# ความสามารถและกลยุทธ์เชิงรุกและเชิงรับ ในการออกผลิตภัณฑ์ใหม่ของผู้ส่งออกไทย

นางสาว อภิรดี เมธารมณ์




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# CAPABILITIES AND NEW PRODUCT PROACTIVE AND REACTIVE STRATEGIES OF THAI EXPORTERS

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A Dissertation Submitted in Partial Fulfillment of the Requirements
for the Degree of Doctor of Business Administration
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อภิรดี เมธารมณ์ : ความสามารถและกลยุทธ์เชิงรุกและเชิงรับในการออกผลิตภัณฑ์ใหม่ของผู้ส่งออกไทย (CAPABILITIES AND NEW PRODUCT PROACTIVE AND REACTIVE STRATEGIES OF THAI EXPORTERS) อ.ที่ปรึกษา : ผศ. ดร. พักตร์ผจง วัฒนสินธุ์, อ.ที่ปรึกษาร่วม : Assoc. Prof. Dr. Phillip H. Phan 177 หน้า. ISBN 974-334-273-7.

ในช่วงสิบปีที่ผ่านมา นักวิชาการและนักบริหารให้ความสำคัญกับการพัฒนาผลิตภัณฑ์ใหม่เป็นอย่างมากเนื่องจากเห็นว่าการพัฒนาผลิตภัณฑ์ใหม่เป็นปัจจัยสำคัญยิ่งของการได้เปรียบในการแข่งขัน การศึกษานี้ได้ประยุกต์ทฤษฎีพึ่งพิงทรัพยากร (resource-based theory) มาใช้โดยการหาความสัมพันธ์ระหว่างความสามารถของบริษัทและกลยุทธ์ในการออกผลิตภัณฑ์ใหม่ การศึกษานี้มีวัตถุประสงค์เพื่อเข้าใจบทบาทของความสามารถของบริษัทที่มีต่อกลยุทธ์เชิงรุกและเชิงรับในการออกผลิตภัณฑ์ใหม่ของผู้ส่งออกไทย

ตัวอย่างในการวิจัยครั้งนี้ประกอบด้วยสี่อุตสาหกรรมได้แก่ อาหารกระป๋อง เสื้อผ้า เฟอร์นิเจอร์ และอัญมณี ซึ่งเป็นอุตสาหกรรมที่กระทรวงพาณิชย์ระบุว่าเป็นอุตสาหกรรมที่มีศักยภาพในการส่งออกสูง การเก็บข้อมูลของการศึกษานี้ประกอบด้วยการสัมภาษณ์ผู้บริหาร การศึกษานำร่อง และการสำรวจโโยแบบสอบถามทางไปรษณีย์ อัตราการตอบกลับอยู่ที่15% แบบสอบถามที่ตอบกลับและสามารถนำมาใช้วิเคราะห์มี 243 ชุด การวิเคราะห์ข้อมูลประกอบด้วยการวิเคราะห์ความแปรปรวน การวิเคราะห์องค์ประกอบและการวิเคราะห์สมการถดถอยพหุคูณเพื่อทดสอบสมมติฐาน

ผลของการวิจัยนี้สนับสนุนสมมติฐานบางส่วนที่ว่าความสามารถของบริษัทมีความสัมพันธ์ต่อกลยุทธ์เชิงรุกและเชิงรับในการออกผลิตภัณฑ์ใหม่ ความสามารถด้านเทคนิคช่วยให้ผลิตภัณฑ์ตอบสนองความต้องการใหม่ๆได้ดีขึ้น ความสามารถด้านการตลาดระหว่างประเทศนำไปสู่การออกผลิตภัณฑ์ใหม่สำหรับบริษัทมากขึ้น เช่นใช้เทคโนโลยีใหม่ ออกแบบใหม่เป็นต้น และนำไปสู่การออกสินค้าประเภทใหม่ๆ สำหรับบริษัท

ความสามารถด้านบุคลากรนำไปสู่การออกผลิตภัณฑ์ใหม่โดยมีการออกแบบใหม่ได้บ่อยขึ้นและผลิตภัณฑ์ใหม่มีคุณลักษณะที่ดีขึ้น อย่างไรก็ตามระดับการศึกษาของบุคลากรนำไปสู่การออกผลิตภัณฑ์ใหม่จำนวนน้อยลง ความสามารถของผู้บริหารระดับสูงก็นำไปสู่การออกผลิตภัณฑ์ใหม่โดยมีการออกแบบใหม่ได้บ่อยขึ้น และมีการใช้การวิจัยและการออกแบบของบริษัทมากขึ้นตลอดจนลดการลอกเลียนแบบสินค้าคู่แข่งลง ผลของการวิจัยนี้จะช่วยสร้างความเข้าใจในความสัมพันธ์ระหว่างความสามารถและกลยุทธ์ผลิตภัณฑ์ใหม่ได้ดีขึ้น และเป็นประโยชน์ต่อผู้ส่งออกและองค์กรรัฐในการพัฒนากลยุทธ์ผลิตภัณฑ์ใหม่ของผู้ส่งออกไทย

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| ภาควิชาพาณิชยศาสตร์ | ลายมือชื่อนิสิต..... |
| สาขาวิชาธุรกิจระหว่างประเทศ | ลายมือชื่ออาจารย์ที่ปรึกษา..... |
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New product development has received much attention in academic and managerial literature over the last ten years because it was seen as an important source of competitive advantage. This study applied resource-based theory to the relationship between firms' capabilities and new product strategy. This study attempted to understand the role of capabilities towards new product proactive and reactive strategies of Thai exporters.

Four industries were chosen for study, which were canned food, garments, furniture, and gems/jewelry. Ministry of Commerce identified these industries as high potentiality of export. This study included three steps in data collection : preliminary interview, pilot study, and mail survey. Response rate was 15%. There were 243 usable questionnaires. Data analysis included factor analysis, analysis of variance and multiple regression analysis to test the hypotheses.

The results of this study partially supported the hypothesis that firms' capabilities were related to new product proactive and reactive strategies. Technical capability helped new products serve new customers' needs better. International marketing capability leaded to greater product newness to firm, such as new technology and design, and increased number of new product lines introduced.

Personnel capability leaded to more frequency of new product introduction with new design and better new product characteristics. Top management capability leaded to more frequency of new product introduction with new design, greater use of firm's own research and design, and lower use of imitation. The result of this research will help develop a better understanding of the relationship between firms' capabilities and new product strategies, and will be useful for export companies and public policy decisions in improving the new product strategies of Thai manufacturing exporters.

ภาควิชาพาณิชยศาสตร์ ลายมือชื่อนิสิต.....

สาขาวิชาธุรกิจระหว่างประเทศ ลายมือชื่ออาจารย์ที่ปรึกษา.....

ปีการศึกษา 2542 ลายมือชื่ออาจารย์ที่ปรึกษาร่วม.....

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This work is dedicated to my parents. family. professors and Thai exporters who have contributed to the wealth and prosperity of our beloved country, Thailand.

# Contents

# List of Tables

**Table**

# List of Figures

**Figure**

# Chapter 1

# Introduction

## Introduction

New product development has received much attention in academic and managerial literature over the last ten years because it is seen as an important source of competitive advantage (Brown and Eisenhardt 1995; Terwiesch, Loch and Niederkofler 1998). The development of new products is rewarding and necessary to maintain a healthy organization (Urban and Hauser 1993). For example, in a survey of 700 firms Booz, Allen, and Hamilton, Inc. (1982) found that over a five-year period new products accounted for 28% of these companies' growth. In a 1990 study sponsored by the Marketing Science Institute researchers found that 25% of current sales were derived from new products introduced in the last three years (Wind, Mahajan, and Bayless 1990).

Resource-based theory is used in this study as the theoretical approach. Resource-based theory is quite a long established theory since Penrose (1959). Many other authors have contributed to resource-based theory such as Wernerfelt (1984), Barney (1991) and Conner (1991). However, it has only recently begun to earn increased attention from strategists (Moingeon and Edmondson, 1996). Therefore, there are only a few empirical studies that use resource-based theory as a theoretical foundation (Roth 1995, Tallman and Li 1996).

This study applies resource-based theory to approach the relationship between firms' capabilities and new product strategy. This study attempts to understand the role of capabilities towards new product proactiveness of Thai exporters. The result of this research will develop a better understanding of this relationship and guide export companies and public policy decisions in improving performance among Thai export firms.

Thailand's exports have changed from agricultural product to industrial product orientation. A study of Thailand's exports by Nanak et al. (1997) showed that export growth rates of many products have tended to decline since 1996. Exports of technology-intensive products grew by 10.73 percent, while traditional agri-product exports grew by only 2.94 percent. Industrial product exports rose by 2.10 percent, and those of labor-intensive industrial products by 3.31 percent. Among these, garments and footwear have faced serious problems. This decline is due to the entry of new competitors to both labor- and capital-intensive sectors in the Asian market. Thailand's major competitors include India, China, Malaysia and Indonesia.

Jirapaeth (1996) stated that higher labor costs, with a five-year average growth rate of 10.04 percent (1991-1995) and the problem of labor shortages are the cause of higher production costs. Production of export goods in Thailand relies extensively on imported capital goods and raw materials. This is considered the major obstacle to the development of the country's export production. Any changes in government policy or measures, along with the value of the Baht, will have impacts on exporters' production costs. These factors have resulted in Thailand losing its competitive advantage in the world market.

The World Competitiveness Yearbook 1996, the international Institution for Management Development (IMD) and the World Economic Forum showed that Thailand's competitiveness has declined greatly, ranking the last among its competitors in Asia such as Singapore, Taiwan, Malaysia, China, and South Korea. The country needs to be developed in terms of infrastructure, management, science and technology, and personnel. The Thai government has to be responsible for the country's infrastructure development. Developments in science, technology and personnel need stronger cooperation between the public and private sectors, while management development can be done by the private sector alone (Lueprasidthskul 1997).

The industrial development policies of Thailand Development Research Institute Foundation (TDRI) state that to improve the manufacturing industries, Thai producers need to develop production technology to be quality-competitive with developed countries and to avoid price competition in low quality products with lower-labor cost countries (Akkaraseranee et al. 1996). In order to develop technology, it needs researchers who have graduated in this field. However, education in the research field is neglected. Few people

have graduated directly in this field even though there is a lot of employment for researchers. For example, the garment industry employs about one million researchers. Furthermore, there should be more emphasis on research and development because Thai industries cannot only depend on low-labor cost any longer (Akkaraseranee et al. 1996).

The international trade policy of the Thailand Development Research Institute Foundation (TDRI) state that to improve competitiveness in international market share, it is necessary to improve both product categories and market extension simultaneously. For example, conducting market research of foreign customers regarding their needs in order to develop and improve Thai products. Moreover, it is necessary to have good service and export management systems (Akkaraseranee et al. 1996).

**Promoting Industrial Capability and Competitiveness**[1]

The competitiveness of Thailand's growing industrial base depends on many factors. Human resources, technology, standards, energy and infrastructure are just some of the priority areas under the Ministry of Industry's work plan to raise the competitiveness of Thai based industrialists. To achieve the mentioned objectives, the Ministry of Industry has started to restructure industrial sectors and support industrial entrepreneurs towards self-reliance in order to develop their capabilities in manufacturing products to compete in both the domestic and international markets.

The key to competitiveness is productivity. The Department of Industrial Promotion (DIP) has long encouraged industry to improve product quality as well as reduce costs. Increased global and regional trade liberalization calls for further upgrading of Thai industry, with programs like the Thailand Productivity Institute (TPI) leading such efforts. TPI works with the private sector to provide training, consultancy, labour management, and R&D services aimed at increasing productivity of industries.

[1] source : Ministry of Industry profile from the internet (www.moc.go.th), July 1999.

Increasingly, industrial policy-makers throughout the world recognize the need to develop the capability and competitiveness of small and medium-scale enterprises (SMEs). The Department of Industrial Promotion is the leading organization in promoting and supporting the special needs of SMEs which comprise 95.8% of existing industries. Through this Department, a variety of services ranging from consultancy, information, training, seminars, study tours both in the country and abroad, raw materials, and products testing and analysis, design and R&D to financial assistance are provided to industrialists.

Spearheading the drive towards increased competitiveness is the Department of Industrial Promotion. The Department of Industrial Promotion runs a number of technical and managerial services as well as industry-specific programs in developing small and medium scale industries in various sectors such as textiles, furniture, agro-industry, jewelry, ceramics, leather and leather goods, supporting industries-automotive, electrical and electronics, metal-working and machinery, packaging and handicrafts.

To facilitate development of new businesses, especially small and medium-scale enterprises, the Department of Industrial Promotion's Bureau of Industrial Enterprise Development (BIED) assists in identifying and developing industrial investment opportunities. Particular emphasis is placed on the linking of foreign investors with supporting industries or joint-ventures with foreign investors in the various industries. A particularly valuable service provided by the Bureau of Supporting Industries Development (BSID) involves sophisticated product testing such as the X-raying of metal components to ensure tolerances meet industry standards.

Cooperation with foreign governments provide important support for increasing competitiveness. Under bilateral as well as multilateral cooperation, the Ministry of Industry has implemented several projects in technical and managerial capacity building. Raising technical and managerial capability will enable Thailand to broaden its industrial base and expand production into the higher technology industries.

## Rationale for the Study

The rationale for the study includes the followings:

1. Urban and Hauser (1993) divide new product strategy into reactive and proactive. **Reactive strategy** is based on dealing with initiative pressures as they occur, whereas a **proactive strategy** would explicitly allocate resources to preempt undesirable future events and achieve goals. There is no previous empirical academic research that has studied new product strategy as reactive and proactive. This study treats reactive and proactive strategies as a continuum called new product proactiveness. It is the degree of proactiveness which is directly related to Thai exporters.
2. Resource-based theory is quite a long established theory and some scholars have tested this theory in their studies. For example, Roth (1995) used a resource-based framework to test the pattern of CEO characteristics ideal for enabling a CEO to contribute to firm performance. However, nobody has used this theory in a new product study before. Resource-based theory can be used to help explain or understand the way companies introduce new products.
3. This study is aimed at finding out how firms' capabilities have impacts on new product proactiveness.

## Research Objectives

Objectives of this study are as follows :

1. To find the effects of firms' capabilities on new product proactiveness. There are four capability types: technical capabilities, international marketing capabilities, personnel capabilities, and top management capabilities.
2. To find the interaction effects between top management capabilities and the other three capabilities towards new product proactiveness.
3. To operationalize the constructs of capabilities and new product proactiveness.
4. To suggest from the findings which capabilities are critical for Thai exporters to improve or develop in order to increase the degree of new product proactiveness.

## Research Questions

There are two research questions in this study as follows :

1. Do firms' capabilities have significant positive effects on new product proactiveness?
2. Are there significant positive interaction effects among firms' capabilities on new product proactiveness?

## Operational Definitions in This Study

Operational definitions in this study include two main constructs as follows :

1. **Capabilities** are tangible and intangible assets that are firm-specific and created over time through complex interactions among resources (Teece, Pisano, and Shuen 1990). For this study, capabilities are divided into four groups: technical capabilities, international marketing capabilities, personnel capabilities and top management capabilities.
   1) **Technical capabilities** are the capabilities in research and development, design and production.
   2) **International marketing capabilities** are the capabilities and experience of firms in international marketing, including advertising, promotion and marketing research.
   3) **Personnel capabilities** are the capabilities of key personnel in the company including research personnel, product designers, engineers, technicians, and marketing personnel.
   4) **Top management capabilities** are the capabilities of top management and their support of new product development.

2. **New Product Proactiveness.** New product strategies include reactive and proactive strategies (Urban and Hauser 1993). For this study, new product strategies are treated as the degree of proactiveness continuum, therefore, it is called new product proactiveness. The strategy is more proactive when it involves greater creativity, product radicalness (involves a large new body of technical knowledge), and R&D effort. It is based on the R&D effort to develop a technically superior product. The proactive dimension also includes more innovation, higher quality, and improved satisfaction of customer needs. The strategy is more reactive (less proactive) when it

involves less creativity, greater product similarity (only minor improvement), and more imitation (copies a new product from a competitor).

## Study Contributions

There are two study contributions as follows :

### 1. Theoretical Contributions

Major theoretical contributions of this study are as follows :

1) This study creates a new model that links firms' capabilities and new product proactiveness.
2) This study applies resource-based theory to new product studies.
3) This study operationalizes firms' capabilities and new product proactiveness constructs in comprehensive ways using both objective and subjective measures which no previous study has done.

### 2. Practical Contribution

The results of this study will show how firms' capabilities impact on new product proactiveness of Thai exporters, so that exporters may place greater emphasis on the capabilities that lead to increased proactiveness. The results of this study will encourage exporters to build and invest in critical capabilities so that they can compete internationally according to their own strengths.

## Scope of the Study

The scope of this study embraces four Thai manufacturing exporters in the canned food, garments, furniture, and gems/jewelry industries. These four industries were chosen from a total of seventeen industries on the basis of potentiality and local resources. and are recognized by the Department of Export Promotion (DEP) and the Ministry of Commerce as high potential export industries. The DEP has a program to encourage and support exporters from these industries to build international brand names and trademarks in order to be well known abroad and to be legally protected. This program started in February

1999. Details are attached in **Appendix 1.** These four industries also have a high percentage of total Thai export sales and are expanding as shown in **Appendix 2.**

Moreover, these four industries have introduced a lot of new products compared to other industries and use a high proportion of local raw materials which make them more efficient compared to the industries that import raw materials. These four industries mostly use natural resources endowed in Thailand which make them more efficiency compared to the industries that have to import raw materials from abroad. The diversity of these four industries contributes to the generalizability of results (Gatignon and Xuereb 1997).

## The Organization of the Paper

This study is divided into four chapters. **Chapter 1** describes the background and objectives of the study. **Chapter 2** reviews the relevant literature which leads to the formulation of the research methodology employed. **Chapter 3** shows the theoretical framework of the study and hypotheses settings. **Chapter 4** presents research methodology including research design (population, sampling method and instruments), construct operationalization, data collection, and data analysis.

# Chapter 2

# Literature Review

The purpose of this chapter is to conceptualize the constructs of this research. For this purpose, the relevant literature is reviewed and synthesized. This chapter is divided into seven parts. Literature streams concern new product strategy, resource-based theory, technical capabilities, international marketing capabilities, personnel capabilities, and top management capabilities. The final part shows the gaps of research studies from the literature review.

## New Product Strategy

Most organizations find it more profitable to approach new product development with an effective managerial strategy likely to achieve success, but at the same time, minimize costs and risk. Today's organizations face a variety of circumstances, some call for innovation from scratch (new markets and totally new products), and some call for a rapid defensive response that might include imitating a competitor's innovation. To manage in this situation, it is necessary to understand the range of strategies that are possible including innovative versus imitative, offensive versus defensive, entrepreneurial versus organizational, and internal versus external development. A good strategy includes a portfolio of product development strategies that are balanced to the demands of the situation the company faces (Urban and Hauser 1993).

Corporate strategy is a framework that gives an organization its overall direction and impels it to action. New product strategy is one part of the overall corporate strategy. It is a means of implementing an organization's corporate strategy. This means that a new product strategy depends on the *organization's capabilities* and its environment (Urban and Hauser 1993).

## 1. Types of new product strategies

New product strategies can be divided into reactive and proactive strategies (Urban and Hauser 1993). **Reactive strategy** is based on dealing with initiative pressures as they occur, whereas a **proactive strategy** would explicitly allocate resources to preempt undesirable future events and achieve goals. For example, a reactive view of the competition is to wait until a competitor introduces a product and copy, if it is successful, whereas a proactive strategy would be based on preempting competition by being first on the market with a product that competitors would find difficult to match or improve (Urban and Hauser 1993).

1) **Reactive strategies** are based on dealing with the initiative pressures as they occurs.

There are four types of reactive strategies.

***1.1) Defensive strategy***

A defensive strategy protects the profitability of existing products by countering competitive new products. For example, when Datril entered the analgesic market with a position of "the same ingredients as Tylenal, but less expensive", the makers of Tylenol responded with an effective strategy based on reduced price, aggressive promotion, and emphasis on goodwill built up by years of doctors' recommendations.

Some defensive strategies are primarily marketing mix responses - advertising, promotion, or price, whereas some strategies include counteroffensives of new flankers and new products. For example, once Tylenol countered Datril's attack, they launched Tylenol Extra-Strength to establish their brand among consumers who demanded a more effective pain reliever.

***1.2) Imitative strategy or "Me too" strategy***

An imitative strategy is based on quickly copying a new product before its maker is assured of success. It is common practice in the fashion and design industries for clothes, furniture, and small appliances. For example, once Cuisinart demonstrated that a market existed for expensive food processors, many of the major appliance companies followed with products that imitated Cuisinart. This strategy made sense to them as an expansion of a product line; they could exploit their expertise in this channel, in production, and

marketing. It stopped further erosion in sales as consumers switched from mixers and blenders to food processors.

*1.3) Second-but-better strategy*

For second-but-better strategy, the firm does not just copy the competitive product, but identifies ways to improve the product and its positioning. This strategy might not attack a new product head on but rather identify a niche where it can provide unique benefits. For example, Microsoft's Excel spreadsheet program gained market share from Lotus among certain users by providing a superior graphical user interface, flexibility, efficiency, and compatibility with Apple computers. In the early 1990s Lotus had the dominant share of IBM-compatible machines, and Excel had the dominant share among Apple's MacIntosh users. The market battle continues as users move to graphical user interfaces.

*1.4) Responsive strategy*

Responsive strategy means purposely reacting to customer's requests. For example, because scientific instrument users often modify and improve the equipment they use, manufacturers can identify new opportunities and new designs by facilitating the information flow from users. Similarly, an office furniture manufacturer can identify new ideas by observing how customers modify their furniture, for example, to create work stations for computers and printers.

2) **Proactive strategies.** Organizations can be proactive and initiate change. A proactive aerospace company does preemptive R&D and product development. It might take its work to the government and suggest a request for a proposal be written around this need.

There are five types of proactive strategies.

*2.1) Research and development*

The proactive strategy of an organization may be based on R&D effort to develop technically superior products. IBM, Hewlett-Packard, and Microsoft are examples of organizations that devote considerable energy to the potential of technological innovation.

*2.2) Marketing*

A firm can also be proactive in identifying customer needs and developing products that provide the benefits to satisfy those needs. Such strategy requires that the organization devote energy to understanding input from the customer. This can include market research, the process of talking to users, and personnel rotation so that they have contact with the customers. Proctor and Gamble, General Foods, McDonald's, and most consumer product companies use this customer-based philosophy.

*2.3) Entrepreneurial*

For entrepreneurial strategy, a special person called an entrepreneur has an idea and makes it happen by building venture enthusiasm and generating resources. Many high-technology firms in California's Silicon Valley or Boston's Route 128 were started in this way. At 3M, a separate new venture division was established where entrepreneurs can take a leave from their regular job, to work on ventures.

*2.4) Acquisition*

Acquisition can be an effective strategy for growth and financial success. Other firms are purchased with products new to the acquiring firm and perhaps the market. For example, Microwave Associates grew from a $50 million defense contractor to a $500 million company called MA/COM by the acquisition of more than 16 companies.

*2.5) Alliances*

A Firm cooperates with other firms to put together a new product portfolio of skills that lead to success in the market. These may be joint ventures such as General Motors (GM) and Toyota cooperation (called NUMI) to produce small cars for the U.S. market. In this venture GM gained access to Toyota's skill in manufacturing and quality control, while Toyota gained access to the U.S. market.

Alliances also may be structured as R&D consortia such as the effort by U.S. manufacturers to build new integrated circuit technologies in a venture called SEMITECH. Similarly, European joint efforts in multinational technology development projects like EURICA are large and significant.

Alliances are designed to bring together a pool of skills in technology, marketing, production, finance, and geographical experience so that alliance members can be competitive in the market and achieve their goals. Such alliances provide opportunities to the initiating firm to gain skill at lower costs. The participants gain the opportunity to grow without bearing the full risk of market development.

The proactive strategy is based on preempting competition by being first on the market with a product that competitors would find difficult to match or improve. It also has the first mover advantage. It will bring the first mover high rent yielding before imitators can follow. More innovative products should create more opportunities for differential and competitive advantage, and hence impact positively on performance (Kleinschmidt and Cooper, 1991). The result from the study of Gatignon and Xuereb (1997) showed that innovation radicalness and differentiation for competitive advantage are crucial to the successful marketing of new products.

Proactive strategy is also related to differentiation strategy (Porter 1985). A firm with differentiation strategy attempts to achieve competitive advantage by creating a product or service that is perceived as unique. Some common characteristics of such firms are strong marketing abilities, an emphasis on product engineering and basic research, a corporate reputation for quality products, and amenities that are attractive to highly skilled labor. Approaches to differentiation can take many forms, among them : design or brand image; technology; features; customer service; and dealer network (Gomez-Mejia et al. 1998).

Differentiation provides competitive advantage because of the brand loyalty it fosters. Consumers who are brand loyal are less sensitive to changes in price. This enables the differentiator to enjoy higher profit margins, which in turn allow it to invest in activities that are costly and risky but enhance the perceived superiority of its products or services. These activities include extensive research, experimentation with new ideas and product designs, catering to the needs of different customers, and supporting creative initiatives by managers and employees (Gomez-Mejia et al. 1998).

## 2. Reactive versus proactive strategies

To select the appropriate strategy, it is necessary to understand the situations that affect this decision. The types of considerations that go into an organization's decision to select a particular type of product development strategy are as follows (Urban and Hauser 1993) :

### 1) Growth opportunities

**Figure 1** describes four strategies based on whether the products and markets are existing or new.

**Figure 1**

**Opportunities Matrix (Ansoff 1957)**

| | Existing products | New products |
|---|---|---|
| Existing markets | 1. Market penetration | 3. Product development |
| New markets | 2. Market development | 4. Diversification |

The first cell, *market penetration*, describes opportunity as growth through existing products and markets. This strategy is characterized as the development of high market share in existing markets with existing products. The growth strategy is not based on innovation in products as much as in selling and promotion. For example, Kentucky Fried Chicken has bucked the trend of proliferation in varieties of fast foods and instead concentrated on chicken. Market focus is becoming increasingly important to firms and total quality programs are increasing.

In many of today's markets, saturation occurs so frequently that firms are increasingly looking toward new markets. Cell 2, *market development*, represents the strategy of taking existing products and entering new markets. for example, Heinz has positioned their vinegar product to clean automatic coffee makers 'naturally'.

The usual *new-product development* strategy is to attack existing markets with new products (cell 3). This strategy is consistent with the notion of 'building on strength' and expanding in areas of skill and knowledge in distribution and production. For example, McDonald's introduced Chicken McNuggets, and salads to expand its menu and widen its product line.

Some companies may choose to *diversify* into new markets with new products (cell 4). McDonald's entered the breakfast market with longer hours and a line of breakfast items in order to make further use of facilities and attract a new line of business. Although diversification can be successful, Exxon, a leading petroleum company, incurred substantial losses when it attempted to create a new division to develop products for the rapidly growing 'office of the future' market. If the new market is a strategic opportunity and is consistent with the organization's designated competitive advantage, and the use of diversification into new markets can help achieve the organization's goals.

