success of NPD (Fain, Kline, & Duhovnik, 2011; Griffin, 1997; Hillebrand & Biemans, 2004; Shah, 2010). Griffin and Hauser (1996) argue that as firms grow, the functions of R&D and marketing become more specialized in their respective fields and they drift further apart. Hence, the need to cooperate so that their combined talents enhance the success of NPD (Fain et al., 2011; Griffin & Hauser, 1996). However, there are barriers to the integration between R&D and marketing functions that must be recognized and managed (Shah, 2010).

2.4.4.3 External organizations cooperation strategy. In contrast with the strategy of internal cooperation, firms can enhance their capabilities in NPD by cooperating with external organizations (Hillebrand & Biemans, 2004; Zakic et al., 2008). This strategy is particularly important for small firms that have limited resources as this strategy would allow them to gain access to capabilities and resources that they do not have internally. Moreover, firms can enhance their NPD success by unifying internal and external participants (Koufteros et al., 2005). Internal cooperation serves as a coordination mechanism for the success of external coordination (Hillebrand & Biemans, 2004) because internal cooperation enables firms to disseminate and use the acquired knowledge throughout the organization efficiently. Koufteros et al. (2005) argue that

internal integration is a precursor to external integration where firms involve suppliers and customers in their NPD efforts in order to improve product innovation and quality.

2.4.4.4 Information and communication technologies strategies. The use of information and communication technologies (ICT) in marketing has a positive correlation to the level of product innovation (Vilaseca-Requena, Torrent-Sellens, & Jiménez-Zarco, 2007). The use of ICT in marketing comes in the forms of emails, websites, data bases on clients, customer relationship management (CRM), connectivity with suppliers and clients, etc. Vilaseca-Requena et al. (2007) found in their study that ICT plays an important role in facilitating communication and cooperation among the innovation project team members which helps to reduce the barriers to innovation and promote the development of differentiated products.

Although the existing literature has shed some light on the factors and strategies affecting the success of NPD, there are some limitations. For example, Brown and Eisenhardt (1995) organize the literature into three streams of research emerging from their review, therefore, NPD as communication web, NPD as disciplined problem solving, and NPD as rational plan. This approach is useful in investigating the critical success factors of NPD across many industries, but it does not take into account that NPD is industry specific (Maidique & Zirger, 1984). Therefore, the findings lack practical implications. Similarly, the study conducted by Evanschitzky et al. (2012) is based on 233 empirical studies over a 12 year period, from 1999 up to 2011, covering many product categories. It is a follow-on to the work carried out by Henard and Szymanski in 2001. While Evanschitzky et al.'s (2012) work is useful in demonstrating the evolution

of the NPD success factors over an 11 year period, it does not provide any data that would be applicable to any industry in particular. Hence, the work lacks specificity.

In contrast to the studies of Evanschitzky et al. (2012) and Brown and Eisenhardt (1995), Maidique and Zirger (1984) studied the success and failure in product and process innovation in the U.S. electronics industry. Their findings are valuable to the U.S. electronics industry, but there has been no research evidence to suggest that the findings are applicable to other industries. Likewise, the study on barriers to innovation carried by Galia and Legros (2004) has been conducted in the French manufacturing industry, and this may also raise the issue of applicability to other geographical areas. In addition, the Maidique and Zirger (1984) study has focused inside the firm. All eight areas covered in the research are internal factors. The research does not take into account external factors that may significantly affect the success of NPD (Brown & Eisenhardt, 1995; Evanschitzky et al., 2012).

The empirical study carried out by Herrmann et al. (2007) provides a better understanding of the antecedents for radical product innovations as they relate to some specific characteristics of the organization. However, the study focuses on the organizational characteristics only and does not cover any other areas, either inside or outside of the firm that may affect its ability to innovate. In contrast, de Jong and Vermeulen (2006) study factors inside and outside of the firm to examine key determinants of product innovation across several industries including manufacturing, construction, wholesale and transport, retail, hotel and catering, knowledge intensive services, and financial services. The findings show that different industries focus on

different innovation activities to drive product innovation. However, the categories in the industry are so broad that it may raise the issue of applicability. The researcher would argue that manufacturing is such a big category that it is inconceivable to conclude that all manufacturing enterprises follow the same innovation practice. Likewise, wholesale and transport are two very different kinds of businesses that putting them in the same category may raise the issue of validity. Even though the categories may be very broadly defined, nevertheless the results of the study shed some light on the topic of determinants of product innovation, particularly the innovative practice used by different industries to enhance the success of NPD.

It should be noted that the studies carried out by Zhao (2001) cover only high technology industries which are in a highly competitive environment characterized by a high rate of technological obsolescence and short product life cycle. It would be worthwhile for future studies to focus on low technology industries where technologies evolve at a slower rate and the product life cycle is longer, then compare the results with Zhao's (2001) studies.

2.4.5 NPD Process Model

NPD processes evolve and change on multiple fronts over time to become more sophisticated (Najib & Kiminami, 2011). Management of the NPD process is a challenging, costly, risky, and complex activity that often results in failure in the marketplace (Millson & Wilemon, 2008; Sakellariou, Karantinou, & Poulis, 2014). NPD process begins with the identification of a market opportunity and ends in the production, sales and delivery of a new product (Zhao, 2001). Firms use NPD as a means to diversify

and transform themselves in light of the changing external environment (Schoonhoven, Eisenhardt, & Lyman, 1990). NPD is crucial to firms' survival, growth and prosperity, and is one of the firms' vital competencies (Birou & Fawcett, 1994; Herrmann et al., 2007; Koufteros, Vonderembse, & Jayaram, 2005; Mu et al., 2009; Zhao, 2001).

The NPD process consists of all the activities that firms undertake when they develop and introduce new products (Bhuiyan, 2013). The NPD process can be the target of innovation (Francis & Bessant, 2005). Some authors, for example, Bhattacharya, Krishnan, and Mahajan (1998), describe the NPD process as consisting of three distinct stages: the definition stage where the NPD team sets the product definition based on the input from potential customers to enhance the attractiveness of the product; the realization stage where the NPD team implements product prototypes; and the integration stage where the NPD team focuses on optimizing the process to develop the product at the lowest costs. However, in more recent literature, the NPD process is conceptualized as consisting of five stages (Dahan & Hauser, 2001; Sawhney et al., 2005) as follows:

1. Ideation – the identification and evaluation of a business opportunity with respect to the firm's requirements.
2. Concept development – a description of a new product idea including product features, customer benefits, target market, product positioning, and feasibility studies.
3. Product design – determining the exact parameters of the product, prototyping and tooling.
4. Product testing – testing prototypes to confirm that the physical requirements are adequate and production requirements are being met.

5. Product launch – the manufacture of the product, its release onto the market, its launch plan including sales, advertising, and promotion activities.

In managing the NPD process, firms must aim to develop and market new products with short cycle time and low costs in order to gain and sustain competitive advantage (Ahmadi, Roemer, & Wang, 2001). In contrast, Sirichakwal (2013) argues that, in addition to time and cost, firms must strive for scope and quality as well.

The NPD activities can be grouped into two segments: the front-end segment and the back end segment. The front-end segment activities include idea generation and screening, and preliminary evaluation and concept evaluation (Verworn, Herstatt, & Ako, 2008). The remaining activities of the NPD process, namely, design and engineering, testing and launch, are relegated to the back-end segment. The front-end segment is characterized by uncertainty, equivocality, and complexity, and yet the front-end activities are the key steps in the new product process (Cooper, 1988; Cooper & Kleinschmidt, 2007; Floren & Frishammar, 2012; Verworn et al., 2008).

2.4.6 NPD Best Practice

This section discusses best practice for NPD. There have been several studies on best practice for NPD in the last few decades. For instance, empirical research studies on NPD carried out by the Product Development & Management Association (PDMA) from 1990 up to 2003 have found that no one practice, tool, technique, or method is either necessary or sufficient to guarantee that a firm is one of the best at developing new products (Barczak et al., 2009). What the studies have found are practice that are significantly associated with the best performance for product innovation. The author

would argue that practices, tools, techniques and methods adopted in the management of NPD are context sensitive and situation dependent. What works in one situation or context may not necessarily work in another situation or context.

Table 2.15 describes in detail the best practice for the management of NPD from the literature.

Table 2.15: Best Practices for the Management of NPD

Best practices	Details of the best practices
Systematic portfolio management method	Using portfolio management method that brings rigor and discipline to the project selection decisions and guides the resource allocation (Cooper & Edgett, 2006).
Formal and systematic idea-to-launch methodology for developing new products	Conception, development, and launch of new products using the Stage-gate model to closely monitor and evaluate each stage of the NPD process by senior or qualified personnel (Barczak, Griffin, & Kahn, 2009; Cooper, 2013; Cooper, 2014; Cooper & Edgett, 2008; Cooper, Edgett, & Kleinschmidt, 2002; Cooper & Kleinschmidt, 2007a). Firms have moved from implementing single project NPD processes to implementing multiple projects NPD processes in a more orchestrated manner (Barczak et al., 2009; Kahn et al., 2012).

(Continued)

Table 2.15 (Continued): Best Practices for the Management of NPD

Best practices	Details of the best practices
Strategy and leadership	<p>Aligning NPD investment with the firm's stated strategy. First-to-market innovation strategies to guide the firm's NPD efforts that result in a higher percentage of radical product innovation in their project portfolio. Focusing on projects that extend the firm into new competitive spaces. NPD is strategically driven from the firm level to the business unit and project levels (Barczak et al., 2009; Kahn et al., 2012).</p> <p>Articulating the firm's strategic intent including clear vision, objectives and direction for the product innovation to all members of the firm and map its R&D portfolio (Schilling & Hill, 1998).</p>
Advanced innovation technologies support tools	<p>Using virtual simulation tools to speed up development, lower cost, and solve problems in NPD projects (Baregheh, Rowley, & Sambrook, 2009).</p> <p>Using appropriate tools to improve the efficacy of NPD and software support tools for NPD activities (Barczak et al., 2009; Schilling & Hill, 1998)</p>

(Continued)

Table 2.15 (Continued): Best Practices for the Management of NPD

Best practices	Details of the best practices
Structure, teamwork, performance and communication	<p>The integration of cross-functional teams to achieve high performance and multiple mechanisms such as internet-based work-spaces and face-to-face meetings to foster open and constant communications across team members and between the team and other entities within and outside of the firm. Team members should be rewarded based on their performance (Barczak et al., 2009).</p> <p>Setting up a diverse range of functions in the project team including marketing, manufacturing, R&D, customers and suppliers; matching team structure to project type and match team leader attributes to type of team; and establishing mission and charter for project team. Diversity in team structure leads to improved creativity and project performance (L.M. Birou & S.E. Fawcett, 1994; Chandy & Tellis, 1998; Clark & Wheelwright, 1992; Schilling & Hill, 1998).</p>
Organizational context, culture and climate	<p>Using strategic alliances to gain access to enabling technologies; using strategic implications of technology development in the project selection process; using a parallel development process to speed up the project; and appointing executive champions (Schilling & Hill, 1998).</p>
Planning and selection	<p>Using market planning as an integral part of the NPD process and commencing marketing planning early in the development (Kahn et al., 2012).</p>

(Continued)

Table 2.15 (Continued): Best Practices for the Management of NPD

Best practices	Details of the best practices
Early involvement of key customers and other stakeholders through workshops, social networking technologies, or research programs	Active involvement from key customers and/or other stakeholders in the early stages of the NPD process which provides the firm with valuable insights for product concept development, and enables the firm to accomplish the task at a faster speed and lower costs than what would have incurred under the normal procedures (Eisenberg, 2011; Herstatt & Von Hippel, 1992; Leavy, 2012; McCreary, 2010). Multiple research tools used to investigate market needs that include, for example, beta testing, customer site visits, and voice of the customer (Barczak et al., 2009; Kahn et al., 2012).
Learning and continuous improvement	Developing a continuous improvement culture and creating a learning organization where those responsible for developing new products understand, affirm and support the NPD process, and share ownership of the project (Bessant & Francis, 1997).
Partly parallel process	Using partly parallel process instead of sequential process to accelerate projects and reduce conflicts between product design, which is handled by R&D, and process design, which is under manufacturing, as manufacturing can start its process design work well before R&D finalizes its product design work. Using value stream analysis to cut the time wasters and blockages, and overlapping stages and concurrent activities to support project management (Robert G. Cooper, 2014; Schilling & Hill, 1998)

In summary, the literature on best practice for the processes of NPD has identified key structures, methods, and practice. This includes deployment of a systematic portfolio management method; using formal and systematic idea-to-launch methodology for

developing new products; aligning NPD investment with the firm's strategy; using advanced innovation technologies support tools; integration of cross-functional team; managing organizational context, culture and climate; focusing on marketing planning; involving key stakeholders; creating a learning organization where people understand and support the NPD process; and using partly parallel processes to accelerate projects and reduce conflict between members from different functions.

2.5 Knowledge Gap: NPD vs. Strategized NPD

Not every NPD initiative is necessarily innovative. To have an innovative new product, an appropriate innovation strategy needs to be built within the NPD process. Currently there are few studies that explicitly integrate innovation strategies with the NPD processes. For example, Zemlickiene and Maditinow (2012) argue that marketing solutions are important to the NPD process, but the authors do not provide a theoretical framework for achieving this goal. Other authors, notably Aagaard (2012),

Verworn, Herstatt, and Ako (2008), Cooper & Edgett (2008), Bigliardi and Ivo Dormio (2009), Belkahla and Triki (2011) focused their studies on the front end of the NPD process which includes preliminary market assessment; technical assessment; source of supply assessment; market research including voice of customer; concept testing of proposed product; value-to-customer assessment; and business and financial analysis. On the other hand, Suzianti (2012) provides a heuristic-based conceptual framework for innovative product development by focusing on the use of conjoint analysis as a tool for identifying and evaluating new product concepts. Although conjoint analysis provides a framework to incorporate customers' opinions into product

innovation, the number of possible combinations generated by conjoint analysis in terms of preferred product attributes, particularly for high technology products, can be so large that finding a realistic solution within a reasonable time frame can be a real challenge (Suzianti, 2012). And finally, Wang, Lee, and Kurniawan (2012) provide guidelines for developing innovative new products by addressing the various stages of the NPD process and the evaluation criteria firms use in each stage. However, none of the above studies explicitly integrates innovation strategies with NPD process models. Specifically, there are very few studies on innovation management in Thai F&B manufacturing SMEs (Saigosoom, 2012). The integration of innovation strategies with the NPD processes could provide valuable insights to academic researchers and business managers.

2.6 Proposed Integrated Framework for Strategized NPD Process

One major theoretical contribution of the current study is the development of an integrated framework for innovative NPD process by combining innovation strategies with NPD process as shown in Table 2.16.

Table 2.16: An Integrated Framework for Strategized NPD Process

Innovation Strategies	Front end activities (ideation, concept development)	Back end activities (product design, product testing)
Open innovation strategy	1	2
Networking strategy	3	4
Resource-based strategy	5	6
Technology make strategy	7	8
Technology buy strategy	9	10
Knowledge-based strategy	11	12

Readers are advised that the scope of innovation strategy is enterprise-wide whereas the scope of the current study is innovation process. In combining the above two constructs into a single theoretical framework of Table 2, the word ‘innovation strategy’ refers to the operationalized strategy in relation to various NPD activities. In situations like that some may prefer to use the term ‘tactic’ rather than ‘strategy’. However this study has consistently used the word ‘innovation strategy’ that also equally refers to the ‘innovation tactics’.

Due to the similarities among arguments in relation to various NPD activities, the current study provides a simplistic view of the NPD process by classifying the standard NPD activities into two major groups of activities called ‘front end’ activities and ‘back end’ activities. The front end activities include ideation and concept development,

whereas the back end activities include product design and product testing. The last activity of the NPD process, i.e., product launch, is not included in the framework as product launch is concerned with marketing, sales, and distribution, which is outside the scope of this study.

In Table 2.16, columns correspond to two groups of NPD activities and rows represent various innovation strategies. The explanations for each of the twelve cells within the above 2 x 6 matrix are provided below:

Cell 1: Open innovation strategy enables the generation of more ideas, and the creation of a more customer-oriented and technically- and financially-feasible product concept.

Cell 2: Open innovation strategy enables the designing of a more appealing and functional product and the reduction of the time and costs in product testing.

Cell 3: Networking strategy, which involves collaboration with other actors in the supply chain including other firms in the industry, outside organizations, institutions, or individuals, enables the generation of more ideas, and the creation of a more customer-oriented and technically- and financially-feasible product concept.

Cell 4: Networking strategy enables the designing of more appealing and functional product and the reduction of the time and costs in product testing.

Cell 5: Resource-based strategy, which includes the utilization of tangible, intangible, and human resources, enables the generation of a more ideas, and the creation of more customer-oriented and technically- and financially-feasible product concept.

Cell 6: Resource-based strategy enables the designing of a more appealing and functional product and the reduction of the time and costs in product testing.

Cell 7: Technology make strategy, which involves the development of technologies internally, enables the generation of a more idea, and the creation of a more customer-oriented and technically- and financially-feasible product concept.

Cell 8: Technology make strategy enables the designing of a more appealing and functional product and the reduction of the time and costs in product testing.

Cell 9: Technology buy strategy which involves the purchase of technologies enables the generation of more and greater ideas, and the creation of a more customer-oriented and technically- and financially-feasible product concept.

Cell 10: Technology buy strategy enables the designing of a more appealing and functional product and the reduction of the time and costs in product testing.

Cell 11: Knowledge-based strategy which involves the creation, acquisition, capture, sharing, and use of knowledge within the organization, enables the generation of more ideas, and the creation of a more customer-oriented and technically- and financially-feasible product concept.

Cell 12: Knowledge-based strategy enables the designing of more appealing and functional product and the reduction of the time and costs in product testing.

The above framework provides a fanatical tool for investigating various aspects of innovative new products including decision-making, goal setting, assessment, and evaluation of the innovation of the new products. In the current study the proposed framework has been used to investigate the state of innovativeness among Thai F&B

SMEs for developing new products as a precursor to providing guidelines for enhancing such improvements.

2.7 Chapter Summary

In this chapter, the researcher begins by explaining the goals of the literature review. This is followed by a presentation of the plan of the literature review. The section ends with a discussion of the method employed for the review. The critical review method is used for this dissertation.

The second section discusses the topic of innovation. The author has described briefly the theories in innovation and analyzed the research findings on innovation in the literature up to the present. The discussions cover the concept of innovation in general, and lead to product innovation which is the main focus of this dissertation.

The third section discusses product innovation in more detail. The section begins with the discussions about the theories and concepts in product innovation. The author proceeds to discuss the definition of product innovation and the types of product innovation. Then the discussion deals with key concepts that influence the success of product innovation. Key concepts include firm size, cannibalization, organizational learning capability, absorptive capacity, firm orientation, and institutional context and are all presented in this part. Next, the topic of product innovation strategies is presented. The strategies that are examined in this part include open innovation strategy, networking strategy, resource-based strategy, radical versus incremental product innovation strategies, technology make versus technology buy strategies, exploitative versus explorative innovation strategies, and knowledge-based strategy. The discussion then

moves to cover the topic of product innovation process. In this part, the discussion groups the product innovation process into two bands, namely, sequential process and non-sequential process. Finally, the section ends with a discussion on product innovation best practice.

The fourth section presents NPD. The author has discussed definitions of NPD, analyzed the topics of product characteristics influencing the success of new products, presented critical success factors, NPD strategies, NPD process models, and NPD best practice.

The fifth section discusses knowledge gaps. The author has identified knowledge gaps from the literature on NPD, innovation, and innovation strategies.

The sixth section presents a proposed integrated framework for innovative NPD process as a theoretical framework for this research.

The seventh section presents refined research questions. Based on the overarching question, several research questions are presented.

From the literature review, the following conclusions can be made:

1. In general, innovation has been widely recognized as crucial to firms' survival, long term growth, and sustainability. Product innovation can be categorized in many ways. The two most widely accepted categories of product innovation are: radical product innovation and incremental product innovation. The classifications are based on the degree to which the innovation impacts on the existing technologies and the customer's benefits.

2. Research has identified best practice, concepts, and strategies that contribute to the success of product innovation, such as networking, open innovation, knowledge management, sourcing and development of technology, and resource-based view.

3. The process of product innovation has evolved over time from sequential process to non-sequential process, and become more complicated with more actors involved.

4. In contrast, NPD is concerned with the steps firms take to develop and commercialize new products. There are several concepts and factors that contribute to the success of NPD, such as product advantage, predevelopment task proficiency, cross-functional team, leadership, and outsourcing.

5. The process of NPD can be broadly divided into two segments, front-end and back-end. The front-end segment, consisting of ideation and concept development, is more related to creativity, whereas the back-end segment, consisting of design and engineering, testing, and launch, is more related to the technical function and marketing.

Most studies focus on either product innovation or NPD. There are few studies that address both subjects in the same study. To the researcher's knowledge, there has not been any study that integrates the front-end and the back-end activities of NPD with innovation strategies. This is the research gap that the current study will address.

CHAPTER 3

RESEARCH METHODOLOGY

3.1 Introduction

This chapter discusses the research methodology of this study. It starts with a discussion of the paradigm that guides this study. The chapter then presents the research design and the research approach, and discusses the research methods adopted for data collection and analysis. The topic of rigor of study is then discussed. Next, the issues participants, ethical considerations, and role of researcher are discussed. The chapter concludes with a summary.