The choice of market opportunity is an important decision that affects the strategic response. If existing products and markets are to be primary growth vehicles (cell 1), the organization must be superior in production and distribution, and growth-rate aspirations should not be too high. In this case product development would be used to defend existing products by *reacting* to competitive and environmental pressures.

However, if the organization wants growth or a policy of innovation, and has skills in R&D and marketing, a *proactive* strategy would have the potential to help meet its overall organizational objectives. Proactive strategies based on R&D and marketing lead to new products and new markets (Urban and Hauser 1993).

**2) Protection of Innovation**

Another major factor in selecting between reactive and proactive strategies is the amount of protection a new product can obtain. If the product can be patented, the innovating organization can be assured that its developmental investment will be returned. Firms that can achieve good protection should be proactive, whereas those that cannot, may be better of in a reactive mode (Urban and Hauser 1993).

**3) Scale of market**

Market size and margins can affect the choice of development strategy. In large markets with economies of scale or experience in production, distribution, or marketing, a proactive first-in innovation may establish market dominance and give the firm an advantageous position. Conversely, in markets that have neither volume nor the margins, a firm may not be able to recoup its investment in product development - especially if there are high overhead costs (Urban and Hauser 1993).

**4) Competition**

The competitive environment may be critical to the selection of strategic posture. It may make a reactive strategy of imitation feasible and necessary. If the time is necessary to copy is short, there are few entry costs, the innovation is not protected by patents. and the organization can achieve economies of scale quickly, this may be appropriate. The relative size of the competitors is also important. A small firm may be particularly vulnerable to competitive reaction and thus must be preemptive in its innovation plans. Similarly a large firm may be proactive to protect its lead. For example, in appliances, although imitation is common, Black and Decker allocates substantial resources to design new appliances (Urban and Hauser 1993).

**5) Position in production/distribution system**

In some situations one firm in the chain of distribution may be proactive, with the others reacting to that firm's innovation. In many industrial markets the supplier of the materials or even the final user may develop the product. For example, ALCOA invented the aluminum truck trailer and then sold it to the trucking industry by showing that less weight in the trailer structure meant a greater payload that would pay back the higher initial investment costs. In consumer industries the producer is the usual innovator, but powerful retailers will often specify innovative products and then have other firms produce them. For example, Sears' Craftsman line of tools is well respected and commands a premium price. Whether or not a firm is proactive depends on the stance of other firms in the distribution channel and on its relative power within that channel(Urban and Hauser 1993).

Depending on market circumstances, an organization will choose either a reactive or a proactive development strategy. In particular, *reactive strategies* may be best in situations that :

- require concentration on existing products or markets
- can achieve little protection for innovation
- are in markets too small to recover development costs
- are in danger of being overwhelmed by competitive imitation
- are in distribution chains by another innovator

For such situations, innovation may be too large a risk.

Other situations will favor *proactive strategies*. These are situations that

- require rapid sales growth
- mean entering new markets
- provide high volumes or margins
- offer the capability of achieving patent or market protection
- supply the resources and time necessary to develop new products
- block competition from entering rapidly with a second-but-better strategy
- provide reasonable power in the distribution channel

In such situations an organization can achieve success and reduce risk through proactive strategies.

With the rate of innovation in virtually all markets changing, healthy companies must be adaptable, either by reacting to someone else's innovation or by introducing one of their own. A understanding of the interrelationship among vigilant competitors, opportunistic customers, adaptable producers, and ceaseless technological innovation is required. Managing opportunity from the competitor's point of view means introducing a set of rules - bringing innovation to the opportunistic customer. Successful opportunity management requires an active point on both ends of the vector between customer and producer. Market viability comes from agile opportunity management; market leadership comes from agile innovation management. Both are enabled and coupled by agile resource management. A company needs both proactive and reactive competencies to initiate and counter external change events, and it needs both progressive and resilient competencies to initiate and counter internal change events. Agility is the ability of an organization to adapt proficiently (thrive) in a continuously changing, unpredictable business environment - a combination of viability and leadership (Rick 1995).

## 3. Previous studies of new product research

There is no previous empirical academic study of proactive and reactive strategy from the literature review. It has been discussed only conceptually. However, there are some studies of new product strategy in general terms as the determinants of new product performance (Cooper and Kleinschmidt 1987, Montoya-Weiss and Calantone 1994). For example, there were goals or objectives for the company's new product program; the role of new product in achieving company goals was clearly communicated to all in the firm.

Montoya-Weiss and Calantone (1994) studied the determinants of new product performance at project level, but Cooper and Kleinschmidt (1995) studied the determinants of new product performance at company level which is a broader view of the determinants of success. Cooper and Kleinschmidt (1995) supported this study of firm level with three reasons :

1) Success at company level may be somewhat different to success at the project level. For example, a company might have a string of successful new products measured by return on investment, but because they are relatively small, incremental projects, and because the firm is so large, these winners have a relatively minor impact on the company's total operation.
2) There may be company practices that are not apparent at the project level and yet are important to success. An example might be the existence of a clear and solid corporate strategy for product innovation - a product innovation charter.
3) Company characteristics may be important to success or failure of the firm. For example, company culture and climate.

Therefore, it is also necessary to move to firm level in order to view the complete picture. Many factors that impact on new product outcome have been identified in the literature. Cooper and Kleinschmidt (1995) developed the following propositions based on the previous studies such as Shrivastava and Souder (1987); John and Snelson (1988) and Dwyer (1990).

The company's overall new product performance depends on :

1) *Process :* The firm's new product development process and the specific activities within this process.
2) *Organization :* The way the program is organized (e.g., a cross-functional team vs. a functional approach).
3) *Strategy :* The firm's total new product strategy (as part of its corporate strategy).
4) *Culture :* The firm's internal culture and climate for innovation (e.g., support for teamwork and intrapreneurs).
5) *Commitment :* senior management's involvement with and corporate commitment to new product development.

Each of these five elements and the rationale for their inclusion in the framework of the study are highlighted below.

1) *The new product development process :* The importance of the new product development process on project outcome has been revealed in numerous success/failure studies at the project level. The activities that comprise a new product process are strongly associated with project outcome. For example, strong market orientation, the undertaking of marketing tasks in a quality fashion, completing the predevelopment activities well, and having an early, sharply defined product, prior to product development begins have all been found to be correlated with success. Similarly, quality of execution of technological activities has been linked to performance. Finally, the existence of a formal new production process has been found to yield positive results.

2) *How the firm organizes for new products :* The organizational setting of the new product development activities has become increasingly important to both academics and managers. The use of a cross-functional team and the existence of cross-functional responsibility and interfaces between departments promotes positive new product performance, including time to market. Finally, Larson and Gobeli (1988) reported that a cross-functional team with an empowered leader yielded much better results than a functionally based new product effort. The key role of the project leader or champion has also been identified in other studies.

3) *New product strategy :* The firm's new product strategy or product innovation charter defines the role of new product development in the company's overall strategy. It specifies product/market arenas as areas of focus, formalizes the necessary organizational structures for implementation, and defines corporate and new product goals. An explicit product innovation strategy enables management to plan for and to make available adequate resources for specific product development. Further, having well focused new product strategy results, according to some studies, in more successful new product programs.

4) *Culture and climate :* A positive culture and climate for new product development is vital to successful product development, according to some studies. Facets of a positive climate include organizational practices that :

- support teamwork;
- permit the emergence of intrapreneurs or product champions;
- provide support in terms of reward, risk, autonomy, and treatment of failures;
- encourage employee submission of new product ideas (e.g. via idea or suggestion schemes);
- provide time-off or free time for employees to develop their own ideas;
- make available venture capital or seed money for internal projects.

5) *Senior management's involvement and corporate commitment :* The impact of these two senior management elements on new product development has been found to be positive. Success factors here include :

- senior management commitment to risk-taking in product innovation.
- clear messages from senior management about the role and importance of new product development;
- availability of funds and resources for product development;
- ease of access to senior management in case of difficulties or for major new product decisions;
- technical literacy among senior managers.

Cooper and Kleinschmidt (1995) conducted an empirical study with a total of 135 firms from Europe and North America which were known to be active in new product development. The results of the analysis showed the main performance drivers that separate the solid performers from the stragglers as follows :

1) *A high-quality new product process :* This process included those steps and activities in a new product project from idea to launch. Here, the better performers had quality processes where;

- there was a focus on quality of execution (where every activity was carried out in a quality fashion);
- the process was complete or thorough (where every activity was carried out - no hasty shortcuts);
- there was emphasis on up-front homework (on predevelopment work);

- the process included sharp, early product definition (before development work began);
- there were tough Go/Kill decision points in the process, where projects really were killed;
- the process was flexible (where stages and decision points could be skipped or combined, as dictated by the nature and risks of the project).

2) *A clear and well-communicated new product strategy* for the company, that was :

- there were goals or objectives for the company's new product program; i.e., what sales, profit, etc. of new products would contribute to the corporate goal;
- the role of new products in achieving company goals was clearly communicated to all in the firm;
- there were clearly defined arenas - specified areas of strategic focus, such as products, markets, or technologies - to give direction to the firm's total new product program;
- the new product program had a long-term thrust and focus, including come long term projects (as opposed to short-term, incremental projects).

3) *Adequate resources* for new products, that were :

- senior management devoted necessary resources to achieve the firm's new product objectives;
- R&D budgets were in place, and had their time freed up for new products.
- the necessary people were in place, and had their time freed up for new products.

4) *Senior management commitment* to new products, specifically:

- senior management was strongly committed to new products;
- they had devoted the necessary resources; and
- they were intimately involved in the key Go/Kill and spending decisions for new product projects.

5) *An entrepreneurial climate* for product innovation : this translated into :

- ideation : a new product idea suggestion scheme solicited ideas from employees :
- free time : technical employees were provided free time or scouting time - up to 10% to 20% of their working week - to do creative things or to work on their pet projects;
- bootstrapping : resources or seed money were made available for creative work or pet projects;

- skunk works : the formation of skunk works was encouraged - teams working on unofficial projects.

6) *Senior management accountability :* Not only were senior managers committed, they were also held accountable in a real way for new product performance results, namely :

- new product performance measures (e.g., percentage of sales or number of launches per year) were an explicit part of senior managers' annual objectives;
- these same performance measures became criteria for senior management compensation (e.g., their bonuses were tied to these performance measures);
- were measured each year (e.g., performance of sales or profits achieved from new products, success versus failure rates, etc.)

7) *Strategic focus and synergy,* this meant :

- new products did not take the firm into new and unfamiliar markets (rather, they stayed closer to their base or existing markets);
- new products did not require technology that was totally new to the firm (instead, they leveraged in-house or existing technology).

8) *High-quality development teams,* that had :

- dedicated leadership : project team leaders tended to be dedicated to one project (did not have a multitude of projects underway at once);
- frequent communications : project teams tended to have frequent meetings (once per week or more);
- efficient decision making : decisions tended to be handled quickly and efficiently, with a minimum of bureaucracy.

9) *Cross-functional teams,* that had :

- every project with an assigned team of players;
- a cross-functional team - players from different functions in the company;
- in all projects an identifiable and accountable team leader;
- a leader and team who were accountable for all facets of the projects - from beginning to end.

Johne and Snelson (1988) used the McKinsey 7S's framework popularized by Peters and Waterman (1982) to review factors that affected success of product innovation. Strategy was one part of their framework. They defined strategy as 'the plan leading to the allocation of resources' and they developed a question related to strategy as 'Is there a product development strategy that defines the sort of new products to be developed and the resources to be released for the purpose?' in order to define principal factors underlying efficient product development.

Nystrom (1979) as referred to by Johne and Snelson (1988) has categorized fundamental business strategies as being either positional - where the emphasis is on achieving efficiency with present products, or entrepreneurial - where the emphasis is on new product or new business development. As far as product development strategies are concerned a business has four main choices open to it, as is shown in **Table 1.**

**Table 1**

**Principal Organic Product Development Strategies**

| Proactive strategies | Reactive strategies |
|---|---|
| 1. Broad-span leader<br>undertaken for leading in several market segments. | 3. Reactor<br>undertaken (sometimes very fast) in response to successful competitive launches. |
| 2. Narrow-span leader<br>undertaken for leading in a particular market segment. | 4. Responder<br>undertaken (usually with some reluctance) in response to competitive pressure. |

Source : Nystrom, H. (1979), *Creativity and Innovation*. London: John Wiley.

New product development strategy options can also be categorized using market-entry timing variables such as, first to the market, follow the leader and the me-too alternative which is a useful amplification of the four main strategies (Johne and Snelson 1988).

Many authors have stressed that particular product innovation strategies will suit business in different circumstances (Johne and Snelson 1988). Nominally, a business that wants to grow and whose products are based on technology that is still not obsolete can choose any one of the four strategies shown in **Table 1**. But in circumstances when product technology is moving very fast, many writers have stressed the potential advantage of pursuing a proactive strategy (Johne and Snelson 1988). It has been asserted that a delay of 6 to 12 months in launching a new product in certain fast-moving sectors of the electronics components industry can mean foregoing up to 50% of the potential profit (Uttal 1987 as referred to by Johne and Snelson 1988). If these assertions are anywhere near correct, then there are clear advantages in choosing a proactive strategy in circumstances where a premium price can be charged early on, in the life of a new product.

The way strategy choice in new product development pivots around the technological turbulence of a firm's existing and related markets suggests that technological analysis should be the fundamental drive behind product innovation strategy formulation. Indeed many authors have stressed the importance of keeping abreast of product technology to avoid the risk of missing out on those developments that revolutionize the nature of products (Johne and Snelson 1988). Moreover, as Foster (1986) demonstrated, the effect of technological turbulence was not restricted to industries with products of high technological content. Process technology could revolutionize product offerings of many industries with low technology content products, such as food and packaging manufacture. However, Cooper's (1984) analysis of the strategy performance demonstrated that a strategy that was solely technology-led did not always guarantee success. More successful were balanced strategies that sought to marry technological sophistication and market-place needs.

Song and Parry (1997) developed and tested a conceptual framework that was based on Day and Wensley's (1998) source-position-performance (SPP) framework. The framework links sources of advantages (skills and resources) to positional advantages on the basis of product differentiation advantage. In turn, positional advantages influenced performance outcome, including satisfaction, loyalty, market share, and profitability. Firm skills and resources could be divided into marketing resources and skills, which embraced marketing research, advertising, promotion, sales force, distribution, technical resources and skills, which embraced R&D, engineering, and production (Song and Parry 1997).

Positional advantages of product differentiation included more innovation, higher quality, and an ability to meet customers' needs better (Song and Parry 1997). The SPP framework linked product differentiation to product performance because differentiated products offered greater potential for customer satisfaction and loyalty (Day and Wensley 1988). Product differentiation was one of the most important factors for new product success (Cooper and Klienschmidt 1993).

Song and Parry (1996, 1997) operationalized new product competitive advantage by using a five-item ten-point Likert scale to measure the unique features or attributes of products, meeting customer needs, and higher quality than competitors' products. Higher quality means tighter specification, stronger, greater durability, reliability, and superior technical performance than competitors' products. Calantone and Benedetto (1988) also operationalized product quality as perceived higher quality, tighter specification, or stronger and more durable than competitors' products.

**The Technical Aspect of New Product Proactiveness**

The technology base of a company is essentially the asset of the technical competence or capability that the company possesses. As an asset, the technology base can be acquired in various ways, in an internal (make) and external (buy) spectrum. A firm may acquire skills and know-how for its own use through in-house R&D. Alternatively. it may acquire through purchase or license, external technology from elsewhere in various stages of development. Cooperative R&D (with other firms or with the government) is another method that lies in the middle of the make-buy spectrum (Chulwon et al. 1994).

Empirical studies suggest that a firm acquires a license for a new product when appropriate internal capabilities for its development are lacking (Chulwan et al.1994). Atuahene-Gima (1992) suggested that lack of internal new product development capability in a particular area is more likely to lead to a choice of inward technology licensing over internal R&D. However, Sen and Rubenstein (1990) indicated that a firm's R&D involvement was higher in the external technology acquisition process when the perceived adequacy of its capability was high. The preceding findings suggest that a firm's internal technological capability is a prime condition for the selection of a technology acquisition strategy.

A mixed strategy - external sourcing of technology followed by substantial and sustained internal adaptation and improvement - needs to be applied for new product commercialization (Chulwon et al. 1994). Therefore, the technical aspect of new product proactiveness includes licensing, cooperative R&D, and in-house R&D. The more the firms use any, or all three, the more they will enhance the technical capabilities of the firms, thereby achieving a higher degree of new product proactiveness.

**The Innovation Aspect of New Product Proactiveness**

Gatignon and Xuereb (1997) classified innovations on the basis of the notion of radical versus incremental innovations (Anderson and Tushman 1990; Henderson and Clark 1990). Radical innovations are technological discontinuities that advance by an order of magnitude the technological state of art which characterizes an industry (Anderson and Tushman 1991, p.27). This concept is related to the concept of relative advantage, because innovation that is similar to existing products cannot be highly differentiated and, therefore, cannot have a major advantage over existing products or competitors. Gatignon and Xuereb (1997) proposed that the greater a new product's relative advantage, the more radical it is, the better the performance (of this new product).

More innovative products should create more opportunities for differentiation and competitive advantage, and, hence impact positively on performance (Kleinschmidt and Cooper, 1991). The result from the study of Gatignon and Xuereb (1997) showed that innovation radicalness and differentiation for competitive advantage were crucial to the successful marketing of new products.

Gatignon and Xuereb (1997) operationalized innovation in terms of increment and radical by using a two-item scale as follows : The new product was a minor improvement in current technology. The new product incorporated a large new body of technological knowledge. They also operationalized innovation in terms of similarity with competitors' products as follows : Overall, this new product was similar to the main competitors' products. The applications of this new product were totally different from the applications of the main competitors' products.

Lee and Na (1994) studied the determinants of technical success in product development where innovative radicalness was considered. They classified innovation in two ways : incrementally improving innovation and radical innovation. They operationalized technical innovation of a product as the perceived degree of difference from other products in technical characteristics or specification.

The taxonomy created by Booz, Allen and Hamilton (1982) is a widely used framework that categorizes products along two dimensions that reflect their newness to (1) the developing firm and (2) the market that consumes or uses them. True innovations are entirely new to both firm and market place and are described as new-to-the-world products. By contrast, product modifications replace existing products with ongoing changes and therefore are quite familiar to both the firm and its customers. Between these two extremes are line extensions (which are new to the marketplace but not very new to the firm) and me-too products (which are new to the firm but not new to the marketplace). Booz, Allen and Hamilton state that the more innovative categories yield a higher proportion of success (referred to by Cooper and Kleinschmidt 1993).

Numerous studies have probed the key factors in new product success. Logic dictates that product innovation should be an important dimension with a direct or indirect impact on performance (Kleinschmidt and Cooper 1991):

- More innovative products should create more opportunities for differentiation and competitive advantage, hence impact positively on performance.
- Conversely, less innovative products are more familiar, less uncertain, may have higher synergies, and hence have a higher success rate.
- Finally, new products. One might expect the degree of newness - how new or innovative the product really is - might impact on performance.

Kleinschmidt and Cooper (1991) defined three categories of innovation for the study which were applied from Booz, Allen and Hamilton's model (1982). These are :

1) Highly innovative products : consisted of new-to-the-world products and innovative new product lines to the company.
2) Moderately innovative products : consisted of the new lines to the firm, but where the products were not as innovative (that is, not new to the market); and new items in existing product lines for the firm.

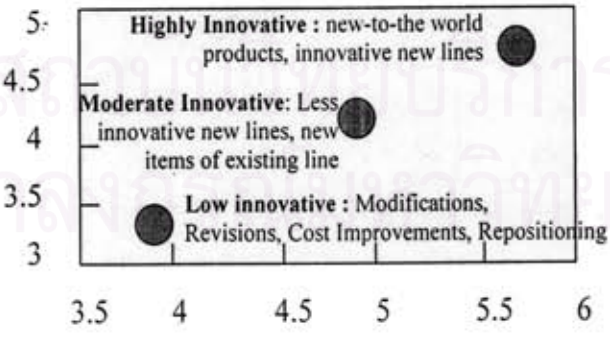
3) Low innovative products : consisted of all others : modifications to existing products; redesigned products to achieve cost reductions and repositionings.

Kleinschmidt and Cooper (1991) demonstrated that the relationship between product innovation and commercial success is U-shaped. This meant that both high and low innovative products are more likely to be more successful than those in-between. They suggested that past research has not allowed for this non-linear relationship and that their data showed that moderately innovative, middle-of-the-road products were less likely to succeed when measured by a number of performance criteria.

Kleinschmidt and Cooper (1991) operationalized product innovativeness into two dimensions which were market and technical newness. Market newness is an index, the mean of six 0-10 scale questions : new customers for firm, new competitors, new customer needs served; new sales force, new types of advertising/promotion, and new market research methods. Technical newness is an index, the mean of four 0-10 scaled questions : new product category to firm, new technology to firm, new engineering/design work to firm, and new production process to the firm.

**Figure 2** shows market and technological newness map. The three types of projects are significantly different in both dimensions.

**Figure 2 Market and Technological Newness Map**




**Source:** Kleinschmidt and Cooper (1991), "The Impact of Product Innovativeness on Performance". *Journal of Product Innovation Management*, Vol.8, pp.240-251.

The results shows that innovative and non-innovative products do well. The problem lies with the middle category - moderately innovative products - whose performance lags far behind the other two groups. For the middle group of products, they have many adverse factors : lack innovation to provide differential advantage and too out of step to gain from synergy. This is especially true for products that are not particularly innovative, yet are new lines to the firm.

The existence of such a curvilinear relationship may explain why innovation has not been identified as a key success ingredient - either positive or negative. Given the number of variables studied in the typical success/failure study, analysis techniques have assumed linearity. Such techniques do not identify the existence of a U-shaped relationship.

## Resource-Based Theory

The starting point for the formulation of strategy must be some statement of the firm's identity and purpose. For example : What is our business ? Who are our customers? Which of their needs are we seeking to serve? But in a world where customers are volatile, customer identity is changing, and technology for serving customer requirements is continually evolving, an externally focused orientation does not provide a stable foundation for formulation of long-term strategy (Grant, 1991). When the external environment is in a state of flux, the firm's own resources may be a much more stable basis on which to define its identity. Hence, the definition of a business in terms of what it is capable of doing may offer a more durable basis for strategy than a definition based upon the needs which the business seeks to satisfy. However, customer needs still cannot be ignored because they are also very important.

In resource-based theory, a firm is viewed as a collection of productive resources (Penrose 1959, Wernerfelt 1984). These resources are worth more to the firm than their individual market values because of the specialized links between them within the firm (Penrose 1959, Rubin 1973, Barney 1986a).

The key to a resource-based theory is understanding the relationships between resources, capabilities, competitive advantage, and profitability, in particular, an understanding of the mechanisms through which competitive advantage can be sustained over time. This requires the design of strategies which exploit each firm's unique characteristics to maximum effect. Resources of the firm are the foundation for its long-term strategy because internal resources provide the basic direction for a firm's strategy and they are also the primary sources of profit for.

## 1. Strategic Management : An Emerging Dynamic View

The aim of strategy theorists is to explain sustained superior performance, or above average profitability, of companies (McGrath et al., 1995). For years the dominant view - explained superior performance through structural features of industries such as barriers to competition (Porter, 1980). In this view, industry characteristics explained much of the variance in firm performance, and industry analysis was the means by which managers could attempt to improve their company's competitive advantage (Moingeon and Edmondson 1996).

An alternative view proposed that firm-specific resources and capabilities were critical factors enabling firms to achieve superior performance in the market. This perspective can be traced back to Selznick (1957) who proposed that organizations each have a 'distinctive competence' that allows them to earn superior profits, and to Penrose (1959) who described the firm as a 'collection of productive resources'. Wernerfelt (1984) and Barney (1991) have proposed that a firm conducts an analysis of its competitive environment. Subsequently, an empirical study found that a stable difference across business units accounted for more variance in returns than industry effects (Rumelt, 1991), and a resource-based theory began to earn increased attention from strategists (Moingeon and Edmondson, 1996).

The resource-based view did not represent a pendulum swing to an opposing view, but rather explicitly called for dual focus on industry analysis and firm capability (Collis and Montgomery, 1995). The line separating strategic approaches is blurred, and static versus dynamic is not a clear-cut distinction. For instance, the capability of analyzing industry forces and generating new insights provides one of the ways a firm can achieve

competitive advantage (Collis, 1994). Diagnosis can be an organizational capability, and thus process (learning to analyze) and framework (Porter's five forces) coexist in the resource-based view.

Resource-based theory focuses on a unique firm-specific resources (FSRs), rather than industry structure, and addresses both competitive advantage and the strategies intended to exploit such advantage (Tallman, 1992). Resource-based theory suggests that the complex organizational systems that are the bases for strategic advantage derive from the unique historical backgrounds of individual firms (Fladmoe-Lindquist and Tallman, 1997).

The resource-based model of business strategy focuses on how sustained competitive advantage is generated by the unique bundle of resources that are at the core of the firm (Barney, 1991; Conner, 1991; Dierickx & Cool, 1989; Grant, 1991; Mahoney & Pandian, 1992; Wernerfelt, 1984). Resource-based strategy relates sustainable competitive advantage to complex organizational system, described as rent-producing resources or core competencies, developed over time within specific firms. These competencies, or firm-specific resources (FSRs), are unique to the firm, and therefore sources of differentiation. Fundamentally, the resource-based model argues that heterogeneous firms result from a unique mixture of physical, human and intangible resources (Mahoney & Pandian, 1992).

Conner (1991) demonstrated that the resource-based model fitted transaction cost economics, which is the basis for the internalization models of the multinational firm. Both theories are concerned with asset (resource) specificity. However, the resource-based model focuses on both protecting unique resources and applying these FSRs to gain strategic advantage while transaction cost economics concentrates strictly on the avoidance of opportunism and efficient asset governance. In addition, the transaction cost model assumes the same economic activities can be performed (at different costs) via markets or hierarchies while resource-based strategy treats the organization as a unique bundle of assets that will not function in the same way in an alternative relationship (Conner, 1991, p.142). If the resource-based theory is, as Conner argues, a more general theory than the oligopoly and transaction cost concepts currently applied to studies of the multinational, then a model of multinational competitive advantage based on resource-based theory

should be considered complementary to and more general than the current models of the multinational firm.

## 2. Characteristics of Strategic Resources

Prahalad and Hamel (1990) determined that core competencies are multiuse, valuable and inimitable. In a practitioner-oriented article, Grant (1991) recognized that for a profit-generating sustainable capability to emerge, it must be durable, non-transparent (inimitable), non-transferable (immobile), non-replicable and appropriate.

Barney (1991) proposed that sustained competitive advantage derived from the possession of resources that are : (1) valuable; (2) rare; (3) imperfectly imitable; and (4) imperfectly substitutable. *Valuable* resources should be able to provide excess profits or quasi-rents to the firm. *Rare* resources are possessed by no more than a few firms in an industry. *Uncertain imitability* is necessary to protect sustainable competitive advantage and preserve the value of assets. Finally, *imperfect substitutability* of resources is also a key to sustaining competitive advantage. Some of these factors are not independent; the value of a resource will decline if it becomes readily available; a resource is less valuable if it becomes readily available and is easily imitated.

## 3. Defining Resources and Capabilities

### 1) *Resources*

Caves (1980, p.65) defined resources as the tangible and intangible assets semi-permanently tied to the firm. Barney (1991, p.101) suggested three types of rent yielding firm-specific resources which were physical, human, and organizational capital. **He contends that *physical* resources (e.g. physical technology, plants and equipment, geographic location, and raw materials access) seldom generate sustainable advantage because these resources are relatively easy to copy or work around.** Grant (1991) provided a broader set of resource categories that added financial (internal), technological, and reputational resources to the above categorization. Of these resources, the most likely sources of true sustainable advantage are the "invisible assets" (Itami and Roehl, 1987) or "core competencies" (Prahalad and Hamel, 1990) of *human* (e.g. training, experience, and relationships) and *organizational* skills (e.g. formal reporting structures,

control and coordination systems, and informal relationships). These firm-specific resources are organizationally embedded, socially complex, and difficult to identify specifically, and thus difficult to copy.

According to Itami and Roehl (1987), invisible assets (e.g. a particular technology, accumulated consumer information, brand name, reputation, corporate culture, and management skill) are the real source of comparative advantage. How strategies affect and are affected by these invisible assets influence a firm's competitive success. These invisible assets are key success factors because they are difficult to obtain. Accumulation of these assets requires ongoing, conscious, time-consuming, and uncertain efforts (Jacobson, 1992).

**2) *Capabilities***

Capabilities are the potential applications of resources (Nanda 1996). Resources and capabilities are closely related terms - access to a resource leads to a capability, a capability arises from the possession of a resource. While a resource is a fixed asset, a capability is the potential input from the resource stock to the production function. Teece, Pisano, and Shuen (1990) defined capabilities as tangible and intangible assets that are firm-specific and created over time through complex interactions among resources (Chang 1995, p.388). Grant (1991, p.119) defined capability as 'a team of resources to perform some task or activity'.

Further, a capability may draw upon several of firm resources. If a firm wishes to develop a particular capability, it may be necessary to simultaneously develop the multiple resources which contribute to that capability. One asset may need another co-specialized asset (Teece, 1982) to develop capability. The circumstance of assets being co-specialized is a special case of multi-resource capability when the resources are complementary. We can also consider positive scope-effects (the asset *interaction effect* mentioned by Dierickx and Cool, 1989) - there is a positive synergy among resources, so that the capability generated by their being jointly present is greater than the sum of the capability they would generated separately. On the other hand, we can also contemplate substitute resources (one resource may be able to offer the same capability as another), and negative scope effects (there may be negative synergies among resources) (Nanda 1996).

Teece, Pisano, and Shuen (1990, p.19) discussed *dynamic capabilities* as the mechanisms by which firms accumulate and dissipate new skills and capabilities.

Broadly, capabilities operate on resources in two ways - refinement and renewal :

- Refinement : This is the incremental accumulation of a resource.
- Renewal : This is the discovery of new, more efficient production functions. The timing for such discovery is statistically unpredictable, and it depreciates existing resources.

Refinement capability, for instance, helps accumulate organizational knowledge incrementally through *learning by doing*. Empirically, Rubin (1973) quoted a dated, but still relevant, study of thirty-two Wisconsin company executives by McLennan (1967), which found that informal on-the-job training was considered the most effective method of skill and knowledge development. However, if an organization focuses only on refinement, its ability to flexibly adapt to changing circumstances becomes limited, since organizational resources become too specific. Strategic resources may become constraints of circumstances change, core capabilities may become core rigidities (Leonard-Barton, 1992a).

Renewal capability, on the other hand, leads to the spawning of unanticipated products (Prahalad and Hamel, 1990) and the Schumpeterian revolutions hypothesized by Barney (1986b). However, this capability may lead to the undermining of existing assets, especially embedded knowledge (Henderson and Clark, 1990). Nonaka (1988) described organizational self-renewal as a process of dissolving an existing organizational order and creating a new one. Thus, renewal involves creative destruction (Schumpeter, 1950) - moving to a more productive organizational transformation function, but at the cost of depreciating existing resources.

## 4. Previous empirical studies using resource-based theory

There are a few empirical studies applying resource-based theory. Roth (1995) used a resource-based framework to test the pattern of CEO characteristics ideal for enabling a CEO to contribute to firm performance.

Chang (1995) used resource-based theory as the theoretical approach to test the relationship between capability building and sequential foreign entry of multinational corporations (MNCs). Chang (1995) stated that resource-based theory emphasizes the application of underutilized productive resources to new businesses. There are two such applications: diversified entry into a related business area and entry into a foreign market. The dominant view in diversification research is that intangible resources, such as *technology and marketing skills,* encourage firms to diversify into new businesses in order to exploit the public is good nature of information intensive assets (Chang 1995).

Chang (1995) used *research and development (R&D) and advertising intensity* as a measurement for technology and marketing skills. The data are collected from the COMPUSTAT aggregate file. Following the argument of resource-based theory, Chang (1995) expects that firms that have underutilized rent-yielding information-intensive resources would be more likely to invest overseas. *Export ratio* is measured as the average ratio of foreign sales to total sales over the study period. The *export ratio reflects a firm's international business activity before switching to direct investment as well as international experience.*

Denekamp (1995) provided empirical evidence in support of the intangible assets model of foreign direct investment. Previous studies used a wide variety of different proxies for various specific sources of intangible assets. The most common of these proxies was an industry's *research and development (R&D) intensity* (Dunning 1980, 1988, Yu 1990). This proxy is thought to capture the firm-specific assets that are generated from research and development activity. R&D proxy is calculated as the percentage of scientists and engineers in total industry employment. Similarly, a number of authors have used a firm's *advertising/sales ratio* as a proxy for intangible assets (Kumar 1987, Yu 1990). The assumption implicit in this proxy is that money spent on advertising and marketing generates firm-specific assets in the form of brand recognition and product differentiation (Denekamp 1995). A measure akin to the advertising/sales ratio, referred to as the *marketing intensity*, is calculated as the percentage of marketing and advertising personnel in total employment for each industry.

Tallman and Li (1996) applied resource-based theory to test the effects of international diversity and product diversity on MNCs performance. Resource-based theory (Barney 1991), coupled competitive advantage with the internal capabilities of a firm, this suggests that diversification into products that use the existing rent yielding resources of the firm will generate economies of scope in the use of these resources and therefore will yield greater profitability. Tallman and Li (1996) used resources-based theory as the theoretical approach to their empirical study of product diversity, but they did not really operationalize resources and capabilities of the firm. They operationalized international diversity, product diversity, and firm performance.

## Technical Capabilities (Research and development, design and production)

A firm's existing base of *technical strengths* is important. A high level of fit with the firm's existing technical resources and skills enhances the proficiency of technical activities undertaken by the firm in the new product development process. This increase in technical proficiency should increase product competitive advantage by raising the actual performance of the new product relative to competitors (Song and Parry 1997).

A company's technical resources and capabilities (including production resources, skill of engineering staff, experience in research and development) are important factors in the ability to launch product successes. Firms lacking these technical capabilities stand a greater chance of launching products which will eventually fail on the market. Product development which uses or applies the technical capabilities of the firm is more likely to result in innovative success (Calantone and Benedetto 1988).

Globe et al. (1978) as referred to by Calantone and Benedetto (1988) showed that technical variables are the predominant determinants of success or failure. These included recognition of a technical opportunity, adequate management of R&D, sufficient development funds and the presence of a technical entrepreneur.

Calantone and Benedetto (1988) operationalized technical skills in their study as the adequacy of financial resources, R&D skill and people, production, and engineering skill. Technical capabilities are operationalized as the perceived adequacy of R&D, engineering, and manufacturing capabilities in the study of Chulwon et al. (1994).

Lee and Na (1994) studied the determinants of technical success in product development when innovative radicalness is considered. Capabilities are parts of their independent variables. They summarize critical factors affecting the technical success of new product development from literature review as the existence of champions, support of top managers, availability of required resources, and communication between R&D and other departments. They hypothesized that capabilities availability and successful new product development are positively related. And those required for successful development of new products include R&D, production, financial and marketing capabilities. They exclude marketing capability from the consideration because they studied only technical performance. The R&D capability includes the experience of the corporation in the related areas. They operationalize R&D capability as the perceived adequacy of R&D capability of the corporation for the development of a new product. They operationalize production capability as the perceived adequacy of production capability of the corporation for the development of a new product.

Chang (1995) used *research and development (R&D) intensity* as a measurement for technology skills. The data are collected from the COMPUSTAT aggregate file. Following the argument of resource-based theory, Chang (1995) expects firms that have underutilized rent-yielding information-intensive resources will be more likely to invest overseas.

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Song and Parry (1997) divided firm skills and resources into marketing resources and skills, which embrace marketing research, advertising and promotion, sales force and distribution; and technical resources and skills, which embrace R&D, engineering, and production (Song and Parry 1997). They operationalize technical skills in their empirical study as perceived adequacy of R&D skills, R&D resources, engineering skills, and engineering resources for the selected project.

## International Marketing Capabilities

From the view point of an individual firm, marketing is the segment of business concerned with the planning, promoting, distributing, pricing, and servicing of goods and services desired by intermediate and ultimate consumers (Albaum et al 1989, p.2).

Marketing includes such business activities as (Albaum et al 1989):

1) Analysis of markets and potential markets.
2) Planning and development of products that consumers want, clearly identified in a suitable package.
3) Distribution of products through channels that provide services or conveniences demanded by purchasers.
4) Promotion of products - including advertising and personal selling - to inform and educate consumers about products or services, or persuade consumers to try new, improved products, and different ways of satisfying their wants and needs.
5) The setting of prices which reflects both a reasonable value (or utility) of products to consumers, as well as a satisfactory profit or return on investment.
6) The technical and non-technical service given to consumers - both before and after a sale is made - to ensure satisfaction, and possibly, pave the way for future sales which are necessary for company survival, growth, and perpetuation.

The definition of international marketing is different from the general definition of marketing only in that goods and services are marketed across political boundaries (Albaum et al 1989, p.3). This difference changes in important ways the nature of marketing management, the solution of marketing problems, the formulation of marketing policies, and the implementation of such policies.

New products are generally more likely to be successful if they build on the firm's existing *marketing strengths* (Day and Wensley 1988). A good fit between existing marketing skills and resources and the product development project's need raises the project team's ability to gather market and competitive information. This ability enhances the team's ability to interpret gathered information. In turn, this provides greater insight for and focus to idea generation and screening and to business and market opportunity analysis. This same information can also provide direction to product commercialization efforts, permitting the efficient use of marketing resources and enhance the firm's ability to differentiate the new product from competitive offerings (Song and Parry 1997).

To substantially improve the chances of product success, many international marketing activities specific to the new product must be undertaken and performed well. These include preliminary market investigation, rough sales projections to determine future market potential, careful attention to market plan development, adequate sales force and promotion/advertising effort, and distribution effort and obtaining reseller support , according to Calantone and Benedetto 1988, who measured marketing skills by using a combination of marketing research skills, management skills, sales force and/or distribution skills, and advertising and promotional skills.

Chang (1995) used *advertising intensity* as a measurement for marketing skills. The data are collected from the COMPUSTAT aggregate file. *Export ratio* is measured as the average ratio of foreign sales to total sales over the study period. The *export ratio reflects a firm's international business activity before switching to direct investment as well as international experience.*

Denekamp (1995) provided empirical evidence in support of the intangible assets model of foreign direct investment. Previous studies have used a wide variety of different proxies for various specific sources of intangible assets. The most common of these proxies is an industry's *research and development (R&D) intensity* (Dunning 1980, 1988, Yu 1990). Similarly, a number of authors have used a firm's *advertising/sales ratio* as a proxy for intangible assets (Kumar 1987, Yu 1990). The assumption implicit in this proxy is that money spent on advertising and marketing generates firm-specific assets in the form of brand recognition and product differentiation (Denekamp 1995). A measure akin to the

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## Personnel Capabilities

***Human resources*** are defined as the people who work in an organization and their relationship with that organization (Gomez-Mejia et al. 1998, p.2). Different terms are used to described these people : employees, associates, personnel, human resources. They often are used interchangeably.

Human resources represent the single most important cost in many organizations. Organizational labor costs range from 36% in capital intensive firms like commercial airlines to 80% in labor-intensive firms like the postal service. How effectively a company uses its human resources can have a dramatic effect on its ability to compete (or even survive) in an increasingly competitive environment (Gomez-Mejia et al. 1998).

### 1. Human resources policies

An organization will outperform its competitors if it effectively utilizes its human resources' unique combination of skills and abilities to exploit environmental opportunities and neutralize threats. HR policies can influence an organization's competitive position by controlling costs, improving quality, and creating distinctive capabilities (Gomez-Mejia et al. 1998).

#### *1) Controlling costs*

One way for a firm to gain competitive advantage is to maintain low costs and a strong cash flow. A compensation system that uses innovative reward strategies to control

labor costs can help the organization grow. A well-designed compensation system rewards employees for behavior that benefits the company.

Other factors besides compensation policies can enhance a firm's competitiveness by keeping labor costs under control. These include : better employee selection so that workers are more likely to stay with the company and to perform better while they are there; training employees to become more efficient and productive; developing harmonious labor relations; effectively managing health and safety issues in the workplace; and structuring work to reduce time and resources needed to design, produce, and deliver products or services.

*2) Improving quality*

The second way to gain competitive advantage is to engage in continuous quality improvement. Many companies are implementing total quality management (TQM) initiatives, which are programs designed to improve the quality of all the processes that lead to a final product or service. In a TQM program, every aspect of the organization is oriented toward providing a quality product or service.

*3) Creating distinctive capabilities*

The third way to gain competitive advantage is to utilize people with distinctive capabilities to create unique competence in a particular area. For example. 3M's competence in adhesives, and Xerox's dominance of the photocopier market.

## 2. HR strategies that fit a differentiation strategy (Gomez-Mejia et al. 1998)

HR strategies that fit a differentiation strategy emphasize innovation, flexibility, renewal of the human resource base by attracting new talent from other firms, providing opportunities for independence, and reinforcement of creative ability. The specific HR strategies that are likely to benefit differentiators, include the use of broad job classes, loose work planning, external recruitment at all levels, team-based learning, emphasis on what the individual can do (rather than on the job title held) as a basis for pay, and reliance on performance appraisal as a developmental (rather than a control) device.

## 3. Previous studies of personnel capabilities

Johne and Snelson (1988) used the McKinsey 7S's framework popularized by Peters and Waterman (1982) to review factors that affect success of product innovation. Personnel capabilities are one part of their skill framework. They define skills as 'the distinctive capabilities of key personnel' and they developed a skills related question as 'What specialist knowledge and techniques are applied for the execution of product development tasks?' in order to define the principal factors underlying efficient product development.

## Top Management Capabilities

The term 'top management' refers to a group of individuals who push a product development project forward to completion and successful commercialization (Song and Parry 1997). These individuals can include members of top management, project leaders, project team members, and other product champions within the firm (Griffin and Hauser 1992; Zirger and Maidique 1990). These committed individuals ensure that the projects remains a high priority within the firm and/or attract resources to the project, and work to maintain individual and corporate enthusiasm when the project encounters difficulties. These activities raise the level of technical development proficiency and enhance product commercialization efforts (Song and Parry 1997).

Johne and Snelson (1988) used the McKinsey 7S's framework popularized by Peters and Waterman (1982) to review factors that affect the success of product innovation. Top management resources are one part of their framework which are included in style. They define style as 'the cultural style of the organization' and they developed a style related question as 'Does top management provide active support for those involved in key product development tasks?' in order to define the principal factors underlying efficient product development.

All recent major studies into product innovation management have shown that a crucial factor in bringing a new product to the marketplace successfully is top management support (Johne and Snelson 1988). Conversely, top management isolation from a project

and preoccupation with short-term business performance is characteristic of failed innovation (Quinn 1985 as referred to by Johne and Snelson 1988).

Top managers need to have an open, imaginative and creative management style to encourage middle management to function effectively in product innovation (Johne and Snelson 1988). Booz, Allen, and Hamilton (1982) argued that top management of innovating firms provide a supportive environment in which risk-taking and experimentation are encouraged.

Such top management support is not a matter of direct hands-on control of projects; indeed, studies have shown that over-meddling by top management actually delays and upsets the innovation process (Booz, Allen, and Hamilton 1982, Quinn 1985 as referred to by Johne and Snelson 1988). Takeuchi and Nonaka (1986) argued that top management should exert a subtle control over innovation. Top management should set the broad goals for innovation but give the organization's change agent or task group freedom to operate how they wish in respect of fulfilling these goals. Similarly, Soulder's (1981) research showed that top management encouragement of *entrepreneurial* behavior involves endowing change agents with a formal license and clearly defined discretionary powers to carry out their work (Johne and Snelson 1988).

Lee and Na (1994) studied the relationship between top management support and technical success in product development when radicalness is considered. Top management support for the development team is operationalized as (1) perceived degree of importance of a project developing a new product, (2)perceived degree of management interest in a project, (3) perceived degree of resource availability for a project. They classify technical innovation in two ways : incrementally improving innovation and radical innovation.

Lee and Na (1994) hypothesized that the support of top management for the team developing a new product is positively related to technical performance. When managers support the new product activity, they carefully plan the entry and allocate sufficient managerial and financial resources to it. With formal planning and resources commitment, uncertainty is reduced and marketing strategy can be implemented effectively. They found out from the analysis that top management support is strongly related to technical

performance. However, this statement is valid only with regard to technical performance, and not overall product success.

Song and Parry (1996) hypothesized that the level of new product success is positively correlated with the level of top management support and they operationalized this construct as the perceived degree of top management support for new product development.

Cooper and Kleinschmidt (1995) studied the determinants of new product performance at company level and hypothesized that *senior management commitment* to new products is one of the determinants, specifically:

- senior management strongly committed to new products;
- devote the necessary resources; and
- they are intimately involved in the key go/kill and spending decisions for new product projects.

Cooper and Kleinschmidt (1995) operationalized senior management commitment as time off allowance for creative things, support for skunk work, senior managers committed to new product development, new product measures as part of senior management objectives, new product performance as part of senior management bonuses, senior management commitment of resources for new product program, R&D budget adequate for new product objectives, and senior management involvement in go/kill decision.

The importance of top management in the development and success of new products or services cannot be underestimated. The results of the study by Raymond and Ellis (1993) showed that top management support is essential in all aspects of product development and launch, although it has only been identified as a weak success factor in previous studies or rarely examined at all. In summary, for the development of new products and services to be successful, they must receive sufficient attention from top management, which is in a position to allocate both financial and human resources. Companies must also evaluate which opportunities best fit their technology, expertise, resources, and marketing plan, as well as with customers' needs.

Atuahene-Gima (1996) put top management support as one factors affecting innovation performance in his study. He operationalized top management support as follows : management did a good job of marketing the new product to front-line employees, management provided an environment conducive for different functions to communicate and understand each other, plus coordination between management and front-line employees during development.

## Gaps

1. New product proactiveness is critical to new product success. But there has been no previous academic empirical study about the factors that lead to new product proactiveness. The previous studies just focused on strategy as the determinant for new product success (Montoya-Weiss and Calantone 1994, Cooper and Kleinschmidt 1995).
2. Most of new product studies from literature reviews place little emphasis on the theoretical approach. None of the new product research has applied resource-based theory yet. Resource-based theory is quite a long established theory, but it has just begun to earn increased attention from strategists (Moingeon and Edmondson, 1996). There are not many studies applying it. Those that do just use it to back up their studies conceptually. They do not really operationalize the constructs from the theory or only operationalize partially. Therefore, the constructs in this theory have not been well operationalized. None of the studies links new product strategy to firms' capabilities.
3. The empirical studies of firms' capabilities, which are technical, international marketing, personnel and top management, are quite diverse. However, none of the previous empirical studies links firms' capabilities to new product strategy. Some capabilities are not well operationalized. Some research studies just use subjective measurements and have only a single dimension. For example, perceived adequacy of technical capabilities (Lee and Na 1994, Song and Parry 1997, Calantone and Benedetto 1988, Chulwon et al. 1994).
4. New product proactiveness construct is not well operationalized. Previous academic research just discusses proactive and reactive strategy conceptually. Scholars did not really operationalize and test it empirically. There are only studies of new product strategy in general terms as the determinants for new product performance as already mentioned.

# Chapter 3

# Research Model and Hypotheses

## Research Model

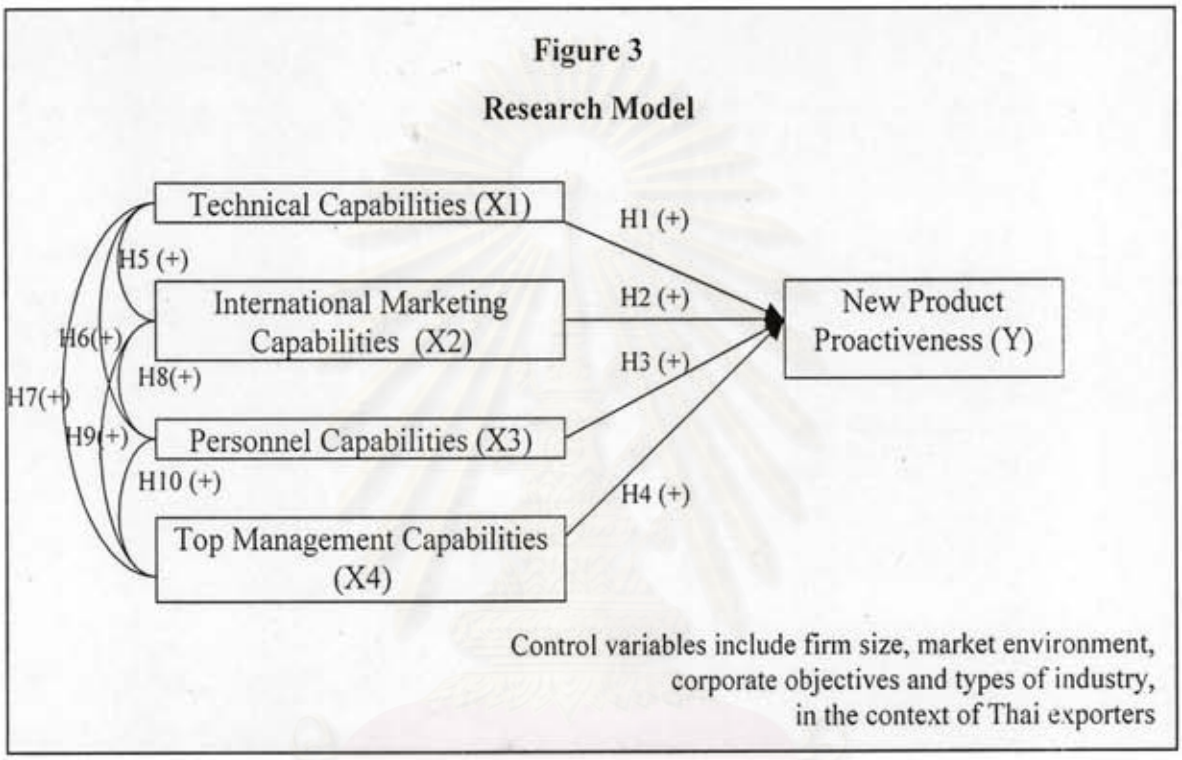



**Figure 3**

**Research Model**

**Figure 3** shows the conceptual framework of this study in the context of Thai exporters. The purpose of this model is that the firm has capabilities, therefore it can develop new products with proactiveness. Firms that have different levels of capabilities will bring about different degrees of proactiveness.

The framework of this study consists of five constructs. New product proactiveness is the dependent variable. The independent variables are firms' capabilities which include technical, international marketing, personnel, and top management. *Firms' capabilities* are based on the resource-based theory. *New product strategies* include reactive and proactive strategies. For this study, new product strategies are treated by degree of proactive and reactive continuum, therefore, it is called new product proactiveness.

This study also tests the interaction effects between each pair of capabilities because the definition of capabilities embraces the tangible and intangible assets that are firm-specific and created over time through complex interactions among resources (Teece, Pisano, and Shuen 1990). Therefore, the interaction or the synergy among capabilities will lead to higher degree of new product proactiveness. Actually, there should be the arrows from interactions to new product proactiveness, but they are omitted here to keep the figure simple.

There are four types of control variables in this framework which are firm size, market environment, corporate objectives and types of industry. The focus of this study is the relationship between firms' capabilities and new product proactiveness. However, market environment, corporate objectives and types of industry also affect the degree of new product proactiveness. Therefore, their effects need to be controlled statistically.

## 1. Firm size

The industrial organization and marketing strategy literature places considerable emphasis on the size of a firm, especially because of the resources advantage that it possesses and can use to compete (Gatignon and Xuereb, 1997). This factor can strongly affect a new product's performance (Narver and Slater, 1990). The greater the resources of a firm, the more market power, which is a competitive advantage that translates into better performance of the new product. These advantages can, in part, be the ability to invest greater resources into the design of superior innovations (Capon et al. 1992).

Shumpeter (1950) as referred to by Ali (1994) stated that the larger firms are more efficient in conducting R&D. Galbraith (1956) as referred to by Ali (1994) also emphasized the importance of firm size by asserting that the cost of technological innovation in modern times are so great that they can be borne only by large firms. From Aaby and Slater (1989), firm size itself is not an important factor unless it is linked to aspects such as financial strength or variables related to economies of scale. This study does not test the impact of the firm size, but rather the firm capabilities embedded in it. However, firm size may have an influence on new product proactiveness. therefore its effects need to be controlled statistically.

## 2. Market environment

Market environment concerns about the markets that are outside the company, but have an effect on the company. Market environment also affects new product proactiveness as it cannot be controlled by the company, therefore, its effects need to be controlled statistically. Market environment includes market potential, and competitive intensity (Song and Parry 1996).

**Market potential** refers to the attractiveness of a target market, which reflects market characteristics such as size and growth (Song and Parry 1996). Market potential also reflects the need level of target market customers and the importance to customers of products addressing those needs. Therefore, a high level of market potential increases a new product's potential sales, share, and profit performance (Song and Parry 1996).

Gatignon and Xuereb (1997) operationalized market growth as the perceived annual market growth rate of the market in the category at the same time as the new product is launched. Song and Parry (1996) operationalized market potential as the perceived number of potential customers for the product, the level of need for the product, and the quickness of market growth.

**Competitive intensity** refers to the nature of interfirm rivalry within the firm's target market (Song and Parry 1997). When competitive intensity is high, new product introduction can elicit aggressive responses from competitors, which can adversely affect new product performance (Song and Parry 1996, Gatignon and Xuereb 1997). Many Japanese and U.S. managers attributed the failure of their high-quality products to an intensely competitive environment (Song and Parry 1996). The nature of innovations can also be affected by the level of competitive intensity. In particular, management must pay greater attention to costs in a competitively intense market, because of greater pressure on prices (Porter 1980).

Gatignon and Xuereb (1997) operationalized competitive intensity as the perceived competitive intensity in this product category compared to the airline industry. Song and Parry (1996) operationalized competitive intensity as perceived price competition, number of competitors, and the existence of a strong, dominant competitor in the market.