3.2 Research Paradigm

Research paradigms are concerned the philosophical dimensions of social sciences dimensions (Wahyuni, 2012). The two philosophical dimensions are ontology and epistemology. Ontology is concerned with “nature of reality” whereas epistemology concerns “what constitutes acceptable knowledge in a field of study” (Saunders et al., 2009, p 110 & p 69). Guba and Lincoln (1994, p. 105) define paradigms as “the basic belief system or worldview that guides the investigator, not only in choices of method but in ontologically and epistemologically fundamental ways”, while Hammersley (2013) refers to paradigms as mental models or frames of references that shape the design and conduct of research. Creswell (2009, p. 6) uses the term “worldview” with the same meaning. Similarly, Rossman and Rallis (2003, p. 36) define paradigm as “a worldview, shared understandings of reality”, and Weaver and Olson (2006, p. 459) describe paradigms as “sets of beliefs and practices, shared by communities of researchers, which

regulate inquiry within disciplines” (p. 459). In addition, Wahyuni (2012, p. 69) defines paradigm as “a set of fundamental assumptions and beliefs as to how the world is perceived which then serves as a thinking framework that guides the behavior of the researcher”.

This research study was guided by the post-positivism paradigm with logical inference made from an observation to a hypothesis that accounts for the observation, ideally seeking to find the simplest and most likely explanation. Post-positivism is a modified version of positivism, addressing the criticisms encountered by positivism. The post-positivism paradigm was chosen as this paradigm assumes that research is relevant and contextual and that knowledge is conjectural (D. Phillips & Burbules, 2000). The main objective of post-positivist enquiry is understanding rather than explanation, and the significance of reflexivity in research practice and the role of the researcher as an interpreter of data are highly recognized (Fox, 2008). Post-positivist researchers take a middle position between interpretivism and positivism and believe that research is the process of making claims and then refining or abandoning some of them when new claims are made. In post-positivism, only observable phenomena can provide credible data and facts (Wahyuni, 2012).

3.3 Research Design

Based on the initial research questions of the study in Chapter 1, the research methodology adopted for the study was a qualitative methodology. The specific reasons for adopting this methodology are explained below:

1. Although there have been extensive studies in the domains of NPD and innovation strategy, little has been written about innovation strategy of NPD activities. The researcher sought to listen to participants and build an understanding based on the experiences of practitioners. Hence, this was an exploratory study which is one of the main reasons for conducting a qualitative study (Creswell, 2009, p. 26).

2. Qualitative research contributes insights into existing or emerging concepts that may help to explain human social behavior (Yin, 2011). In the current study, the researcher sought to contribute insights into the concepts of innovation strategy and NPD. Therefore, qualitative research is appropriate for the aim of the study.

3. Qualitative research represents the perspectives and views of the participants in a study (Yin, 2011, p. 7). In the current study, the perspectives and views of the participants were crucial to the understanding of the existing NPD process and practices in Thai F&B manufacturing SMEs.

The research design of the current study is illustrated in Figure 3.1.

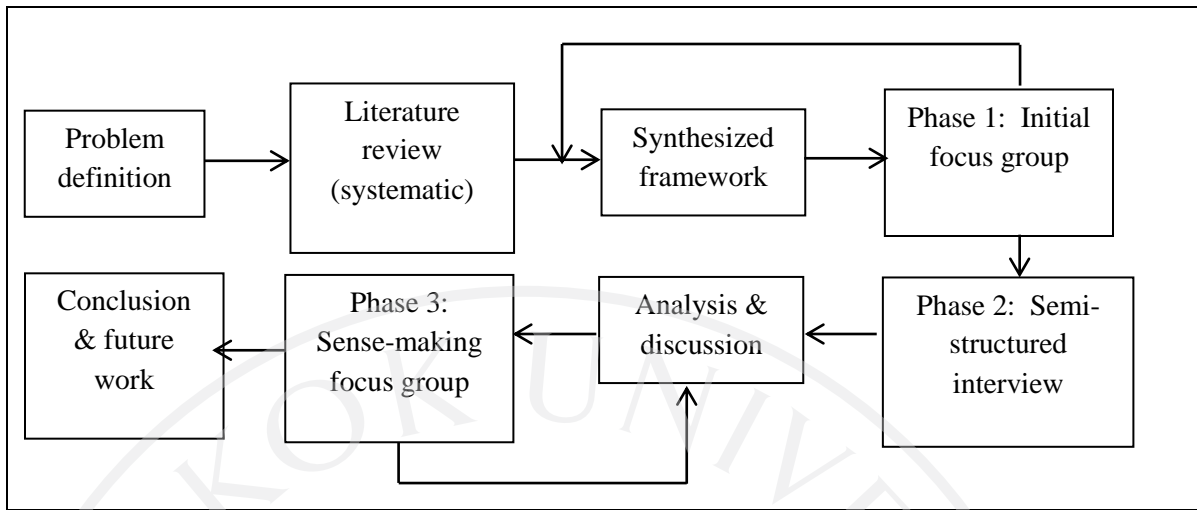


Figure 3.1: Research design

3.4 Research Approach

There are a large number of approaches for qualitative studies (Creswell, 2009) each with a somewhat different focus, resulting in differences in how the research questions might be formulated, variations in sample selection, data collection and analysis, and write-up. The approach chosen for this study is “multiple case study” which is a variant of the case study. The selection of a multiple case study approach seems to be appropriate to address the research questions of this study for the following reasons:

1. This study is about NPD practices in Thai F&B manufacturing firms, and it could not be considered without a context for data collection. The data collection context of the study is the Thai F&B manufacturing firms of different sizes. It is in this context that NPD practices are carried out. It would have been impossible for the researcher to have a true picture of NPD practices without considering the context within which they

occur. The case study approach emphasizes the study of a phenomenon within its real-world context and favors the collection of data in natural settings (Yin, 2012, p. 5).

2. The study is largely exploratory in nature. The case study has been widely recognized as an appropriate approach for exploratory research (Yin 2012, p. 29).

3. The multiple case study approach involves the collection of data from a limited number of sources in a relatively large number of cases at one point in time. The aim of the strategy is to broadly explore phenomena in their real-life contexts and develop tentative explanations based on the fact that the cases have been selected based on the principle of theoretical replication. (Drongelen, 2001).

4. Multiple case studies enable the researcher to explore differences within and between cases. The objective is to replicate findings across cases. The researcher can predict similar results across cases, or predict contrasting results based on a theory (Yin, 2003).

The unit of analysis (UoA) of the study is the Thai F&B SME. Two main attributes of the UoA that are relevant to the current study are (i) the UoA's innovation strategies and (ii) the UoA's NPD process activities.

3.5 Research Methods

Research methods refer to the techniques or tools with which researchers collect their data (Willig, 2008, p. 6) and build their argument (Schensul, 2008). The selection of the techniques or tools is made based on the larger set of assumptions and procedures that constitute the overall research methodology for the study (Schensul, 2008). There are several research methods in qualitative research, namely, participant observation;

interview; elicitation techniques; and various forms of mapping. Each of the methods can be further subdivided such as interviews with key participants or local experts; in-depth interviews or narratives with individuals; network interviews; and group interviews (Schensul, 2008).

The current study adopts two main research methods including semi-structured interviews and focus group, as explained below in detail.

3.5.1 Phases of Data Collection

The semi-structured interview and focus group methods were used in the three phases of the data collection process as briefly explained in 1.5, and are expanded later in the following sections.

For the first and third phases of this research, called the ‘initial focus group’ and ‘sense-making focus group’; respectively, the researcher chose the focus group method, and for the second phase the semi-structured individual interview method was adopted. A focus group study employs a researcher-led group discussion method to generate data (Morgan, 2008). The data analysis method for this focus group is the Krueger (1994) framework of raw data; descriptive statements; interpretation. According to this framework, raw data are statements as they were said by participants. The data might be categorized by natural levels or themes in the topic. Descriptive statements summarize participants’ comments and provide illustrative examples using the raw data. Decisions must be made by the researcher as to which quotes to include. Interpretation builds on the descriptive process by providing or presenting meaning of the data rather than simply summarizing the data. In giving meaning to the descriptions, one should be reflective

about their own biases in interpretation. For the ‘interpretation’ phase the ‘systematic participatory analysis’ (de Negri & Thomas, 2003) was utilized. The systematic participatory analysis process consists of several stages including identifying variables that can influence interpretation; considering the context; looking at findings through a behavior change lens; drawing conclusions and making recommendations; looking for alternative explanations; and validating results (de Negri & Thomas, 2003).

The main reasons for the researcher to adopt a focus group method are:

1. Focus groups can be used for exploratory research where either the participants are free to discuss the topic the way they like, or the moderator takes a more active role in controlling the points to be discussed (Morgan, 2008, p. 352);
2. Participants tend to more readily express themselves when they are part of a group, than when they are alone (Yin, 2011, p. 142);
3. Focus groups allow the researcher to have a large role in determining how the conversation will proceed (Morgan, 2008, p. 352);
4. The focus group study environment generates momentum and allows attitudes, feelings, beliefs, and opinions to emerge in parallel with individual experiences (Randle, MacKay, & Dudley, 2014);
5. Focus groups can be modified in a wide variety of ways to suit a wide range of purposes (Morgan, 2008, p. 352);
6. The main emphasis of the focus group is the participants’ conversation about the research topic. There is no requirement to produce a decision or reach consensus (Morgan, 2008, p. 352); and

7. Focus group study tends to base the content of the interview on the researcher's interests (Morgan, 2008, p. 352).

In the current study phase 1 is intended to achieve the following inter-related objectives: (i) to get some general ideas about the product innovation strategies being adopted by Thai F&B manufacturing firms, and (ii) to seek the focus group participants' inputs on the relevance of the proposed integrated framework, and possibly, to enhance the existing proposed framework accordingly. The participants of the focus group were a mix of academic experts in the domain of F&B product innovation and practitioners with high levels of knowledge and experience in the field.

The main objective of the second phase, the individual interview is to provide answers to the following research questions:

RQ1: What are the current practices and barriers to NPD processes in Thai F&B manufacturing SMEs, and how is innovation addressed in the NPD process?

RQ2: What are the potential areas for improving the effectiveness of NPD initiatives in Thai F&B manufacturing SMEs? More will be discussed about this phase in the next chapter.

The second phase consists of 20 semi-structured interviews. Using results from the previous phase a set of interview questions were developed for twenty interviews with each interviewee representing one case study. The reasons behind adoption of the semi-structured individual interview method are as follows:

1. In semi-structured individual interviews, the researcher can develop rapport with participants and increase the likelihood of learning details about their perspectives (Plano

Clark, 2008, p. 432).

2. Semi-structured individual interview studies tend to base the content of the interview on the researcher's interests (Morgan, 2008, p. 352).

3. The researcher can learn about participants' views in their own words (Plano Clark, 2008).

4. Semi-structured individual interview studies allow the researcher to have a large role in determining how the conversation will proceed (Morgan, 2008, p. 352).

5. The researcher can make observations during interviews which may include key nonverbal cues used by participants such as head nodding and hand motions (Plano Clark, 2008, p. 432)

6. Semi-structured individual interview studies can provide more depth and detail about each participant (Morgan, 2008, p. 352).

7. The researcher can observe individuals' context, if the interviews take place in the participants' setting such as their places of work or homes (Plano Clark, 2008, p. 432).

The individual interviews give the researcher good opportunities to learn from participants about their experiences with and perceptions of the topic under study. In order to gain a deep understanding of the context and phenomena of the topic under study, the current research mixed the data in this phase of the research. Mixing data means that both qualitative and quantitative data are mixed or combined in some way with one of the data sets playing an auxiliary role (Creswell, 2009). Mixing of data can occur at any or all of the different stages: the data collection, the data analysis, and

interpretation. The current study mixes the data at all these stages. However, the qualitative data plays a key role and the quantitative data plays an auxiliary role in this study. This design is called ‘Concurrent Embedded Strategy’ in which both quantitative and qualitative data are collected simultaneously at the data collection phase (Creswell, 2009, p. 214). Figure 3.2 illustrates the Concurrent Embedded Strategy.

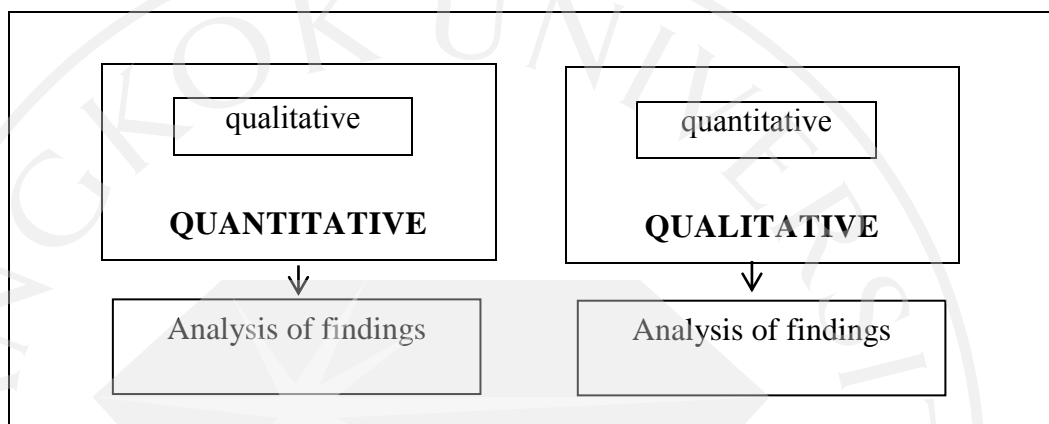


Figure 3.2: Concurrent Embedded Strategy. Adapted from Creswell (2009).

The third phase of data collection takes the form of a ‘sense-making focus group study’. The aim of the third phase is to present the results from the second phase of semi-structured interviews to the audience and ask them to comment on the results based on the expected outcome of the thesis. They are asked to comment if the results truly address the research questions of the study in a meaningful manner.

The data analysis methods corresponding to these methods are discussed in the next section.

3.5.2 Data Analysis

The data analysis method (reasoning method) adopted for data analysis is abductive reasoning as an epistemic process which involves both the researcher’s information,

knowledge and beliefs, as well as the actions that modify this information (data et al., 2013). This in turn has roots in Charles Sanders Peirce notion of pragmatism (Magnani, 2009, p. 1). That is, despite many possible explanations for arriving at an answer to the RQs, in the absence of evidence the researcher tends to abduct the explanation(s) that better match the specific nature of the F&B SMEs based on experience of the researcher in the field, and disregard some possibilities.

Abductive reasoning begins with an incomplete set of observations and proceeds to the likeliest possible explanation for the set. This characterizes the current study where twenty F&B SME executives were selected out of 1.5 million in Thailand alone, who were interviewed who may have been unconscious or fail to provide appropriate answers to the questions for a variety of reasons. This certainly represents a case of incomplete evidence. The researcher believes that in such situations where evidence is incomplete his own decades of experience in the F&B industry can be used to make 'educated guess' in order to partially compensate for such incomplete evidence. However the researcher also recognizes the possibility of the risk that the conclusions arrived in such pragmatic manner may still fail to completely explain the phenomena. For this reason, it is believed that future studies are needed to complement results obtained from the current exploratory investigation. Putting it differently, the researcher made clear distinction between the logic of justification (traditional) and the logic of discovery (new and creative) with the latter being a rational choice between competing theories and hypotheses and on the discovery process. It is by means of this synthesis that the creation,

elaboration, and communication of the results have been made possible and presented as new emerging representation of scientific domain.

In general, several researchers have proposed methods to analyze qualitative data. As an example, van den Hoonaard and van den Hoonaard (2008) provide the following four step method for analyzing qualitative data. These include: note-taking, coding, writing, and developing concepts. Other researchers including Ritchie and Lewis (2003) and Rabiee (2004) propose that the data analysis consists of two key stages (i) managing the data; and (ii) making sense of the evidence through explanatory or descriptive accounts. The two stages are sub-divided into five distinct and interconnected stages including: (i) familiarization; (ii) identification of a thematic framework or concepts; (iii) constructing an index; (iv) constructing a set of thematic matrices or charts; and (v) mapping and interpretation.

For the focus groups, the overall method for analyzing the data in the current study is based on an integration of the above two methods proposed by van den Hoonaard and van den Hoonaard (2008) and Rabiee (2004) with minor modifications as follows: the note-taking stage has been replaced by both recording as well as note-taking activities. Coding is conducted through Thematic Analysis (Ayres, 2008) where important concepts within the data set are captured through the process of segmenting, categorizing, summarizing, and reconstructing qualitative data. Thematic analysis facilitates the search for patterns of experience within a qualitative data set and describes those patterns and the overarching design that unites them (Ayres, 2008). In terms of the sense-making stage of Rabiee (2004) the sense-making phase of the current study has been

implemented through a focus group method and is explained in detail in Chapter 4. The data analysis process of the focus group is illustrated in Figure 3.3.

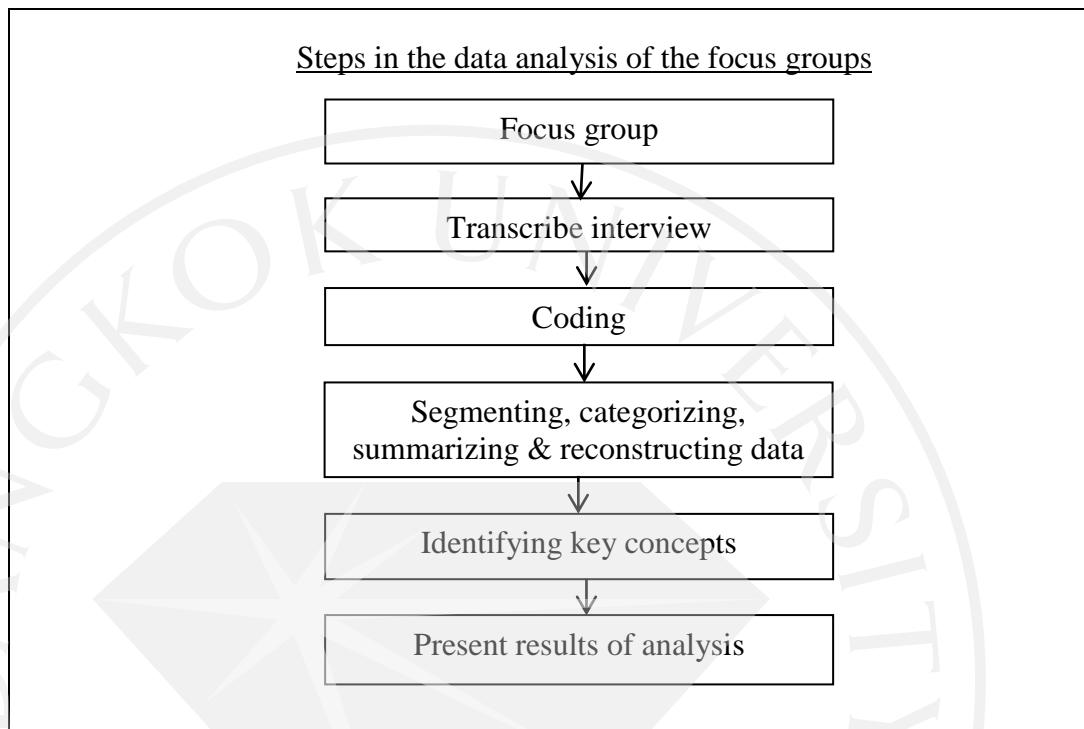


Figure 3.3: Data analysis process of the focus groups.

For semi-structured interviews, the main data analysis methods adopted for the current study are the laddering technique (Breakwell, 2004) and the analytical interview method (Czarniawska, 2002). Whenever the need arises to uncover the subconscious motives of participants, the laddering interview technique was used. On the other hand there have been situations where the interviewer felt it was necessary to emphasize collaborative analysis and construction of knowledge between himself and the participant (Weick, 1989). Such collaborative construction of meaning is referred to as collaborative analytical interviewing (Ellis and Berger, 2002), which is a sort of conversation (Holstein

and Gubrium, 1995), in which the classical distribution of interviewing roles is radically changed. The data analysis process of the semi-structured interviews is illustrated in Figure 3.4.

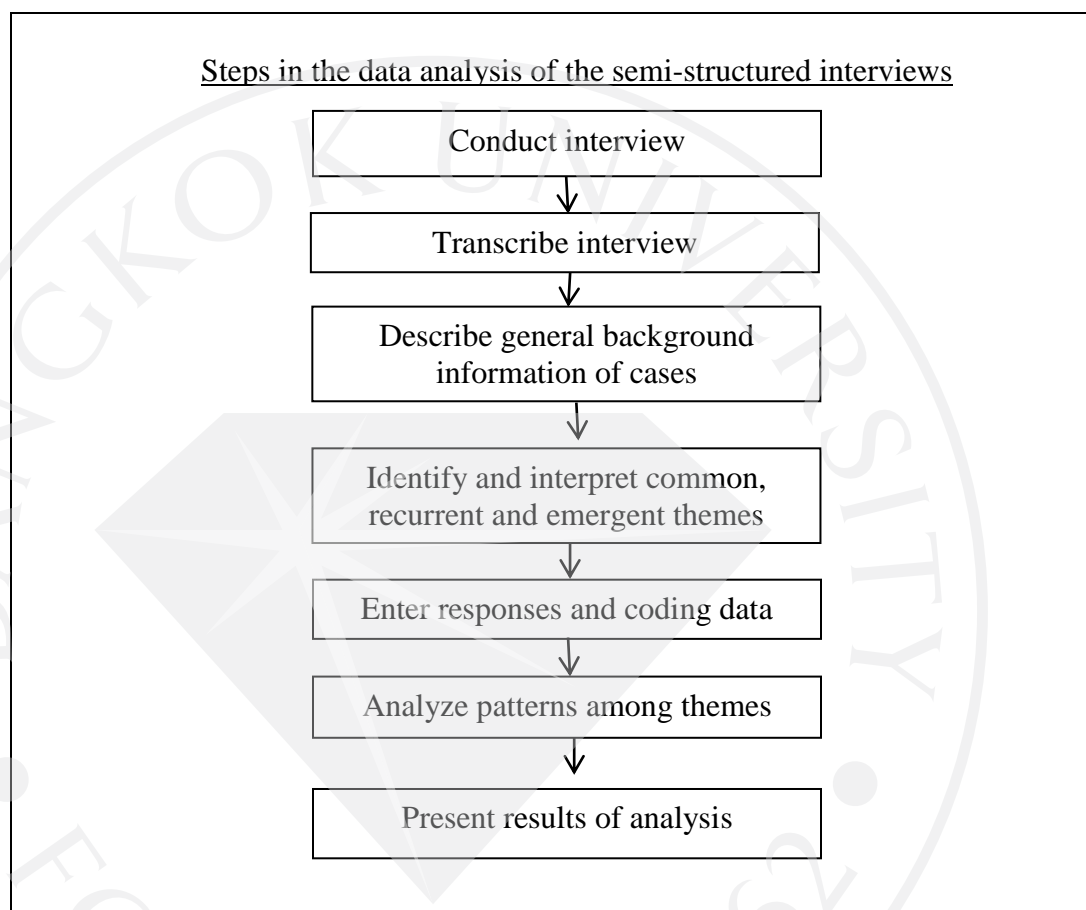


Figure 3.4: Data analysis process of the semi-structured interviews.