## 2. Corporate objectives

Corporate objectives also influence on new product proactiveness. For example, firms that respond to competitive pressure and the firms that wants to increase product and company awareness overseas may use different degrees of new product proactiveness. Therefore, their effects need to be controlled statistically. Day and Wensley (1988) as referred to by Song and Parry (1997) stated that superior skills and resources are not automatically converted into positional advantages, but that, they are mediated by corporate objectives.

## 3. Types of industry

Each industry has its unique characteristic. Different industries may have different types of capabilities and different degrees of new product proactiveness. Therefore, it is necessary to control the effect of industry types statistically.

## Hypotheses

From the research model, proposed hypotheses are as follows :

$H_1$ : Technical capabilities have significant positive impact on new product proactiveness. (The higher the technical capabilities, the higher the degree of new product proactiveness.)

$H_2$ : International marketing capabilities have significant positive impact on new product proactiveness.

$H_3$ : Personnel capabilities have significant positive impact on new product proactiveness.

$H_4$ : Top management capabilities have significant positive impact on new product proactiveness.

$H_5$ : There is significant positive interaction effect between technical capabilities and international marketing capabilities on new product proactiveness.

$H_6$ : There is significant positive interaction effect between technical capabilities and personnel capabilities on new product proactiveness.

$H_7$ : There is significant positive interaction effect between technical capabilities and top management capabilities on new product proactiveness.

$H_8$ : There is significant positive interaction effect between international marketing capabilities and personnel capabilities on new product proactiveness.

$H_9$ : There is significant positive interaction effect between international marketing capabilities and top management capabilities on new product proactiveness.

$H_{10}$ : There is significant positive interaction effect between personnel capabilities and top management capabilities on new product proactiveness.

Successful new products emerge from a combination of the firm's existing capabilities, skills, and resources (Clark and Wheelright 1992; Day and Wensley 1988; Prahalad and Hamel 1990). The firm's existing base of **technical strengths** is important. An increase in technical proficiency can increase product competitive advantage by raising the actual performance of the new product relative to competitors (Song and Parry 1997). The more technical capabilities the firms have, the more proactively they can develop the new product.

The proposed hypothesis is as follows:

$H_1$ : Technical capabilities have significant positive impact on new product proactiveness.

New products are generally more likely to be successful if they build on the firm's existing **marketing strengths** (Day and Wensley 1988). A good fit between existing marketing skills, and resources and the new product's development needs raises the firm's ability to gather market and competitive information and enhances the firm's ability to interpret that information. This in turn provides greater insight for and focus to idea generation and screening plus business and market opportunity analysis. This same information can also provide direction toward product commercialization efforts, permitting the efficient use of marketing resources and enhancing the firm's ability to differentiate the new product from competitive offerings (Song and Parry 1997). The more international marketing capabilities the firms have, the more proactively they can introduce the new products.

The proposed hypothesis is as follows:

$H_2$ : International marketing capabilities have significant positive impact on new product proactiveness.

An organization will outperform its competitors if it effectively utilizes its personnel's unique combination of skills and abilities to exploit environmental opportunities and neutralize threats. Human resources policies can influence an organization's competitive position by controlling costs, improving quality, and creating distinctive capabilities (Gomez-Mejia et al. 1998). The more personnel capabilities the firms have, the more proactively they can develop the new products.

The proposed hypothesis is as follow :

$H_3$ : Personnel capabilities have significant positive impacts on new product proactiveness.

**Top management** refer to a group of individuals who push a development project toward completion and successful commercialization (Song and Parry 1997). These individuals can include members of top management, project leaders, project team members, and other product champions within the firm (Griffin and Hauser 1992: Zirger and Maidique 1990). These committed individuals ensure that the projects remains a high priority within the firm and/or attract resources to the project, and work to maintain individual and corporate enthusiasm when the project encounters difficulties. These activities raise the level of technical development proficiency and enhance product commercialization efforts (Song and Parry 1997).

The support of top management to the team developing a new product is positively related to the technical performance (Lee and Na 1994). When managers support the new product activity, they carefully plan the entry and allocate sufficient managerial and financial resources to it. With formal planning and resources commitment, uncertainty is reduced and marketing strategy can be implemented effectively. The more top management capabilities the firms have, the more proactively they can develop the new products.

The proposed hypothesis is as follows:

$H_4$ : Top management capabilities have significant positive impact on new product proactiveness.

A capability may draw upon several of firm resources. If a firm wishes to develop a particular capability, it may be necessary to simultaneously develop the multiple resources which contribute to that capability. One asset may need another co-specialized asset (Teece, 1982) to develop capability. The circumstance of assets being co-specialized is a special case of multi-resource capability when the resources are complementary. We can also consider positive scope-effects (the asset *interaction effect* mentioned by Dierickx and Cool, 1989) - there is a positive synergy among resources, so that the capability generated by their being jointly present is greater than the sum of the capability they would generated separately. On the other hand, we can also contemplate substitute resources (one resource may be able to offer the same capability as another), and negative scope effects (there may be negative synergies among resources) (Nanda 1996).

The proposed hypotheses are as follows :

$H_5$ : There is significant positive interaction effect between technical capabilities and international marketing capabilities toward new product proactiveness.

$H_6$ : There is significant positive interaction effect between technical capabilities and personnel capabilities on new product proactiveness.

$H_7$ : There is significant positive interaction effect between technical capabilities and top management capabilities on new product proactiveness.

$H_8$ : There is significant positive interaction effect between international marketing capabilities and personnel capabilities on new product proactiveness.

$H_9$ : There is significant positive interaction effect between international marketing capabilities and top management capabilities on new product proactiveness.

$H_{10}$ : There is significant positive interaction effect between personnel capabilities and top management capabilities on new product proactiveness.

# Chapter 4

# Research Methodology

The purpose of this chapter is to present the research design and methodology of this study. It includes a section on construct operationalization, research design (population, sampling method, and data collection), and data analysis.

## Construct Operationalization

From the research model in **Figure 1**, there are five variables which are technical capabilities, international marketing capabilities, personnel capabilities, top management capabilities and new product proactiveness. Four control variables are firm size, market environment, corporate objectives and types of industry. The questionnaire attached in **Appendix 3. Table 2** summarizes the construct operationalization of this study.

## Operational Definitions

### 1. Dependent Variable : New product proactiveness

New product strategies include reactive and proactive strategies (Urban and Hauser 1993). For this study, new product strategies are treated as a degree of proactiveness continuum, therefore, it is called new product proactiveness.

### 2. Independent Variables :

1) **Technical Capabilities** are the capabilities in research and development, design, and production.
2) **International Marketing Capabilities** are the capabilities and experience of firms in international marketing including advertising, promotion and marketing research.
3) **Personnel capabilities** are the capabilities of key personnel in the company including research personnel, product designers, engineers, technicians, and marketing personnel.
4) **Top management capabilities** are the capabilities of top management and their support of new product development.

**Table 2 Construct Operationalization**

| Constructs | Operationalization |
|---|---|
| **Dependent variable**<br>• New product proactiveness | **Objective :**<br>The number of new products introduced last year; number of new products last year as % of total products the previous year; number of new product lines, new products with new technology, new products with new design, new products with new production process introduced last year; and new products time launched.<br>**Subjective :**<br>A twenty-item five-point scale addressing types of research (technology licensing, cooperative research, in-house research) (Chulwan et al. 1994); new product introduction (reaction to customer request (reverse score), by imitating competitors (reverse score), by conducting marketing research (adapted from Urban and Hauser 1993); product innovation (market and technical newness) (Klienschmidt and Cooper 1991); new product characteristics (uniqueness, meet customer needs, tight specification, strength, durability, reliability) (Calantone and Benedetto 1988, Song and Parry 1997, 1996). |
| **Independent variables**<br>• Technical capabilities (research and development, design and production) | **Objective :**<br>The number of international standard application, number of patents, R&D spending as % of total sales (Chang 1995, Denekamp 1995).<br>**Subjective :**<br>A seven-item five-point scale addressing the allowance for job-related experimental activities, R&D capabilities, design capabilities, production capabilities (Calantone and Benedetto 1988, Chulwon et al. 1994, Lee and Na 1994, Song and Parry 1997) and the importance of these capabilities on new product development. |

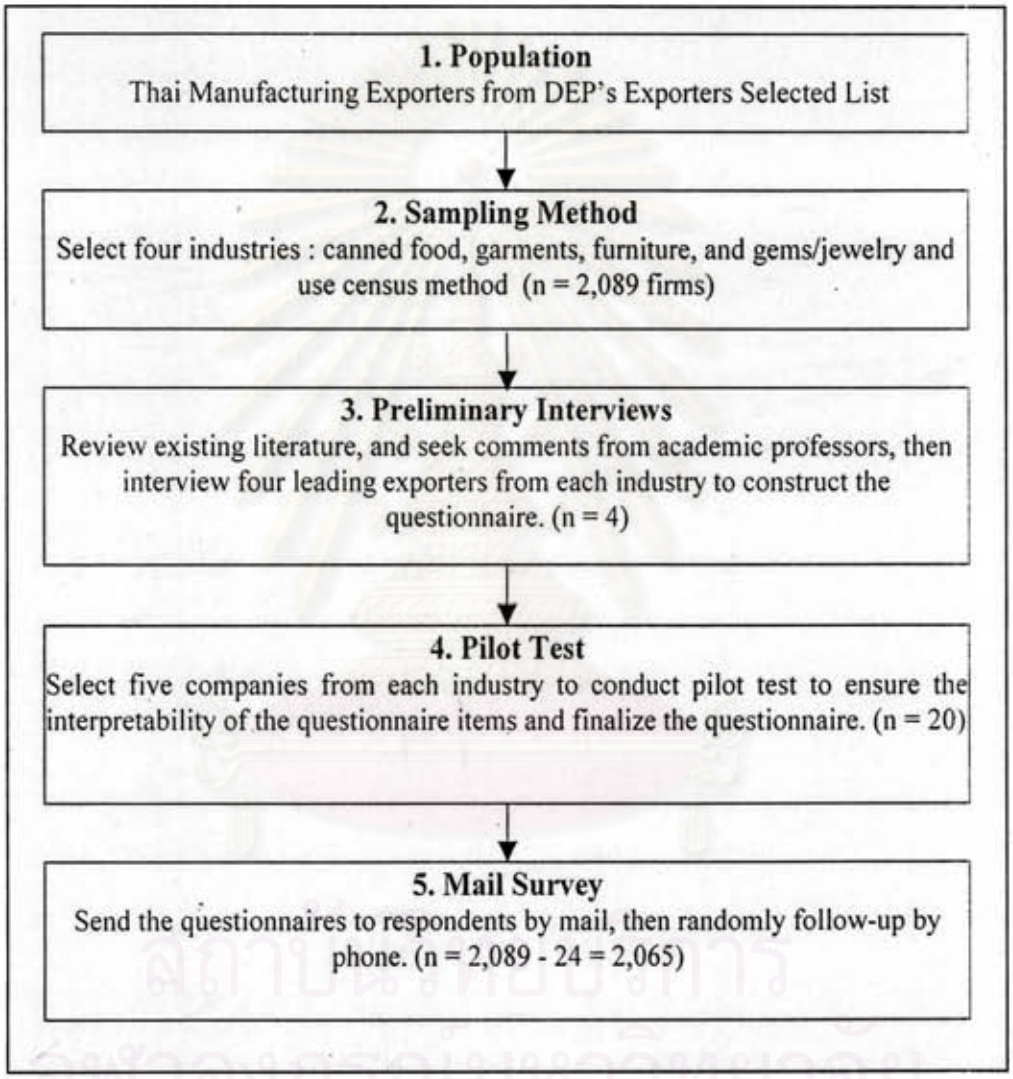
| | |
|---|---|
| • International marketing capabilities | **Objective :**<br>The export ratio (Chang 1995), years of export, number of export markets, percentage of export sales in each market group, advertising and promotional spending as % of total sales (Denekamp 1995, Yu 1990), marketing research spending as % of total sales, number of registered trademarks, and number of internationally recognized brand names.<br>**Subjective :**<br>A fourteen-item five-point scale addressing distribution channel usage, distribution capabilities, advertising and promotional capabilities, marketing research capabilities (Calantone and Benedetto 1988, Chulwon et al. 1994, Song and Parry 1997), and the importance of these capabilities to new product development. |
| • Personnel capabilities | **Objective :**<br>The number of researchers and designers, engineers and technicians, marketing personnel (Chang 1995, Denekamp 1995), their experience in years, and number of training courses last year.<br>**Subjective :**<br>A six-item five-point scale addressing education degree and skills of personnel. |
| • Top management capabilities | **Objective :**<br>The number of management members (from managers to CEO) as a percentage of total employees, top management exporting experience in years, top management experience in new product development in years, top management industry experience in years.<br>**Subjective :**<br>An eight-item five-point scale addressing top management's education degree, knowledge of foreign markets, staff creativity encouragement (Cooper and Kleinschmidt 1995), new product development support (Lee and Na 1994, Song and Parry 1996, Cooper and Kleinschmidt 1995), open communication support (Atuahene-Gima 1996), commitment to employee training, interest in external happenings, and response to the changing environment. |

| | |
|---|---|
| **Control Variables**<br>• Firm size | **Objectives :**<br>Total number of employees and Baht sales (Gatignon and Xuereb 1997, Narver and Slater 1990). |
| • Market environment<br>1) Market potential<br><br><br><br>2) Competitive intensity | **Objective :**<br>Estimate market growth rate as a percentage (adapted from Song and Parry 1996)<br>**Subjective :**<br>A two-item five-point scale addressing number of potential customers and their level of needs for the firm's products (adapted from Song and Parry 1996).<br>**Objective :**<br>The number of firm's competitors, and the existence of a strong and dominant competitor (binary measure, 1-0) (adapted from Song and Parry 1996).<br>**Subjective :**<br>A one-item five-point scale addressing the level of price competition (adapted from Song and Parry 1996). |
| • Corporate objectives | **Subjective :**<br>A five-item five-point scale addressing response to competitive pressure (reverse score), improvement of company's market share position, increase in the profitability of the company, concentration on existing products or markets (reverse score), extension of overseas markets (adapted from Cavusgil and Zou (1994) and Urban and Hauser (1993). |
| • Types of industry | Dummy variables are used for each industry. There are four industries, canned food, garments, furniture, and gems/jewelry. |

## Research Design

The research design includes population, sampling method, and data collection. **Figure 4** shows research design diagram of this study.

**Figure 4 Research Design**



## 1. Population

Thai manufacturing exporters were used as the population because Thailand mainly focused on exports. The sampling frame for this study was the manufacturing companies in "Thailand's Exporters Selected List" revised in December 1998 of Department of Export Promotion, Ministry of Commerce because the exporters in the list were known to meet the standard required by the Ministry of Commerce.

## 2. Sampling Method

Four industries were chosen for studying, which were canned food, garments, furniture, and gems/jewelry out of a total of seventeen industries on the basis of the potentiality and local resources. These four industries are recognized by the Department of Export Promotion (DEP), Ministry of Commerce as potentially high export industries. DEP has a program to encourage and support exporters from these industries in building international brand names and trademarks in order to be well known abroad and be legally protected. This program started in February 1999. The document is attached in **Appendix 1.** These four industries also have a high percentage of total Thai export sales and are expanding as shown in **Appendix 2.** The information is from 'International Trade Statistics of Thailand 1998' a book from the Commercial Statistic Center, Ministry of Commerce.

Moreover, these four industries have introduced a lot of new products compared to other industries and use a high proportion of local raw materials which make them more efficient in comparison to those that import raw materials. These four industries use mostly Thai natural resources which make them more efficient in comparison to those that have to import raw materials from abroad. The diversity of the four industries contributes to the generalizability of the results (Gatignon and Xuereb 1997).

This study used ***census*** by questionnaire survey of all companies from each of four industries. The total sample size in this study is 2,089 companies equal to population. **Table 3** shows population and sample size.

**Table 3 Population and Sample Size**

| Industry | Population | Sample Size |
|---|---|---|
| 1. Gem and Jewelry | 612 | 612 |
| 2. Furniture | 294 | 294 |
| 3. Garments | 774 | 774 |
| 4. Canned Food and Food in Containers | 409 | 409 |
| Total | 2,089 | 2,089 |

Multiple regression techniques require 20 samples for each variable (Hair et al. 1995, p.373). There are five variables in the model, therefore it needs a total of 100 samples for data analysis.

This study tried to maximize response rate by using phone-follow up and the attaching of cover letters from the Federation of Thai Industries (FTI) and Department of Export Promotion (DEP). The research also offered Certificates from the JDBA Program and a summary of results for respondents who replied. Therefore, the **response rate** was expected at least 10%. There would be at least 209 firms for data analysis.

## 3. Data Collection

Data were collected from two major sources. Secondary data were obtained from academic journals, textbooks, and documents from the Department of Export Promotion and Commercial Statistic Center, Ministry of Commerce. Secondary data were used for the literature review. Primary data were obtained from the questionnaire survey. This kind of data was used for analyzing the relationship between firms' capabilities and new product proactiveness.

**Unit of analysis** of this study was firm level. The questionnaire was aimed at **chief executive officers (CEOs) or the owners** who knew best the firms' overall capabilities and new product strategy.

There were three steps in data collection.

**1) Preliminary interviews**

Four interviews were conducted with chief executive officers (CEOs) or the owners of four companies (one company from each industry) in order to get an insight of each industry and to construct the questionnaire. These interviews, along with an extensive review of the relevant practitioner and academic literature, were used to check **content, construct validity** and to develop a questionnaire. Based on numerous open-ended discussions, it was appropriate to include all construct measurement in the questionnaire. The summary of the interviews is attached is **Appendix 4.**

**2) Pilot study**

Conducting a pilot study by selecting five companies from each industry to ensure the interpretability of questionnaire items. The pilot study of the questionnaire was performed to assess the **face and construct validity** of the scales. The variables and scales deemed irrelevant by responding managers were not included in the final instrument.

Based on in-depth interviews and a questionnaire pilot study, some modifications were made to the questionnaire such as re-wording and the changing of some questions. Then, the questionnaire was finalized and ready for use.

**3) Mail survey**

Data were collected through questionnaires designed to fit the objectives of the study. The questionnaire was developed from the literature review and comments from professors and four leading exporters' top executives and the pilot study. The questionnaire consisted of a series of questions and was divided into four main parts as shown in **Appendix3.**

The questionnaires were sent to respondents by mail and randomly follow-up by phone. To increase the response rate, cover letters from the Federation of Thai Industries (FTI) and Department of Export Promotion (DEP) were also attached and the researcher offered Certificates from the JDBA Program and a summary of results for the respondents who replied.

**Response rate**

**Table 4** shows sample size and response rate of mail survey. After 2,058 questionnaires were mailed, 121 questionnaires were returned as undeliverable. There were several reasons for returned mails such as businesses quit, changing address and unclear addresses. The result reduced the effective sample size to 1,937. Consequently, a total of 290 responses were received, leading to a response rate of 15 percent. Of this number, 47 questionnaires were disqualified as the respondents were not currently exporting, had closed factory, were only traders or buying agents, were out of four industries, or had too many missing values. The effective response rate was thus 12.5%.

**Table 4 Sample Size and Response Rate**

| | Jewelry | Furniture | Garments | Canned Food | Total |
|---|---|---|---|---|---|
| Companies from DEP Exporter List | 612 | 294 | 774 | 409 | 2,089 |
| Deduct repetitive, no address available | 13 | -- | 13 | 5 | 31 |
| Mail sent | 599 | 294 | 761 | 404 | 2,058 |
| Deduct Mail returned* | 32 | 23 | 48 | 18 | 121 |
| Mail reached | 567 | 271 | 713 | 386 | 1,937 |
| Mail replied | 57 | 54 | 104 | 75 | 290 |
| Deduct unusable questionnaire** | 14 | 9 | 13 | 11 | 47 |
| Usable questionnaire | 43 | 45 | 91 | 64 | 243 |
| **Response rate** | 10.1 % | 20 % | 14.6 % | 19.4 % | 15 % |
| **Effective Response rate** | 7.6 % | 16.6 % | 12.8 % | 16.6 % | 12.5 % |

* **Mail returned** due to business liquidation, change of address, or unclear address.

** **Unusable questionnaires** due to business liquidation, no longer export, non-producers (e.g., traders, buying agents), out of these four industries, or too many missing values.

The period of survey was during economic recession. Many companies liquidated. A lot of companies were struggling for survival. Therefore, they were not willing to respond to the survey. There were many companies that had affiliates or were belong to the same owners. The questionnaires were sent to these companies, for example, five sets for five companies, but only one of them replied with the explanation that they were the same company or same group, so they could not reply to all questionnaire. These companies shared capabilities and new product development together. Therefore, the response rate was relatively low.

Of the 243 responses, 43 responses were from jewelry industry, 45 responses were from furniture industry, 91 responses were from garment industry, and 64 responses were from canned food industry.

| Industries | Mail Reached | % | Effective Mail Response | % |
|---|---|---|---|---|
| 1. Jewelry | 567 | 29.3% | 43 | 17.7% |
| 2. Furniture | 271 | 14.0% | 45 | 18.5% |
| 3. garments | 713 | 36.8% | 91 | 37.4% |
| 4. Canned food | 386 | 19.9% | 64 | 26.4% |
| Total | 1,937 | 100.0% | 243 | 100.0% |

Of the 243 responses, 137 responses were small-sized firms (2 to 100 employees), 61 responses were medium-sized firms (101 to 500 employees) and 26 responses were large-sized firms (501 to 7,000 employees). 19 responses did not tell the number of their full-time employees. Regarding the total Baht sales, 98 responses had 100 million Baht or less, 72 responses had from 100 million Baht to 500 million Baht, and 39 responses had above 500 million Baht. 34 responses did not declare their total Baht sales.

# Chapter 5

# Data Analysis and Results

## Data Analysis

Data analysis of this study composed of six steps as follows:

### 1. Descriptive statistics

**First,** descriptive statistics of all variables were computed including means, standard errors of mean, medians, modes, standard deviations, variances, skewness, kurtosis, ranges, minimums, maximums, and sums. **Second,** frequency tables of all variables were computed to check errors in keying data and reporting some variables descriptively. **Finally,** bivariate correlations for all variables were run and checked as to whether there was any pair of independent variables or dependent variables that had high correlations (i.e., correlation coefficients above 0.8). Missing values were coded 999. The questions with three years data such as total Baht sales were computed to get average numbers.

The output showed that there were four pairs of independent variables that had high correlations, which were mktg5.3 Andean Pact, and mktg5.5 Eastern Bloc (.924), mktg5.3 Andean Pact and mktg5.14 Others (1.00), mktg5.6 Africa and mktg5.11 Korea (1.00), and mktg5.6 Africa and mktg5.12 Taiwan (.897). There was one pair of dependent variables that had high correlations which was pdt4.4 product strength and pdt4.5 product durability (.932). Therefore, one variable from the pair had to be deleted from further analysis because it was redundant to include both of them and it would have high multicollinearity as well.

### 2. Data Examination

Data examination included outlier checking and normality testing. A box plot was conducted for all variables to check for outliers. The output showed that there were no serious outliers in this analysis. The effect of outliers was not strong because after trying to delete outliers, the mean of each variable changed less than one standard error of mean.

Normality testing involved the examination of individual variables in meeting the important assumption underlying the multivariate procedures. Conducting Kolmogorov-Smirnov test, histograms and normal P-P Plot to test normal distribution of all variables. The variables that did not have normal distribution would have significance in the Kolmogorov-Smirnov test of lower than .05. For the variables that were not normally distributed, transformation to produce normality was necessary. This study took logarithm for firm sizes (total dollars sales and total employees), which were control variables.

Dummy variables included three variables for types of industry (jewelry, furniture, and garments) and one variable for a dominant competitor. They were all control variables. They did not have to have normal distribution in order to enter into regression analysis. Mktg15 channel usage, person17 education level and intense4 competitive intensity are not normally distributed. However, they were nearly normal and had standard scores computed from factor scores. Therefore, it was acceptable to keep them for further analysis.

## 3. Validity and Reliability Test

Multiple items were used to construct five variables in this study. Selection of items was based on the literature review, comments from professors, four leading exporters' top executives, and pilot study. This showed face validity of the research.

Item-total correlations were examined as a test of internal consistency of each measure. The measurement scales were purified using principle component factor analysis to test the empirical validity of predetermined constructs and to form new variables by using means of items in each factor. Based on factor analysis results, the reliability of each construct was assessed using Cronbach's coefficient alpha. All of the coefficient alphas should meet the minimum acceptable level recommended by Nunnally (1978) which is 0.7. However, Cronbach's alpha can be lower than 0.7 for the research that is exploratory in nature (Hair et al, 1995).

Before conducting factor analysis, it was necessary to multiply two sets of variables together, which are capabilities and their importance to new product development. Top5 top mgmt education had to be deleted from Factor Person17 education level because Cronbach's alpha with Top5 was only .5759. Mktg10.1 trading companies, mktg10.2 direct distribution, mktg10.3 agents, and mktg10.4 dealers were grouped together to form one

factor. However, Cronbach's alpha was only.1682 and it could not exceed .6 although some items were deleted. Therefore, this factor was not usable. Pdt4.4 product strength was deleted from factor analysis because it had high correlation with Pdt4.5 product durability. Factor analysis with Pdt4.5 product durability formed factors according to theory better than factor analysis with pdt4.4 product strength.

The output showed that all factor analyses have eigen values higher than 1. The factors were formed according to a predetermined model, which met the validity test. Cronbach's alpha exceeded 0.6, which satisfied the reliability test for exploratory research. **Table 5.1 – 5.4** show the results of factor analysis.

Eigen value or latent root is column sum of squared loadings for a factor. It represents the amount of variance accounted for by a factor (Hair et al, 1995). The most commonly used technique to decide on the number if factors to be extract is eigen values or latent root criterion (Hair et al, 1995). Only the factors having eigen values greater than 1 are considered significant. The rationale for the latent root criterion is that any individual factor should account for the variance of at least a single variable if it is to be retained for interpretation.