Prior to each interview, various publicly available documents about the organization participating in the case study organization were reviewed in order to obtain some general understanding about the company. These findings were used both as discussion points during the interviews as well as for analyzing the results of the interviews. The majority of the interview questions were guided by both the document

review data as well as the initial proposed integrated framework in Table 2.16.

Documents reviewed were those that were publicly available mainly on the companies' web sites. No private internal documents were visited.

The duration of the data collection phase for this study has been 3 months, from December 2014 to February 2015 with subsequent updates in early March 2015 in the form of short telephone conversations to some respondents for further clarity. There were a total of 20 interviews representing twenty Thai F&B SMEs.

3.6 Rigor of the Research Study

According to Bhattacharjee (2012), scientific research must contribute to a body of science, and should follow scientific methods. The current study satisfies the above conditions by having provided a substantial contribution to the bodies of literature in the NPD process as well as the innovation strategies as discussed in section 1.11. The research process of the study also mandates the use of a scientific method and this has already been detailed in sections 3.2 to 3.5 and summarized in Figure 3.1.

The study also operates at two levels, namely the theoretical level and the empirical level. At the theoretical level, abstract concepts have been investigated from the three knowledge domains of NPD processes, innovation strategy, and F&B SMEs in Thailand. The theoretical aspect was conducted through a systematic review of the literature. Results of this review were then used by the researcher to develop an initial version of the study's synthesized theoretical framework that integrates the two domains of NPD activities and innovation strategies with the aim of constructing a novel concept called a strategized NPD process.

For the interview process, care has been taken to minimize biases that could distort responses, such as personal bias, anger, anxiety, politics, and lack of awareness (Patton, 2002:306-307). Also, attention was given to Neuman's (2011, p 347-349) six categories of interview biases including 'error by the respondent', 'unintentional errors or interviewer sloppiness', 'international supervision by the interviewer', 'influence due to the interviewer's expectations', 'failure of interviewer to probe', and 'influence on the answers due to the interviewer's appearance' and appropriate strategies were developed to avoid these biases wherever applicable.

In terms of focus the groups, care has been taken to maximize trustworthiness of the study by ensuring that credibility, transferability, dependability, and confirmability are evident in the research (Given & Saumure, 2008). These criteria allow the researcher to present meaningful and believable findings and enable the readers to draw similar conclusions from the data (Morrison-Beedy, et al., 2001). These criteria have been widely recognized by the research community for their contributions to the rigor of qualitative research (Loh, 2013). To achieve these criteria, the researcher adopted several techniques suggested by Morrison-Beedy, et al. (2001) including 'conduct multiple focus groups', 'encourage participants to share their views', 'go back to participants for verification of findings', 'use the same interview guide with each group', 'provide the same environment with each group', 'prepare transcripts promptly', 'use direct quotes when presenting findings', 'provide thick, rich data slices for descriptions', 'describe sample and setting so potential appliers can make transferability decisions', 'provide detailed audit trail of what was done and why', 'keep notes on process, procedure, and researcher

thoughts’, and ‘return to the data to verify concordance of findings with the raw data’.

In addition, the transcripts were verified by an independent researcher to ensure accuracy.

3.7 Participants

For this study, the researcher used purposive sampling because it involves selecting “information-rich and illuminative” cases for study in depth. Information-rich and illuminative cases allow researchers to learn a great deal about issues of the greatest significance to the aim of the research (Patton, 2002). In the purposive sampling approach, there are several types of sampling, for example, stakeholder sampling; extreme or deviant case sampling; typical case sampling; paradigmatic case sampling; maximum variation sampling; criterion sampling; theory-guided sampling; critical case sampling; and disconfirming or negative case sampling (Palys, 2008). The researcher adopted criterion sampling for this study as it involves searching for individuals or cases which meet a certain criterion (Palys, 2008). For the first and the third phases of the study, participants were individuals who were experts in F&B product innovation. Eight participants were recruited for the first phase and third phase focus group. For the second phase of the study, participants were F&B manufacturing SMEs who have experiences in NPD. There were 20 participants for the second phase individual interviews.

3.8 Ethical Considerations

The following steps had been taken to ensure that (i) participants were well-informed about the purposes and requirements of the study, (ii) their rights to participate or decline the interview or focus group, (iii) they can participate in the study conveniently, and (iv) all data provided by them would be treated in the most confidential

manner:

1. At the beginning, all prospective participants were fully briefed on the purposes, requirements and implications of the study so that they could decide if they would like to participate or decline the interview or focus group. Any questions they might have were answered truthfully and fully. Prospective participants were made aware of the fact that audio recording were made for individual interviews, and video recording were made for focus groups.

2. Once a prospective participant agreed to proceed with the interview or focus group, he/she was told of the right to terminate the conversation at any time he/she wished.

3. For individual interviews, participants were given a choice as to the location where they would like to have their interviews. This could be their work places or any other locations they felt comfortable with. For focus group, an easily accessible location was selected.

4. All personal information and data generated from the interviews and focus groups were kept strictly confidential. Measures were taken to secure the storage of all the data and information. Only the researcher and a limited number of authorized personnel at Bangkok University had access to the information and data.

3.9 Role of Researcher

In qualitative research, the researcher is typically involved with participants in an extensive and sustained experience (Creswell, 2009). Data are mediated through the researcher (Denzin & Lincoln, 2003). This raises a number of personal, ethical, and

strategic issues in the research process (Creswell, 2009). To address these issues, researchers explicitly identify their personal background, values and biases (Creswell, 2009).

For the current study, there is a possibility of bias from the researcher as a researcher in interpreting the findings through the lens of the author's own experiences, perspectives and background as a practitioner in the business management discipline for over 30 years. This bias was minimized by the presence of the researcher's supervisor(s) in the interpretation of the results, as well as by conducting the second focus group as the last stage, to make sure that the above biases were reduced.

3.10 Summary

This chapter discusses the research methodology of this dissertation. It begins with a discussion of the research paradigm. The post-positivism paradigm is adopted to guide this study. The next topic of discussion is research design. The discussion presents the rationale for selecting qualitative research and the methodological steps of the research together with the corresponding mechanisms/methods adopted for the study. The issue of research approach is then discussed. The multiple case study approach is adopted for this research, and reasons for this decision are provided. The next topic discussed is the research method. The research methods chosen for this study are focus groups and individual interviews. The rationale for choosing these two methods is provided, with discussions on data collection and data analysis. The topic of rigor of study is then presented. Details of the steps which are taken to ensure rigor of the study are discussed.

The topic of participants is then presented, and this is followed by discussions on the issues of ethical considerations, and the role of researchers.



CHAPTER 4

DATA COLLECTION AND ANALYSIS

4.1 Introduction

This chapter provides the results obtained from the three phases of data collection throughout the study. Phases 1 and 3 are focus group studies. Phase 2 is a semi-structured interview study and is the main data collection phase of the study. The two main research questions (RQs) are mapped into a set of interview questions to be used in phase 2.

RQ1: What are the current practices and barriers of NPD process in Thai F&B manufacturing SMEs, and how is innovation addressed in the NPD process? This RQ has been divided into the three following sub-RQs:

RQ1.1 What are the current NPD practices among Thai F&B manufacturing SMEs? The interview questions related to this RQ are questions 11, 12, 13 and 14 (see Appendix A for the interview protocol and Appendix B for the semi-structured interview questions).

RQ1.2 What are the major barriers to NPD process in the above organizations? The interview questions related to this RQ are questions 16, 17 and 18.

RQ1.3 How is innovation addressed in the NPD process of the above organization? The interview questions for this RQ are questions 18, 20, 21, 22, 23, 24 and 25.

RQ2: What are the potential areas for improving the effectiveness of NPD initiatives in Thai F&B manufacturing SMEs? The interview questions related to this RQ are questions 17, 20, 24 and 25.

Some interview questions are not directly related to any of the RQs, however they provide context for answering the RQs. These are interview questions 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 15, and 19.

The above mapping framework is used for both the presentation of the collected data as well as for their analysis. The data collection results and the analysis of the collected data are presented in 4.5.

4.2 Data Collection Context

This section provides succinct descriptions of the twenty cases that have been selected for the study. First, the criteria used for the selection of the cases are presented followed by a brief description of each case.

4.2.1 Case Study Selection Criteria

Some researchers have argued for an open-ended number of cases, while others have suggested a restricted range of respondents. However the most appropriate range falls between 4-8 cases (Eisenhardt, 1989; Perry, 1998). However, McCracken (1988) argues that at least eight participants are required to generate insightful themes from in-depth interviews. For the current study, twenty Thai F&B manufacturing SMEs have been selected on the basis of reasonable range within the industry as well as the convenience of accessing them in geographical terms. An in-depth semi-structured interview was conducted with a senior executive from each case study SME.

The Institute for Small and Medium Enterprises Development (ISMED) in Thailand defines medium enterprise for firms in all industries as firms with 51-200 employees, and 50-200 million Baht fixed assets (ISMED, 2014). However, in the F&B

industry, some firms with 2,000 employees still consider themselves as "medium". This is because F&B is a labor-intensive industry, and large firms in the industry usually have much higher numbers of employees. This research classifies medium enterprises according to the industry practice, and not the ISMED's definition. The twenty case organizations are referred to as Case 1 to Case 20. It is expected that these 20 cases will provide adequate insights into investigating the Thai F&B manufacturing sector. The 20 cases cover a wide range of products including seafood, snacks, processed fruits and vegetables, canned fish, juices, desserts, rice, food ingredients, seasonings, health food, edible oil, ready meals, cereals, beverages, processed food, and instant noodles. All of these product categories are key segments of the F&B industry in Thailand.

All selected cases agreed the researcher's request to have interviews with their key personnel. The participants were incumbents in the positions of Business Group Manager, Managing Director, Director for NPD, Chief Operating Officer, Assistant Managing Director, Marketing Vice President, R&D Manager, CEO, Factory Manager, General Manager, Marketing & R&D Manager, and Sales & Marketing Manager. These participants held key positions in their organization's NPD activities and had full authority to discuss any issues related to the NPD projects in their respective firms.

All cases were located within a distance of 100 kilometers from Bangkok. However, some participants preferred to be interviewed in Bangkok at a site of their choice. In these cases, the interviews took place at a venue outside of the participant's factory. There was a good mix in the 20 cases in terms of firm size ranging from 10 to

2,000 employees thus allowing for clear recognition of emerging patterns when investigating their NPD practices and strategies.

Among the 20 cases, some of them launched as many as 10 or more new products per year, while some launched only one product every one or two years. By studying these twenty cases, the researcher would be able to gain a balanced perspective from firms with varying degree of NPD activities.

4.2.2 Description of Cases

A brief description of each case study is provided below.

Case 1. This was an SME in the dried and processed seafood business located in the south of Bangkok. It was one of the several hundred enterprises in the area that were engaged in the seafood business. As there were many firms in the same industry, the business was very competitive. Every firm had to compete fiercely to get its raw material (mainly fish), labor, and more importantly, customers. Most of the products offered by these firms were similar, so they were interchangeable and price sensitive.

This SME was a family-run business with two generations working in the firm. The management of the firm realized that the firm needed to increase its competitiveness by developing greater product innovation. Being SME, the firm was constrained by qualified technical and skilled workers who generally preferred to work in bigger firms that may offer further career paths. The level of technology in its manufacturing facilities was relatively simple compared to the multi-national firms. However, the firm had an NPD team and owned some basic R&D equipment. The firm's products were well accepted for their high quality in international markets.

Case 2. This firm was set up three years ago in Bangkok to produce snack foods. The firm was owned and managed by an engineer who previously worked as a production manager in a major local snack firm. The first item that the firm introduced to the market was a chocolate-coated wafer. While the product tasted as good as any other wafer on the market, its sales had been disappointing. The trade was reluctant to stock the product as it was perceived as generic merchandise without any unique selling proposition. The firm did not do any advertising or promotion activities because it did not have marketing budget. The firm's production facilities were running below 50% of their capacity. The firm was not making any profit.

In an attempt to turn the firm around, the management made two moves. First, it searched for export market opportunities. This resulted in the expansion of the business to new markets, primarily in Africa. The additional volumes helped fulfill the production capacity levels available and provided the firm with much needed cash flow. Second, the firm started to develop new products that would provide some differentiation. The management went to several trade fairs to get new product ideas and to catch up with new production technologies. The knowledge gained from the visits to trade fairs enabled the firm to develop and eventually launch several innovative products. Sales of the new products increased steadily. The management was convinced that product innovation was critical to its survival and success.

Case 3. This firm produced canned fruit juice, fruits, and vegetables. The firm was located in the Ratchaburi area to the west of Bangkok. Ratchaburi is a major plantation area growing several kinds of fruits and vegetables. The firm was one of the many

canned juice, fruits, and vegetables producers in Thailand, and exported all its products. The firm faced several challenges like many other firms in the industry, for example, the seasonality of the fruits and vegetables that affected both the production volumes and costs throughout the year. The firm was active in participating in international trade fairs in order to meet customers and get ideas to develop new products.

The firm recently introduced a new product, coconut water made of pure natural coconut water. Natural coconut water generally had short shelf life but this innovative canned product could stay at room temperature for up to one year while maintaining its natural taste and aroma. This was a product innovation that made it a drink of choice among many consumers. Coconut water was a beverage that started to gain popularity in both domestic and international markets. The high demand meant increased sales and profitability for the firm. The success of this new product served as a catalyst for the firm to focus more on further product innovation.

Case 4. This was a long established medium-sized firm engaged in canned fish and dehydrated fruits.. The firm was established a century ago, and the current management was the third generation of the founding family. The firm was located in the Samutsakhon area south of Bangkok. Most of their products were sold to overseas customers, while a small portion of the overall volume produced was sold to the domestic market. The products were either sold as unbranded products, or packaged in private labels for large retail chains. By acting as a contract manufacturer for large retail chains, the firm found that it had to constantly offer competitive prices or risk losing the

customers. Customers could switch their sources of supply relatively easily because the products were sold to the end users under their private labels.

In the last few years, the firm focused on product innovation in the dehydrated fruit business. It launched a number of innovative products. The new products significantly contributed to the firm's sales and operating margin. The firm was investing more in the R&D department in terms of skilled personnel, training, and modern laboratory equipment. It had become a leader in the dehydrated fruit sector setting industry standards for several kinds of fruit products.

Case 5. This was a firm manufacturing Thai desserts in Pathumthani, a province north of Bangkok. The firm started as a small family business making desserts for sale from home to nearby customers. As Thai desserts were made of fresh ingredients and were so delicate, they had very short shelf life in a tropical climate characterized by relatively high temperatures and humidity. The products had to be made and sold on a daily basis. This made it difficult for the firm to expand sales into a larger geographical area. In the past, the firm had not paid much attention to NPD.

However, with the rapid developments of e-commerce, and the expansion of the modern trade retailers, particularly in the convenience store format, had presented new challenges for the firm. Some customers preferred to buy products through the internet. Selling products on-line could be done only if the products could withstand long-distance delivery which normally took a few days to complete the task. The traditional desserts were not suitable for on-line sales as they could be damaged easily. Demand for Thai desserts also came from the modern trade retailers. However, they required that the

desserts must have a shelf life of a minimum of 7 days, a feature not commonly found in Thai desserts.

To meet these challenges, the firm had little choice other than to develop new products that had longer shelf life, taking it from one day to a minimum of one week, so that they could be sold through convenience stores, or be delivered to online customers. The firm had found that the task of developing new products that could last much longer than normal, and still keep their original taste and texture, and at the same time met the food safety standards set by the modern trade, required a lot of R&D work that did not always produce satisfactory results. However, the reward for such an achievement was also very significant in terms of sales, profitability, and long-term growth. The key issue confronting the firm was how to become more effective in their NPD initiatives with the limited resources that the firm had available.

Case 6. This firm had been in the rice business for more than a century. It had a production plant in Saraburi province, north-east of Bangkok. The firm was one of a very few firms that used advanced technology to create product innovation in a business that was largely dominated by undifferentiated commodities. Most rice companies did not invest in technology because they wanted to keep costs down to ensure that they could compete on price in an industry characterized by many buyers and many sellers. However, this firm chose to invest in technology to create product innovation so that the products it sold offered better value and could command higher prices.

Rice is a commodity whose quality changes appreciably over a short period of time. Rice from a newly harvested crop is soft and fluffy. However, as rice is harvested

according to its season, there was always a period when rice sold on the market was not from newly harvested crops. As rice aged, it became harder and less fluffy. Therefore, the quality of rice was generally not consistent over the year. This posed a problem for many restaurants, especially first-class restaurants that wanted to serve food of consistent quality. The firm saw this as a business opportunity and developed a technology that measured the softness of the rice, and blended rice from different crops to ensure that the quality of its rice was consistent throughout the year. This was a product innovation that satisfied the need of a market niche. The firm could charge a premium price for its products as the products were unique. The product innovation was significant as it was created in a very large industry with so many suppliers, most of whom did not see any need for product innovation.

Case 7. This firm manufactured processed fruits, vegetables, seasoning, sauces, coffee, and fruit juice. It had one factory in Nakornpathom, a province to the west of Bangkok, and another factory in Lampang, a northern province in Thailand. Both factories were located near the sources of raw materials including corn, mango, rambutan, pineapple, and several kinds of vegetables.

The firm set a priority for product innovation, and invested continuously in R&D and technology to drive its product innovation programs. The products that the firm manufactured met the quality standards established by some of the most developed countries such as the U.S.A. This enabled the firm to export its products to virtually any country in the world, a privilege that only a few medium-sized firms had. A recent product innovation from the firm was its coconut water that was launched successfully on

the export markets, and subsequently on the domestic market. The product achieved its sales objective in a highly competitive beverage market that was characterized by heavy advertising and promotion activities from both local and multinational firms. The firm set, as its mission, the core objective of bringing innovative products to the market in order to keep its leading market position in the canned fruit, juice, and vegetable sectors. The firm's brand was widely accepted by the trade and consumers alike.

Case 8. This firm manufactured maltose syrup, fructose syrup, and glucose syrup from tapioca starch. It was located in Nakornpathom province. The firm's customers were food and beverage manufacturers such as dairy firms, beverage firms, confectionary firms, bakeries, and snack firms that used its products as ingredients in their products. It offered both industry standard items that were similar to those products being offered by its competitors, and worked with its own customers to develop new products to meet their specific needs. As a result, product innovation was achieved through customization allowing the firm to gain higher margin while also creating a stronger business relationship with the customers.

The firm used modern technology and equipment in its production plant to ensure high and consistent product quality which was a key feature demanded by most food and beverage manufacturers. The firm was certified by several internationally recognized organizations for its quality control management system and good manufacturing practice. In the food ingredient business, the number of new products developed annually is generally lower than the F&B category.

Case 9. This was a firm that manufactured food seasoning products for both households and food service customers. The firm started 15 years ago in Nakhonpathom province with only two products: chicken-flavored seasoning powder and pork-flavored seasoning powder. During the past few years, a number of new products had been launched including hot-and-spicy, beef-flavored, and mushroom-flavored powders; ready-mix soups; lime-flavored juice; Japanese sukiyaki sauce; and a marinade sauce. These products not only enhanced the taste of food, but also made it more convenient for the customers to cook. All products were presented in a pre-mixed, ready-to-use liquid or powder form. Customers only needed to open the containers and pour the products into their food. No preparation work was required. Customers, especially those in the food service business, found that the firm's products help them save time, labor, and cost. This was particularly important for the food service industry because seasoning products were a key item in their business.

Thanks to the product innovations that were introduced in the last few years, the firm became a market leader in a number of product categories. This was quite an achievement, considering the fact that some of its key competitors were multi-national firms that have been in the business for a much longer period.

Case 10. This was a small firm set up two years ago in the health food business sector. The firm was located in Bangkok. Unlike most other firms in the F&B business, this firm chose to outsource the production function to another firm that specialized in producing F&B products. The factory that manufactured the health food product was

located in Nakhonnayok, a province about 100 kilometers away from Bangkok towards the northeast.

The key product offering from the firm was an essence of chicken beverage. The product was quite similar to those on the market, and could not claim to be unique. The firm's strategy was to use an aggressive pricing policy to attract new consumers who otherwise could not afford to buy essence of chicken beverage on a regular basis. By making the product more accessible and affordable to a lower income group, the firm hoped to fill a gap in the market. The firm had no plan to embark on a product innovation program in the near future.

Case 11. This was a small firm that manufactured coconut oil for cooking purposes. The firm was located in Nakhonpathom. It had a team of NPD employees who looked after new product development and innovation.

Although coconut oil has been available on the market for many decades, its use as cooking oil has not been as widespread as some other types of cooking oil. This was due to the fact that coconut oil had a strong aroma which some consumers found objectionable. Another factor concerned the health benefits of coconut oil. Many people were not aware of the health benefits that coconut oil provided. Worse still, as a result of many years of marketing campaigns from competing cooking oil manufacturers, some people had been led to believe that coconut oil was actually bad for their health.

However, results from some studies demonstrated that coconut oil had many nutritional values that were superior to those available in other types of cooking oil. Based on these findings, the firm had set as its mission to manufacture and distribute coconut oil to both

the Thai and international markets. It had committed substantial resources to R&D. The firm had introduced a product innovation that was not only free of the objectionable aroma, but also had higher nutritional values than normal coconut oil on the market. This was due to its advanced technology in processing the coconut oil. The firm marketed two types of coconut oil, cold pressed virgin oil, and regular coconut cooking oil. The products were well accepted on the local market as well on international markets such as Australia, Japan, and Hong Kong. It was in the process of creating further product innovations using the by-products from the production of coconut oil.

Case 12. This was a family-run firm established about 30 years ago in Bangkok to manufacture ready meals. The firm had a team of NPD who developed a wide range of products including fresh food, chilled food, frozen food, and sauce. The firm's radical product innovations were in the Thai frozen food industry in which it was a pioneer. However, most of the firm's innovations were incremental innovations where new recipes were developed to meet ever changing market needs. There are over 100 different items on the firm's product list that featured several types of foods such as Thai meals, desserts, bakery items, and snacks.

The firm's products are sold in modern trade channels where refrigerators and freezers were available to store them. Another important channel was the catering business which included railway, air, ground, and cruise travel. The firm also sold to hotels, restaurants, and offered food and snack box delivery to function organizers. It also manufactured for private labels. It is one of the leaders in the ready meal industry.

Case 13. This was a small firm in Bangkok that manufactured its own products as well as private brands for its customers. The firm used retort pouches to package its products, a technology that was not commonly found among SMEs because it involved relatively high investment costs in machinery. The retort pouch is a type of packaging material made from a laminate of metal foils and flexible plastic that can withstand the thermal processing used for sterilization. It was used as an alternative to canning, with the added benefits of being flexible, lighter, and consuming less energy to produce than those made from metals.

For the private label business, the firm offered a wide range of services including development of food recipes for a retort pouch, rental of retort pouch machines, registration of food formulas with the authority, food analytics, food production and food distribution. For its own brand, the firm sold its products to both the retail trade and the food service industry conducting both local and export businesses. Its product quality was well accepted by the market. A team of NPD employees were responsible for creating product innovation to meet market needs.

Case 14. This was a small firm established 15 years ago with a factory in Suphanburi province, 100 kilometers northwest of Bangkok. The area is famous for the plantation of rice, corn, and other grains. The firm's vision was to become a leader in the organic whole-grain food business. The management of the firm was guided by the philosophy of a sufficiency economy developed by H.M. King Bhumibol Adulyadej. The philosophy centered on living a moderate, self-dependent life without greed or overexploitation of natural resources. It promoted moderation, broad-based development

and sustainability. A major implication was that the firm needs to take into account the well-being and interests of all stakeholders, and the impact on the environment when carrying out its business activities.

The firm worked closely with farmers in the area to ensure that only high quality organic grains were cultivated and used in its production process. An NPD team was set up to develop innovative products that not only provided high nutritional values, but also had a good taste for consumers of all ages. It offered a wide range of products including cereals of many varieties, snacks, and congee. All products received certification from several national and international organizations for their high quality standards. The firm had a strong base of consumers who preferred its products over other competitive products because of their unique product attributes. The owner of the firm was a pharmacist.

Case 15. This was a medium-sized firm in Pathumthani manufacturing sausages. The firm was owned and managed by a food scientist who had spent many years working in several major food processing firms before founding this firm more than 10 years ago. The main strength of the firm lay in its NPD team. The firm was highly creative and had generated several product innovations in the previous few years.

The firm's products were sold to its distributors who in turn sold the sausages to wholesalers, retailers, and food-service operators. As well as on-premise and in-home consumption, there were a large number of roadside vendors who cooked and sold sausages as snacks to consumers and school children.

In general, the sausage market has been growing steadily in the last few years. However, it is also a very competitive market because many local and national manufacturers have adopted very aggressive pricing strategies. As a result, the average margin was very low. Firms that can generate reasonable profits were those that are cost effective. The firm's focus on product innovation was based on its strategy to use new products to penetrate into new markets. The firm's owner-manager was a doctoral graduate in food technology.

Case 16. This was a small firm in the functional drinks sector. The firm was located in Bangkok. It initially launched a range of innovative products for health-conscious consumers. The products were made from cereals and were rich in vitamins, proteins, minerals, fibers, and other nutrients. The products were sold in modern trade retailers, health outlets, and on the firm's website. The products were suitable for busy office workers who needed nutritional food in a convenient form. The main target group was modern working females living in Bangkok and other major cities.

In addition to the healthy drink, the firm also developed a range of new products including coffee for weight control and a collagen drink for healthy and youthful skin. The main focus of the firm was on product innovation.

The firm had an NPD team and worked closely with universities and machinery suppliers to develop radical and incremental product innovations. It outsourced the manufacturing function to a number of independent food and beverage factories. This strategy gave the firm the flexibility of selecting from several manufacturing facilities for its production requirements. The firm did not have to commit its financial resources to

setting up manufacturing facilities. It could also order relatively small production batches. The downside of this approach was that the product cost tended to be high, as the manufacturing of the products was carried out by a third party. The owner of the firm was a graduate in food science.

Case 17. This was a firm in the jelly and beverage business located in Nakhonpathom. The firm started as a small firm manufacturing a limited number of flavored drinks for the middle and low income segments of the market. The products main target was school children throughout the country. Sales were growing steadily and the firm expanded its product lines to include jelly, flavored drinks, drinking water, Popsicle, and herbal drinks.

The firm has introduced a number of innovative products over the years. One of the firm's product innovations was a Popsicle packaged in a very innovative container that made it widely accessible and affordable to low-income consumers living in very remote areas. Another product innovation from the firm was a 3-in-one jelly. This was a jelly that featured three different flavors of jelly in one pack, while all other competitive products contained only one flavor in a pack. Both products were widely accepted by the consumers and gained leadership position in their respective markets. The firm had an NPD team and planned to introduce several new products in the next few years.

The firm's products were primarily sold in Thailand with extensive distribution coverage. However, export sales, particularly to neighboring countries such as Myanmar, Cambodia and Vietnam had grown rapidly in the last few years. The owner and managing director of the firm was a graduate in food science.

Case 18. This small firm which was located in Bangkok started over a decade ago with a product innovation in the health food category. Its first product was developed to address a major health problem. The product was a coconut cream substitute made from vegetable oil. Coconut cream was a popular ingredient in many Thai and other Asian dishes and desserts. However, some consumers preferred to stay away from food that contains coconut cream for health reasons. They believed that the saturated fat found in coconut cream could raise the body's level of low-density lipoprotein (LDL) cholesterol which could lead to the increase of cardiovascular disease. In contrast, the firm's coconut cream substitute contained only a fraction of the saturated fat compared to coconut cream and a lesser amount of fatty acids. This made it a preferred food ingredient over coconut creams for some consumers. The owner and managing director of the firm was a food scientist.

The success of the first product had led the firm to develop another product innovation, a cereal health drink. This was a very unique product made from organic rice germ, wheat germ, and oats. The product, which was offered in several flavors, was widely accepted by consumers who appreciated its nutritional values and good taste.

The firm won several awards from both governmental and non-governmental organizations in recognition of its achievements in product innovation.

Case 19. This was a firm in the ice-cream business sector. The firm was run by the second generation of the founding family and was located in Nakhonpathom province. Its main competitors were a small number of large multinational ice-cream firms that dominated the ice-cream market. The firm sold ice-cream to around 1,000 outlets that

were within a 300 kilometers distance from its factory, a small fraction of the estimated 200,000 outlets selling ice-cream nationwide. This was because the firm did not have an extensive logistics facility, so it was very costly for the firm to transport relatively small volumes of ice-cream to very remote areas. Another factor inhibiting the expansion of distribution was the high costs associated with ice-cream storage. The firm had to install its own freezers in all the outlets that carried its products. The main target groups of the firm's products were school children, factory workers and families in the middle and lower income groups.

In terms of product innovation and NPD, the firm had a much smaller number of new products compared to its larger competitors during the last few years. This was primarily due to the constraints in skilled personnel, technology, and laboratory equipment. Due to its size the firm found it difficult to recruit highly qualified personnel. It also lacked the technology and equipment that large firms had. However, the firm developed some innovative products that were based on popular local fruits such as durians and mango.

Case 20. This was a medium firm that manufactured snacks and instant noodles. The firm was located in Nakhonpathom province. During the 26 years since its inception, the firm launched a number of products including crackers, cookies, instant noodles, and instant rice porridge. Some of its products became market leaders in their respective market segments. The firm put great emphasis on product innovation. It developed strong working relationships with machinery and raw material suppliers from several countries.

The firm's first product innovation was its range of crackers with vegetable and fruit flavors. This was quite innovative as all other products on the market were prawn flavored crackers. The firm's crackers were very well accepted and became market leaders in their segments. Another product innovation was their instant noodles. Although the instant noodle market was highly competitive, the firm launched a new product especially developed for the food-service market. The product was designed to provide convenience and economy, came in a bulk pack and consisted of all the useful ingredients for the noodle vendors. The product was the largest selling food in the noodle shop segment. The firm's customers included children, students, households, food service operators, and private label retailers. The firm also exported its products to a number of countries including the U.S.A., Canada, EU countries, Australia, and several Asian countries. The owner and managing director of the firm was a graduate in food science. General information on all the above cases is provided in Table 4.1.

Table 4.1: General Information on Case Studies (from Case 1 to 20)

Case	Job title	Products	No. of employees	No. of NPD staff	New products per year
1	Business Group Mgr.	Dried & processed seafood	400	11	4-5
2	Owner & MD	Food & snacks	10	2	1-2
3	Director for NPD	Canned fruits & vegetables	200	5	2-3
4	Chief Operating Officer	Processed fish & fruits	1,000	15	2-3
5	MD	Thai desserts	40	2	4-5
6	Asst. MD	Rice	100	6	<1
7	Marketing VP	Processed fruits & vegetables	2,000	4	1-2
8	MD	Glucose & sweetener	250	5	<1
9	R&D Mgr.	Food seasoning products	350	7	1-2
10	Chief Executive Officer	Essence of chicken	15	6	2
11	MD	Coconut cooking oil	100	10	10
12	Factory Mgr.	Ready meals	180	4	50-60
13	General Mgr.	Ready to eat food	25	3	17-18
14	Marketing & R&D Mgr	Cereals, beverages & snacks	70	5	2
15	VP	Sausages	800	20	6-7
16	Sales & Marketing Mgr	Healthy & functional drinks	50	3	2-3
17	Director	Fruit juice & jelly	1,000	7	2
18	General Mgr.	Alternative coconut creamer	30	3	2-3
19	MD	Ice-cream	65	5	2-3
20	MD	Instant noodles	900	10	2-3

MD = Managing Director

4.3 Phases of Study

The first phase of the study was a focus group study conducted in two separate sessions. The first session involved 5 academic members from both Bangkok University and overseas in October 2014 while the latter were visiting Bangkok for an innovation conference. At the start of the session the researcher explained the aim of the focus group phase (as outlined in Chapter 3) and then presented them with the study's synthesized conceptual framework and sought comments from the participants. The participants raised questions and provided comments regarding the conceptual framework. More details of the results are presented in the next section. These comments were recorded and served as inputs for the second session of focus group. The second session of Phase 1 was conducted with three senior practitioners in the area of F&B manufacturing sector in Thailand. These participants had many years of experience in the NPD activities in the Thai F&B industry. During this session the participants were asked to express their views on the theoretical and potential practical aspects and the suitability of the study. Their inputs were analyzed and, where appropriate, incorporated into the question guide for the phase 2 semi-structured interviews.

During phase 2, study data was collected from 20 case studies using semi-structured in-depth interviews with senior executives of 20 F&B SMEs that were involved in NPD activities. Interviews lasted from 45 minutes to one hour. An interview questionnaire (see Appendix B) was used to assist the researcher during the interviews to ensure that all intended questions were asked, and to avoid drifting outside the areas of interest. Questions were both open-ended and close-ended. Although a small number of

questions required a precise and brief answer, most questions were designed to let information emerge from the discussions. Participants were given the opportunity to express their opinions on the topic of interest as freely as possible. While most of the interviews were done in English, some participants (cases 2, 5, 9, 19, 20) preferred to be interviewed in Thai.

When a participant agreed to the interview, an interview guide containing all interview questions was sent to the interviewee a few days prior to the interview taking place. The purpose of this procedure was to ensure that the participant was given enough time to read the questions before the interview. This would enable her/him to reflect on the NPD activities performed in her/his firm and to think about her/his answers to the questions. All the interviews were audiotape recorded and supplemented by note-taking when key points were made. These audiotapes and notes were transcribed and reviewed shortly after the interviews. Subsequently, the within-case analysis was performed while the information was still fresh in the mind of the researcher.

The 3rd phase of the research involved a sense-making focus group study where the members of the focus group were given the aims of study, results obtained from the above two phases, and were asked to provide some sense, in the form of sense-making links between the study objectives and the above results. Due to the nature of this phase, the focus group members were selected from the leading academics in the field. Details of the results from this and other phases of the study are provided in the next section.

4.4 Results of Initial Focus Group

This focus group consisted of two separate sessions. Members of the first session

included academic members from a US (one), South Africa (one), and from the Institute for Knowledge and Innovation -South East Asia in Bangkok University (3). In the second session three senior practitioners in the area of F&B manufacturing sector in Thailand participated in the discussions. The researcher first presented the study goals, literature review, and the theoretical framework of the study in 30 minutes, and then the participants were asked to provide their views on the theoretical as well as the potential practical aspects of the study. More specifically they were asked to discuss the suitability of the theoretical framework of the study as well as the suitability of the study for the SMEs in F&B industry. A summary of the major points raised and discussed by the participants is discussed below.

During the first session, the following issues were raised:

1. Generally, the group liked the theoretical framework of the study. One participant suggested that there might be a better way of showing the proposed integrated theory than through a two dimensional table. However, the researcher explained that the theoretical framework of the study was more a taxonomy than a relational theory. One other participant raised the issue of formalization of the taxonomy using a form of logical language that was suitable for formalization of the taxonomies. The researcher explained that such language was generally beyond the Business Schools' curriculum but a future collaborative research with a researcher from the field of engineering or management science would be considered.

2. The group raised concerns about the definitions of the innovation strategies and the fact that the current definition(s) provided by the researcher did not provide rankings

among various ‘outsiders’. For example, “‘customer’ as an outsider can only provide what they know and that may not necessarily result in innovation” OR “which of these ‘outsiders’ are more important?”. These discussions caused the researcher to slightly modify his definition of the innovation network strategy to reflect that the mix as well as the ranking of those ‘outsiders’ was completely situational to the company and currently no theories existed to precisely determine what mix was preferred in what situations. Therefore, it was established by the company strategist.

3. One participant raised the issue that the paper needed to be clear about the measurement of innovativeness. The researcher explained that the current *innovation types*, including *incremental* and *radical* innovation, were the original intention of the researcher and not the ‘intensity’ of the innovation. The group suggested that to avoid any misunderstanding the researcher should avoid the term *innovativeness*, and use the term ‘innovation type’ instead. This suggestion was adopted by the researcher.

During the second focus group session, with three executives of Thai F&B SMEs, new insights were received from a different perspective as the participants were senior executives within the F&B manufacturing sector in Thailand. Members of this group included General Managers of two F&B SMEs (non-carbonated drinks and ice sticks, cooking ingredients; and non-dairy cream) and a Marketing and Sales Director (health and beauty beverages e.g., for whitening of skin, anti-aging, and/or weight loss). The group was first introduced to the goals of the study, explained the academic concepts in NPD process activities as well as existing main innovation strategies. The potential/desired link between the two, the fact that not any NPD initiative may

necessarily be innovative, and the need for integration of the NPD and innovation strategies were then expanded upon. Finally the researcher explained the theoretical framework of the study. The group was then asked to discuss the suitability, relevance, and significance (if any) of the study to the F&B SMEs in Thailand. Below is a summary of the points raised and discussed:

1. The group did not see much difference between the differences in various innovation strategies and mentioned that they both consciously and unconsciously adopted various forms of innovation strategies. One of the General Managers suggested that all five innovation strategies could be used throughout the NPD process. For example, getting new ideas from outsiders and designing the product using internal resources. They were not clear about “*why the study should not put all these forms of strategies in a single holistic strategy?*” The researcher explained that adoption of various innovation strategies during various NPD activities was quite acceptable and that was the reason for proposing the two dimensional theoretical framework/taxonomy. The group argued that a mix of innovation strategy could be adopted in a single NPD activity, particularly during the *idea generation* stage. This important comment was noted and welcomed by the researcher and was further considered during the data collection and analysis phases of the study.

2. The Sales and Marketing Director suggested that due to the importance of the ‘customer’ such an entity had to be excluded from the current definitions of the innovation strategies and be treated differently, or, perhaps as the third dimension of the proposed theoretical framework. The researcher explained that while such distinction

might be an interesting subject for future research, in the current study the ‘customer’ entity already had strong presence in three of the five strategies and such distinction would completely change the direction of the study without any apparent benefit. The group agreed that this could be postponed to a future study.

3. The group argued that the definition of ‘product innovation’ must not only include acceptance by the customers. In the context of F&B industry, any NPD initiative was quite sensitive in respect of other issues such as health and safety for human or animal consumption. However, the group agreed that this would be included in the area of product quality. Addressing the issue of product quality would be outside the scope of the current study with the assumption that the customer would only accept a product that was of good quality. Although the topic of ‘good quality’ was beyond the scope of the current study, it was part of various sub-activities such as product testing that was under the supervision of several government agencies and other independent sources.

4.5 Results of Interviews

The semi-structured interviews were conducted with 20 participants selected from 20 F&B manufacturing SMEs in Thailand. These were senior executives who were involved in their firm’s NPD activities. This was a diverse group of F&B manufacturing SMEs. The numbers of years the participants were with the firms ranged from 2 years (case 10) to 26 years (case 20).

There were many types of products that these firms manufactured including instant noodles, fruit juice, food ingredients, essence of chicken, ready meals, healthy drinks, seasoning, seafood, and desserts amongst others. The number of new products developed

by these firms varied from less than one (cases 6, 8) to 50-60 products (case 12) per year, and the number of employees ranged from 10 (case 2) to 2,000 (case 7). The firms sold their products to either the local market (cases 5, 10, 14, 16, 18 and 19) or international markets (case 3) or both (for the remaining 13 cases). Their customers included end-users, retailers, wholesalers, importers, other F&B manufacturers, and private label retailers. The size of their NPD team ranged from 2 (case 2) to 20 people (case 15). Some of the manufacturers sold their products under their own brands, and some sold commodities or unbranded products. Among firms that had been in business for more than three years, sales derived from new products launched during the last three years ranged from 10%-80% of total sales.

To provide context for answering the RQs, participants were also asked a number of non-RQ interview questions. A summary of the results is presented in Table 4.1 and explained in the sections below.

Interview Question 8: How is the business environment; stable or volatile?

Some participants found the business environment volatile (cases 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 12, 13 and 20). The causes of the volatility included the unstable supply of raw materials as a result natural disasters, over-exploitation of the natural resources, or seasonality; economic uncertainty which affected consumer demand; high competition; changes in consumer preferences; a lack of brand loyalty among customers; disruptive changes in laws and regulations from Food and Drug Administration (FDA); demands from modern trade operators which kept on squeezing more trade margins out of their suppliers; and demanding customers who were well-informed as a result of better

education.

Case 1: For the seafood the raw material in Thailand, that is, the catching, is very low which means the supply is not very stable. Sometimes natural disaster happens that affects supply (e.g., flood in the Southern Thailand), the supply will be short for about a week. Some of the fish that we buy it delivered from the south and the roads may be blocked.

Case 3: Supply varies according to seasonality. High price and low price in a year, so you have to plan accordingly.

Case 4: From one point, when economy is bad, canned fish sale is high. When economy is good, dehydrated fruit sale is high so we have a balancing factor here. However both businesses are very volatile due to many unpredicted and uncontrolled factors. For canned fish, you cannot control metal price and quantity of fish caught. For dehydrated fruits, you cannot control the weather, highly seasonal.

Case 7: Beverage business is very dynamic. By nature, Thai people love to try new things, but they will not stay with that for long time. They will switch back to what they were used to. But they would love to try new things every year or so. These are normal for beverage business in the Thai market.

Case 13: Business environment is volatile. It is not easy to run this business as a start-up. It is a very competitive market because of many big players in the market. Hard to compete on economies of scale for cost of raw materials. Many laws and regulations on this new technology from Thai Food and Drug Administration, they change very often.

Interview Question 15: How specifically can your business benefit from NPD when competing on the market? Can you also give some historical examples and/or hints?

The benefits of NPD to business as described by the participants included: improvement in product quality (case 1,); ensuring business survival (cases 2, 3, 4, 9 and 10); gaining more business (cases 5, 6, 7, 8, 9, 13, 14, 16, 17, 18 and 19); uplifting brand image (cases 7, 15 and 19); improvement in margin (cases 11 and 13); increasing product varieties (cases 12); and securing market leadership position (case 20).

Case 1: We have fish snack that we sell in the local market, we have serious problem here as the colors will fade if we keep the snacks for 1-2 months. We have set up an R&D team to deal with this matter, so that our fish snacks remain unchanged when compared to our competitor.

Case 2: When I started the business, I launched biscuit that was not so successful with Thai demand. So we redeveloped with new products to be able to survive the business.

Case 5: New products help us get more business from modern trade.

Case 7: Besides additional sales which are natural, new products will help uplift the brand and make us an active brand. The perception of our brand to the Thai consumers is an old, very conservative, and very old-fashioned. So in the last couple of years we tried to launch new products which are healthier, more modern, and fit better to the new generation's lifestyle.