**Table 5.1 Factor Analysis of New Product Strategies**

| Items | Pdt12newness to firm | Pdt13new product characteristics | Pdt14newness to markets | Pdt15own research & design | Pdt16imitation | Pdt17licensing |
|---|---|---|---|---|---|---|
| Pdt3.2new technology | .850 | | | | | |
| Pdt3.4new production process | .817 | | | | | |
| Pdt3.1new product categories | .724 | | | | | |
| Pdt3.3new design | .709 | | | | | |
| Pdt4.6reliability | | .799 | | | | |
| Pdt4.3tight specification | | .785 | | | | |
| Pdt4.5durability | | .742 | | | | |
| Pdt4.2needs response | | .653 | | | | |
| Pdt2.2new markets | | | .813 | | | |
| Pdt2.1new customers | | | .803 | | | |
| Pdt2.3new needs served | | | .648 | | | |
| Pdt2.4new promotion | | | .606 | | | |
| Pdt1.3in-house research | | | | .749 | | |
| Pdt1.7marketing research | | | | .572 | | |
| Pdt4.1unigue design | | | | .550 | | |
| Pdt1.5imitating | | | | | .886 | |
| Pdt1.6improve from competitor' products | | | | | .878 | |
| Pdt1.4customer request | | | | | .423 | |
| Pdt1.1licensing | | | | | | .840 |
| Pdt1.2cooperative research | | | | | | .805 |
| Eigen value | 5.365 | 2.204 | 1.822 | 1.509 | 1.341 | 1.098 |
| % of Variance accounted for | 26.826 | 11.018 | 9.110 | 7.544 | 6.703 | 5.492 |
| Cumulative % of variance | 26.826 | 37.844 | 46.953 | 54.497 | 61.201 | 66.693 |
| **Cronbach's alpha** | .8470 | .7861 | .7744 | .6147 | .6296 | .6415 |

**Table 5.2 Factor Analysis of Firm Capabilities**

| Items | Top9top mgmt capabilities | Tech8technical capabilities | Mktg14mktg capabilities | Person16personnel capabilities |
|---|---|---|---|---|
| Top8.2staff creativity | .814 | | | |
| Top8.4open communication | .803 | | | |
| Top8.5changing environment | .800 | | | |
| Top8.3new product development | .743 | | | |
| Top8.1market knowledge | .561 | | | |
| Tech7.2design capabilities | | .862 | | |
| Tech7.1R&D capabilities | | .793 | | |
| Tech7.3production process capabilities | | .638 | | |
| Person15.1research personnel skills | | .533 | | |
| Mktg13.2promotion capabilities | | | .867 | |
| Mktg13.3marketing research capabilities | | | .751 | |
| Mktg13.1distribution capabilities | | | .657 | |
| Person15.3marketing personnel skills | | | | .832 |
| Person15.2engineer&technician skills | | | | .677 |
| Eigen value | 5.840 | 1.511 | 1.179 | 1.066 |
| % of Variance accounted for | 41.715 | 10.791 | 52.506 | 60.925 |
| Cumulative % of variance | 41.715 | 52.506 | 60.925 | 68.540 |
| **Cronbach's alpha** | .8260 | .8060 | .7447 | .6236 |

**Table 5.3 Factor Analysis of Control and Other Independent variables**

| Items | Mktg15channel usage | Person17education level | Intense4competitive intensity | Growth4market potential |
|---|---|---|---|---|
| MKtg10.7joint ventures | .785 | | | |
| MKtg10.6plants abroad | .757 | | | |
| Mktg10.5branches | .745 | | | |
| Person10research personnel's education | | .816 | | |
| Person11technician's education | | .697 | | |
| Person12marketing personnel's education | | .668 | | |
| Intense3price competition | | | .893 | |
| Intense2number of competitors | | | .890 | |
| Growth2potential customers | | | | .866 |
| Growth3potential customer needs | | | | .856 |
| Eigen value | 1.897 | 1.800 | 1.607 | 1.315 |
| % of Variance accounted for | 18.974 | 17.997 | 16.069 | 13.149 |
| Cumulative % of variance | 18.974 | 36.971 | 53.040 | 66.189 |
| **Cronbach's alpha** | .6243 | .6154 | .7432 | .6804 |

**Table 5.4 Factor Analysis of Corporate Objectives**

| Items | Obj6corporate objectives |
|---|---|
| Obj2market share | .776 |
| Obj3profit | .727 |
| Obj5expand markets | .667 |
| Obj1competitive response | .458 |
| Obj4existing products and markets | .440 |
| Eigen value | 1.981 |
| % of Variance accounted for | 39.622 |
| Cumulative % of variance | 39.622 |
| **Cronbach's alpha** | .6038 |

## 4. Bivariate Correlations

Bivariate correlation was run again to check whether any pair of independent variables or dependent variables had high correlations (correlation coefficients above 0.8). This test included new variables from factor analysis and transformed variables. The output showed that there was no pair of variables that was highly correlated. **Table** 6 shows bivariate correlations. Multicollinearity analysis will be shown in output of multiple regression.

Moreover, bivariate correlations were also used to find the signification correlations among independent and dependent variables. This study used the Pearson test. The independent variables that had significant correlations with dependent variables were used in regression analysis.

From **Table 6**, variable lists are as follows :

- **Control Variables**

1. Jewelry : industry type – 0 = non-jewelry , 1 = jewelry
2. Furniture : industry type – 0 = non-furniture , 1 = furniture
3. Garments : industry type – 0 = non-garments , 1 = garments
4. Obj6 : corporate objective (mean of items from factor analysis)
5. Intense1 : dominant competitor – 0 = no, 1 = yes
6. Intense4 : competitive intensity (mean of items from factor analysis)
7. Growth1 : market growth rate in percentage
8. Growth4 : market potential (mean of items from factor analysis)
9. Mktg1 : total Baht sales per year (firm size)
10. Person1 : total number of employees (firm size)

- **Independent Variables**

1. 1. Tech4 degree of job-related experimental activities
2. Tech8 technical capability (mean from factor analysis)
3. Mktg3 export years

4. Mktg4 number of foreign markets
5. Mktg15 degree of channel usage (mean from factor analysis)
6. Person5 researchers' and product designers' experience in years
7. Person7 marketing personnel's experience in years
8. Person16 personnel capability (mean from factor analysis)
9. Person17 personnel's education level (mean from factor analysis)
10. Top2 top management's export experience in years
11. Top3 top management's new product experience in years
12. Top4 top management's industry experience in years
13. Top5 top management's education level
14. Top9 top mgmt capability (mean from factor analysis)

- **Interaction Variables**

1. Inter1 interaction between tech8 technical capability and mktg14 international marketing capability
2. Inter2 interaction between tech8 technical capability and person16 personnel capability
3. Inter3 interaction between tech8 technical capability and top9 top management capability
4. Inter4 interaction between mktg14 international marketing capability and person16 personnel capability
5. Inter5 interaction between mktg14 international marketing capability and top9 top management capability
6. Inter6 interaction between person16 personnel capability and top9 top management capability

## Table 6 Pearson Correlation Matrix (Italic : Correlation is significant at the 0.05 level, 2-tailed).

Pearson Correlation Matrix (Italic : Correlation is significant at the 0.05 level, 2-tailed).

| Variables | jewelry | furniture | garment | obj6 | intens1 | intens4 | growth1 | growth4 | tech4 | tech8 | mktg1 | mktg3 | mktg14 | mktg15 | person1 | person5 | person7 | pers16 | pers17 | top2 | top3 | top4 | top5 | top9 | pdt6 | pdt8 | pdt10 | pdt11 | pdt12 | pdt13 | pdt14 | pdt15 | pdt16 | pdt17 | inter1 | inter2 | inter3 | inter4 | inter5 | inter6 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| jewelry | 1.000 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| furniture | *-0.221* | 1.000 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| garment | *-0.359* | *-0.369* | 1.000 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| obj6 | -0.060 | -0.023 | -0.036 | 1.000 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| intens1 | -0.041 | 0.101 | -0.025 | 0.028 | 1.000 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| intense4 | -0.063 | 0.093 | 0.001 | *0.182* | *0.316* | 1.000 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| growth1 | 0.078 | 0.031 | -0.026 | *0.132* | *-0.163* | -0.100 | 1.000 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| growth4 | -0.028 | -0.014 | -0.049 | *0.285* | 0.029 | -0.012 | *0.215* | 1.000 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| tech4 | 0.063 | 0.004 | -0.091 | 0.274 | 0.003 | -0.012 | 0.114 | 0.261 | 1.000 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| tech8 | 0.014 | *0.173* | -0.060 | 0.049 | 0.038 | -0.095 | 0.007 | 0.026 | 0.114 | 1.000 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| mktg1 | *-0.169* | -0.014 | *-0.218* | 0.136 | -0.004 | -0.027 | -0.118 | *0.195* | *0.152* | 0.064 | 1.000 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| mktg3 | -0.008 | -0.048 | -0.071 | 0.026 | -0.028 | 0.096 | -0.104 | 0.062 | 0.062 | 0.005 | *0.248* | 1.000 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| mktg14 | 0.061 | 0.016 | *-0.190* | 0.054 | 0.039 | 0.008 | 0.073 | -0.063 | 0.060 | 0.013 | *0.156* | -0.004 | 1.000 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| mktg15 | *0.196* | 0.075 | -0.150 | -0.031 | -0.035 | -0.015 | 0.007 | -0.139 | 0.031 | *0.075* | *0.169* | 0.114 | 0.004 | 1.000 | | | | | | | | | | | | | | | | | | | | | | | | | |
| person1 | *-0.186* | 0.108 | 0.030 | *0.134* | 0.002 | -0.062 | -0.118 | 0.086 | 0.128 | *0.161* | *0.693* | 0.193 | 0.054 | *0.174* | 1.000 | | | | | | | | | | | | | | | | | | | | | | | | |
| person5 | *0.148* | 0.054 | -0.029 | 0.022 | 0.044 | -0.065 | -0.059 | -0.114 | 0.066 | *0.261* | 0.041 | 0.055 | 0.033 | -0.003 | 0.041 | 1.000 | | | | | | | | | | | | | | | | | | | | | | | |
| person7 | 0.110 | -0.075 | 0.030 | -0.066 | *-0.131* | -0.124 | -0.019 | -0.065 | -0.058 | 0.101 | -0.010 | 0.121 | *-0.170* | 0.009 | -0.046 | *0.385* | 1.000 | | | | | | | | | | | | | | | | | | | | | | |
| person16 | -0.011 | 0.001 | -0.117 | *0.256* | -0.032 | -0.051 | 0.055 | *0.163* | 0.030 | -0.006 | *0.259* | 0.112 | 0.051 | 0.097 | *0.146* | 0.100 | 0.117 | 1.000 | | | | | | | | | | | | | | | | | | | | | |
| person17 | *-0.195* | 0.127 | *-0.216* | 0.032 | 0.075 | -0.011 | 0.072 | -0.012 | 0.025 | *0.097* | *0.308* | -0.061 | 0.108 | 0.005 | 0.152 | 0.045 | -0.001 | *0.311* | 1.000 | | | | | | | | | | | | | | | | | | | | |
| top2 | *0.202* | -0.089 | -0.116 | -0.008 | 0.017 | 0.072 | -0.107 | 0.004 | 0.066 | *0.086* | 0.029 | 0.552 | -0.122 | 0.107 | -0.023 | *0.228* | *0.372* | *0.179* | 0.000 | 1.000 | | | | | | | | | | | | | | | | | | | |
| top3 | *0.202* | 0.071 | -0.119 | 0.021 | -0.009 | 0.065 | 0.018 | 0.034 | -0.008 | *0.396* | 0.086 | 0.222 | 0.024 | 0.058 | 0.047 | *0.434* | *0.381* | *0.151* | -0.008 | *0.496* | 1.000 | | | | | | | | | | | | | | | | | | |
| top4 | *0.192* | -0.099 | -0.065 | 0.003 | 0.012 | 0.087 | -0.091 | 0.091 | -0.011 | 0.061 | 0.058 | 0.476 | -0.028 | -0.042 | -0.058 | *0.253* | *0.360* | 0.010 | -0.088 | *0.611* | *0.461* | 1.000 | | | | | | | | | | | | | | | | | |
| top5 | -0.143 | 0.103 | -0.053 | 0.124 | -0.026 | 0.040 | -0.068 | -0.003 | 0.072 | -0.081 | *0.145* | -0.039 | 0.028 | 0.021 | *0.178* | -0.114 | -0.073 | *0.163* | *0.201* | -0.095 | -0.057 | *-0.237* | 1.000 | | | | | | | | | | | | | | | | |
| top9 | 0.136 | 0.012 | -0.136 | *0.283* | -0.036 | *0.176* | 0.090 | *0.244* | *0.487* | 0.048 | 0.047 | 0.053 | -0.059 | 0.091 | 0.054 | 0.116 | 0.032 | 0.045 | -0.149 | *0.243* | *0.193* | 0.053 | 0.067 | 1.000 | | | | | | | | | | | | | | | |
| pdt6 | 0.035 | *0.291* | 0.097 | 0.042 | -0.048 | 0.074 | 0.143 | 0.081 | 0.056 | 0.096 | -0.144 | -0.256 | -0.093 | 0.094 | 0.123 | *0.151* | -0.044 | -0.053 | -0.147 | -0.099 | 0.095 | *-0.167* | 0.034 | 0.128 | 1.000 | | | | | | | | | | | | | | |
| pdt8 | *-0.191* | -0.130 | -0.064 | -0.124 | 0.038 | -0.156 | -0.153 | *0.205* | -0.027 | -0.132 | 0.135 | 0.156 | 0.085 | -0.168 | 0.039 | -0.017 | 0.035 | -0.034 | 0.117 | -0.078 | -0.127 | 0.108 | 0.146 | -0.119 | *-0.291* | 1.000 | | | | | | | | | | | | | |
| pdt10 | -0.095 | -0.108 | -0.093 | -0.109 | 0.045 | -0.044 | *-0.182* | 0.024 | -0.104 | -0.083 | 0.125 | 0.137 | 0.162 | -0.125 | 0.095 | 0.037 | 0.061 | 0.053 | 0.078 | 0.037 | -0.083 | *0.225* | 0.149 | -0.068 | *-0.263* | *0.761* | 1.000 | | | | | | | | | | | | |
| pdt11 | -0.048 | -0.010 | -0.046 | -0.013 | -0.088 | *-0.256* | -0.148 | 0.001 | 0.010 | *0.242* | *0.177* | 0.068 | *0.244* | -0.014 | 0.108 | *0.274* | 0.061 | 0.048 | -0.070 | 0.142 | *0.177* | 0.092 | 0.022 | -0.084 | 0.047 | -0.022 | 0.040 | 1.000 | | | | | | | | | | | |
| pdt12 | 0.009 | *0.166* | -0.104 | *0.196* | -0.051 | -0.024 | 0.111 | 0.003 | 0.176 | *0.262* | 0.044 | -0.057 | 0.139 | 0.035 | *0.182* | *0.222* | 0.038 | 0.106 | *0.248* | 0.091 | *0.252* | 0.087 | 0.077 | 0.073 | *0.246* | -0.146 | *-0.186* | 0.080 | 1.000 | | | | | | | | | | |
| pdt13 | 0.126 | 0.060 | -0.060 | 0.043 | -0.036 | 0.096 | 0.055 | 0.140 | 0.113 | *0.181* | 0.047 | -0.017 | -0.076 | 0.020 | 0.053 | 0.034 | 0.109 | *0.233* | -0.012 | 0.047 | 0.132 | 0.001 | 0.050 | *0.266* | *0.204* | -0.154 | -0.047 | 0.072 | 0.008 | 1.000 | | | | | | | | | |
| pdt14 | 0.053 | 0.004 | -0.109 | *0.281* | -0.130 | -0.091 | *0.297* | *0.231* | *0.151* | -0.004 | *0.162* | -0.075 | *0.191* | 0.027 | -0.014 | -0.058 | -0.017 | 0.106 | 0.061 | -0.101 | 0.002 | -0.039 | 0.110 | *0.156* | 0.070 | -0.059 | -0.061 | -0.066 | -0.025 | 0.026 | 1.000 | | | | | | | | |
| pdt15 | *0.209* | 0.024 | *-0.196* | 0.009 | -0.045 | -0.040 | -0.054 | -0.101 | 0.103 | *0.405* | 0.124 | 0.048 | *0.246* | 0.130 | 0.086 | *0.284* | *0.210* | 0.067 | 0.078 | *0.140* | *0.296* | *0.152* | -0.104 | *0.184* | 0.058 | -0.091 | -0.018 | *0.200* | -0.032 | -0.004 | 0.028 | 1.000 | | | | | | | |
| pdt16 | 0.028 | -0.096 | 0.127 | -0.012 | -0.008 | *0.176* | -0.099 | -0.015 | 0.036 | -0.098 | -0.103 | -0.070 | -0.022 | -0.050 | -0.114 | *0.161* | 0.053 | -0.004 | -0.088 | -0.111 | -0.053 | -0.121 | -0.035 | *0.212* | 0.024 | 0.080 | -0.091 | *-0.269* | -0.001 | -0.020 | -0.028 | 0.020 | 1.000 | | | | | | |
| pdt17 | -0.067 | -0.071 | 0.009 | *0.172* | *0.186* | 0.151 | -0.021 | 0.162 | *0.183* | -0.069 | *0.154* | 0.021 | 0.139 | 0.139 | *0.179* | -0.088 | -0.040 | 0.024 | 0.030 | 0.045 | *-0.154* | -0.065 | 0.055 | 0.144 | 0.042 | -0.017 | 0.069 | 0.003 | 0.013 | -0.001 | 0.027 | -0.063 | -0.008 | 1.000 | | | | | |
| inter1 | 0.061 | 0.116 | *-0.165* | 0.084 | 0.049 | -0.067 | 0.079 | -0.009 | 0.105 | *0.661* | *0.164* | -0.023 | *0.726* | 0.019 | *0.159* | *0.200* | -0.073 | 0.029 | 0.148 | -0.049 | *0.258* | 0.005 | -0.026 | -0.008 | 0.027 | -0.047 | 0.057 | *0.360* | *0.279* | 0.077 | 0.136 | *0.429* | -0.113 | 0.043 | 1.000 | | | | |
| inter2 | 0.003 | 0.107 | -0.100 | *0.194* | -0.008 | -0.112 | 0.040 | 0.132 | 0.116 | *0.666* | *0.228* | 0.100 | 0.040 | 0.106 | *0.226* | *0.261* | *0.150* | *0.709* | *0.255* | *0.185* | *0.351* | 0.048 | 0.080 | 0.051 | 0.015 | -0.120 | -0.018 | *0.239* | *0.234* | *0.278* | 0.043 | *0.299* | -0.064 | -0.030 | *0.473* | 1.000 | | | |
| inter3 | 0.102 | 0.116 | -0.098 | *0.215* | 0.011 | 0.053 | 0.072 | *0.167* | *0.421* | *0.700* | 0.048 | 0.011 | -0.032 | 0.116 | 0.132 | *0.258* | 0.111 | 0.015 | -0.046 | *0.225* | *0.387* | 0.070 | -0.003 | *0.712* | 0.147 | *-0.193* | -0.122 | 0.096 | *0.231* | *0.306* | 0.096 | *0.393* | 0.099 | 0.064 | *0.426* | *0.480* | 1.000 | | |
| inter4 | 0.011 | 0.055 | *-0.215* | *0.202* | 0.015 | -0.009 | 0.097 | 0.038 | 0.056 | 0.001 | *0.249* | 0.064 | *0.725* | 0.081 | 0.118 | 0.071 | -0.019 | *0.683* | *0.263* | 0.033 | 0.118 | -0.007 | 0.122 | -0.013 | -0.108 | 0.026 | 0.123 | *0.195* | *0.177* | 0.092 | *0.201* | *0.204* | -0.019 | 0.097 | *0.524* | *0.479* | -0.015 | 1.000 | |
| inter5 | 0.131 | 0.021 | *-0.222* | *0.234* | -0.014 | 0.143 | 0.107 | 0.095 | *0.352* | 0.043 | *0.161* | 0.027 | *0.694* | 0.114 | 0.093 | 0.097 | -0.120 | 0.064 | -0.043 | 0.058 | 0.125 | 0.007 | 0.018 | *0.637* | 0.032 | -0.017 | 0.098 | 0.145 | 0.115 | 0.130 | *0.246* | *0.283* | *0.153* | *0.213* | *0.526* | 0.064 | *0.461* | *0.515* | 1.000 | |
| inter6 | 0.026 | 0.032 | *-0.157* | *0.342* | -0.072 | 0.064 | 0.079 | *0.282* | *0.299* | 0.016 | *0.230* | 0.114 | -0.009 | 0.126 | 0.127 | *0.143* | 0.108 | *0.733* | 0.133 | *0.290* | *0.236* | 0.057 | 0.120 | *0.669* | 0.040 | -0.097 | -0.019 | 0.002 | 0.104 | *0.300* | *0.158* | *0.154* | 0.129 | 0.103 | 0.004 | *0.526* | *0.451* | *0.473* | *0.462* | 1.000 |
| trans | 0.177 | 0.185 | 0.375 | -0.003 | 0.885 | 0.040 | 19.265 | 0.012 | 3.280 | 0.072 | 501M. | 11.985 | 0.039 | -0.082 | 263.71 | 5.771 | 7.3856 | -0.060 | 0.046 | 12.002 | 9.015 | 14.448 | 3.064 | 0.012 | 18.601 | 17.554 | 17.855 | 3.732 | -0.026 | -0.034 | 0.073 | 0.009 | 0.067 | -0.005 | 9.348 | 9.025 | 9.299 | 8.984 | 9.096 | 8.898 |
| D. | 0.382 | 0.389 | 0.485 | 1.006 | 0.320 | 0.984 | 20.208 | 0.995 | 0.975 | 0.978 | 1.220M. | 7.883 | 1.011 | 0.844 | 543.04 | 5.700 | 6.251 | 0.974 | 0.999 | 6.808 | 6.303 | 7.431 | 0.750 | 0.984 | 20.243 | 1.705 | 15.138 | 11.476 | 0.946 | 1.002 | 0.970 | 0.951 | 0.976 | 0.988 | 4.303 | 4.291 | 4.313 | 4.400 | 4.286 | 4.078 |

## 5. Analysis of Variance (ANOVA)

Analysis of variance was used to compare two or more means to see if there were any reliable differences among them (Tabachnick and Fidell, 1996). Analysis of variance evaluated the differences among means relative to the dispersion in the sampling distribution.

There were three steps of ANOVA testing in this study:

### 1) Capability and Proactiveness Differences among Industries

Before running ANOVA, items from the factor analysis were added to form the factor, then divided by the number of items in each factor. For example, pdt12newness to firm from **Table 5.1** includes four items together, which are pdt3.1 new product categories, pdt3.2 new technology, pdt3.3 new design, and pdt3.4 new production process. These four items were added together, then divided by four to get the average or mean of this factor-pdt12 newness to firm. The scale was from 1 to 5.

Only four factors had a 25-point scale, which were technical capabilities, international marketing capabilities, personnel capabilities, and top management capabilities. The scale of these four factors came from multiplying the 5-point scale of capabilities by the 5-point scale of their importance to new product development. After getting the average score of each factor, then ANOVA was run to find capabilities and proactiveness differences among industries. The dependent list included technical capabilities, international marketing capabilities, personnel capabilities, top management capabilities, channel usage, personnel's education level, competitive intensity, market potential, newness to firm, new product characteristics, newness to market, own research and design, imitation, licensing. Factor was industry types. Industries in this study included four types – jewelry, furniture, garments, and canned food. This study used the least significant difference (LSD) approach to conduct post hoc comparisons. This method identified which comparisons among groups had significant differences. It

provided the analyst with tests of each combination of groups (Hair et al, 1995). The summary of ANOVA results is in the result section.

**2) Proactiveness Differences between Low and High Capabilities**

Continuing from the step one, the factor variables were divided into high and low groups. Technical capabilities, international marketing capabilities, personnel capabilities, and top management capabilities that had scores lower then 9 were treated as low capabilities and recoded as zero. Capabilities that had scores equal to, or higher than, 9 were treated as high capabilities and recoded as one. Capability variables came from multiplying capability by importance. The medium capability was 3 and medium importance, also 3. When multiplying, this became 9 – the cut off point for low and high capabilities.

Channel usage, personnel's education level, competitive intensity, and market potential were a 5-point scale (1 to 5). The medium score was 3. Therefore, scores below 3 were treated as low and recoded as zero, while the scores equal to, or higher than, 3 were treated as high and recoded as one.

Dependent list included pdt12 newness to firm, pdt13 new product characteristics, pdt14 newness to market, pdt15 own research and design, pdt16 imitation, and pdt17 licensing. Factors were technical capabilities, international marketing capabilities, personnel capabilities, top management capabilities, channel usage, personnel's education level, competitive intensity, and market potential.

**3) Proactiveness Differences between Low and High Capabilities by Industry.**

Continuing from the step two, the samples were separated by industry. Then, ANOVA was run in the same way as step two to see the proactiveness differences between low and high capabilities by industry.

## 6. Multiple Regression Analysis

Multiple regression was used in this research to estimate the effects of firms' capabilities (independent variables) on new product proactiveness (dependent variable). This study controlled other variables that are likely to affect new product proactiveness of the firms, including industry type, competitive intensity, market potential, corporate objectives, and firm size (total Baht sales, total employees). Although not testing theory, the significant results implied that any test that did not control such inputs was likely to show spurious results.

Multiple regression analysis were run by using the enter method. There were thirteen regression equations altogether. The dependent variables were as follows :

- pdt5 number of new products introduced per year
- pdt6 new products introduced as a percentage of total products
- pdt7 number of new product lines introduced per year
- pdt8 frequency of new products introduced with new technology
- pdt9 frequency of new products introduced with new design
- pdt10 frequency of new products introduced with new production process
- pdt11 new products time launched compared to main competitor
- pdt12 product newness to firm (means of items from factor analysis)
- pdt13 new product characteristics (means of items from factor analysis)
- pdt14 newness to the market (means of items from factor analysis)
- pdt15 own research and design (means of items from factor analysis)
- pdt16 imitation (means of items from factor analysis)
- pdt17 licensing (means of items from factor analysis)

To test the hypotheses, there were three steps of multiple regression as shown in **Table 7:**

**Table 7 Multiple Regression Analysis**

| Dependent Variable | Control Variables | Independent Variables |
|---|---|---|
| **1. Test control variables** | | |
| New product proactiveness | Firm size, market environment, corporate objectives, types of industry | --- |
| **2. Test main effects (H1 to H4)** | | |
| new product proactiveness | Firm size, market environment, corporate objectives, types of industry | technical, international marketing, personnel, and top management capabilities |
| **3. Test interaction effects** | | |
| **3.1) Test H5** | | |
| new product proactiveness | Firm size, market environment, corporate objectives, types of industry | interaction variables between technical X international marketing capabilities |
| **3.2) Test H6** | | |
| new product proactiveness | Firm size, market environment, corporate objectives, types of industry | interaction variables between technical X personnel capabilities |
| **3.3) Test H7** | | |
| new product proactiveness | Firm size, market environment, corporate objectives, types of industry | interaction variables between technical X top management capabilities |
| **3.4) Test H8** | | |
| new product proactiveness | Firm size, market environment, corporate objectives, types of industry | interaction variables between international marketing X personnel capabilities |
| **3.5) Test H9** | | |
| new product proactiveness | firm size, market environment, corporate objectives, types of industry | interaction variables between international marketing X top management capabilities |
| **3.6) Test H10** | | |
| new product proactiveness | Firm size, market environment, corporate objectives, types of industry | interaction variables between personnel X top management capabilities |

**There were three steps in entering independent variables.**

**Step 1,** enter control variables which were three dummy variables of industry type (jewelry, furniture, garments), competitive intensity (intense1,4), market potential (growth1,4), corporate objectives (obj6), and firm size (mktg1 Baht sales, person1 employees). Intense4, growth4, obj6, are factor scores from factor analysis.

**Step 2,** enter independent variables in addition to control variables which were tech4 creativity allowance, tech8 technical capabilities, mktg3 export years, mktg14 marketing capabilities, person5 researcher experience, person7 marketer experience, person16 personnel capabilities, person17 education level, top2 top export experience, top3 top NP experience, top4 top industry experience, top5 top education, and top9 top management capabilities. Tech8, mktg14, mktg15, person16, person17, top9 are factor scores from factor analysis.