Case 11: For example, in the case of virgin oil after we improve to organic oil we can increase price by 10%. Coconut waste can be converted to flour and make 10 times higher price than animal feed.

Case 20: New product that is truly innovative gives us a chance to be the market leader in that market segment because we will be the first to launch the product. When our competitors launch competing products, we already secure market leadership position.

In general, all participants found new products crucial for the survival, growth, profitability, and sustainability of the business, as well as uplifting brand image.

Interview Question 19: How does the size of your firm impact on your NPD initiatives?

The participants generally responded that firm size did not really have any direct impact on NPD initiatives. However, some participants pointed out that small firms had a disadvantage in attracting skilled people, and might not be able to invest in large or sophisticated equipment. This could possibly hamper innovation capabilities.

Case 5: Yes. If we were bigger, we can have more skilled people and modern laboratory.

Case 20: Small firms do not have the necessary resources to do new product development like large firms do.

It is interesting to note that some participants raised the issue that a large size in terms of number of employees in a firm could actually be counter-productive. The scarcity of labor and the rapidly increasing rate of wages had put labor-intensive firms in

a disadvantageous position. Hence, firms focused on product innovation to create products that could be manufactured with lower number of people.

Case 7: The direction for us to do the R&D or product innovation is that we try to get away from the labor intensive business. So for the innovation, we try to focus on the less labor required products. We are working on that. We have foreseen that labor will be the issue for the future. We will be harshly affected if the labor cost for skilled workers keep on increasing.

In short, most participants believed that small size did not present any problem for their NPD initiatives. However, some cases stated that small firms had financial constraints and also found it difficult to attract skilled employees to the firm.

4.5.1 Summary of Results for RQ1.1

RQ1.1: What are the current NPD practices among Thai F&B manufacturing SMEs?

Results for this RQ are discussed below in the context of the answers provided to the related interview questions.

Interview Question 11: Who is responsible for the success or failure of the NPD projects?

Three levels of authority were adopted by the researcher for categorizing responses. These were: (i) executive role, which gave the NPD projects a strategic importance, (ii) tactical role, which gave the NPD projects a tactical importance; and (iii) operational role that assumed NPD projects as being yet another operational project. In the majority of the 20 cases, the responsibility for the success or failure of the NPD projects rested solely

with executives such as the managing director (MD) who may also be the owner of the firm (cases 2, 5, 6, 8, 10, 11, 14, 15, 16, 17, 18, 19 and 20).

Case 6: Ideas come from me (MD). When we layout all the strategy and brand positioning. We have to analyze research result. I study hard and analyze to get insight of the customers. I heavily rely on research and I also talk with our customers, chefs, and restaurant owners.

Case 17: The owner, the managing director. You have to decide it yourself. A lot of investment, maybe 50 million baht for one product. We have a project manager. But he is not the one who is responsible for the project success.

In the remaining cases (cases 1, 3, 4, 7, 9, 12, and 13) the responsibility was shared with line managers including the marketing manager and R&D manager.

Case 1: I (the MD) am responsible for the NPD projects, but also every manager when it comes to new products. For example, when we have new product project we will discuss it first if this product will work in the market. We then analyze the product and if everybody agrees we will write a business plan and will pass it to the R&D staffs.

Case 7: Marketing team is the project champion for any new product development project. The project involves R&D team, Quality Assurance team, Engineering team, and Marketing team.

None of the cases reported the responsibility of the NPD projects being given to an operator, for example a Facebook operator.

The above results indicated that all of the eleven small firms, with less than 100 employees, fell into the category 1, implying that small firms used their R&D capabilities

only in order to implement their NPD projects. Exceptions were case 8 (250 employees), case 15 (800 employees), case 17 (1,000 employees) and case 20 (900 employees). After further review of the interview transcripts it became clear that three out of the four above cases were directly run and owned by executives who had graduated specifically in Food Science Technology. While this may be considered as a positive factor, the imbalanced orientation caused by the lack of business knowledge proportional to such highly technical knowledge intensive venture might not be a desirable position in the light of the current volatile business environment.

In the second category, there were seven larger firms with an average number of employees of 679. It became evident that the top executives of the larger companies tended to involve other line managers in the NPD process activities and as a result, there was a far better chance that new ideas were being generated, new concepts were being developed, and new methods and principles were embraced. This translated into adoption through most of the necessary NPD activities. Entering into such a complete cycle of NPD activities in these cases would, according to the existing literature, directly translate into more satisfactory new products and services and ultimately increase the chance of success (Cooper & Edgett, 2008; Floren & Frishammer, 2012; Verworn et al., 2008).

Interview Question 10: How is the NPD project team structured (if any)?

Two patterns emerged for this question. One group had a well-structured NPD team in place (cases 1, 3, 4, 7, 9, 11, 12, 13, 17, and 20):

Case 1: At the top of the structure sits the management team, followed by group business manager or R&D manager, and R&D staffs.

Case 3: Six people. The owner and managing director, the marketing manager, and her assistant, and assistant factory manager, quality control manager who is in charge of production supervision, and quality management representative who has to be informed on the process approval.

On the other hand, the other group had only a loosely structured team that was formed on an ad hoc basis (cases 2, 5, 6, 8, 10, 14, 15, 16, 18, and 19):

Case 2: I look at market and product. But I subcontract product to other people to develop product for the right taste, texture, then determine if it is in demand in the market.

Case 15: There is no pure manager in R&D. The owner is in charge, the rest is the middle level. They are ordinary workers.

When comparing the above results to the results obtained from interview question 11, one pattern could be clearly observed, therefore, that firms who explicitly engaged line managers in their NPD process tended to have a well-organized NPD structure. Firms whose top executives were fully responsible for the NPD function and did not delegate major roles for NPD activities to line managers either had a somewhat loosely organized structure for NPD or none at all. Exceptions were cases 11, 17, and 20 that had a well-structured NPD team. The dissimilarities between these SMEs and the other 17 SMEs were that these SMEs claimed that their managing directors or CEOs were mainly in charge of new product projects, and they also had a well-structured organization for NPD in place. After reviewing the raw data and making additional telephone calls to the above three participants, one interesting sub-theme emerged from these three firms; the

firms had a significant volume of sales from export business. A further investigation into this matter revealed that (i) almost all the SMEs that claimed to have a well-structured NPD organization also stated that their export business constituted a significant portion of their revenues; and (ii) in doing export business, SMEs had to cope with different market requirements from their overseas buyers because of the different consumer preferences and other regulatory rules and laws including food safety standards that existed in those export markets (e.g., cases 1 & 4).

Interview Questions 13 & 14: What are the various activities of your current NPD process and practice?

The majority of participants mentioned that they had a formal NPD process (cases 1, 2, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 17, 18, 19, 20), whereas the others (cases 3 and 16) said that they did not have a formal NPD process. Explanations from some of those SMEs that claimed to have a formal NPD process were:

Case 7: First, we look at the market to see what will be the potential product. Then we look at our facilities to see whether we can produce or whether we require further investments for the machines or raw materials. After that we create product concept and ask R&D to make product sample like initial sample, and we try. Among the team, if we feel it is almost there, then we will go one step further to do concept research tests with the consumers and give product samples for the research. We call it prototype testing. If we get a positive feedback, we will proceed further to calculate costs. If the result is negative, we may re-work. For every step we have to make a proposal to the executive manager.

Case 9: First, we get idea. We collect product information in the market, check consumer behavior and market environment, search internet. Second is concept development. This is based on knowledge and expertise that we have and measure to produce product that fits customer need by me and the R&D team. Then we build model, product design, the product, and perform packaging.

In contrast, some SMEs stated that they did not have an NPD process.

Case 16: We are small, don't have a full system. It is risky. We have to use our judgment. Sometimes we fail because we don't know well enough. I wish if we had more money, then we would do it better.

Among the SMEs that claimed to have a formal process for their NPD, they described their process activities as consisting of the standard NPD process namely, scanning of the environment, idea generation, concept development, assessment of the business potential, product design, developing product prototype, product testing and product launch. However, the sequence and number of activities that were adopted differed from firm to firm.

Generally, the concepts for new products came from various sources including the market (both customers and trade), the suppliers of raw materials and machines, and from attending trade fairs. Customers seemed to be the key source of product idea generation, as stated below.

Case 8: From customers. We go to customers and get what they need. Actually we have sale from our contact and we keep contacting them. Then we get some ideas what they need. We try to develop that fit their need or service, just a prototype sample. Then

we send them to customer to test the product. Start pilot plant to scale up before going to commercial run, production.

Case 9: First, we get idea from both internal and external sources. We collect product information from the market, check consumer behavior and market environment, and search internet. Second is concept development. This is based on knowledge and expertise that we have for producing the product that fits customer need by me and R&D team. Then we build model, product design, the product, and packaging.

The data suggested that the current practices in NPD were basic and simple. Further investigation of their current practices in NPD revealed that all except two cases adopted a responsive market orientation approach (Lamore et al., 2013; Wang et al., 2013) to NPD. Firms that adopt a responsive market orientation approach are firms that focus on immediate customer needs (Lamore et al., 2013). These firms initiated an NPD project when customers explicitly requested a new product, or when forced to by competitive pressures.

Case 2: First I check market to see demand in the market. Next I check to see if it's feasible to develop. Next I proceed to product development at laboratory scale. Then I proceed to implementation at production scale.

Case 5: If we have requests from modern trade (the main customer) and all other steps go as planned, then we launch the product.

However, two SMEs from the 20 SMEs studied (cases 4 and 15), not only responded to customer's requests, but also adopted a *pro-active market orientation approach* (Lamore et al., 2013; Wang et al., 2013). Firms that adopt a pro-active market

orientation approach are firms that focus on future market needs (Lamore et al., 2013). Pro-active market orientation positively contributes to market performance (Lamore et al., 2013). Case 4 and case 15 initiated NPD projects on their own in order to be one step ahead of their rivals and gain a competitive advantage.

Case 4: Ideas can come from R&D teams or Marketing Director who goes to see the market and customers, and tells R&D this is what he saw. Ideas can also come from the Chief Operating Officer who goes to many trade fairs and asks if R&D can develop something like what he saw. Marketing Director has sales view. R&D has technical knowledge in developing something that can be sold. When new ideas come up, someone will voice it in the meeting, and will ask if there is any potential, and see how many projects are on-going at the moment. If the idea has potential while there are already many projects, we will hold it. All of them will be voted by the R&D team, Marketing Director, and Chief Operating Officer, whether the project should be done or not.

Case 15: We start the idea from comments from sales. We will talk about marketing. We have four regions, people are different. Southern people are Muslims, they have their type of food. Comments from the sales, then my boss thinking. After the idea, we create, develop prototype, test the product and make adjustments. We have the sensory test. When it is OK, we go back to the sales force to get the reaction. We develop the name, packaging. How to pull people to interest in our product. Like this one, the name is Hot Hungary. The taste is more chili, spicier. We discuss and everyone

agrees with the name. Then the next is the design. This is the flag of Hungary. Not only are the customers the source of innovation, but also the chefs from outside.

Pro-active market orientation positively contributes to market performance (Lamore et al., 2013). However, where this study departed from Wang et al.'s (2013) study was that it did not find firms adopting responsive market orientation as a result of high technological turbulence. One possible explanation may be that as far as technological turbulence is concerned, the F&B industry is different from high-tech industries such as mobile phones or computers where technological turbulence occurs frequently and rapidly. The F&B industry is classified as a low tech industry (Suwannaporn & Speece, 2010) where technological advances occur much less frequently. The collected data suggested that the majority of the cases studied adopted a responsive market orientation because of existing market demand.

Further investigation into the two SMEs (case 4 and case 15) that adopted a *pro-active market orientation* as opposed to the more dominant *responsive market orientation* revealed that in both cases these SMEs had a much higher number of personnel in their NPD teams than those found in all other SMEs. While the average number of personnel in the NPD teams among the 20 cases studied was 6.5, case 4 had 13, and case 15 had 20.

4.5.2 Summary of Results for RQ1.2

RQ1.2: What are the major barriers to NPD process in the above organizations?

Interview Question 16: What are the main barriers to developing new products in your firm?

For this question and for the sake of consistency of the answers, the researcher had to intervene extensively by providing top level categories of barriers such as organizational barriers for example skills, in-house technology, and management insight; environmental barriers for example global and local business climate; and government regulations and subsidies such as Food and Drug Administration (FDA).

Cases 1, 3, 5, 10, 11, 12, and 16 stated the lack of appropriate employee skills was a barrier to NPD. All these cases, except case 1 which employed 400 people, had a smaller than average number of employees. The average number of employees in the 20 cases being studied was 379, while the above SMEs had from 15 to 200 employees in their firms. This implied that the lack of employee skills as a barrier to NPD was more likely to occur in smaller SMEs than larger SMEs. Small SMEs found it challenging to attract skilled workers to their firms.

Case 3: Lack of skills and knowledge in terms of technology to make new product.

Case 11: Difficult to get expert people for R&D for small business. They don't like to work in small companies. They prefer big companies. So, our main barriers are finance, technology, and people.

Case 12: Skills of our staff, because every new product and new sample, when we start in our production line, we have to train the skills our staff for the quality. Sometimes the products from production line and R&D lab are different. The first production line needs a little change because the equipment and condition are different from the R&D lab. So the first production, the R&D, Quality Control, Quality Assurance, and Production will discuss with production line.

The above findings supported Saigosoom's (2012) argument that weak employee skills in the product development arena are a barrier to NPD. Furthermore, Avermaete et al. (2004) claim that the skills of the workforce play a key role in product innovation.

The lack of technology and an in-house laboratory was another barrier to product innovation (cases 3, 4, 5, 8, 9, 11, 19, and 20). SMEs that did not have an in-house laboratory lacked the flexibility to carry out laboratory tests for or on new products economically and speedily because they needed to outsource the laboratory work. Some new products could only be manufactured with new technology that SMEs did not possess, and the costs of acquisition of the technology could be prohibitively high.

Case 5: For internal barriers. We're not big so we do not have our own laboratory. We have to use outside laboratories so it is costly and time-consuming.

Case 19: First, technology and machinery. We don't have high technology and sophisticated machines.

Case 20: The other barriers involve technology and machinery. Sometimes the technology or the machinery that is needed to manufacture the product is not available.

Lack of support from other management members (cases 3 and 7) could be a barrier to product innovation. The causes for concern were related to financial considerations and/or lack of confidence in the new product.

Case 3: Fear of having longer return on investment from the pay back for the machine invested.

Case 7: If we do something really new and get a rejection, it starts with the organization itself. It is just too new, people may not believe, especially for products that

come from dreamers. So others who do not share the dream would not understand.

Sometimes the production facilities that we have do not match with what we want, so we will require further investments. But this is solvable, I would say. It is the objection and obstacle that we can overcome, if we can convince the top management to invest further.

The above finding is somewhat unexpected, as the issue of lack of management support as a barrier to NPD in F&B Manufacturing SMEs does not surface in the existing literature. Instead, Saigosoom (2012) finds that the lack of time of key decision makers is a barrier to NPD. This suggests that more research is needed to shed light on this issue.

Lack of market information (case 19) could be a barrier to NPD. F&B SMEs that did not have market information found it difficult to develop new products that would satisfy market needs.

Case 19: The lack of knowledge about the market, like changing consumer preference, lifestyle, trends, makes us look like a follower, not a leader. We always have to follow other bigger competitors.

This finding supports Talegeta's (2014) argument that lack of market information is a major barrier to product innovation. A further examination of case 19 revealed that the firm was a manufacturer in the ice-cream business. The ice-cream business had undergone some major changes in the last few decades. In a follow-up telephone conversation, case 19 explained that the ice-cream business had seen a rapid decline in the number of SMEs as the market was progressively dominated by only a few multi-national firms. These major ice-cream firms were active in gathering market information and used the information to create new products. This led to the frequent introductions of

new products from the major firms. In contrast, SMEs generally did not have the capacity to acquire relevant and up-to-date market information. As a result, SMEs fell behind the major firms in NPD activities. SMEs were mainly selling traditional types of ice-cream in the middle and lower market segments, and did not fully participate in the new market segments created by more fashionable new products. This probably explains why a large number of ice-cream SMEs had not survived in this market segment.

Another internal barrier identified by the participants was the lack of cost competitiveness (cases 3 and 13). SMEs' volumes of business were relatively small compared to large firms. This deprived SMEs of the benefit of economies of scale. The higher costs were found to be obstacles to NPD activities.

Case 3: External barrier, competitiveness, price cutting, very low price, lowest possible cost of goods sold to compete.

Case 13: We cannot compete the price with big brands in the shelf in the supermarket.

SMEs in general were owned by entrepreneurs who did not have large financial resources. The lack of financial resources could hamper their NPD initiatives (cases 5, 11, 14, and 16). SMEs also found it more difficult to get loans from financial institutions, and the costs of borrowings were generally higher than what large firms pay.

Case 11: We're SME we start from small business, we don't have budget, R&D, laboratory, pilot plant. That's our main problem.. ..So, our main barriers are finance, technology, and people.

Case 14: Number 3 it is about if new product is very new, sometimes we have to educate the customers. But we have no budget to do advertising, but have to do below the line. Like Gaba, we have to educate them.

Regarding external barriers to NPD, one of the main barriers concerned restrictive laws and regulations, such as FDA laws and regulations, both from the local FDA and FDAs in the countries that SMEs export products to (cases 1, 4, 9, 13, 14, 18, and 19). What made things more complicated was that different countries used different laws and regulations, and the authorities kept on changing these laws and regulations continually. The approval process from the FDA was also very time-consuming, causing considerable delay and incurring excessive costs to the NPD project. Additionally, some of the laws were archaic and could not be applied to the business environment or climate today. There were instances where although very much required and necessary, the FDA would not make a decision. Some of the comments expressed by the participants illustrated these issues:

Case 1: The barrier can be different laws from different countries. For our products in the U.S. we can put preservatives, for China they do not allow us to put any preservative. For Japan, they allow to put synthetic color. For local they don't allow that. This is a little difficult to know every country's regulations.

Case 14: Sometimes it is the regulations from FDA. It makes us long time to make new products. We plan to launch a new product, we have 2-3 months for FDA, but when we talk to modern trade, but we have to wait for FDA approval.

From all the interviews conducted, only case 10 explicitly mentioned that FDA was not a barrier.

Case 10: FDA isn't the barrier, very straight forward process within time frame.

This comment prompted the researcher to find out more about the nature of the business of case 10. A review of the background information revealed that this SME's core business activity was the manufacture of chicken essence. Although the firm was established only two years ago, essence of chicken as a product had been available on the Thai market for several decades. This was an existing product that had long been approved by FDA for other firms in same line of business. Therefore, when case 10 requested the FDA's approval for its product, it did not encounter any problems. It should also be noted that case 10 had only launched one product in its two years history, so it did not have as much experience with FDA as most other cases which may explain the positive observation on their part.

In contrast to Saigosoom's (2012) argument that restrictive regulations and standards from FDA act as innovation promoters by encouraging and supporting a higher quality of product innovation, none of the cases studied stated that FDA restrictive regulations and standards helped them achieve higher level of product innovation. To the contrary, the SMEs that participated in the current study stated that FDA was an obstacle to NPD.

Case 18: Sometimes the regulations do not support it. We cannot categorize our products. We need a lot of time to convince them.

The contradictory results between Saigosoom's (2012) study and the current study can possibly be caused by (i) the different regulations that FDA use for different types of products; some regulations may lead to more positive end results than others; and (ii) different officials in FDA may use different criteria in making critical decisions, because personal discretion plays a key role in the FDA's approval process. As a result, the FDA process is seen as complex, slow, and with a high degree of uncertainty.

Case 4: Government is always a challenge.

Case 13: First, laws and regulations from government sector. They have many protocols, many processes to get approval to sell from the government.... We cannot overcome the laws and regulations. When we sell to the restaurants, it is one of the ways to avoid FDA.

In summary, the FDA and other governmental regulatory bodies, both local and overseas, were found to be main barriers to NPD in the F&B business.

The lack of raw materials also posed an obstacle to NPD activities in cases 1, 3, and 4. Some raw materials, such as farm produces and fish, were very seasonal and were in short supply during the low-season. Costs also fluctuated highly between high and low-season periods. In other cases, excessive harvesting led to disruption of the sustainability of raw materials. For instance, excessive fishing had adversely affected the volume of marine life in the Gulf of Thailand and nearby waters. Natural disasters such as flooding, drought, and extreme weather also negatively impacted upon the sources of supply.

Case 1: For the seafood as everybody knows the raw material in Thailand the catching is very low, which means the supply is not very stable. Sometimes natural

disaster happens that affects supply. Let's say flood in the Southern of Thailand, the supply will short for about a week. Some of the fish that we buy it delivered from the south so the roads are blocked.

Case 3: Demand is quite stable, but supply varies according to seasonality. High price and low price in a year, so you have to plan accordingly. You have commitment with suppliers. Cost of the year we have to average cost of goods sold. We have price per unit otherwise you get so excited when price is up and down. So you get uninterrupted cost of raw material.

Case 4: For canned fish, you cannot control metal price and quantity of fish caught. For dehydrated fruits, you cannot control the weather, highly seasonal.

The volatility of raw material not only affected normal manufacturing, but also hindered NPD activities. This finding confirms Saigosoom's (2012) argument that seasonal/raw material limitation is a barrier to food SMEs' NPD activities.

Resistance from customers to new products was another barrier to NPD for some F&B manufacturing SMEs (cases 4, 7 and 14). Customers expressed a disinclination to purchase new products, particularly if the new products were more expensive. Lack of appreciation of the benefits that the new product had to offer could also be a cause for the resistance. Customers who were wholesalers or retailers were also reluctant to stock new products because they were uncertain of the level of consumer acceptance for the products.