**Step 3,** enter interaction variables in addition to control variables and main independent variables which were inter1 (tech8xmktg14), inter2 (tech8xperson16), inter3 (tech8xtop9), inter4 (mktg14xperson16), inter5 (mktg14xtop9), and inter6 (person16xtop9).

**Evaluate the Variate for the Assumptions of Regression Analysis**

In evaluating the estimated equation, this study addresses two basic issues : (1) meeting the assumption underlying regression, and (2) identifying the influential data points.

**1) The Assumptions Underlying Regression Analysis**

The assumptions to examine are linearity, constant variance, independence of residuals, and normality. The principal measure used in evaluating the regression variate was the residual – the difference between the actual dependent variable value and its predicted value. For comparison purpose, **the studentized residuals** were used. The residual should fall randomly, with relatively equal dispersion about zero and no strong tendency to be either greater or less than zero. Likewise, no pattern should be found for large versus small values of independent variables.

The specific tests for each assumption violation check were as follows :

**1.1) Linearity**

The linearity of the relationship between dependent and independent variables represented the degree to which the change in the dependent variable associated with the predictor variable (the regression coefficient) was constant across the range of values for the independent variables (Hair, et al., 1995). The first assumption, linearity, was addressed through the analysis of residuals and partial regression plots. Scatter plot of regression studentized residual did not exhibit any nonlinear patterns to the residuals, thus ensuring that the overall equation was linear.

Examination of the residuals showed the combined effects of all predictor variables, but it did not examine any predictor variables separately in a residual plot. Standardized partial regression plots, showed the relationship of a single predictor variable to the criterion variable, were used to examine predictor variables separately. The line in partial regression plots should slope up or down depending on whether the regression coefficient for that predictor variable was positive or negative (Hair et al. 1995). The results of multiple regression analyses showed that some partial regression plots were quite well defined; thus these independent variables had strong and significant effects in the regression equation. However, partial regression plots for other independent variables were less well defined, both in slope and scatter of the points, thus explaining their lesser effect in the equation. The smaller coefficient, beta value, and significant level evidenced this. For all independent variables, no nonlinear pattern was shown. thus meeting the assumption of linearity for each predictor variable.

**1.2) Homoscedasticity**

The next assumption dealt with the constancy of the residuals across values of the predictor variables. Homoscedasticity was related to the assumption of normality because when the assumption of multivariate normality was met, the relationships between variables were homoscedastic. The failure of homoscedasticity was caused by either nonnormality of one of the variables or by the fact that one variable was related to some

transformation of the other (Tabachnick and Fidell 1996). Heteroscedasticity was not fatal to an analysis. The analysis was weakened, but not invalidated (Tabachnick and Fidell 1996).

Homoscedasticity analysis was again through examination of the studentized residuals, which showed no pattern of increasing or decreasing residuals. This finding indicated homoscedasticity in the multivariate case.

**1.3) Independence of the Residuals**

The third assumption dealt with the effect of carry-over from one observation to another, thus making the residual dependent. When carry-over was found in such instances as time-series data, the analyst had to identify potential sequencing variables. This study was cross-sectional analysis. Therefore, there were no carry-over effects from time.

**1.4) Normality**

Testing the final assumption was normality of the error term of the variate with a visual examination of the normal probability plots of the residuals. From the output, the values fell along the diagonal with no substantial or systematic departures; thus, the residuals were considered to represent normal distribution. The regression variate was found to meet the assumption of normality.

**2) Identifying Outliers as Influential Observations**

This regression analysis used casewise diagnostics to inspect outliers outside 3 standard deviations. The results showed that regression with Pdt10 new products with new production process, Pdt12 new to firm, Pdt14 new to market, and Pdt15 own research and design (dependent variables) had one outlier case, Pdt13 product characteristics had two outlier cases, and Pdt11 products time launched had three outlier cases. These outlier cases were deleted from each regression equation. The regression analysis was run again. The results came out with better adjusted $R^2$ and outcome.

## Results

Results are in three parts: descriptive statistics, analysis of variance, and multiple regression analysis.

## 1. Descriptive Statistics

Data in this part have been organized into different sets according to the distinctive characteristics of the variables under consideration. The data are presented in terms of frequencies, percentages and means. This section begins with firm size, four types of firm capabilities, and new product strategies.

### 1) Firm Size

From **Table 8.1**, the majority of respondent firms (56.4%) are small in size by number of full-time employees. 56.4% of total firms have 100 employees or less. 25.1% have from 101 to 500 employees. 40.4% of total firms have total sales of Baht 100 million or below. 14% have total sales from Baht 100 to 200 million. 31.6% have total sales higher than Baht 200 million. Total Baht sales are the average over three years.

**Table 8.1 Frequency Distribution of Firm Sizes**

| Variables | Counts | Percent |
|---|---|---|
| **Number of full-time employees (mean 263.7, median 67.5)** | | |
| 2 to 100 persons | 137 | 56.4 |
| 101 to 500 persons | 61 | 25.1 |
| 501 to 1,000 persons | 11 | 4.5 |
| 1,001 to 7,000 persons | 15 | 6.2 |
| Missing | 19 | 7.8 |
| Total | 243 | 100.0 |
| | | |
| **Total Baht sales (mean 501,000,000, median 112,000,000)** | | |
| 300,000 to 50,000,000 Baht | 59 | 24.4 |
| 50,000,001 to 100,000,000 Baht | 39 | 16.0 |
| 100,000,001 to 200,000,000 Baht | 34 | 14.0 |
| 200,000,001 to 500,000,000 Baht | 38 | 15.6 |
| 500,000,001 to 8,000,000,000 Baht | 39 | 16.0 |
| Missing | 34 | 14.0 |
| Total | 243 | 100.0 |

**2) Technical Capabilities**

**Table 8.2** shows that most respondent firms in this study do not have international standard certificates (79%) or patents (88.5%). Therefore, these two variables cannot be used to test the hypothesis. The majority of respondent firms (55.5%) have in-house research spending of only 1% or less. 34.2% do not have any in-house research. In-house research spending as a percentage of total sales is the average over three years.

**Table 8.2 Frequency Distribution of Technical Capabilities**

| Variables | Counts | Percent |
|---|---|---|
| **Number of international standard certificates (ISO, HACCP, etc.)** | | |
| None | 192 | 79.0 |
| 1 certificates | 43 | 17.7 |
| 2 to 8 certificates | 6 | 2.5 |
| Missing | 2 | 0.8 |
| Total | 243 | 100.0 |
| | | |
| **Number of patents** | | |
| None | 215 | 88.5 |
| 1 patent | 17 | 7.0 |
| 2 to 10 patents | 10 | 4.1 |
| Missing | 1 | 0.4 |
| Total | 243 | 100.0 |
| **In-house research spending as % of total sales** | | |
| None | 83 | 34.2 |
| 0.01 to 1% | 52 | 21.3 |
| 1.01 to 3% | 27 | 11.1 |
| 3.01 to 6% | 29 | 12.0 |
| 6.01 to 33.33% | 25 | 10.3 |
| Missing | 27 | 11.1 |
| Total | 243 | 100.0 |

**Table 8.3** shows the means of variables representing technical capabilities. From this table, respondent firms have a very low level of international standard certificates and patents. In-house research spending has a 2.74% average. Research and development, design, production process capabilities are computed by multiplying each perceived capability item by its importance to new product development. Both capability item and importance are on a five-point scale. Therefore, each technical capability is twenty-five points. Half of scale is 9 points (3 x 3). The means of research and development (R&D), design and production process capabilities are higher than half of scale, therefore, they

are on the higher side of capabilities. Production process capabilities have a higher mean than R&D and design capabilities.

**Table 8.3 Means of Technical Capabilities**

| Variables | Means |
|---|---|
| Number of international standard certifications | 0.25 |
| Number of patents | 0.19 |
| In-house research spending as % of total sales | 2.74 |
| Creativity allowance (five-point scale) | 3.28 |
| Research and development capabilities | 11.27 |
| Design capabilities | 11.95 |
| Production process capabilities | 14.67 |

**3) International Marketing Capabilities**

**From Table 8.4**, 52.7% of total firms export to 9 countries or less. 42.8% export to 10 countries or more. 32.9% of total firms export mainly to North America while 24.3% export to Asia and Pacific. The majority of firms (58%) have an export ratio of 76% or higher. In term of exporting years, 36.2% of respondent firms have been exporting for 6 to 10 years, and 20.6% have been exporting for 11 to 15 years.

Export ratio, advertising and promotion spending as a percentage of total sales, marketing research spending as a percentage of total sales, trademarks, and brand names are the average over three years.

The majority of respondent firms (53.1%) have spent only 1% or less of total sales on promotion and advertising. The majority of respondent firms (51.9%) do not spend on marketing research at all. 45.7% of respondent firms do not have a trademark. 42.4% do not have an internationally recognized brand name.

**Table 8.4 Frequency Distribution of International Marketing Capabilities**

| Variables | Counts | Percent |
|---|---|---|
| **Number of foreign markets to which firms export** | | |
| 1 to 3 countries | 49 | 20.2 |
| 4 to 6 countries | 50 | 20.6 |
| 7 to 9 countries | 29 | 11.9 |
| 10 to 12 countries | 51 | 21.0 |
| 13 to 100 countries | 53 | 21.8 |
| Missing | 11 | 4.5 |
| Total | 243 | 100.0 |
| | | |
| **Regions of firms' main markets** | | |
| North America | 80 | 32.9 |
| Middle and West Europe | 46 | 18.9 |
| Eastern Europe | 5 | 2.0 |
| Middle East | 6 | 2.5 |
| ASEAN | 15 | 6.2 |
| Asia and Pacific | 59 | 24.3 |
| Missing | 32 | 13.2 |
| Total | 243 | 100.0 |
| | | |
| **Average ratio of export sales to local sales** | | |
| 3.33 to 25% | 33 | 13.6 |
| 26% to 50% | 27 | 11.2 |
| 51% to 75% | 21 | 8.6 |
| 76% to 100% | 141 | 58.0 |
| Missing | 21 | 8.6 |
| Total | 243 | 100.0 |
| | | |
| **Years of exporting** | | |
| 1 to 5 years | 47 | 19.3 |
| 6 to 10 years | 88 | 36.2 |
| 11 to 15 years | 50 | 20.6 |
| 16 to 20 years | 30 | 12.3 |
| 21 to 100 years | 23 | 9.5 |
| Missing | 5 | 2.1 |
| Total | 243 | 100.0 |
| | | |
| **Advertising and promotion spending as % of total sales** | | |
| None | 80 | 32.9 |
| 0.01 to 1% | 49 | 20.2 |
| 1.01 to 3% | 41 | 16.9 |
| 3.01 to 23.33% | 55 | 22.6 |
| Missing | 18 | 7.4 |
| Total | 243 | 100.0 |

**Table 8.4 Frequency Distribution of International Marketing Capabilities (cont.)**

| Variables | Counts | Percent |
|---|---|---|
| **Marketing research spending as % of total sales** | | |
| None | 126 | 51.9 |
| 0.01 to 1% | 41 | 16.9 |
| 1.01 to 3% | 23 | 9.5 |
| 3.01 to 16.67% | 30 | 12.2 |
| Missing | 23 | 9.5 |
| Total | 243 | 100.0 |
| | | |
| **Number of trademarks** | | |
| None | 111 | 45.7 |
| 0.33 to 1 trademark | 67 | 27.5 |
| 1.33 to 3 trademarks | 34 | 14.0 |
| 3.33 to 17 trademarks | 15 | 6.2 |
| Missing | 16 | 6.6 |
| Total | 243 | 100.0 |
| | | |
| **Number of international recognized brand names** | | |
| None | 103 | 42.4 |
| 0.33 to 1 brand name | 65 | 26.7 |
| 1.33 to 3 brand names | 37 | 15.2 |
| 3.33 to 17 brand names | 25 | 10.4 |
| Missing | 13 | 5.3 |
| Total | 243 | 100.0 |

**Table 8.5** shows the means of variables representing international marketing capabilities. The average export ratio of respondent firms is 73.57%, therefore they are quite highly involved in export. The average export years is 12. They have sent products to 12 countries on average. Distribution, promotion, and marketing research capabilities are computed by multiplying each perceived capability item by its importance to new product development. Both capability item and importance are on a five-point scale. Therefore, each international marketing capability is twenty-five points. The mean of distribution capabilities is a bit higher than half of scale, while means of promotion and marketing research capabilities are a bit lower than half of scale. Most respondent firms use direct distribution to customers, followed by the use of export traders for their distribution channels.

**Table 8.5 Means of International Marketing Capabilities**

| Variables | Means |
|---|---|
| Export ratio (Export sales to total sales) | 73.57 |
| Years of exporting | 11.99 |
| Number of foreign markets | 11.81 |
| Promotion spending as % of total sales | 2.62 |
| Marketing research spending as % of total sales | 1.53 |
| Number of trademarks | 1.05 |
| Number of internationally recognized brand names | 1.41 |
| Distribution capabilities | 11.05 |
| Advertising and promotion capabilities | 7.86 |
| Marketing research capabilities | 8.37 |
| **Channel Usage (five-point scale):** | |
| Export traders | 2.61 |
| Direct distribution to customers | 3.43 |
| Agents | 2.78 |
| Dealers or distributors | 2.36 |
| Branches or sales office in foreign countries | 1.40 |
| Plants abroad | 1.17 |
| Joint ventures with companies in foreign countries | 1.35 |

**4) Personnel Capabilities**

From **Table 8.6,** 64.6% of respondent firms have 2 people or less as researchers and product designers. 54.3% have 2 people or less as engineers and technicians. 59.7% have 2 people or less as marketing personnel. 58% of researchers and product designers have experience of 5 years or less. 49.4% of engineers and technicians have experience of 5 years or less. 50.2% of marketing personnel have experience of 5 years or less.

In-house training courses and employee training outside are the average over three years. 54.7% of respondent firms have 2 courses or less in-house training. 45.2% have sent 3 employees or less to be trained outside companies.

**Table 8.6 Frequency Distribution of Personnel Capabilities**

| Variables | Counts | Percent |
|---|---|---|
| **Number of researchers and product designers** | | |
| None | 76 | 31.3 |
| 1 to 2 persons | 81 | 33.3 |
| 3 to 5 persons | 52 | 21.4 |
| 6 to 45 persons | 29 | 11.9 |
| Missing | 5 | 2.1 |
| Total | 243 | 100.0 |
| **Number of engineers and technicians** | | |
| None | 53 | 21.8 |
| 1 to 2 persons | 79 | 32.5 |
| 3 to 5 persons | 54 | 22.2 |
| 6 to 60 persons | 50 | 20.6 |
| Missing | 7 | 2.9 |
| Total | 243 | 100.0 |
| **Number of marketing personnel** | | |
| None | 35 | 14.4 |
| 1 to 2 persons | 110 | 45.3 |
| 3 to 5 persons | 56 | 23.0 |
| 6 to 74 persons | 36 | 14.8 |
| Missing | 6 | 2.5 |
| Total | 243 | 100.0 |
| **Average experience of researchers and product designers** | | |
| None | 73 | 30.0 |
| 1 to 5 years | 68 | 28.0 |
| 6 to 10 years | 66 | 27.2 |
| 11 to 20 years | 29 | 11.9 |
| Missing | 7 | 2.9 |
| Total | 243 | 100.0 |
| **Average experience of engineers and technicians** | | |
| None | 60 | 24.7 |
| 1 to 5 years | 60 | 24.7 |
| 6 to 10 years | 78 | 32.1 |
| 11 to 35 years | 38 | 15.6 |
| Missing | 7 | 2.9 |
| Total | 243 | 100.0 |

**Table 8.6 Frequency Distribution of Personnel Capabilities (cont.)**

| Variables | Counts | Percent |
|---|---|---|
| **Average experience of marketing personnel** | | |
| None | 30 | 12.3 |
| 1 to 5 years | 92 | 37.9 |
| 6 to 10 years | 74 | 30.5 |
| 11 to 35 years | 40 | 16.4 |
| Missing | 7 | 2.9 |
| Total | 243 | 100.0 |
| | | |
| **Number of in-house training** | | |
| None | 64 | 26.3 |
| 0.33 to 2 courses | 69 | 28.4 |
| 2.33 to 5 courses | 47 | 19.3 |
| 5.33 to 36 courses | 41 | 16.9 |
| Missing | 22 | 9.1 |
| Total | 243 | 100.0 |
| | | |
| **Number of employees sent to be trained outside companies** | | |
| None | 55 | 22.6 |
| 0.33 to 3 persons | 55 | 22.6 |
| 3.33 to 9 persons | 59 | 24.3 |
| 9.33 to 100 persons | 53 | 21.9 |
| Missing | 21 | 8.6 |
| Total | 243 | 100.0 |
| | | |
| **Education level of researchers and product designers** | | |
| Below Bachelor degree | 62 | 25.5 |
| Bachelor degree | 124 | 51.0 |
| Master degree | 10 | 4.2 |
| Missing | 47 | 19.3 |
| Total | 243 | 100.0 |
| | | |
| **Education level of engineers and technicians** | | |
| Below Bachelor degree | 81 | 33.3 |
| Bachelor degree | 114 | 46.9 |
| Master degree | 8 | 3.3 |
| Missing | 40 | 16.5 |
| Total | 243 | 100.0 |
| | | |
| **Education level of marketing personnel** | | |
| Below Bachelor degree | 35 | 14.4 |
| Bachelor degree | 158 | 65.0 |
| Master degree | 30 | 12.3 |
| Missing | 20 | 8.3 |
| Total | 243 | 100.0 |

**Table 8.7** shows the means of variables representing personnel capabilities. Respondent firms have on average 3 researchers and/or product designers, 5 engineers and/or technicians, and 4 marketing personnel. The experience of these personnel are 6, 7, and 7 years respectively. Education level of these personnel is Bachelor degree.

Research personnel, engineers, and marketing personnel capabilities are computed by multiplying each perceived capability item by its importance to new product development together. Both capability item and importance are on a five-point scale. Therefore, each personnel capability is twenty-five points. Marketing personnel are rated with higher capabilities than researchers and engineers.

**Table 8.7 Means of Personnel Capabilities**

| Variables | Means |
|---|---|
| Number of research personnel and product designers | 2.91 |
| Number of engineers and technicians | 5.36 |
| Number of marketing personnel | 3.79 |
| Experience of researchers and product designers (yrs) | 5.77 |
| Experience of engineers and technicians (years) | 6.74 |
| Experience of marketing personnel (years) | 7.39 |
| Number of in-house training (courses) | 3.48 |
| Number of employees trained outside companies | 7.22 |
| **Education level of following personnel (five-point scale)** | |
| Researchers and product designers | 2.68 |
| Engineers and technicians | 2.56 |
| Marketing personnel | 2.95 |
| Researchers and product designers capabilities | 10.45 |
| Engineers and technician capabilities | 11.37 |
| Marketing personnel capabilities | 12.61 |

**5) Top Management Capabilities**

From **Table 8.8,** 61.75% of respondent firms have 6 people or less as top management members. 68.33% of top management have export experience for longer than 9 years. 52.7% of top management have new product development experience longer than 9 years. 77.8% of top management have industry experience longer than 9 years.

**Table 8.8 Frequency Distribution of Top Management Capabilities**

| Variables | Counts | Percent |
|---|---|---|
| **Number of management members (department managers to CEO)** | | |
| 1 to 3 persons | 79 | 32.5 |
| 4 to 6 persons | 71 | 29.2 |
| 7 to 10 persons | 48 | 19.8 |
| 11 to 100 persons | 34 | 14.0 |
| Missing | 11 | 4.5 |
| Total | 243 | 100.0 |
| **Top management's exporting experience** | | |
| 0 to 6 years | 48 | 19.7 |
| 7 to 9 years | 23 | 9.5 |
| 10 to 12 years | 85 | 35.0 |
| 12 to 40 years | 81 | 33.3 |
| Missing | 6 | 2.5 |
| Total | 243 | 100.0 |
| **Top management's new product development experience** | | |
| 0 to 4 years | 54 | 22.2 |
| 5 to 8 years | 47 | 19.3 |
| 9 to 12 years | 74 | 30.5 |
| 13 to 35 years | 54 | 22.2 |
| Missing | 14 | 5.8 |
| Total | 243 | 100.0 |
| **Top management's industry experience** | | |
| 2 to 9 years | 42 | 17.3 |
| 10 to 12 years | 76 | 31.3 |
| 13 to 20 years | 84 | 34.6 |
| 21 to 40 years | 29 | 11.9 |
| Missing | 12 | 4.9 |
| Total | 243 | 100.0 |
| **Top management's education level** | | |
| Below Bachelor degree | 30 | 12.3 |
| Bachelor degree | 154 | 63.4 |
| Above Bachelor degree | 52 | 21.4 |
| Missing | 7 | 2.9 |
| Total | 243 | 100.0 |

**Table 8.9** shows the means of variables representing top management capabilities. Respondent firms have on average 9 people as top management members. Top management have on average 12 years export experience, 9 years new product development experience, and 14.5 years industry experience. Top management's education level is Bachelor degree.

Top management's knowledge of foreign markets, staff creativity encouragement, new product development support, open communication support among departments, and response to the changing environment are computed by multiplying each perceived capability item by its importance to new product development. Both capability item and importance are on a five-point scale. Therefore, each top management capability is twenty-five points. The means of top management capabilities are quite high compared to other capabilities. 'Knowledge of foreign markets' capability has the highest mean, followed by 'response to the changing environment'.

**Table 8.9 Means of Top Management Capabilities**

| Variables | Means |
|---|---|
| Number of top management members | 8.83 |
| Exporting experience in years | 12.00 |
| New product development experience in years | 9.02 |
| Industry experience in years | 14.45 |
| Education level (five-point scale) | 3.06 |
| Knowledge about foreign markets | 16.97 |
| Staff creativity encouragement | 15.70 |
| New product development support | 15.47 |
| Open communication among departments support | 15.06 |
| Well-prepared to changing environment response | 16.56 |

**6) New Product Strategies**

From **Table 8.10**, 44.5% of respondent firms launch more than 2 products per year. 48.6% launch new products as more than 5% of total products per year. 40.7 have launched new product line(s) to markets. 37.9% introduce new products with new technology every year or less. 52.7% introduce new products with new design every year or less. 36.2% introduce new products with a new production process every year or less. 38.3% introduce new products before main competitors.

The number of new products introduced, percentage of new products introduced, and number of new product categories are the average over three years. Missing values are because some respondents did not know or remember the numbers. Some respondents explain that their companies did not have that kind of new production process, for example. Therefore, they left it blank.

**Table 8.10 Frequency Distribution of New Product Strategies**

| Variables | Counts | Percent |
|---|---|---|
| **Number of new products introduced per year** | | |
| 0 to 2 products | 62 | 25.5 |
| 2.33 to 5 products | 37 | 15.3 |
| 5.33 to 20 products | 36 | 14.8 |
| 20.33 to 2,000 products | 35 | 14.4 |
| Missing | 73 | 30.0 |
| Total | 243 | 100.0 |
| | | |
| **New products introduced as % of total sales** | | |
| 0 to 5% | 53 | 21.8 |
| 5.1 to 10% | 35 | 14.4 |
| 10.1 to 20% | 30 | 12.3 |
| 20.1 to 40% | 26 | 10.7 |
| 40.1 to 80% | 27 | 11.2 |
| Missing | 72 | 29.6 |
| Total | 243 | 100.0 |
| | | |
| **Number of new product lines** | | |
| None | 85 | 35.0 |
| 0.33 to 1 line | 73 | 13.6 |
| 1.33 to 2 lines | 30 | 12.3 |
| 2.33 to 8 lines | 36 | 14.8 |
| Missing | 59 | 24.3 |
| Total | 243 | 100.0 |
| | | |
| **Frequency of introducing new products with new technology** | | |
| Every 1 to 6 months | 35 | 14.4 |
| Every 7 to 12 months | 57 | 23.5 |
| Every 13 to 30 months | 26 | 10.7 |
| Every 31 to 72 months | 22 | 9.0 |
| Missing | 103 | 42.4 |
| Total | 243 | 100.0 |
| | | |
| **Frequency of introducing new products with new design** | | |
| Every 1 to 3 months | 45 | 18.5 |
| Every 4 to 6 months | 25 | 10.3 |
| Every 7 to 12 months | 58 | 23.9 |
| Every 13 to 72 months | 30 | 12.3 |
| Missing | 85 | 35.0 |
| Total | 243 | 100.0 |

**Table 8.10 Frequency Distribution of New Product Strategies (cont.)**

| Variables | Counts | Percent |
|---|---|---|
| **Frequency of introducing new products with new production process** | | |
| Every 1 to 6 months | 37 | 15.2 |
| Every 7 to 12 months | 51 | 21.0 |
| Every 13 to 30 months | 30 | 12.3 |
| Every 31 to 72 months | 23 | 9.5 |
| Missing | 102 | 42.0 |
| Total | 243 | 100.0 |
| | | |
| **New products time launched** | | |
| 1 to 30 months after main competitors | 47 | 19.3 |
| Equal to main competitors | 15 | 6.2 |
| 1 to 12 months before main competitors | 43 | 17.7 |
| 13 to 24 months before main competitors | 34 | 14.0 |
| 25 to 36 months before main competitors | 16 | 6.6 |
| Missing | 88 | 36.2 |
| Total | 243 | 100.0 |

**Table 8.11** shows the means of variables representing new product strategy. Respondent firms develop new products mostly by reaction to customer request, followed by the use of in-house research. Reaction to customer request means customers give the specification, then the firms produce according to specification.

For the degree of newness to the market of new product, new products serve new needs of customers the most, followed by bringing in new customers from existing markets. For the degree of newness to firm of new product, most new products from firms are of new design, followed by a new production process. The best new product characteristic compared to main competitors is reliability, followed by tight specification to customer request.

**Table 8.11 Means of New Product Strategies**

| Variables | Means |
|---|---|
| **Level of doing the following things in developing new products (five-point scale)** | |
| By using technology from outside | 2.45 |
| By conducting cooperative research | 2.09 |
| By using in-house research | 3.31 |
| By reacting to customer request | 4.16 |
| By imitating the competitors | 2.16 |
| By improving from competitors' products | 2.68 |
| By conducting the marketing research | 3.06 |
| **Perceived degree of newness to market of new products (five-point scale)** | |
| Number of new customers in existing markets | 2.85 |
| Number of new markets | 2.66 |
| Customers' new needs being served | 3.34 |
| New types of advertising and promotion | 2.43 |
| **Perceived degree of newness to firm of new products (five-point scale)** | |
| New product category | 2.88 |
| New technology | 2.66 |
| New product design | 2.99 |
| New production process | 2.93 |
| **New product characteristics compared to main competitor (five-point scale)** | |
| Unique design or attributes in customers' view | 3.30 |
| Response to customers' needs | 3.69 |
| Tight specification to customers' requests | 3.92 |
| Strength | 3.72 |
| Durability | 3.74 |
| Reliability | 4.10 |
| Number of new products introduced per year | 45.31 |
| New products introduced as % of total products | 18.60 |
| Number of new product categories | 1.18 |
| Frequency of introducing new products with new technology (every…months) | 17.55 |
| Frequency of introducing new products with new design (every…months) | 11.60 |
| Frequency of introducing new products with new production process (every…months) | 17.85 |
| New products time launched compared to main competitor (before competitor…months) | 3.73 |

## 2. Analysis of Variance (ANOVA)

**Table 9** shows capabilities and proactiveness differences among industries. From **Table 9,** garment industry has the least capabilities among four industries. Jewelry industry has highest top management capabilities and channel usage. Furniture industry has highest technical and personnel capabilities. Canned food industry has highest international marketing capabilities and personnel's education level.