Case 4: External factor is the customers. Customers always stick with old products. New products are more expensive because they are more sophisticated. When come up

with new products, we need to set higher prices to be the first mover, because we have high R&D costs.

Case 7: Maybe the market is not ready for that kind of product. Sometimes we just have it too early, like the 100% no sugar added coconut water product that we conducted a research 3 years ago. At that moment, the Thai people just love the sweet coconut water. A few years past, the trend change. More people want to have more healthy products. Sometimes it is the gap between the launch and first conception.

As explained by the participant in case 7, some new products that were not accepted by customers when they were first launched could become successful later when the market became more receptive to changing trends. The current study supports Saigosoom's (2012) argument that customer's resistance to change is a main barrier to product innovation.

The progressive shift in bargaining power from manufacturers to modern trade such as hypermarkets, convenience stores, supermarkets, and cash and carry stores in the last few decades has also resulted in making modern purchasing methods a barrier to NPD (cases 4, 5, and 14). The landscape of the retail business changed considerably as modern retail chains such as Tesco, 7-Eleven, and Big C (Casino) increased their number of outlets to cover all parts of Thailand. These modern trade channels had amassed an unprecedented amount of bargaining power through their high volumes of business. Manufacturers in general, and SMEs in particular, found the modern trade retailers very demanding in terms of product specifications, product selections, trade deals, listing fees, and payment conditions. SMEs did not have much choice except to comply with the

demand of the new market entrants if they wanted their products to be sold through this very important channel.

Case 4: Our customers are distributors, department stores, and not the end users. Have to convince them that consumers will like it, somehow, even though the price is higher. Concerns about customers can be a barrier.

Case 5: For external barriers, modern trade requirement is very challenging. They want products with much longer shelf life than normal. They also set high standard for product safety and taste.

Case 14: Modern trade is also a barrier. They ask for listing fees. I have to pay to them. Sometimes, it is a new product. If we are not sure if the product makes money or not, we have to think more.

To the researcher's knowledge, the existing literature has not identified new market trends as an external barrier to NPD initiatives. This is probably due to the rapidly changing context in the Thai fast moving consumer goods business where global competitors having entered the market have gained dominance and key positions in a relatively short time span.

Another external barrier was competition (cases 7, 8, and 9). Competitors that quickly copy a new product can sometimes reap the full benefits of the NPD efforts from the originating firm (Teece, 1986), and put the originator of the product innovation in a disadvantageous position.

Case 7: A lot of competitors also have this coconut water product. Every competitor jumps in the same time.

Case 8: First, for my business it's very high competition. What I did is to create competitive advantage compared to other suppliers.

Case 9: Competitor is a part.

Interview Question 17: What actions do you take to overcome these barriers?

Please be specific.

The data supports Larsen & Lewis's (2007) argument that SMEs are just as likely to live with or ignore a barrier as resolve it (cases 9, 13, and 19). For example, in dealing with restrictive regulations and standards imposed by government agencies such as FDA, some SMEs decided to live with the barrier:

Case 13: We cannot overcome the laws and regulations. When we sell to the restaurants, it is one of the ways to avoid FDA. We sell it like raw materials.

Case 19: For FDA, we cannot do much. They are government officials.

In contrast, some SMEs chose to spend time and resources resolving the barrier (cases 1, 14, and 18):

Case 1: For the law, we ask customers to send reference or we contact NFI (National Food Institute of Thailand) or Treasury Department to clear laws for each country.

Case 14: For FDA, I have to deal direct to know more what the barriers are. Then we keep the knowledge for the next time. We have to learn more. I ask my friends or my sister to help. I make connections. I am a pharmacist. I know my sister's friends. It is easy when you know someone. You have to go direct and find which was to do.

To overcome the barriers NPD were faced with, a number of actions were taken by

some of the firms. Table 4.2 illustrates the actions that emerged from the collected data for overcoming obstacles.

Table 4.2: Actions Taken to Address Barriers to NPD

Barriers to NPD	Actions taken to address barriers
Lack of relevant technology	Establish relationships/network with outside technicians, business partners, machine suppliers, universities and other technological institutes Hire part-time consultants (for financial reasons) Develop production process
Lack of raw material	Source raw material from other countries Develop alternative raw materials
Laws and regulations from FDA and other government offices	Seek help from customers to send references to authorities concerned, or seek help from National Food Institute (NFI) or other government agencies Make product adjustment to comply with FDA regulations Sell to restaurants as ingredients so as to circumvent FDA's regulations Create, store and use knowledge from experience with FDA
Resistance from customers	Convince customers (trade) that it is in their long term interest if they support new products Conduct product demonstration and/or communication campaign
Demand from modern trade retailers for high listing fee	Gain a better understanding of modern trade retailers' requirements Test marketing at trade exhibitions to assess market potential before committing to modern trade's fee
Lack of cost competitiveness	Develop new formulation for the product

(Continued)

Table 4.2 (Continued): Actions Taken to Address Barriers to NPD

Barriers to NPD	Actions taken to address barriers
Resistance from people inside the organization	Seek management's support to move the project forward
Lack of financial resources	Give priority to an R&D budget
Lack of skills	Develop the skills of employees
Concern for financial returns	Seek outside information to support NPD decisions
Lack of market knowledge	Sponsor staff to participate in outside marketing training programs

The following sections discuss each of the barriers and the actions taken by F&B SMEs to deal with them in more detail.

It is evident from Table 4.2 that a lack of relevant technology was a barrier that many F&B manufacturing SMEs faced. To overcome this barrier, F&B manufacturing SMEs collaborated with external parties such as suppliers, universities, customers, government agencies, laboratories, amongst others to enhance their technology capabilities. This strategy is in line with the networking strategy presented by several researchers including Hansen & Birkinshaw (2007) and Serra & Garcia (2013). In addition, SMEs developed their production process in order to meet their technology gap. This initiative is part of a resource-based strategy (Paladino, 2007). Another strategy that SMEs adopted was the employment of outside experts or technicians to augment their organizational knowledge. The use of inflows of knowledge to accelerate innovation is a

key element in an open innovation strategy (Chesbrough & Brunswicker, 2014). In short, to address the issue of lack of technology, Thai F&B manufacturing SMEs used several strategies identified in the literature including networking, resource-based, and open innovation.

To overcome the barrier related to raw material shortages and high costs of raw material, Thai F&B manufacturing SMEs adopted two strategies. First, they sourced raw materials from other countries, particularly from neighboring countries such as Vietnam, Indonesia, and Myanmar. These countries could generally offer very competitively-priced raw materials because of several favorable factors including a relatively lower wage rate in these countries compared to that found in Thailand; the costs of transportation were not so high due to their proximity to Thailand; favorable currency exchange rates; and lower import tariffs as a result of the ASEAN economic community agreement. These factors prompted some SMEs to source their raw materials from other countries (cases 1, 9, and 20). Secondly, some SMEs developed alternative raw materials to substitute for those that were in short supply or were costly (cases 2 and 20). This strategy enabled the SMEs to keep the cost of materials at a lower level and maintained an uninterrupted flow of products that might otherwise be disrupted by shortages of raw materials (case 2).

The barrier relating to FDA's and other governmental agencies' restrictive regulations and standards has received little attention in the literature. Saigosoom's (2012) study is one of a rare piece of research that raises and addresses this issue. SMEs are just as likely to live with or ignore a barrier as resolve it (Larsen & Lewis, 2007).

SMEs perceive governmental agencies such as FDA as official authorities that are bureaucratic and inflexible (cases 9, 13, and 19). Hence, FDA's regulations and standards can be perceived as official procedures to be strictly followed, rather than barriers to be overcome. This perception may well be responsible for the small amount of research in this area. In the current study, the researcher discovered that (i) some SMEs (cases 9, 13, and 19) recognized that FDA's regulations and standards were a barrier to NPD projects, but either there was not much an SME could do about it or it was not worth the time and efforts to take any action; and (ii) some SMEs (cases 1, 14, and 18) recognized that such barriers existed, and attempted to overcome these barriers. These SMEs adopted various strategies including soliciting support from other governmental agencies or trade partners to handle the barriers; building a knowledge base on FDA so that lessons learned from previous projects could be used to help future projects; building connections with well-placed people to assist in FDA affairs; and, introduced frequent communications with FDA personnel to influence their opinions.

For SMEs that sold their products to the trade channel, their direct customers were wholesalers, retailers, and importers. These customers played a key role for the success of a new product because they distributed the product to the end consumers. However, the trade might not want to stock a new product, particularly if there was no evidence that there was a market demand for it, or the new product cost more than existing products. Faced with such obstacles, SMEs had to adopt marketing and sales strategies aimed at convincing the trade that it was in their long term interests to carry the new product. The strategies might include setting up product demonstrations to illustrate the product's

superior quality or new benefits, launching communication campaigns and/or offering sales incentives for the initial period.

For SMEs that sold their products direct to the end consumer, the emphasis was more on conducting product sampling, educating the consumer in the product's benefits, getting product endorsement from credible sources and show-casing the product in consumer trade fairs. SMEs, particularly the smaller-sized firms generally did not use mass media advertising because of the high cost associated with doing so and financial constraints. Only some medium-sized firms used mass media advertising to create consumer demand. The current study expands from Saigosoom's (2012) study on this issue by investigating the strategies adopted by F&B manufacturing SMEs to cope with this barrier.

It is a general practice among current trade retailers to demand a listing fee from manufacturers who wanted to sell products to them. The listing fee is a charge that retailers collect from manufacturers before they agree to carry any products in their stores. Since this new market entry trade has gained more market shares in the last few decades, they have steadily increased their listing fees. SMEs that wanted to sell their new products to these retailers were forced to pay a listing fee which was non-refundable. If a new product whose listing fee had already been paid was not selling well, the manufacturer could incur a relatively huge loss because of the listing fee. As such F&B manufacturing SMEs must be very careful in selling new products in this market sector through this process. The strategies that cases 5 and 14 adopted to cope with this barrier included test marketing new products at trade exhibitions to assess market potential

before committing to any retailer listing fee and ensuring that they fully understood and complied with the standards and requirements established.

Although the collection of listing fees have been in practice for a few decades, the researcher has not found them included in the existing literature as a barrier to NPD in F&B manufacturing SMEs. This is probably due to the increasing pressure modern retailers have put on manufacturers, including F&B manufacturing SMEs, for higher margins that has led some SMEs to regard the listing fee as a barrier to NPD.

F&B manufacturing SMEs also found that the lack of cost competitiveness was a barrier to the development of a new product (cases 2 and 7). To overcome this barrier, some F&B manufacturing SMEs developed new product formulation, changed product ingredients and, if necessary, altered the manufacturing process in order to lower the cost of the new product. In contrast, Saigosoom (2012) argues that it is the high investment for developing new products that is a barrier to NPD for F&B manufacturing SMEs. Saigosoom's (2012) study does not present any strategy to overcome this barrier, nor does it identify the lack of cost competitiveness as a barrier to NPD projects.

Resistance from people inside the organization was a barrier to NPD activities (case 7). Some employees might not believe in the new product and this could derail the NPD efforts. To overcome this barrier, top management support was needed to move NPD projects forward. However, Saigosoom's (2012) study does not find resistance from people inside the organization as a barrier to NPD. Instead the study finds that it is the lack of time of key decision makers that is a barrier to NPD. The different results between Saigosoom's (2012) and the current study can be explained as follows.

Saigosoom's (2012) study investigated only firms with less than 200 employees, while case 7 in the current study had 2,000 employees. In small organizations, there are only few people involved in the NPD process, and generally the top executives make all the key decisions. Therefore, the chance of any employee opposing an NPD initiative is very slim. In contrast, medium organizations generally have more people involved in the NPD process. There are instances where some members in the organization may disagree with an NPD project. Therefore, top management needs to influence those who may not believe in the new product to give their support so that the project can proceed.

Cases 16 and 17 found that one barrier to NPD activities was their financial constraints. Similarly, Saigosoom (2012) argues that insufficient budget allocated for developing new products is a barrier to NPD. NPD activities normally require upfront investments, and generally it takes some time before sales of a new product reach a level where they can generate a positive cash flow. To overcome this barrier, these SMEs gave priority to the R&D budget so that NPD activities could be carried out effectively.

The current study found that lack of employee skills in product development area was a barrier to NPD process. This is in line with existing literature including the studies from Goedhuys & Veugelers (2012) and Saigosoom (2012). To overcome this barrier, cases 3, 5, and 12 developed the skills of their employees through the use of both internal and external training programs.

When an NPD project required the purchase of new machinery, this would be assessed in terms of the payback period for the new investment. Unless this issue was addressed satisfactorily, it could become a barrier to NPD (case 3). To overcome this

barrier, case 3 sought information from outside sources to support their NPD decisions. Saigosoom (2012) identifies high investment for developing new products as a barrier to NPD, but the researcher does not include payback period of assets such as machinery as a concern.

Case 19 found the lack of market knowledge to be a barrier to NPD. Without proper knowledge about the consumer behaviors and market trends, SMEs run a high risk of developing products that do not satisfy the market need. To overcome this barrier, case 19 sponsored staff to participate in outside marketing training programs and seminars so that they could acquire market knowledge gained from outside of the organization. This finding supports Alegre & Chiva's (2008) argument that the firm's capability to learn new knowledge is important to its innovation performance.

Interview Question 18: Based on your past experience, how effective have these actions been in overcoming these barriers (rank 1-5, low to high)?

Some cases rated the effectiveness of their actions to overcome the barriers to NPD at 3 (cases 5, 9, 13, 15, 16, 17, 18 and 19), and the remaining cases (cases 1, 2, 3, 4, 6, 7, 8, 11, 12, 14, and 20) rated 4 and 5.

Case 18: I think we are at 3. About average.

Case 1: About 4. Last few years we used 100% of local surimi, but now we use 5%. Last year, we imported 40 - 50 containers from Vietnam. We never have problem with raw material again. Last few years we had a lot of it for NPD and cheaper. When it becomes cheaper we can enter new markets as well. Sometimes we get cheaper raw

material. Sometimes there are demand on the local class of market as well, so we create a new product for them.

However, it is worth noting that one barrier that most cases, except cases 10 and 14, felt was that there was nothing much they could do about was the one related to FDA bureaucracy, laws and regulations. FDA was generally perceived as a government agency that was too powerful to deal with. However, case 14 insisted that FDA regulations, although troublesome, were not particularly a barrier for them because they had clear understanding of the specific FDA procedures as a result of effective management of their knowledge. In contrast, case 1 sought help from other organizations including customers and government agencies to deal with the barrier. These cases represent the best practices in relation to the interview question 18.

4.5.3 Summary of Results for RQ1.3

RQ1.3: How is innovation addressed in the NPD process of the above organization?

Interview Question 18: Based on your past experience, how effective have these actions been in overcoming these barriers (rank 1-5, low to high)? (See above)

Interview Question 20: What does the word 'innovation' generally mean in the context of the food/beverage industry?

Innovation had several meanings in the context of the F&B industry including improving customer's benefits (cases 1, 3, 4, 6, 7, 8, 9, 11, 12, 14, 19, and 20), preparing the firm for future competitive environment (case 2), improving sales performance (case 5), the firm's growth (cases 16),; extending products shelf-life (cases 1, 4, and 16),

meeting regulatory requirements (case 4) and something new that had not existed before (cases 17, 18, 19 and 20).

Case 4: You develop or change something to get better results. It can just be the same product with new packaging. It is very important in food and beverage industry. In the past, without innovation there was no way to preserve fish and fruit. It is a challenge to develop new products to meet regulation, to not use certain chemicals or preservatives to preserve food. To satisfy customer needs and to create new needs. Every time we create a new product, customers do not know that this product exists, so we create new needs for customers.

Case 2: Innovation means it can help improve product and organization to be ready for the future. Having innovation as a way to developing organization to meet future challenge.

Case 19: Innovation means fulfill market needs. It also means going beyond the normal things. Like we may look at Durian fruit, and create Durian ice cream for our customers.

Case 20: Innovation means making something that is new, or making improvements to existing products. It has to provide more benefits to the customers.

In short, innovation meant more than introducing new products to the market. It had implications for customer benefits, firm's competitive position, sales performance, firm's growth, product enhancement and regulatory compliance.

Interview Question 21: How do you describe the role of innovation in your firm's NPD initiatives? In other words, what is the relationship between innovation and NPD initiatives in your firm?

Some believed that not all new products are necessarily product innovation (cases 12, 13 and 15); and some did not distinguish between new products and product innovation (case 6 and 19). The importance of innovation in NPD initiatives was emphasized by all participants.

Case 4: Innovation is important for us because we are not a large firm. Large firms have cost advantage from economies of scale. We don't have that advantage. So we need innovation in order to compete successfully.

Case 7: Innovation plays a key role in our new product programs. We always search for new ideas and technologies to create innovation.

Cases 14 and 18 emphasized that they would focus on product innovation and avoid producing “me-too” products because they believed that it was difficult to be successful with replicates or duplicates. Product innovation was key to gaining a market leadership position (case 20). However, it was acknowledged that product innovation required higher investments (case 10). Succinctly put, in order to achieve innovation in their NPD initiatives, several strategies were adopted by the participants in their NPD process. These included collaborating with government agencies, universities, customers, suppliers, competitors; recruiting skilled staff, sending staff to trade exhibitions, seminars, and training programs; developing technology and innovation internally; setting up a joint-venture(s) with strategic partners; and, allocating resources to R&D.

Some participants discussed their plans to improve innovation in their NPD initiatives through focusing on customer value delivery, establishing formal, systematic, and centralized procedures, encouraging staff participation in NPD activities, empowering staff, succession planning knowledge transfer and knowledge management.

Interview Question 22: Based on your past experience, how important is 'innovation' to the success of your firm's NPD projects" rank 1 (low) – 5 (high):

Cases 1, 9, 10, 12, and 19 rated the importance at 4, while cases 2, 3, 4, 5, 6, 7, 8, 11, 13, 14, 15, 16, 17, 18, and 20 rated at 5. The data implied that innovation was very important to the success of Thai F&B manufacturing SMEs' NPD initiatives.

Case 1: Without NPD we cannot grow. From the past 3 years we growth 3-7% each year. Without NDP, we just maintain and wait for external factor to affect us.

Case 10: Our company given our lack of money resources, we've idea coming. We're very innovative. We are between 4 and 5. 4.5 in order to survive.

Case 11: If we don't have innovation we cannot add up price. Now our products can sell in Japan, and Australia at higher price than Sri Lanka and New Zealand products.

Case 12: Very high. As 90% of the customers want new products. For long-time export customers, if we do not introduce new products, they will not make order. For new customers, they will come with requirements.

Case 13: Five. Very important. Most of our products that can sell come from innovation.

Interview Question 23: How do you rank (from 1-5) the innovation capability of your firm compared to your competitors within the industry?

Participants rated their innovation capability from 2-5. Participants who rated their firm's innovation capability at 2 (cases 10 and 19) believed that they were slightly below average.

Case 10: We receive knowledge from customers and suppliers. We are in number 2. Case 19: We are not strong in innovation. We are 2.

Some participants believed that their innovation capability was on a par with their competitors (cases 1, 2, 5, 7, 9, 14, 16, and 17).

Case 1: Average 3 - 4. I'm never satisfied with our current situation. We mainly compare to our competitors, we don't have strong marketing.

Case 7: Outcome is about the same level as competitors. We look at concept ideas. Others may have something very advanced. We can only see marketable things.

Some participants rated their innovation capability higher than their peers (cases 3, 8, 11, 12, 13, 18, and 20).

Case 8: Four. More innovative, after 9 years and you're quite success I believe this is the key.

Case 13: Four. Higher than competitors. Our weakness is the scale, the size of company. We cannot invest much as the bigger companies, but we have good directions, good view in terms of innovation.

Cases 4, 6, and 15 rated their innovation capability at 5.

Case 4: We rank ourselves as 5 compared to the same business. When we come up with new products, the competitors will always follow us. We are the leader of this industry.

Case 15: We are 5 compared to competition.

From the above data, it can be noted that most of the participants rated their innovation capability at either 3 (8 cases) or 4 (7 cases). However, two cases (10 and 19) believed they were slightly below average. Upon checking into their background information, it was found that these were relatively small SMEs. Case 10 had 15 employees, and case 19 had 65 employees. In contrast, cases 4, 6, and 15 rated their innovation capability at 5. These were slightly larger firms. Case 4 had 1,000 employees, case 6 had 100 employees, and case 15 had 800 employees.

Interview Question 24: What procedures, processes, or activities does your firm adopt to enhance the innovation of its new products?

The participants were asked to discuss the procedures, processes, and activities they had adopted, if any, to enhance the innovation of their new products. The researcher probed on this question based on the innovation strategies identified in the literature. These included: open innovation strategy; networking strategy; resource-based strategy; knowledge management strategy; technology make strategy; and technology buy strategy. The strategies that the participants had adopted, or planned to adopt, were numerous. They included setting up a joint-venture(s) with strategic partners to leverage their combined strengths (networking strategy; open innovation); sourcing customized machines from machine suppliers (technology buy); sending staff to attend trade

exhibitions, seminars and training programs (knowledge management; resource-based); collaborating with customers (one way, inflow open innovation strategy; networking strategy); developing technology internally (technology make; resource-based); allocating financial and non-financial resources to R&D (resource-based); and, setting working relationships with universities, government agencies (one way, inflow open innovation strategy; networking strategy). Therefore, the patterns for this interview question are as follows:

Open innovation strategy/networking strategy (cases 1, 2, 3, 4, 5, 7, 9, 10, 11, 13, 17 and 18):

Case 1: We discuss about this, joining, merging the company. We've friends in China. Sometimes they get good technology. We're talking about to set up company and we'll produce product together

Case 5: We get involved with and support from the NFI (The National Food Institute), DBD (Department of Business Development), the government-sponsored programs so we can get more knowledge.