Furniture industry faces highest competitive intensity in foreign markets among four industries. Canned food industry has highest market potential which is a good opportunity for it.

**Table 9**
**Capabilities and Proactiveness Differences among Industries**

| *Independent variables* | 1.Jewelry | 2. Furniture | 3. Garments | 4.Canned Food | Significant Differences (LSD)* |
|---|---|---|---|---|---|
| Technical capabilities | 13.07 | 15.55 | 11.27 | 12.33 | 1,2>3 |
| International marketing capabilities | 9.80 | 9.64 | 7.79 | 10.04 | 1,2,4>3 |
| Personnel capabilities | 12.54 | 12.73 | 10.96 | 12.30 | 2>3 |
| Top management capabilities | 16.90 | 16.73 | 14.81 | 16.54 | 1,2,4>3 |
| Channel usage | 1.48 | 1.32 | 1.14 | 1.41 | 1,4>3 |
| Personnel's education level | 2.56 | 2.87 | 2.62 | 2.95 | 2,4>1,3 |
| ***Control Variables*** | | | | | |
| Competitive intensity | 3.93 | 4.24 | 4.09 | 4.07 | - |
| Market potential | 3.55 | 3.73 | 3.69 | 3.93 | 4>1 |
| ***Dependent Variables*** | | | | | |
| Newness to firm | 3.07 | 3.24 | 2.67 | 2.73 | 1,2>3; 2>4 |
| Product characteristics | 4.04 | 3.95 | 3.78 | 3.77 | 1>3 |
| Newness to markets | 3.06 | 2.92 | 2.63 | 2.85 | 1>3 |
| Own research and design | 3.68 | 3.32 | 2.95 | 3.29 | 1>4; 1,2,4>3 |
| Imitation | 3.04 | 2.88 | 3.15 | 2.82 | 3>4 |
| Licensing | 2.28 | 2.20 | 2.17 | 2.45 | - |

* Significant differences by LSD test at 0.05 level

Garment industry has lowest proactiveness in all dimensions among four industries again. Jewelry industry has highest proactiveness in terms of new product characteristics, product newness to markets, and using own research and design. Furniture industry has highest proactiveness in terms of new product characteristics, product newness to markets, and using own research and design. Furniture industry has highest proactiveness in dimension of product newness to firm. Canned food industry has highest imitation level which represents reactive side or less proactiveness.

Therefore, there is the correlation between capabilities and proactiveness. Garment industry has both lowest capabilities and proactiveness.

**Table 10** shows proactiveness differences between low and high capabilities for all industries. From this table, it is clear that firms with higher capabilities have higher proactiveness. Comparing means of proactiveness in six dimensions between low and high firms' capabilities, the results show that firms with high capabilities have higher proactiveness than firms with low capabilities.

There are only two exceptions. *First,* firms with low channel usage have higher product newness to market than firms with high channel usage. *Second,* firms with high technical, personnel, and top management capabilities have high imitation level than firm with low capabilities. The explanation is in discussion part. However, these two exceptions are not statistically significant.

**Table 11.1 – 11.4** show proactivenes differences between low and high capabilities by industries. The results are similar to result in **Table 10.** However, there are some variances among industries. For example, in jewelry industry, firms with low personnel education level have lower product newness to market than firms with high personnel education level.

**Table 10**
**Proactiveness Differences between Low and High Capabilities – all industries**

| | Pdt12new to firm | | Pdt13pdt characteristics | | Pdt14new to market | | Pdt15research and design | | Pdt16imitation | | Pdt17licensing | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Independent Variables* | Low | High | Low | High | Low | High | Low | High | Low | High | Low | High |
| Technical capabilities | 2.18 | 3.10* | 3.57 | 3.91* | 2.31 | 3.00* | 2.46 | 3.46* | 2.99 | 3.01 | 2.07 | 2.32 |
| International marketing capabilities | 2.53 | 3.18* | 3.81 | 3.90 | 2.55 | 3.09* | 2.92 | 3.54* | 3.02 | 2.98 | 2.05 | 2.46* |
| Personnel capabilities | 2.36 | 2.98* | 3.59 | 3.89* | 2.35 | 2.92* | 2.57 | 3.40* | 2.87 | 3.01 | 2.00 | 2.37 |
| Top management capabilities | 1.83 | 2.94* | 3.38 | 3.90* | 1.95 | 2.89* | 2.18 | 3.31* | 2.77 | 3.01 | 2.25 | 2.26 |
| Channel usage | 2.85 | 3.16 | 3.84 | 4.21 | 2.82 | 2.73 | 3.19 | 4.30* | 2.98 | 2.91 | 2.25 | 2.59 |
| Personnel's education level | 2.81 | 3.08 | 3.85 | 3.91 | 2.83 | 2.97 | 3.30 | 3.39 | 3.03 | 2.95 | 2.22 | 2.31 |
| *Control Variables* | | | | | | | | | | | | |
| Competitive intensity | 2.88 | 2.86 | 4.33 | 3.84* | 2.70 | 2.83 | 3.30 | 3.24 | 2.57 | 3.02 | 1.70 | 2.31* |
| Market potential | 2.93 | 2.85 | 3.81 | 3.86 | 2.72 | 2.83 | 3.25 | 3.23 | 3.00 | 2.99 | 2.06 | 2.29 |

* significant differences at 0.05 level

**Table 11.1**
**Proactiveness Differences between Low and High Capabilities – Jewelry Industry**

| | Pdt12new to firm | | Pdt13pdt characteristics | | Pdt14new to market | | Pdt15research and design | | Pdt16imitation | | Pdt17licensing | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Independent Variables* | Low | High | Low | High | Low | High | Low | High | Low | High | Low | High |
| Technical capabilities | 2.15 | 3.41* | 3.55 | 4.12* | 2.85 | 3.19 | 2.93 | 3.86* | 3.27 | 3.04 | 1.80 | 2.42 |
| International marketing capabilities | 2.84 | 3.33 | 4.16 | 3.92 | 2.98 | 3.21 | 3.58 | 3.79 | 2.87 | 3.18 | 2.00 | 2.63 |
| Personnel capabilities | 3.06 | 3.11 | 3.56 | 4.06 | 3.63 | 3.00 | 3.08 | 3.79 | 2.67 | 3.13 | 1.63 | 2.53 |
| Top management capabilities | 2.31 | 3.16 | 3.75 | 4.06 | 2.75 | 3.09 | 2.67 | 3.77* | 3.00 | 3.04 | 2.50 | 2.26 |
| Channel usage | 3.07 | 4.12 | 4.03 | 3.75 | 3.08 | 2.50 | 3.66 | 4.00 | 3.00 | 2.33 | 2.20 | 3.00 |
| Personnel's education level | 3.25 | 3.03 | 4.19 | 3.80 | 3.31 | 2.65* | 3.89 | 3.50 | 3.15 | 3.20 | 2.58 | 2.05 |
| *Control Variables* | | | | | | | | | | | | |
| Competitive intensity | 3.50 | 3.05 | 4.38 | 4.02 | 3.13 | 3.06 | 3.17 | 3.71 | 2.83 | 3 05 | 1.00 | 2.35 |
| Market potential | 2.88 | 3.03 | 3.75 | 4.05 | 2.79 | 3.14 | 3.67 | 3.66 | 2.28 | 3.00 | 2.80 | 2.20 |

* significant differences at 0.05 level

**Table 11.2**
**Proactiveness Differences between Low and High Capabilities – Furniture Industry**

| | Pdt12new to firm | | Pdt13pdt characteristics | | Pdt14new to market | | Pdt15research and design | | Pdt16imitation | | Pdt17licensing | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Independent Variables* | Low | High | Low | High | Low | High | Low | High | Low | High | Low | High |
| Technical capabilities | 3.13 | 3.27 | 3.78 | 3.95 | 2.53 | 3.02 | 2.86 | 3.48* | 2.92 | 2.87 | 2.06 | 2.23 |
| International marketing capabilities | 3.12 | 3.39 | 3.82 | 4.08 | 2.67 | 3.22* | 3.35 | 3.51 | 2.95 | 2.79 | 2.11 | 2.30 |
| Personnel capabilities | 2.97 | 3.30 | 3.91 | 3.92 | 2.25 | 3.10* | 2.92 | 3.43 | 2.67 | 2.83 | 1.88 | 2.29 |
| Top management capabilities | 1.50 | 3.27* | 4.25 | 3.94 | 1.25 | 2.97* | 1.67 | 3.36* | 3.33 | 2.88 | 2.50 | 2.21 |
| Channel usage | 3.21 | 3.58 | 3.95 | 4.08 | 2.93 | 2.83 | 3.25 | 4.22* | 2.86 | 3.11 | 2.23 | 1.83 |
| Personnel's education level | 3.02 | 3.36 | 3.97 | 3.93 | 2.40 | 3.31* | 3.43 | 3.25 | 2.71 | 2.86 | 2.00 | 2.27 |
| ***Control Variables*** | | | | | | | | | | | | |
| Competitive intensity | 3.75 | 3.25 | 4.38 | 3.95 | 3.63 | 2.91 | 3.17 | 3.35 | 2.83 | 2.87 | 1.00 | 2.27 |
| Market potential | 3.10 | 3.26 | 4.10 | 3.94 | 3.10 | 2.89 | 3.40 | 3.31 | 2.53 | 2.92 | 1.40 | 2.31 |

* significant differences at 0.05 level

**Table 11.3**
**Proactiveness Differences between Low and High Capabilities – Garment Industry**

| | Pdt12new to firm | | Pdt13pdt characteristics | | Pdt14new to market | | Pdt15research and design | | Pdt16imitation | | Pdt17licensing | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ***Independent Variables*** | **Low** | **High** | **Low** | **High** | **Low** | **High** | **Low** | **High** | **Low** | **High** | **Low** | **High** |
| Technical capabilities | 1.98 | 2.88* | 3.48 | 3.81 | 2.01 | 2.86* | 2.00 | 3.28* | 3.02 | 3.22 | 2.16 | 2.12 |
| International marketing capabilities | 2.27 | 3.17* | 3.71 | 3.86 | 2.28 | 3.03* | 2.51 | 3.43* | 3.23 | 3.08 | 1.98 | 2.33 |
| Personnel capabilities | 2.07 | 2.80* | 3.46 | 3.87* | 2.14 | 2.72* | 2.21 | 3.25* | 3.15 | 3.18 | 2.10 | 2.18 |
| Top management capabilities | 1.50 | 2.74* | 3.05 | 3.86* | 1.42 | 2.73* | 1.60 | 3.06* | 2.67 | 3.18 | 1.67 | 2.17 |
| Channel usage | 2.67 | - | 3.78 | - | 2.63 | - | 2.95 | - | 3.15 | - | 2.17 | - |
| Personnel's education level | 2.55 | 3.08* | 3.78 | 4.04 | 2.74 | 2.65 | 2.96 | 3.44 | 3.15 | 3.11 | 2.14 | 2.07 |
| ***Control Variables*** | | | | | | | | | | | | |
| Competitive intensity | 2.92 | 2.65 | 4.56 | 3.74* | 2.66 | 2.62 | 3.67 | 2.92 | 2.67 | 3.20 | 2.13 | 2.18 |
| Market potential | 2.80 | 2.67 | 3.50 | 3.83 | 2.30 | 2.65 | 2.67 | 2.97 | 3.20 | 3.14 | 2.00 | 2.20 |

* significant differences at 0.05 level

**Table 11.4**
**Proactiveness Differences between Low and High Capabilities – Canned Food Industry**

| | Pdt12new to firm | | Pdt13pdt characteristics | | Pdt14new to market | | Pdt15research and design | | Pdt16imitation | | Pdt17licensing | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Independent Variables* | Low | High | Low | High | Low | High | Low | High | Low | High | Low | High |
| Technical capabilities | 1.92 | 3.04* | 3.56 | 3.84 | 2.48 | 3.03 | 2.81 | 3.40* | 2.89 | 2.82 | 2.04 | 2.57 |
| International marketing capabilities | 2.36 | 2.99* | 3.71 | 3.80 | 2.64 | 3.01 | 2.83 | 3.56* | 2.82 | 2.86 | 2.19 | 2.61 |
| Personnel capabilities | 2.09 | 2.92* | 3.56 | 3.79 | 2.34 | 3.00* | 3.00 | 3.32 | 2.46 | 2.85 | 2.06 | 2.56 |
| Top management capabilities | 1.85 | 2.83* | 3.00 | 3.80 | 2.10 | 2.94* | 3.17 | 3.32 | 2.60 | 2.86 | 2.70 | 2.44 |
| Channel usage | 2.74 | 2.63 | 3.73 | 4.50 | 2.86 | 2.71 | 3.19 | 4.40* | 2.80 | 3.00 | 2.41 | 2.83 |
| Personnel's education level | 2.73 | 2.86 | 3.40 | 3.85* | 2.90 | 3.01 | 3.26 | 3.44 | 2.90 | 2.83 | 2.19 | 2.58 |
| ***Control Variables*** | | | | | | | | | | | | |
| Competitive intensity | 1.83 | 2.77 | 3.75 | 3.77 | 1.92 | 2.89 | 2.83 | 3.31 | 2.00 | 2.86 | 1.50 | 2.50 |
| Market potential | 3.00 | 2.73 | 4.00 | 3.73 | 2.63 | 2.84 | 3.33 | 3.29 | 2.83 | 2.81 | 2.00 | 2.47 |

* significant differences at 0.05 level

## 3. Multiple Regression Analysis

**Table 12** shows the summary of results of multiple regression analysis. The purpose of this study is to test theory, therefore independent variables are limited to resource-based theory. There are also control variables such as firm size, type of industry. Hence, adjusted $R^2$ above 0.5 is acceptable for this type of analysis. Minimum adjusted $R^2$ of multiple regression in this study is 0.165. This study uses Beta in equations because the units of each variable are different.

Two of the more common measures for assessing multicollinearity are the tolerance value and its inverse – the variance inflation factor (VIF) (Hair et al. 1995). These measures tell us the degree to which each independent variable is explained by the other independent variables. Tolerance is the amount of variability of the selected independent variable not explained by the other independent variables. Thus very small tolerance values denote high collinearity. A common cutoff threshold is a tolerance value of .10, which corresponds to VIF values above 10. The results of multiple regression analyses show that there are high multicollinearity of interaction variables, which is a normal situation. Other independent variables do not have high multicollinearity.

**Dependent Variables are as followed:**

1) Pdt5 number of new products introduced per year
2) pdt6 new product introduced as a percentage of total products
3) Pdt7 number of new product lines introduced per year
4) Pdt8 frequency of new products introduced with new technology
5) Pdt9 frequency of new products introduced with new design
6) Pdt10 frequency of new products introduced with new production process
7) Pdt11 new product time launched compared to main competitor
8) Pdt12 product newness to firm (mean from factor analysis)
9) Pdt13 new product characteristics (mean from factor analysis)
10) Pdt14 product newness to market (mean from factor analysis)
11) Pdt15 firm's own research and design (mean from factor analysis)

**Table 12 Full Model of Multiple Regression Results (Beta Values)**

| | Pdt5 | pdt6 | Pdt7 | pdt8 | Pdt9 | pdt10 | pdt11 | pdt12 | pdt13 | pdt14 | pdt15 | pdt16 | Pdt17 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Tech1 | .045 | .061 | .152 | -.117 | -.067 | -.088 | .126 | .015 | -.027 | .002 | -.033 | -.121 | .111 |
| Tech2 | .116 | -.023 | .012 | .041 | .012 | -.118 | .153 | -.049 | -.090 | .012 | -.011 | -.011 | -.135 |
| Tech3 | -.046 | -.046 | -.114 | .175 | .224 | .216 | .048 | .006 | .008 | .110 | .096 | -.114 | .219 |
| Tech4 | -.112 | .015 | .057 | .013 | -.086 | -.123 | .000 | .118 | -.039 | -.016 | .036 | -.060 | .017 |
| Tech8 | .261 | -.016 | -.414 | .172 | .716 | .109 | .306 | -.309 | -.053 | .971* | .309 | .044 | .368 |
| Mktg2 | .020 | .035 | .116 | -.036 | .019 | -.100 | .140 | .096 | -.138 | -.124 | -.004 | .177 | -.087 |
| Mktg3 | -.176 | -.222 | -.007 | .237 | .152 | -.138 | .078 | -.089 | .045 | -.008 | -.006 | .219 | -.169 |
| Mktg4 | .056 | .118 | .028 | -.056 | -.031 | .118 | -.243 | .060 | .129 | -.005 | -.045 | .117 | -.002 |
| Mktg6 | -.041 | -.011 | .012 | -.216 | -.171 | -.131 | .036 | -.011 | .033 | -.050 | -.014 | -.165 | -.251* |
| Mktg7 | .014 | .494** | .256 | -.039 | -.064 | -.074 | .003 | .114 | .092 | .016 | .123 | .178 | -.037 |
| Mktg8 | -.027 | .070 | -.021 | .128 | .006 | .002 | .001 | .103 | -.070 | .036 | .039 | .108 | .071 |
| Mktg9 | .091 | -.111 | -.059 | -.022 | .079 | .127 | .018 | -.048 | -.203* | -.005 | -.028 | -.141 | .013 |
| Mktg14 | .552 | .291 | .313 | -.331 | -.571 | .348 | -.848 | .819 | -.171 | -.721 | .196 | .395 | .509 |
| Mktg15 | -.019 | .047 | .512** | -.017 | .031 | -.178 | .022 | .220* | .060 | -.047 | .127 | .250* | .189 |
| Person2 | .475** | .204 | -.252* | .054 | -.160 | .053 | .185 | -.026 | -.141 | .012 | -.004 | -.155 | -.021 |
| Person3 | -.355** | -.253* | .517** | .014 | .103 | -.093 | .192 | .183 | -.149 | .150 | .132 | .251* | .082 |
| Person4 | .044 | -.001 | .051 | .008 | .180 | .156 | -.286 | -.021 | -.212 | .046 | -.026 | .013 | -.011 |
| Person5 | -.208* | .160 | .130 | .108 | -.021 | .028 | .191 | .080 | -.095 | -.073 | -.019 | .325** | -.177 |
| Person6 | .113 | -.088 | -.074 | .028 | .218* | .122 | .119 | -.031 | -.121 | -.004 | -.063 | -.203* | .113 |
| Person7 | -.033 | -.055 | -.106 | .159 | .007 | .054 | -.044 | -.121 | .206* | .078 | .157 | .111 | .069 |
| Person8 | .194* | .009 | .164 | .236* | .043 | .021 | -.075 | .008 | -.036 | .062 | .108 | .247** | .041 |
| Person9 | -.175 | .118 | .049 | .201 | .187 | .194 | .125 | -.021 | .229 | .005 | -.112 | .183 | .002 |
| Person16 | -.575* | .470 | .712* | .459 | .582 | -.202 | .252 | .046 | .397 | .927** | .583* | 1.022** | .062 |
| Person17 | -.231** | -.245* | .310** | .043 | .111 | -.109 | -.158 | .207* | -.161 | .007 | .016 | .045 | -.014 |
| Top1 | .147 | -.010 | -.239 | -.333* | -.213 | -.302* | .091 | -.078 | .193 | .028 | .072 | -.281* | .027 |
| Top2 | .219 | -.060 | -.395* | -.304 | .083 | .035 | .204 | -.189 | -.097 | -.047 | -.076 | -.538** | .359* |
| Top3 | -.228* | .150 | .347** | -.108 | -.105 | -.303* | .040 | .278* | .109 | .014 | .052 | .041 | -.227 |
| Top4 | -.045 | -.016 | .197 | .185 | .027 | .371** | -.083 | .200 | -.025 | .028 | .123 | -.075 | -.129 |
| Top5 | .006 | .125 | -.174 | .269** | .296** | .251* | .108 | .020 | -.042 | .140 | -.004 | .062 | -.042 |
| Top9 | -.177 | -.468 | -.013 | -.553 | .398 | -.459 | .411 | .228 | .641 | .671 | .688* | -1.042** | .159 |
| Inter1 | -1.266** | 1.371* | -.469 | .159 | -.467 | -.050 | 1.556* | .284 | 2.101** | -.225 | .401 | -.309 | -.008 |
| Inter2 | 2.190** | -1.066 | -2.223** | -.008 | -.726 | 1.524 | -.439 | -.572 | .286 | -1.587* | -.505 | -2.716** | -.329 |
| Inter3 | -1.376* | -.497 | 3.014** | -.642 | -.290 | -1.573 | -.872 | 1.065 | -1.571* | .170 | .060 | 2.322** | -.270 |
| inter4 | -1.678** | -1.794* | 2.059** | -.975 | .900 | -1.920* | .016 | .359 | -1.963** | 1.397* | -.129 | .184 | -.062 |
| inter5 | 1.871** | -.117 | -2.216** | 1.522* | .389 | 1.707* | .132 | -1.648** | .075 | .092 | -.359 | -.580 | -.397 |
| inter6 | .319 | 1.743** | .004 | .053 | -.997 | .688 | -.369 | .049 | .910 | -1.162 | -.509 | .756 | .177 |
| R | .841 | .736 | .731 | .754 | .774 | .705 | .707 | .705 | .652 | .710 | .750 | .680 | .530 |
| R Square | .707 | .542 | .535 | .569 | .599 | .497 | .499 | .496 | .425 | .504 | .563 | .462 | .281 |
| Adj. $R^2$ | .542 | .294 | .297 | .289 | .376 | .176 | .200 | .271 | .165 | .282 | .367 | .222 | -.041 |
| Std. Error | 93.215 | 17.013 | 1.275 | 12.121 | 9.090 | 13.740 | 10.262 | 3.408 | 2.291 | 2.901 | 2.222 | 2.253 | 2.274 |
| F-statistic[a] | 4.295** | 2.184** | 2.249** | 2.035** | 2.693** | 1.549* | 1.670* | 2.207** | 1.637* | 2.275** | 2.881** | 1.926** | .873 |

* P-value is significant at the 0.05 level, 2-tailed test., ** P-value is significant at the 0.01 level, 2-tailed test.

12) Pdt16 imitation (mean from factor analysis)

13) Pdt17 licensing (mean from factor analysis)

**Independent variables are as followed:**

- **Technical Capabilities**

1) Tech1 number of international standard certificates (such as ISO, HACCP)
2) Tech2 number of patents
3) Tech3 in-house research spending as a percentage of total sales
4) Tech4 degree of job-related experimental activities
5) Tech8 technical capability (mean from factor analysis)

- **International Marketing Capabilities**

6) Mktg2 export ratio
7) Mktg3 export years
8) Mktg4 number of foreign markets
9) Mktg6 promotion spending as a percentage of total sales
10) Mktg7 marketing research spending as a percentage of total sales
11) Mktg8 number of registered trademarks
12) Mktg9 number of internationally recognized brand names
13) Mktg14 marketing capability (mean from factor analysis)
14) Mktg15 degree of channel usage (mean from factor analysis)

- **Personnel Capabilities**

15) Person2 number of researchers and product designers
16) Person3 number of engineers and technicians
17) Person4 number of marketing personnel
18) Person5 researchers' and product designers' experience in years
19) Person6 engineers' and technicians' experience in years
20) Person7 marketing personnel's experience in years
21) Person8 number of in-house training courses
22) Person9 number of employees external trained

23) Person16 personnel capability (mean from factor analysis)

24) Person17 personnel's education level (mean from factor analysis)

- **Top Management Capabilities**

25) Top1 number of top management members

26) Top2 top management's export experience in years

27) Top3 top management's new product experience in years

28) Top4 top management's industry experience in years

29) Top5 top management's education level

30) Top9 top mgmt capability (mean from factor analysis)

**Interaction variables are as followed :**

1) Inter1 interaction between tech8 technical capability and mktg14 international marketing capability
2) Inter2 interaction between tech8 technical capability and person16 personnel capability
3) Inter3 interaction between tech8 technical capability and top9 top management capability
4) Inter4 interaction between mktg14 international marketing capability and person16 personnel capability
5) Inter5 interaction between mktg14 international marketing capability and top9 top management capability
6) Inter6 interaction between person16 personnel capability and top9 top management capability

There are thirteen multiple regression equations in this study. To simply the regression results, the control variable effects are not shown in **Table 12.**

**Interaction Effect :**

Interaction effect is the effect of interaction between independent variables on dependent variable. If there is only interaction effect while there is no main effect of independent variables, the interaction effect cannot be interpreted.

If interaction effect has bigger size than main effect, the result will be as follows:

| Main Effect (sign) | Interaction Effect (sign) | Result : |
|---|---|---|
| Positive (+) | Negative (-) | Main effect reverse to negative (-) |
| Negative (-) | Positive (+) | Main effect more negative (-) |
| Negative (-) | Negative (-) | Main effect reverse to positive (+) |
| Positive (+) | Positive (+) | Main effect more positive (+) |

If interaction effect has smaller size than main effect, the result will be as follows:

| Main Effect (sign) | Interaction Effect (sign) | Result : |
|---|---|---|
| Positive (+) | Negative (-) | Main effect less positive (+) |
| Negative (-) | Positive (+) | Main effect more negative (-) |
| Negative (-) | Negative (-) | Main effect less negative (-) |
| Positive (+) | Positive (+) | Main effect more positive (+) |

**1) Pdt5 average number of new products introduced per year**

**Main Effects :**

Person2 number of researchers and product designers and person8 number of in-house training courses have significant positive effects on pdt5 number of new products introduced. The higher the number of researchers and/or in-house training courses, the higher the number of new products introduced.

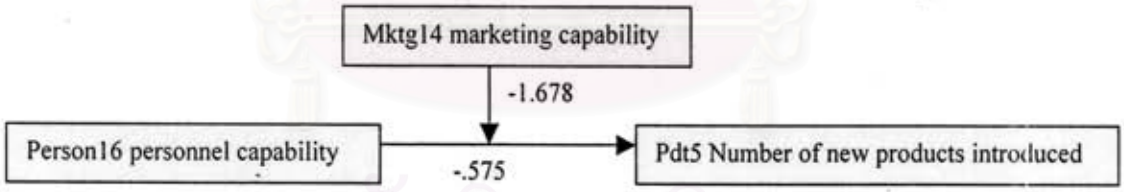
Person3 number of engineers and technicians, person5 researchers' and product designers' experience, person16 personnel capability, person17 personnel's education level, and top3 top management's new product experience have significant negative effects on pdt5 number of new products introduced. The higher the number of technicians, researchers' experience, personnel capability, personnel's education level, and/or top management's new product experience, the lower the average number of new products introduced.