Resource-based strategy (cases 1, 4, 10, 11, 16 and 19):

Case 1: We cut about 10% of profit every year to set up company developing fund. We use it for training our staffs, to make the lives of our staffs happier. To create the ambiance of the company to be attractive.

Case 4: Every year we go to 5-6 trade fairs overseas. We bring at least one R&D with us to every trade fair.

Knowledge management strategy (cases 1, 2, 4, 5, 7, 14, 19 and 20):

Case 7: We contact Kasetsart University, Faculty of Agriculture, to have a meeting every year to discuss and see if they have any project. So it is about knowledge sharing, we support some of their activities and got some knowledge sharing.

Case 14: For FDA, I have to deal direct to know more what the barriers are. Then we keep the knowledge for the next time. We have to learn more. I ask my friends or my sister to help. I make connections. I am a pharmacist. I know my sister's friends. It is easy when you know someone. You have to go direct and find which was to do.

Technology buy strategy (cases 1, 7, 8, 9, 15 and 17):

Case 1: We're close with our machine maker in Japan to create certain type of product that we design. I give them the idea that they can create product for us.

Case 9: We collaborate with suppliers and encourage them to bring us new technology.

Technology make strategy (cases 14 and 15):

Case 14: We don't copycat. Knowledge. We do the design. We search the world, Google, and see which one design, packaging is new. I think technology is part of our innovation. But if we buy technology, it will make our cost high. We think for the health food, no need to buy very fast technology. For food, it is back to basic. How to preserve the food without preservatives. No need for modern technology. We develop our technology. Case 15: The machine we buy from Germany, our boss knows how to adjust the machine to suit our needs. He can customize the use of the machine to produce our products. The company achieves the goal of innovation by investing in machinery and customizes the use. There does not seem to be a formal procedure for innovation.

It can be noted that some of the strategies can be classified as both networking strategy and open innovation strategy as they involve collaborating with and getting knowledge from outside their firm, for example, business partners, universities or governmental agencies (NFI).

Interview Question 25: Are there any other procedures, processes, or activities that you would like to adopt to enhance the innovation of your firm's new products? If yes, what are they?

In addition to the procedures, processes and activities described above, some SMEs stated that there were also other procedures, processes and activities that they would like to adopt in order to enhance the innovation in their new products. These included:

Creating more value for customers:

Case 1: We try to make product that everyone can easily access and afford. Not to mention we have problem in sales and marketing so sometimes you put product in a wrong place. So we need to promote our product. The fish snacks in Thailand are high in sodium and msg. So we try to develop low sodium, low msg. that really benefit them or preservative something like that.

Implementing enhanced NPD procedures:

Case 8: Centralized procedures. We need to have more formal and systematic procedures.

Internal knowledge sharing:

Case 13: We should do knowledge sharing. As the company is very small, the staff are not well-educated, they do not want to do paper task. When we try to apply

knowledge management into our company, they refuse it. They do not want to do paper work, just the routine work is very tough for them. The existing paper tasks are very huge for the workers already. To add more paperwork, to keep the knowledge about the recipe a secret would add work to them, and they cannot do it properly. So the way we can share ideas must be paperless. They do not use their time to prepare paper or presentation, just share what they think, what their ideas, share together in the table. In the past, I shared my ideas with R&D, and R&D just setup an ad-hoc team, but ad-hoc team does not know the direction or things from the customer because of lack of communications during the R&D process. So we setup the monthly meetings to share the knowledge of customers' visits to the organization. Some of the ideas, we do not concentrate on right now. But employees will know what kind of customer information, the demand, so sometimes they will just pop up the ideas.

Empowerment of staff for NPD initiatives:

Case 16: Since right now innovative ideas come from the owner only, I wish other employees can be involved in the NPD process. I want them to expose to consumers, other countries, so they can be more effective. So I want to use them to be innovative tools.

Creating conducive corporate culture:

Case 7: At the moment, I would say that our company is quite conservative. So my dream is we would like to have the attitude for the whole company to support the innovation. For marketing people, we love to have innovation. But for other departments where they do mostly routine jobs, they would love to do the routine things. Something

new would mean additional work, and it is not certain whether it will be successful or not. So when the whole organization has the same attitude to support this, we will get a better result. For that it shall start with the top level.

Succession planning:

Case 20: We need to think about succession plan to ensure that our innovation capability is maintained and enhanced.

Most of the above activities, such as creating more customer value, internal knowledge sharing, systematic NPD procedures, empowerment of staff and creating conducive corporate culture have been well-recognized as factors influencing innovation performance (Cooper, 2014; OECD, 2010; Naranjo Valencia et al., 2010; Barczak et al., 2009; Fuller et al., 2006; Zahic et al., 2008; Wagner, 2006). However, the issue of succession planning as a factor in this context was an unexpected finding. The researcher investigated the background of case 20 to find out why succession planning was considered important for their NPD activities. It was discovered that the CEO of the company who founded the business had a food science technology background. He was instrumental in all the firm's NPD projects. He was in his sixties and believed that the firm should consider succession planning so that its NPD activities could be enhanced.

Responses to the interview questions aimed at addressing RQ1: "What are the current practices and barriers of NPD process in Thai F&B manufacturing SMEs, and how is innovation addressed in the NPD process?" are illustrated in Table 4.3.

Table 4.3: Summary of Answers to RQ1

Factors	Responses	Cases																				
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	
Responsibility for NPD	MD		x			x	x		x		x	x			x	x	x	x	x	x	x	
	Marketing & R&D	x		x	x			x		x			x	x								
NPD team structure	Well-structured	x		x	x			x		x		x	x	x					x		x	
	Loose structure		x			x	x		x		x				x	x	x			x	x	
NPD process	Formal process	x	x		x	x	x	x	x	x	x	x	x	x	x	x			x	x	x	
	No formal process			x															x			
Barriers to NPD	Lack of employee skills	x		x		x					x	x	x					x				
	Lack of technology			x	x	x			x	x		x									x	x
	Lack of management support			x				x														
	Lack of market information																					x
	Lack of cost competitiveness			x														x				
	Lack of financial resources					x						x					x		x			
	Restrictive laws	x			x					x					x	x					x	x
	Lack of raw material	x		x	x																	
	Resistance from customers				x			x									x					
	Pressure from trade				x	x											x					

(Continued)

Table 4.3 (Continued): Summary of Answers to RQ1

Factors	Responses	Cases																				
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	
Barriers to NPD	Competition							x	x	x												
Actions taken to overcome barriers	Networking strategy	x		x	x		x					x				x				x	x	
	Knowledge-based strategy	x		x	x		x					x	x		x				x	x		
	Resource-based strategy		x	x		x		x	x				x		x		x	x			x	
Effectiveness of actions to cope with barriers	Rank 1-5 (low-high): 3					x				x				x		x	x	x	x	x		
	Rank 1-5 (low-high): 4-5	x	x	x	x		x	x	x			x	x		x						x	
Meaning of innovation in F&B	Improving customers' benefits	x		x	x		x	x	x	x			x	x		x				x	x	
	Preparing for competitive environment		x																			
	Improving sales					x																
	Firm's growth																x					
	Product's shelf life	x			x																	
	Meeting regulatory requirements				x																	
	Something new																		x	x	x	x

(Continued)

Table 4.3 (Continued): Summary of Answers to RQ1

Factors	Responses	Cases																				
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	
Role of innovation in NPD initiatives	Innovative new products				x				x	x												
	Market leadership																				x	
	Higher investment												x									
Importance of innovation	Rank 1-5 (low-high): 4	x								x	x		x								x	
	Rank 1-5 (low-high): 5		x	x	x	x	x	x	x			x		x	x	x	x	x	x		x	
Actions taken to enhance innovation	Open Innovation/networking strategies	x	x	x	x	x		x		x	x	x		x					x	x		
	Resource-based strategy	x			x						x	x					x				x	
	Knowledge-based strategy	x	x		x	x		x							x						x	x
	Technology-buy	x						x	x	x						x			x			
	Technology-make															x	x					
Future actions to enhance innovation	Create value for customers	x																				
	Formal/ systematic procedures								x													
	Knowledge sharing														x							
	Empowering staff																		x			

(Continued)

Table 4.3 (Continued): Summary of Answers to RQ1

Factors	Responses	Cases																			
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Future actions to enhance innovation	Create conducive corporate culture							x													
	Succession planning																				

It is evident from Table 4.3 that the responsibility for NPD rested with senior management of SMEs. Although not all participants reported to have a well-structured NPD team in place, all except two claimed to have a formal NPD process. For barriers to NPD, the top three barriers most mentioned by the participants were: lack of technology, lack of employee skills and restrictive regulations from government agencies such as FDA. To overcome these and other barriers, F&B manufacturing SMEs adopted a number of strategies including networking strategy, resource-based strategy and knowledge-based strategy. They rated the effectiveness of these strategies in overcoming the barriers at 3 to 5, from a scale of 1 to 5, 1 being low and 5 being high.

To the participants, innovation meant more than just new products. Innovation was associated with several objectives including: improving sales performance, enabling firm's growth, extending products shelf life, preparing firms for future competitive environments and improving the customer experience and benefits. The term 'improving customer's benefits' was widely used by the participants. Some of the participants stated that they would focus on product innovation. It was also recognized that product

innovation enabled firms to gain market leadership position, and, that it required a high investment to create product innovation.

All 20 participants rated the importance of innovation at either 4 or 5, on a scale of 1 to 5, 1 being low and 5 being high. This shows that these F&B manufacturing SMEs recognized the importance of innovation to their businesses.

Out of 20 participants, 18 claimed that they were engaged in some kinds of practices, processes, and procedures to increase the level of innovation in their firms. The practices, processes, and procedures that they implemented could be categorized under (i) networking/open innovation strategy; (ii) resourced-based strategy; (iii) knowledge management strategy; (iv) technology make; and (v) technology buy. Most of the activities undertaken by these SMEs could be classified under networking/open innovation strategy. When probed on future actions for improving innovation, the participants mentioned ‘creating value for customers’; ‘establishing formal, systematic and centralized procedures’; ‘encouraging knowledge sharing’; ‘empowering staff to participate in NPD projects’; ‘creating corporate culture that is conducive to innovation’; and ‘planning for executive succession’ as possible actions to be taken for achieving this purpose.

4.5.4 Summary of Results for RQ2:

RQ2: What are the potential areas for improving the effectiveness of NPD initiatives in Thai F&B manufacturing SMEs?

The interview questions related to this RQ are questions 17, 20, 24 and 25. Responses to interview questions 3, 9 and 15 also have implications for this RQ.

Interview Question 17: What actions do you take to overcome these barriers?

Please be specific. (See above).

An analysis of the data revealed that Thai F&B SMEs encountered a number of barriers in implementing their NPD activities. As a result, many actions were taken to manage these barriers. These SMEs rated the effectiveness of the actions to overcome the barriers from 3 to 5 (from a scale of 1-5, low to high). However, there was one major barrier that these F&B manufacturing SMEs were widely divided in their approach. This particular barrier related to the FDA restrictive regulations and standards. One SME sought help from government agencies and customers to overcome the barrier (case 1); some SMEs created, stored, and used knowledge from experience with FDA for future projects (cases 14 and 18); and some SMEs decided to live with the barrier (cases 4, 9, 13 and 19). The main reason why some SMEs chose to live with FDA restrictive regulations and standards was because they believed it was beyond their means to tackle this barrier. Based on the results reported by cases 14 and 18, the researcher would suggest that, where possible, F&B manufacturing SMEs should invest in the creation of knowledge on managing FDA issues. Cases 14 and 18 demonstrated that barriers from FDA restrictive regulations and standards could be minimized or overcome through effectiveness knowledge management.

This is one area where F&B manufacturing SMEs can improve the effectiveness of their NPD initiatives.

Interview Question 20: What does the word 'innovation' generally mean in the context of the food/beverage industry? (See above)

In the F&B industry, the word ‘innovation’ meant many things from “extending product’s shelf-life” to “preparing the firm for future competitive environment” to “improving customer’s benefits”. However, the message most mentioned by the SMEs interviewed (12 out of 20) was “improving customer’s benefits”. This could be interpreted that improving customer’s benefits was one of the most common objectives of implementing innovation projects in F&B manufacturing SMEs. For this reason, the researcher focused on this topic to explore the potential areas for improving customers’ benefits.

An analysis of the collected data revealed that the main focus for customer’s benefits was primarily on the product performance, e.g., longer product shelf life (case 1); health benefits of coconut oil (case 11); lighter and flexible property of retort pouch packaging (case 13); and product with lower level of msg. (case 1). There was only one case in which the firm focused on customer’s benefits that derived from both product performance and service (case 6). For product performance, the firm addressed the main problem encountered in the rice industry regarding the inconsistent quality of rice. By nature, the quality of rice fluctuated throughout the year as a result of its seasonality. Rice tended to be white and soft during its harvest season. However, rice that had been stored since the earlier harvest periods aged, turned more yellow and became harder. To solve this problem, case 6 mixed rice from new crops with that from earlier crops so that its quality remained constant throughout the year. Case 6 claimed that customers could rely on its rice for consistency the whole year round.

Case 6: There are several things to think about how to make product consistency. Like Jasmine rice can make once a year, but we consume for a whole year. But quality of rice will change, get tougher, get yellowish, so we have to make product to stay the same consistency throughout the year. So we mixed old and new together many times and still not consistent.

In addition to supplying its customers with high quality rice, case 6 also provided extra services that enhanced customer's benefits. The firm supported its customers with a team of logistics staff who assisted the customers in managing their warehouses. This ensured proper stock rotation so that no rice was left unattended over a long period of time. The end result was a reduction of wastage and improved product quality. The firm also provided training programs for chefs to ensure that the rice was cooked with the right amount of water, at the right temperature, and for the appropriate length of time. This was to ensure satisfactory results of the cooked rice.

Case 6: However, we differentiate our product by offering service innovation. Our customers get advice and service on how to store and cook our rice. We solve their problems quickly. We also make sure our product has consistency throughout the year.

As a result of the above actions, case 6 became a market leader in the food service segment of the market within a few years. This example illustrates how F&B manufacturing SMEs can improve the effectiveness of their NPD initiatives by integrating services to products.

Interview Question 24: What procedures, processes, or activities does your firm adopt to enhance the innovation of its new products? (See above)

Thai F&B manufacturing SMEs adopted a number of innovation strategies to enhance the innovation of their new products including, one-way open innovation strategy, networking strategy; resource-based strategy, knowledge management strategy, technology make strategy and technology buy strategy.

Interview Question 25: Are there any other procedures, processes, or activities that you would like to adopt to enhance the innovation of your firm's new products? If yes, what are they?

In order to enhance the innovation of their products, Thai F&B manufacturing SMEs planned to take a number of initiatives. Their initiatives were further interpreted by the researcher in order to provide a consistent and scientific set of initiatives. This analysis resulted in identifying the following areas for improvements in product innovation in those firms, and is discussed below:

1. Creating more value for customers:

i) "We try to make products that everyone can easily access and afford."

ii) "We try to develop low sodium, low msg. products that really benefit them (customers)."

2. Implementing enhanced procedures:

i) "Centralized procedures. We need to have more formal and systematic procedures."

ii) "The way we can share ideas must be paperless. They (staff) do not (have to) use their time to prepare paper or presentation."

3. Maintaining internal knowledge sharing:

i) “We should do knowledge sharing.”

ii) “We setup the monthly meetings to share the knowledge of customers' visits to the organization. Some of the ideas, we do not concentrate on right now.”

iii) “Just share what they (employees) think, what their ideas (are), share together around the table.”

4. Empowerment of staff for NPD initiatives:

i) “Employees will (should) know about the kind of customer information, and the demand, so sometimes they will just pop up with the ideas.”

ii) “Since right now innovative ideas come from the owner only, I wish other employees can be involved in the new product development process.”

iii) “I want my employees to be more involved in new product development.”

iv) “We empower our staff. They can do new things as long as these are lawful and ethical.”

5. Creating conducive corporate culture:

i) “So my dream is we would like to have the attitude for the whole company to support the innovation.”

ii) The context of this organization was such that the respondent, the Marketing manager, was not happy about the existing corporate culture, claiming that “departments other than Marketing” tended to perform routine jobs and therefore they opposed any NPD initiatives that might add to their current tasks. This culture needed to be changed.”

iii) “I want to expose them (the staff) to consumers, and other countries so they can be more effective and more innovative.”

The above critical findings will also be further discussed in the next chapter.

Interview Questions 3, 8, 9 and 15:

Interview Question 3: Sector within the F&B industry the organization is operating in?

Interview Question 8: How is the business environment; stable or volatile?

Interview Question 9: How dynamic the business is with introducing new products (how many products per years, or how many years per product)?

Interview Question 15: How specifically can your business benefit from NPD when competing on the market? Can you also give some historical examples and/or hints?

Although interview questions 3, 8, 9 and 15 were intended to provide context for answering the RQs, nevertheless, they unexpectedly illuminated some information that illustrated how the effectiveness of NPD initiatives could be improved.

Case 6 in response to interview question 3: In order to win market, you have to establish trustworthiness, brand image and we see lots of advertising that build emotional benefit. Rice is the same, in order to get people to buy your brand; you have to get emotional benefit. Long time brand has advantage, which automatically create trust worthiness without doing anything.

Case 8 in response to interview question 8: It is not stable because we don't have brand loyalty. We're selling product as raw material.

Case 10 in response to interview question 8: Our chance is to switching from existing brand and niche market.

Case 3 in response to interview question 9: So we have private label and company brand. Company brands need more effort to promote for sustainable volume for growth and profit.

Case 7 in response to interview question 15: New products will play very important role. Our existing products launched 40 years ago like canned fruit, canned vegetables, and sauces belong to previous generation. For new generation, they would love to have product that is convenient, on-the-go, healthy, and modern. It also uplifts the brand image and secures our market share, both mindshare in the consumer's mind and sales share in the retail outlets.

From the above findings it can be interpreted that branding or the effective management of brand played an important role for the success of new products. Brand helped distinguish products from commodities and differentiated them from the competitors. It also uplifted the image of the product and added emotional value to it. However, the F&B manufacturing SMEs interviewed did not explicitly explain how they managed their brands. This suggested that in spite of its importance, branding activities did not receive much attention and support from Thai F&B manufacturing SMEs. The researcher would suggest that this is an area where product innovation can be enhanced.

From the data collected in the interviews, Table 4.4 was developed to synthesize the information related to RQ2: “What are the potential areas for improving the effectiveness of NPD initiatives in Thai F&B manufacturing SMEs?”

Table 4.4 (Continued): Summary of Answers to RQ 2

Factors	Responses	Cases																			
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Role of staff	Promote staff's involvement in NPD process																	x	x		
	Empower staff for NPD initiatives																				x
Corporate culture	Promote innovation centric culture							x										x	x		
Branding	Create trust through brand building						x														
	Strong brand creates customer loyalty								8												
	Own brands need more effort to promote for sustainable growth and profit			x																	
	New products help uplift brand image							x													

Several potential areas for improving the effectiveness of NPD initiatives in Thai F&B manufacturing SMEs were identified and discussed.

First, the issue of FDA restrictive regulations and standards was addressed. It was suggested that this problem could be effectively dealt with through the adoption of knowledge management strategy and networking strategy.

Second, several tactics were discussed regarding increasing customer benefits in new products. These included integrating products with service, making products more easily accessible and affordable, and, producing healthier products.

Third, emphasis was given to enhancing NPD procedures including the development of centralized, formal and systematic NPD procedures, and reducing paperwork in the NPD work process.

Fourth, it was suggested that regular and systematic knowledge sharing could help improve the effectiveness of NPD initiatives.

Fifth, several issues regarding the role of staff was addressed including promoting staff's involvement in the NPD process, empowering staff to take NPD initiatives and ensuring that staff acquire customer information to assist them to generate ideas for NPD initiatives.

Sixth, it was suggested that the effectiveness of NPD initiatives could be improved through promoting an innovation-centric culture in a firm.

Finally, the role of branding in the context of new products was emphasized by several participants. Brand was perceived as a key vehicle in creating customer loyalty, promoting sustainable sales volume for growth and profitability and building trust. In addition, it was suggested that new products elevated the brand image.

4.6 Results of Final Focus Group

The third phase of the study was a sense-making focus group study with the aim of presenting the final results from the previous phase to the audience and asking them to comment on the results based on the expected outcome of the thesis. In other words, they were asked to comment if the results truly addressed the research questions of the study in a meaningful manner.

The results indicated a disagreement among the participants about the practical impossibility of mapping any particular NPD process activity with one specific innovation strategy. In response to this issue, the researcher responded that the proposed two-dimensional framework could only facilitate, but not completely resolve such ambiguity; this would continue to remain as a practical-fuzzy area as was in many similar strategic matters. The latter seemed to be acceptable by the group.

Another result from this focus group phase was related to the situation where the SMEs sourced raw material from other countries. There was disagreement on the naming of the matching strategy. One was insisting on the name 'global sourcing strategy' whereas the others were comfortable with the existing mapping done by the researcher that was the 'networking strategy'. The matter was resolved after it was decided once again to expand the definition of the network strategy to incorporate global sourcing strategy. The researcher himself believed that no existing formal definitions of innovation strategies adopt the name 'global sourcing'. In other words, while there were many other definitions of strategies within the strategic management field, there were only five major generic innovation strategies identified in the field of product innovation and the

researcher had to use one from among the five that represented the closest to the actual meaning. Therefore, the networking strategy was the name adopted for this particular situation. This argument however resulted in further clarifying the definition of the networking innovation strategy to also incorporate global sourcing strategy; as a result, minor change was made in the thesis.

Finally, there was disagreement about the term 'innovation NPD process' because the current study did not make the existing NPD process innovative; rather, it integrated innovation strategies within various NPD activities and as a result of such integration, it enforced innovation in various activities. Therefore, an alternative term was agreed; 'strategized NPD'. Appropriate changes were made to the thesis.

4.7 Chapter Summary

At Section 4.2 of this chapter the researcher presented the data collection and analysis comprising the case study selection criteria followed by a brief description of the SMEs being studied. This was followed by a discussion of the three phases of the study at Section 4.3. Throughout these discussions care was taken to closely map the results of the interviews and focus groups to the various research questions and/or concerns raised by the audience, the latter providing a context for the researcher to interpret the actual results and to ultimately provide final responses to the RQs of the study.

Next, the results of the initial focus group were presented. Those comments that were collectively agreed to be valid and suitable were then addressed by the researcher during a session with the supervisors to discuss the researcher's way of addressing those

comments. At the conclusion of this meeting consensus was made on the changes, and the latter was implemented by the researcher.

Section 4.5 provided an analysis of the results of the various interviews. Using the data analysis methodology presented in chapter 3, the researcher was careful in providing a clear description of the transformation of the interview responses into the final analysis of the data and responding to relevant RQs. Not reported elsewhere, on two occasions the researcher had to make follow up telephone calls with the respondents in order to clarify some of the ambiguities in the responses that were not detected during the interview. Two types of analyses were made including with-case analysis and between case analysis, each with different research objectives.

The last part of the chapter, Section 4.6 was allocated to an analysis of the sense-making focus group. Results of this data collection session provided an opportunity to present the findings of the study as well as the objectives of the study and to ask the group members to provide comments as to whether the research objectives had been met. Furthermore, consensus of opinion was requested from the participants for each research area of study. This method provided the researcher with the opportunity to understand the perspectives of external reviewers in respect of the study, its objectives, and the findings. The outcome provided valuable guidelines mainly in the form of some requests for further clarification. Appropriate changes were made throughout the thesis.

CHAPTER 5

CONCLUSION

5.1 Introduction

This chapter provides a summary of conclusive remarks and recommendations to various stakeholders, along with the major theoretical and practical implications derived from the findings in the previous chapter. Following the research conclusions, we will look at the limitations of the study which is followed by a discussion on directions for future research.

5.2 Conclusion from Focus Groups

The main focus of the study has been on innovation strategies of NPD in Thai F&B SMEs. The theoretical foundation of the study was based on three knowledge domains including NPD processes, innovation strategy, and F&B SMEs. Through a systematic review of the literature an integrated theoretical framework was introduced in the form of a two-dimensional matrix highlighting various dyadic relationships between NPD process activities and existing innovation strategies. This framework was then used to guide the investigation to: (i) develop an understanding of the current state of NPD processes and NPD strategies of the F&B SME cluster within the Thai food industry, and (ii) develop a rational framework for linking and integrating various NPD process activities and various existing innovation strategies. This formed the basis for externalization of a set of innovation NPD strategies that current F&B SMEs adopt for various NPD activities. This integrated theoretical perspective will extend the domain of the innovation strategies deeper inside the NPD activities allowing various NPD activities to be associated with

one or more innovation strategy. The outcome is expected to be a more focused analysis of innovation strategies when applied to the NPD process.

The above framework enabled the researcher to analyze innovation strategies within the specific context of NPD process activities. The ultimate goal of the study was to provide Thai F&B SMEs with overall recommendations for improvement and understanding of the practice within the Thai F&B SME cluster. The ensuing analysis will be used in this chapter in order to derive generic guidelines for enhancing the innovativeness of the Thai F&B SME cluster.

As stated in Chapter 3, the study was divided into three phases. The first phase consisted of collecting data through two focus group sessions with the aim of assessing the theoretical and practical suitability of the proposed framework before embarking on the main data collection activities of the study, the latter being the subject of the next phase. As a result of this phase, minor variations were made in the presentation of the proposed theoretical framework. Also suggestions were forthcoming to plan a future study to formalize the proposed framework in collaboration with researchers in the field of Software Engineering. This would enable the development of an automated Decision Support System for the Thai F&B SMEs which would be extended into an industry-wide business intelligence system to be used throughout the industry. Another outcome of this session, received from the practitioner members of the focus group, was to redefine the networking strategy in order to better accommodate the current position of F&B SMEs in terms of their unique nature. The latter suggestion also provided added assurance for the practical relevance of the proposed framework to the practitioners.

The second phase of the study that constituted the major part of the current research was a multiple case study comprising twenty 45-minute semi-structured interviews with Thai F&B SME owners/founders. As this phase represents the main part of the research, conclusions derived from this phase are further discussed in more details in 5.3 below.

The third phase of the study was a sense-making focus group study with the aim of presenting the final results from the previous phase to the audience and asking them to comment on the results based on the expected outcome of the thesis. Results indicated a disagreement among the participants about the practical impossibility of mapping any particular NPD process activity with one or more specific innovation strategy. However everyone agreed that while the proposed two-dimensional framework is not a final solution for such ambiguity, it certainly facilitates such mapping. However the former ambiguity issue will continue to remain as a practical-fuzzy area as is in many similar strategic matters.

Another result of this focus group phase related to SMEs sourcing raw material from other countries. There was disagreement on the naming of the matching strategy. One was insisting on the name 'global sourcing strategy' whereas the others including the researcher were comfortable with the existing mapping done by the researcher that is the 'networking innovation strategy'. The matter was resolved after the meeting concluded that while there are many other types/names of strategies within the field of Strategic Management, there are only five widely recognized generic innovation strategies, and none of them are called 'global sourcing innovation strategy'. The argument however resulted in further clarifying the definition of the 'Networking Innovation Strategy' to

also incorporate global sourcing strategy.

5.3 Conclusion from Semi-structured Interviews

Detailed results related to the two RQs of the study have been presented in Chapter 4. In this section a summary of the major findings from Chapter 4 is presented along with associated conclusions.

While answering RQ1 and RQ2, three areas for improvement were identified that are significant findings of the study with both theoretical as well as practical implications for the Thai F&B SMEs. These three implications are discussed in 5.3.1 to 5.3.3.

5.3.1 Conclusions from Results of RQ1 and RQ2

NEED FOR TRAINING OF EXECUTIVES: In terms of the responsibility for NPD success and structure of the NPD projects, two categories of response included ‘executives being responsible’, and ‘line managers being responsible’. None of the cases reported such responsibility for the operations level management. To further understand the reasons behind this, it was evident that it had been a tradition for the majority of the Thai SMEs to encourage their siblings to study in a scientific discipline that would help the business. The interviewees who were both a company executive as well as a partial or full-owner of the business (19 out of the 20 cases) had undergraduate or postgraduate research degrees in food sciences with very few of them having formal education in business fields. Among other things, this may explain the reason for closer control by top executives of major critical business processes related to R&D and NPD. In fact some of these executives are dedicated scientists rather than having entrepreneurial training. One may conclude that while this can be an opportunity for SMEs in appreciating the latest

technical advances in the field, it also demonstrates a lack of equal understanding of contemporary business strategies which may hinder the innovativeness of their NPD initiatives, hence an overall need for further education in contemporary business strategies.

NEED FOR ENHANCING INTERNAL KNOWLEDGE SENSING

CAPABILITIES: Results also indicated that almost all SMEs that claim to have a well-structured NPD organization also state that (i) their export business constitutes a significant portion of their revenues, and (ii), within the export business, SMEs have to cope with different market requirements from their overseas buyers due to different consumer preferences and other regulatory rules and laws including food safety standards that exist in those export markets. The implications from (i) and (ii) above are that for SMEs to be successful in the export business arena, they need to be able to develop products which meet market demands that may differ vastly from market to market. This is in agreement with Zakic et al.'s (2008) argument that product innovation is important to exporters. One possible explanation for why the exporting SMEs tend to have a well-structured NPD organization is that they must have the required capabilities to develop products that meet different criteria from different markets. Hence, the establishment of a well-structured NPD organization seems to be a logical move. One way to achieve this goal is that F&B SMEs may have to build their internal knowledge sensing capability in order to be better equipped to respond more suitably to those various markets. After all, access to high quality codified knowledge enhances firms' sensing capabilities by providing managers with high-quality information about the state of the business, which

in turn helps them identify emerging opportunities and threats (Overby et al., 2006).

Furthermore, findings from Chapter 4 indicate that the volatility of the marketplace implies that F&B SMEs must be responsive and flexible to be able to cope with changing environments. This can be achieved by adopting an agile perspective to business operations and a considerable amount of literature already exists in this field (Bhatt et al., 2010; Fink & Neumann, 2007; Fink & Neumann, 2009; Helfat & Peteraf, 2009; Lim et al., 2008). Another proposal is to form strategic alliances with major foreign customers with the aim of sharing the burden of the above constrictions.

ADOPTION OF A PRO-ACTIVE APPROACH: In relation to the various activities of NPD processes, the responses implied that the idea generation phase of the NPD process is heavily reliant on customers, the trade, the suppliers of raw materials and machines, and external sources such as attending trade fairs. However, customers seemed to be the key source of new ideas. The implication of this is that a customer-centric attitude towards NPD may prevent these firms from radical product innovation (for radical product innovation see Schoenmakers & Duysters, 2010). One may conclude that there is a need for F&B SMEs to be more pro-active by balancing their customers' conscious need and forecasting their future needs that the latter may not be aware of (for forecasting customers' future needs see Lamore et al., 2013). Those few SMEs that adopted a *pro-active market orientation* as opposed to the more dominant *responsive market orientation* had a much higher number of personnel in their NPD teams than those found in the other SMEs studied. This is consistent with the current literature that states competitive intensity is likely to drive firms to adopt pro-active market orientation so that

firms can build competitive advantage (Wang et al., 2013).

In terms of various NPD activities and practice, participants clearly mentioned that basically all of the NPD process activities existed within their organization. These included scanning of the environment, idea generation, concept development, assessment of the business potential, product design, developing product prototype(s), product testing and product production (Cooper, 2013). The practices of NPD were basic and simple. The main source of ideas for NPD projects were external-oriented and included customers, trade exhibitions and suppliers of machines or raw materials. There were some instances where ideas were generated from internal brain-storming sessions. Such orientation towards external sources of innovation is also consistent with other findings that are discussed below and will be further elaborated in this chapter.

STRATEGIES FOR ADDRESSING BARRIERS TO NPD: FDA

REQUIREMENTS The participants cited several internal and external barriers in developing new products, and also revealed three strategies for addressing the FDA requirements. The internal barriers included (i) lack of skills, technology, cost competitiveness, financial resources, and market knowledge; (ii) concern for financial returns; and (iii) resistance from people inside the organization towards NPD initiatives.

The lack of skills and technology seemed to be the most common barrier. The external barriers included laws and regulations from the FDA and other government offices (both from the local FDA and FDAs located in the countries that SMEs export products to), lack of raw material, customer's resistance to change, and demand from modern trade retailers for high entrance fees. These factors have been discussed fully in

Chapter 4. Among the above barriers the FDA deserves special attention and discussion as there seem to be the potential for enhancement in this particular area in Thailand.

Although the topic of FDA as a barrier to NPD in Thailand has been identified in Saigosoom's (2012) study, no study has been found that provides empirical investigation on how such barrier is dealt within the context of Thai F&B SMEs. The current study can be considered as the first such attempt.

The FDA can cause major setbacks to any NPD project. The barrier from the FDA manifested itself in a long processing time for FDA approval to any F&B registration, and high FDA rejection rates due to inconsistent judgments from its committee members. Within the FDA body itself, different committee members had been found to use different criteria for the approval process.

In relation to the FDA issue, the study identified best practice strategies among the F&B SMEs who have a clear policy and approach for addressing the various FDA requirements. These strategies were: (i) maintaining a knowledge-base of their past expertise in addressing FDA requirements, (ii) networking with their customers (mainly adopted by exporting firms) to prepare evidence of internationally accepted food safety standards in order to convince the FDA, and (iii) using knowledge bestowed in other government agencies that may neutralize the FDA barrier, or may justify the firm's stance in relation to the FDA requirements. This was done by two SMEs through monitoring the other government agencies and identifying useful pieces of knowledge to support the SME's initiative.

INNOVATION STRATEGIES: In terms of the meaning and importance of the word ‘innovation’ to the Thai F&B SMEs, the study found that innovation means more than just new products to the participating SMEs, and instead, it is interpreted as being one or more of the following: (i) improving customer’s benefits/satisfaction, (ii) preparing the firm for future competitive environments, (iii) improving sales performance, (iv) firm’s growth (v) extending products shelf-life, and (vi) something novel that had not existed before. The majority of the respondents also confirmed their emphasis on ‘product innovation’ as opposed to the ‘process, marketing and organizational innovation. Specific strategies for enhancing their product innovation were: (i) customer value delivery; (ii) establishing formal, systematic, and centralized procedures; (iii) encouraging staff participation in NPD activities; (iv) empowering staff decision-making; (v) succession planning; and (vi) knowledge management.

The above discussions reveal that Thai F&B SMEs have an appropriate focus and level of understanding of the word ‘innovation’, and are clear about their notion of innovation being ‘product innovation’ for which they can develop specific strategies.

5.3.2 Implications for Theory

This study contributes to the NPD and innovation literature in two ways.

Firstly, the findings indicate that barriers arising from restrictive regulations and standards from the FDA can be successfully dealt with through a number of measures including building the right connections with the authority, managing knowledge from previous similar encounters, and collaborating with customers and other agencies to address the barriers. This finding is surprising, because the existing literature pays little

attention to theorizing these FDA-type barriers, restrictive regulations, and standards for the implementation and empirical investigations. The main feature of the above barriers in the current literature is to argue that these restrictive regulations and standards are both barriers and stimulants to higher quality product innovation (Saigosoom, 2012).

Importantly, this study illustrates that the barriers arising from restrictive regulations and standards can be dealt with by the adoption of appropriate innovation strategies, i.e. resource-based strategy (case 14); networking strategy (case 1); and knowledge-based strategy (case 14). As mentioned in Chapter 2, these strategies have been primarily adopted in order to gain technological and/or market knowledge for the development of new products. No study has been found where these strategies are adopted to cope with the barriers arising from FDA or other regulatory organizations, such as the environmental protection agency or, consumer protection board, among others.

Secondly, the current study presented a theoretical framework in the form of a two dimensional decision framework. It maps the existing innovation strategies to the NPD process. The framework illustrates the application of various innovation strategies across the different stages/activities in the NPD process. In the current study the framework served as a lens for the execution of the research, that is, the development of interview questions, data collection, and data analysis. By integrating innovation strategies in the NPD activities, the framework introduces a novel concept called *strategized NPD process* that researchers and practitioners can use to assess the application of innovation strategies in a firm's NPD process.

5.3.3 Implications for Practices

There are five implications for practical application.

First, the findings indicate that barriers from the FDA can be reduced by (i) collaborating with outside parties such as customers and government agencies, (ii) creating strong relationships with well-placed people; and (iii) using knowledge acquired from lessons learned to guide applications for the FDA's approval. This can have a positive impact on the cycle time of the NPD process, and avoid the possibility of having to adjust the product formula in order to obtain FDA's approval. A short cycle time for NPD is a source of competitive advantage for manufacturing firms (Filho & Uzsoy, 2013), while adjusting product formula only to comply with FDA's instructions may result in higher costs, lower product performance and a delay in the product launch, all of which can have a detrimental effect on the new product's success.

Second, findings highlight the positive impact servitization can have on the performance of a new product. By integrating services to products, firms can create differentiation and competitive advantage (Raja et al., 2013; Neely et al., 2011). To achieve this, F&B SMEs must be able to develop services that can be added to their products, and invest in providing the services. This will result in increased customer benefits and stronger product differentiation, both of which can enable the SMEs to charge a higher price for their products and achieve sustainable success (Henard & Szymanski, 2001).

Third, it was found that most of the F&B SMEs (18 out of 20) had their own brands. Some even emphasized the importance of brand to the success of their

businesses. However, none of the cases explicitly described how they managed their brands. It seemed that the main purpose of branding their products was only to facilitate the identification of these products. There was no evidence to indicate that key elements of branding as brand vision, brand positioning, brand attributes and brand value were given priority in the building of the brand. This suggests that to maximize the benefits of brand building, F&B SMEs managers need to focus more on creating and nurturing strong and enduring brands for their businesses.

Fourth, the practices for NPD in Thai F&B manufacturing SMEs were basic and simple. There was a lack of a formal and systematic idea-to-launch methodology to closely monitor and evaluate each stage of the NPD process from conception to development and launch of new products by senior or qualified personnel (Barczak, Griffin, & Kahn, 2009; Cooper, 2014). The main benefits from such a methodology are (i) to ensure that all critical steps in the NPD process are not omitted and (ii) to reduce the risk of failure. However, in implementing such a methodology, care must be taken to ensure that the methodology does not cause unnecessary delay to the project, and that suitably qualified personnel are assigned to monitor and evaluate each stage of the process. Otherwise, the methodology can negatively impact the outcome of the project.

Fifth, by organizing the NPD and innovation strategy literature into an integrated framework, this study, in effect, provides an organized framework for managers to draw upon. For example, managers can use the framework to check if their firms have adopted appropriate innovation strategies in the NPD process. The framework can also be used in

a NPD team to ensure that all participants from different work units are aligned and share a common understanding of the key tasks to be accomplished.

5.4 Limitations and Directions for Future Research

This part of the research is structured on the basis of the guidelines provided by Laerd (2015). According to these guidelines, the limitations of the thesis are based on three moves: announcing, reflecting and forward looking. The **announcing move** identifies the limitations of the thesis and explains how important each of these limitations is. The **reflecting move** provides greater depth, helping to explain the nature of the limitations and justify the choices that were made during the research process. Finally, the **forward looking move** provides suggestions on how such limitations could be overcome in future.

The unit of analysis of the study is Thai F&B SME. This implies that the data collected through various methods must truly and realistically reflect this entity. In other words, there should not be any bias in selecting the SMEs for interview. However due to some limitations, the data was collected from 20 SME within a 100 km distance of Bangkok so this is not a representative of the entire country. This represents one limitation of the study. In future studies, SMEs should be selected from all provinces across the country in order to reduce such *selection bias* (Berk, 1983).

Another limitation of the study relates to the generalizability of the results. The current study was not meant to be a survey of the existing F&B SMEs to find out the current state of innovation in their NPD process activities. This would require a solid, reliable, and acceptable theoretical framework to start with, as well as access to a large

sample so that more reliable quantitative methods could be applied. The current study is an exploratory research and the first attempt in understanding the state of product innovation in Thai F&B SMEs. However, a future study will begin where the current study ends; it will apply the proposed theoretical framework to a large sample of SMEs in Thailand and/or overseas with the aim of measuring the extent of the relationships among various variables. The lack of a large sample size prevented the current study from providing more accurate results by categorizing Thai F&B SMEs in various types or groups. Certainly an industry analysis that is based on the results of the current study would be a promising future research.

Organizational and national cultures also greatly affect the quality of the data collected from several aspects. This is particularly true for Thai SMEs where they all seemed to have different assumptions and understanding of the nature, and motivations behind the study. Despite great care being taken in providing clear explanations about the above matters, many of the interviewees volunteered to have their identities exposed within this thesis, apparently because they were very confident about their business and maybe regarded such interviews as a platform for selling their products. Assurances were made that this was not the case. Despite the care taken, many of these prejudices are difficult to avoid or control in semi-structured interviews. It is recommended that future studies that continue the current study utilize a variety of data collection methods in the form of method triangulation, and evaluate results from different angles.

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APPENDIX A
INTERVIEW PROTOCOL

Introduction

- Name of the research: Investigating innovation strategies of new product development:
Multiple case study of Thai food and beverage (F&B) manufacturing SMEs
- Explain the purpose of the study: I am studying the new product development (NPD) process in the food and beverage industry and want to explore enhancement in innovation strategies of new product development.
- Research start & finish time/date:
- Explain the interview length: 45 minutes
- Explain the format & review process
- Explain the confidentiality & ethics
- How to contact me: Tel. 087-697-0008, preecha48@gmail.com
- Any questions they have before starting?

APPENDIX B

SEMI-STRUCTURED INTERVIEW QUESTIONNAIRE

Demographics & Context

1. Interview's job title, department, level of involvement and role in NPD projects
2. How long with the organization?
3. Industry the organization is operating in?
4. Size of the organization?
5. Size of the NPD team?
6. Who are the customers?
7. Does the organization have its own brand?

Environment

8. How is the business environment; stable or volatile?
9. How dynamic the business is with introducing new products (how many products per years, or how many years per product)?
10. What percentage of sales comes from products launched in the last 3 years?

NPD Background

11. Who is responsible for the success or failure of the NPD projects?
12. How is the NPD project team structured (if any)?
13. What is the NPD process?
14. What are the current practices in NPD?
15. How specifically can your business benefit from NPD when competing on the market? Can you also give some historical examples and/or hints?

Experience in NPD

16. What are the main barriers in developing new products in your firm? (Researcher may interfere by providing top level categories of barriers if necessary, e.g., organizational (skill, technology, management, etc.); environmental (global and local business climate, government regulations and subsidies, exchange rate,...); cultural (language barriers,...); etc....). This is a very important question.
17. What actions do you take to overcome these barriers? Please be specific.
18. Based on your past experience, how effective have these actions been in overcoming these barriers (rank 1-5, low to high)?
19. How does the size of your firm impact on its NPD initiatives?

Innovation

20. What does the word 'innovation' generally mean in the context of the food/beverage industry?
21. How do you describe the role of innovation in your firm's NPD initiatives? In other words, what is the relationship between innovation and NPD initiatives in your firm?
22. Based on your past experience, how important is 'innovation' to the success of your firm's NPD projects" rank 1 (low) – 5 (high)
23. How do you rank (from 1-5) the innovation capability of your firm compared to your competitors within the industry?
24. What procedures, processes, or activities does your firm adopt to enhance the innovation of its new products?

* I can probe on this question based on the innovation strategies identified in the literature.

25. Are there any other procedures, processes, or activities that you would like to adopt to enhance the innovation of your firm's new products? If yes, what are they?



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