**Interaction Effects :**

There is a significant negative effect of technical capability on international marketing capability (inter1) to pdt5 number of new products introduced, and vice versa. However, tech8 technical and mktg14 international marketing capabilities do not have significant effect on pdt5 number of new products introduced. Therefore, interaction effect cannot be interpreted.

There is a significant positive effect of technical capability on personnel capability (inter2) to pdt5 number of new products introduced, and vice versa. However, tech8 technical and person16 personnel capabilities do not have significant effect on pdt5 number of new products introduced. Therefore, interaction effect cannot be interpreted.

There is a significant negative effect of technical capability on top management capability (inter3) to pdt5 number of new products introduced, and vice versa. However, tech8 technical and top9 top management capabilities do not have significant effect on pdt5 number of new products introduced. Therefore, interaction effect cannot be interpreted.




There is a significant negative effect of international marketing capability on personnel capability (inter4) to pdt5 number of new products introduced, and vice versa. Person16 personnel capability has significant negative effect on pdt5 number of new products introduced. Mktg14 international marketing capability does not have significant effect on pdt5 number of new products introduced. Therefore, international marketing capability has negative interaction effect on the relationship between personnel capability and number of new products introduced. Moreover, the size of negative interaction effect is bigger than the size of personnel capital effect on number of new products introduced.

This makes personnel capability effect reverse to positive sign. Personnel capability alone leads to less number of new products introduced. However, interacting with international marketing capability, personnel capability leads to more number of new products introduced.

There is a significant positive effect of international marketing capability on top management capability (inter5) to pdt5 number of new products introduced, and vice versa. However, mktg14 international marketing and top9 top management capabilities do not have significant effect on pdt5 number of new products introduced. Therefore, interaction effect cannot be interpreted.

**2) Pdt6 new products introduced as a percentage of total products**

**Main Effects :**

Mktg7 marketing research spending as a percentage of total sales has significant positive effect on pdt6 new products introduced as a percentage of total products. The higher the marketing research spending, the higher the new products introduced as a percentage of total products.

Person3 number of engineers and technicians and person17 personnel's education level have significant negative effect on pdt6 new products introduced as a percentage of total products. The higher the number of technicians and/or personnel's education level, the lower the new products introduced as a percentage of total products.

**Interaction Effects :**

There is a significant positive effect of technical capability on international marketing capability (inter1) to pdt6 new products introduced as a percentage of total products, and vice versa. However, tech8 technical and mktg14 international marketing capabilities do not have significant effect on pdt6 new products introduced as a percentage of total products. Therefore, interaction effect cannot be interpreted.

There is a significant negative effect of international marketing capability on personnel capability (inter4) to pdt6 new products introduced as a percentage of total products, and vice versa. However, mktg14 international marketing and person16 personnel capabilities do not have significant effect on pdt6 new products introduced as a percentage of total products. Therefore, interaction effect cannot be interpreted.

There is a significant positive effect of personnel capability on top management capability (inter6) to pdt6 new products introduced as a percentage of total products, and vice versa. However, person16 personnel and top9 top management capabilities do not have significant effect on pdt6 new products introduced as a percentage of total products. Therefore, interaction effect cannot be interpreted.

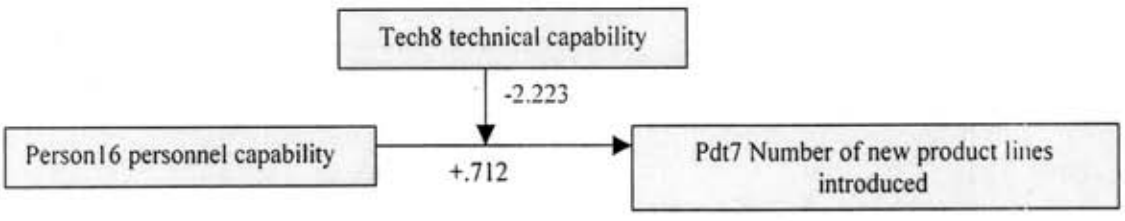
**3) Pdt7 average number of new product lines introduced per year**

**Main Effects :**

Mktg15 degree of channel usage, person3 number of engineers and technicians, person16 personnel capability, person17 personnel's education level, and top3 top management's new product experience have significant positive effects on pdt7 number of new product lines introduced. The higher the degree of channel usage, number of technicians, personnel capability, personnel's education level, and/or top management's new product experience, the higher the number of new product lines introduced.

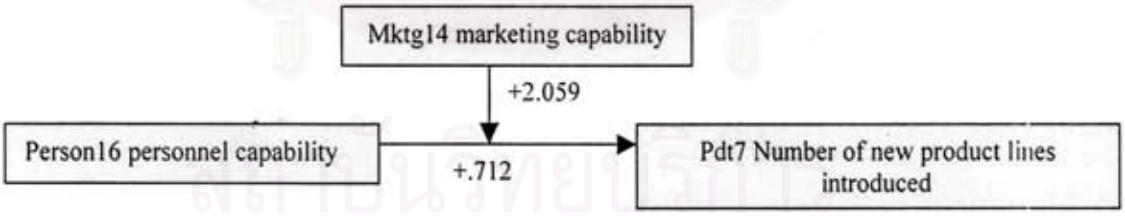
Person2 number of researchers and product designers and top2 top management's export experience have significant negative effects on pdt7 number of new product lines introduced. The higher the number of researchers and/or top management's export experience, the lower the number of new product lines introduced.

**Interaction Effects :**



There is a significant negative effect of technical capability on personnel capability (inter2) to pdt7 number of new product lines introduced, and vice versa. Person16 personnel capability has significant positive effect on pdt7 number of new product lines introduced. Tech8 technical capability does not have significant effect on pdt7 number of new product lines introduced. Therefore, technical capability has negative interaction effect on the relationship between personnel capability and number of new product lines introduced. Moreover, the size of negative interaction effect is bigger than the size of personnel capability effect on number of new product lines introduced. This makes personnel capability effect reverse to negative sign. Personnel capability alone leads to more number of new product lines introduced. However, interacting with technical capability, personnel capability leads to less number of new product lines introduced.

There is a significant positive effect of technical capability on top management capability (inter3) to pdt7 number of new product lines introduced, and vice versa. However, tech8 technical and top9 top management capabilities do not have significant effect on pdt7 number of new product lines introduced. Therefore, interaction effect cannot be interpreted.




There is a significant positive effect of international marketing capability on personnel capability (inter4) to pdt7 number of new product lines introduced, and vice versa. Person16 personnel capability has significant positive effect on pdt7 number of new product lines introduced. Mktg14 international marketing capability does not have significant effect on pdt7 number of new product lines introduced. Therefore, international marketing capability increases the positive effect of personnel capability on number of new product lines introduced. The higher the international marketing

capability, the more positive effect of personnel capability on number of new product lines introduced.

There is a significant negative effect of international marketing capability on top management capability (inter5) to pdt7 number of new product lines introduced, and vice versa. However, mktg14 international marketing and top9 top management capabilities do not have significant effect on pdt7 number of new product lines introduced. Therefore, interaction effect cannot be interpreted.

**4) Pdt8 frequency of new products introduced with new technology**

**Main Effects :**

Person8 number of in-house training courses and top5 top management's education level have significant positive effects on pdt8 frequency of new products introduced with new technology. The higher the number of in-house training courses and/or top management's education level, the higher the frequency of new products introduced with new technology.

Top1 number of top management members has significant negative effects on pdt8 frequency of new products introduced with new technology. The higher the number of top management members, the lower the frequency of new products introduced with new technology.

**Interaction Effects :**

There is a significant negative effect of international marketing capability on top management capability (inter5) to pdt8 frequency of new products introduced with new technology, and vice versa. However, mktg14 international marketing and top9 top management capabilities do not have significant effect on pdt8 frequency of new products introduced with new technology. Therefore, interaction effect cannot be interpreted.

**5) Pdt9 frequency of new products introduced with new design**

**Main Effects :**

Person6 engineers' and technicians' experience and top5 top management's education level have significant positive effect on pdt9 frequency of new products introduced with new design. The higher the technicians' experience and/or top management's education level, the higher the frequency of new products introduced with new design.

**Interaction Effect :**

There is no significant interaction effect of capabilities on pdt9 frequency of new products introduced with new design.

**6) Pdt10 frequency of new products introduced with new production process**

**Main Effects :**

Top4 top management's industry experience and top5 top management's education level have significance positive effects on pdt10 frequency of new products introduced with new production process. The higher the top management's industry experience and/or top management's education level, the higher the frequency of new products introduced with new production process.

Top1 number of top management members and top3 top management's new product experience have significance negative effects on pdt10 frequency of new products introduced with new production process. The higher the number of top management members and/or top management's new product experience, the lower the frequency of new products introduced with new production process.

**Interaction Effects :**

There is a significant negative effect of international marketing capability on personnel capability (inter4) to pdt10 frequency of new products introduced with new production process, and vice versa. However, mktg14 international marketing and person16 personnel capabilities do not have significant effect on pdt10 frequency of new

products introduced with new production process. Therefore, interaction effect cannot be interpreted.

There is a significant negative effect of international marketing capability on top management capability (inter5) to pdt10 frequency of new products introduced with new production process, and vice versa. However, mktg14 international marketing and top9 top management capabilities do not have significant effect on pdt10 frequency of new products introduced with new production process. Therefore, interaction effect cannot be interpreted.

**7) Pdt11 new product time launched compared to main competitor**

**Main Effect :**

There is no capability having significant effect on pdt11 new product time launched.

**Interaction Effect :**

There is a significant negative effect of technical capability on international marketing capability (inter1) to pdt11 new product time launched, and vice versa. However, tech8 technical and mktg14 international marketing capabilities do not have significant effect on pdt11 new product time launched. Therefore, interaction effect cannot be interpreted.

**8) Pdt12 product newness to firm**

**Main Effects :**

Mktg15 degree of channel usage, person17 personnel's education level, and top3 top management's new product experience have significant positive effects on pdt12 product newness to firm. The higher the degree of channel usage, personnel's education level, and/or top management's new product experience, the higher the product newness to firm.

**Interaction Effect :**

There is a significant negative effect of international marketing capability on top management capability (inter5) to pdt12 product newness to firm, and vice versa. However, mktg14 international marketing and top9 top management capabilities do not have significant effect on pdt12 product newness to firm. Therefore, interaction effect cannot be interpreted.

**9) Pdt13 new product characteristics**

**Main Effects :**

Person7 marketing personnel's experience has significant positive effect on pdt13 new product characteristics. The higher the marketing personnel's experience, the better the new product characteristics.

Mktg9 number of brand names has significant negative effect on pdt13 new product characteristics. The higher the number of brand names, the worse the new product characteristics.

**Interaction Effects :**

There is a significant positive effect of technical capability on international marketing capability (inter1) to pdt13 new product characteristics, and vice versa. However, tech8 technical and mktg14 international marketing capabilities do not have significant effect on pdt13 new product characteristics. Therefore, interaction effect cannot be interpreted.

There is a significant negative effect of technical capability on top management capability (inter3) to pdt13 new product characteristics, and vice versa. However, tech8 technical and top9 top management capabilities do not have significant effect on pdt13 new product characteristics. Therefore, interaction effect cannot be interpreted.

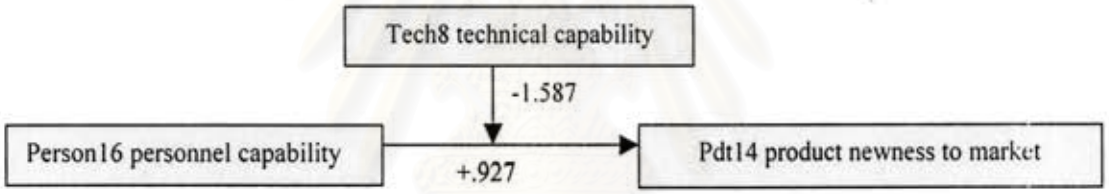
There is a significant negative effect of international marketing capability on personnel capability (inter4) to pdt13 new product characteristics, and vice versa. However, mktg14 international marketing and person16 personnel capabilities do not have significant effect on pdt13 new product characteristics. Therefore, interaction effect cannot be interpreted.

**10) Pdt14 product newness to market**

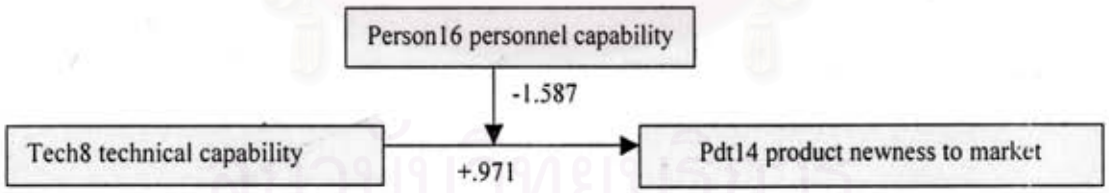
**Main Effects :**

Tech8 technical capability and person16 personnel capability have significant positive effects on pdt14 product newness to market. The higher the technical and/or personnel capabilities, the higher the product newness to market.

**Interaction Effects :**

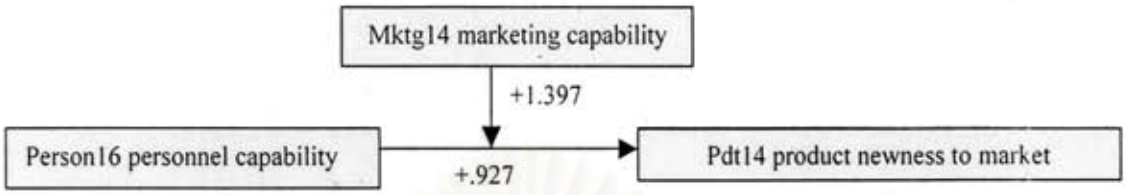



and,




There is a significant negative effect of technical capability on personnel capability (inter2) to pdt14 product newness to market, and vice versa. Both tech8 technical and person16 personnel capabilities have significant positive effects on pdt14 product newness to market. Therefore, technical and personnel capabilities have negative interaction effects on each other to product newness to market. Moreover, the size of negative interaction effect is bigger than the size of main effect on product newness to market. This makes main effect reverse to negative sign. Personnel capability or technical

capability alone leads to more product newness to market. However, interacting of each other, personnel and technical capabilities lead to less product newness to market.




There is a significant positive effect of international marketing capability on personnel capability (inter4) to pdt14 product newness to market, and vice versa. Person16 personnel capability has significant positive effect on pdt14 product newness to market. Mktg14 international marketing capability does not have significant effect on pdt14 product newness to market. Therefore, international marketing capability increases the positive effect of personnel capability on product newness to market. The higher the international marketing capability, the more positive effect of personnel capability on product newness to market.

**11) Pdt15 firm's own research and design**

**Main Effects :**

Person16 personnel capability and top9 top management capability have significant positive effects on pdt15 firm's own research and design. The higher the personnel capability and/or top management capability, the higher the usage of firm's own research and design.

**Interaction Effect :**

There is no significant interaction effect of capabilities on pdt15 firm's own research and design.

**12) Pdt16 imitation**

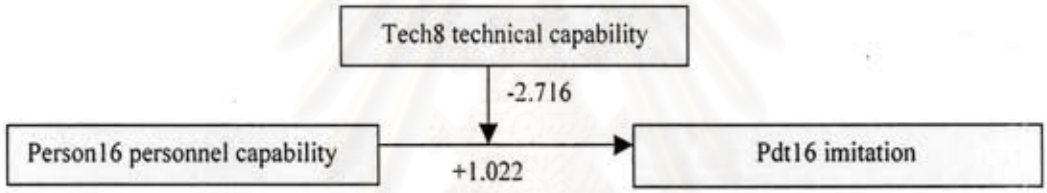
**Main Effects :**

Mktg15 degree of channel usage, person3 number of engineers and technicians, person5 researchers' and product designers' experience, person8 number of in-house

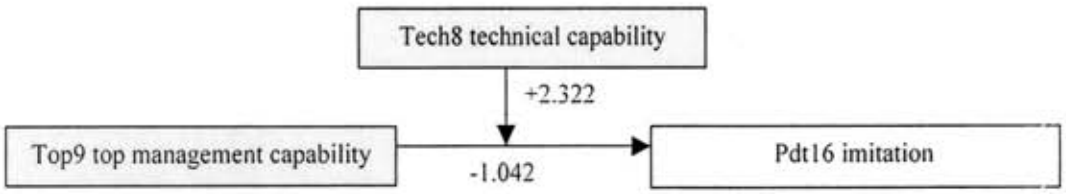
training courses, and person16 personnel capability have significant positive effects on pdt16 imitation. The higher the degree of channel usage, number of technicians, researchers' experience, number of in-house training courses, and/or personnel capability, the higher the imitation.

Person6 engineers' and technicians' experience, top1 number of top management members, top2 top management's export experience, and top9 top management capability have significant negative effects on pdt16 imitation. The higher the technicians' experience, number of top management members, top management's export experience, and/or top management capability, the lower the imitation.

**Interaction Effects :**




There is a significant negative effect of technical capability on personnel capability (inter2) to pdt16 imitation, and vice versa. Person16 personnel capability has significant positive effect on pdt16 imitation. Tech8 technical capability does not have significant effect on pdt16 imitation. Therefore, technical capability has negative interaction effect on the relationship between personnel capability and imitation. Moreover, the size of negative interaction effect is bigger than the size of personnel capability effect on imitation. This makes personnel capability effect reverse to negative sign. Personnel capability alone leads to more imitation. However, interacting with technical capability, personnel capability leads to less imitation.



There is a significant positive effect of technical capability on top management capability (inter3) to pdt16 imitation, and vice versa. Top9 top management capability has significant negative effect on pdt16 imitation. Tech8 technical capability does not have significant effect on pdt16 imitation. Therefore, technical capability increases the negative effect of top management capability on imitation. The higher the technical capability, the more negative effect of top management on imitation.

**13) Pdt17 licensing**

Due to insignificant F-statistic (P-value = .69) and negative adjusted $R^2$, the regression result of pdt17 licensing cannot be interpreted.

## 2) Hypothesis Testing

**Table 13** shows multiple regression results arranged by hypothesis. **Table 14** shows the results of hypothesis testing.

**Table 13 Regression Results by Hypothesis**

| Independent Variables : | New Product Proactiveness |
|---|---|
| **$H_1$ : Technical capabilities** | |
| Tech1 number of international standards | • no significant effect |
| Tech2 number of patents | • no significant effect |
| Tech3 in-house research spending | • no significant effect |
| Tech4 job-related experimental activities | • no significant effect |
| Tech8 technical capability | • +.97 pdt14 product newness to market |
| **$H_2$ : International marketing capabilities** | |
| Mktg2 export ratio | • no significant effect |
| Mktg3 export years | • no significant effect |
| Mktg4 number of foreign markets | • no significant effect |
| Mktg6 promotion spending | • no significant effect |
| Mktg7 marketing research spending | • +.49 pdt6 NP introduced as % of total products |
| Mktg8 number of registered trademarks | • no significant effect |
| Mktg9 number of brand names | • no significant effect |
| Mktg14 international marketing capability | • no significant effect |
| Mktg15 degree of channel usage | • +.51 pdt7 number of new product lines introduced<br>• +.22 pdt12 product newness to firm<br>• +.25 pdt16 imitation |
| **$H_3$ : Personnel capabilities** | |
| Person2 number of researchers and product designers | • +.48 pdt5 number of new products (NP) introduced<br>• -.25 pdt7 number of new product lines introduced |
| Person3 number of engineers and technicians | • -.36 pdt5 number of new products introduced<br>• -.25 pdt6 NP introduced as % of total products<br>• +.52 pdt7 number of new product lines introduced<br>• +.25 pdt16 imitation |
| Person4 number of marketing personnel | • no significant effect |
| Person5 researchers' and product designers' experience | • -.21 pdt5 number of new products introduced<br>• +.33 pdt16 imitation |
| Person6 engineers' and technicians' experience | • +.22pdt9frequency of NP introduced with new design<br>• -.20 pdt16 imitation |
| Person7 marketing personnel's experience | • +.21 pdt13 new product characteristics |
| Person8 number of in-house training courses | • +.19 pdt5 number of new products introduced<br>• +.24 pdt8 frequency of NP intro. w/ new technology<br>• +.25 pdt16 imitation |
| Person9 number of employees external trained | • no significant effect |
| Person16 personnel capability | • -.58 pdt5 number of new products introduced<br>• +.71 pdt7 number of new product lines introduced<br>• +.93 pdt14 product newness to market<br>• +.58 pdt15 firm's own research and design<br>• +1.02 pdt16 imitation |
| Person17 personnel's education level | • -.23 pdt5 number of new products introduced<br>• -.25 pdt6 NP introduced as % of total products<br>• +.31 pdt7 number of new product lines introduced<br>• +.21 pdt12 product newness to firm |

**Table 13 Regression Results by Hypothesis (Cont.)**

| Independent Variables : | New Product Proactiveness |
|---|---|
| **$H_4$ : Top management capabilities**<br>Top1 number of top management members | • -.33 pdt8 frequency of NP intro. w/ new technology<br>• -.30 pdt10 freq. of NP with new production process<br>• -.28 pdt16 imitation |
| Top2 top management's export experience | • -.40 pdt7 number of new product lines introduced<br>• -.54 pdt16 imitation |
| Top3 top management's new product experience | • -.23 pdt5 number of new products introduced<br>• +.35 pdt7 number of new product lines introduced<br>• -.30 pdt10 freq. of NP with new production process<br>• +.28 pdt12 product newness to firm |
| Top4 top management's industry experience | • +.37 pdt10 freq. of NP with new production process |
| Top5 top management's education level | • +.27 pdt8 frequency of NP intro. w/ new technology<br>• +.30 pdt9 frequency of NP introduced w/ new design<br>• +.25 pdt10 freq. of NP with new production process |
| Top9 top management capability | • +.69 pdt15 firm's own research and design<br>• -1.04 pdt16 imitation |
| **Interaction effects :**<br>**$H_5$ : Inter1 technical and international marketing capabilities** | • -1.27 pdt5 number of new products introduced<br>• +1.37 pdt6 NP introduced as % of total products<br>• +1.56 pdt11 new product time launched<br>• +2.10 pdt13 new product characteristics |
| **$H_6$ : Inter2 technical and personnel capabilities** | • +2.19 pdt5 number of new products introduced<br>• -2.22 pdt7 number of new product lines introduced<br>• -1.59 pdt14 product newness to market<br>• -2.72 pdt16 imitation |
| **$H_7$ : Inter3 technical and top management capabilities** | • -1.38 pdt5 number of new products introduced<br>• +3.01 pdt7 number of new product lines introduced<br>• -1.57 pdt13 new product characteristics<br>• +2.32 pdt16 imitation |
| **$H_8$ : Inter4 international marketing and personnel capabilities** | • -1.68 pdt5 number of new products introduced<br>• -1.79 pdt6 NP introduced as % of total products<br>• +2.06 pdt7 number of new product lines introduced<br>• -1.92 pdt10 freq. of NP with new production process<br>• -1.96 pdt13 new product characteristics<br>• +1.40 pdt14 product newness to market |
| **$H_9$ : Inter5 international marketing and top management capabilities** | • +1.87 pdt5 number of new products introduced<br>• -2.22 pdt7 number of new product lines introduced<br>• +1.52 pdt8 frequency of NP intro. w/ new technology<br>• +1.71 pdt10 freq. of NP with new production process<br>• -1.65 pdt12 product newness to firm |
| **$H_{10}$ : Inter6 personnel and top management capabilities** | • +1.74 pdt6 NP introduced as % of total products |

**Table 14 Results of Hypothesis Testing**

| **Dependent Variables :** New product proactiveness | |
|---|---|
| **Independent Variables :** | **Results** |
| $H_1$ : Technical capabilities (+) | Partially support |
| $H_2$ : International marketing capabilities (+) | Inconclusive |
| $H_3$ : Personnel capabilities (+) | Inconclusive |
| $H_4$ : Top management capabilities (+) | Inconclusive |
| $H_5$ : Interaction effect between technical and international marketing capabilities(+) | Inconclusive |
| $H_6$ : Interaction effect between technical and personnel capabilities (+) | Inconclusive |
| $H_7$ : Interaction effect between technical and top management capabilities (+) | Inconclusive |
| $H_8$ : Interaction effect between international marketing and personnel capabilities (+) | Inconclusive |
| $H_9$ : Interaction effect between international marketing and top management capabilities (+) | Inconclusive |
| $H_{10}$ : Interaction effect between personnel and top management capabilities (+) | Partially support |

**$H_1$ : Technical capabilities have significant positive impact on new product proactiveness.**

From **Table 13**, the results show that tech1 number of international standards (such as ISO, HACCP), tech2 number of patents, tech3 in-house research spending, and tech4 job-related experimental activities do not have significant effect on new product proactiveness. Tech8 technical capability has significant positive effect on pdt14 product newness to market. This result **partially supports hypothesis 1**. The higher technical capability, the higher product newness to market.

**$H_2$ : International marketing capabilities have significant positive impact on new product proactiveness.**

The results in **Table 13** show that mktg2 export ratio, mktg3 export years, mktg4 number of foreign markets, mktg6 promotion spending, mktg8 number of registered trademarks, mktg9 number of internally recognized brand names, and mktg14 international marketing capability do not have significant effect on new product proactiveness. Mktg7 marketing research spending has significant positive effect on pdt6 new products introduced as a percentage of total products. Mktg15 degree of channel usage has significant positive effect on pdt7 number of new product lines introduced, pdt12 product newness to firm, and pdt16 imitation. Imitation is from the reactive side of new product proactiveness. From the mixed results, **hypothesis 2 testing is inconclusive**. International marketing capabilities lead to higher degree of both proactive and reactive strategies.

**$H_3$ : Personnel capabilities have significant positive impact on new product proactiveness.**

The results show that person4 number of marketing personnel and person9 number of employees external trained do not have significant effect on new product proactiveness. Person2 number of researchers and product designers has significant positive effect on pdt5 number of new products introduced, but significant negative effect on pdt7 number of new product lines introduced. Person3 number of engineers and technicians has significant negative effect on pdt5 number of new products introduced and pdt6 new products introduced as a percentage of total products, but significant positive effect on pdt7 number of new product lines introduced and pdt16 imitation.

Person5 researchers' and product designers' experience has significant negative effect on pdt5 number of new products introduced, but significant positive effect on pdt16 imitation. Person6 engineers' and technicians' experience has significance effect on pdt9 frequency of new products introduced with new design and significant negative effect on pdt16 imitation. Person7 marketing personnel's experience has significant positive effect on pdt13 new product characteristics. Person8 number of in-house training courses has significant positive effect on pdt5 number of new products introduced, pdt8 frequency of new products introduced with new technology, and pdt16 imitation. From the mixed results, **hypothesis 3 testing is inconclusive**. Personnel capabilities lead to both higher and lower degree of new product proactiveness.

**$H_4$ : Top management capabilities have significant positive impact on new product proactiveness.**

The results show that top1 number of top management members has significant negative effect on pdt8 frequency of new products introduced with new technology, pdt10 frequency of new products with new production process, and pdt16 imitation. Top2 top management's export experience has significant negative effect on pdt7 number of new product lines introduced, and pdt16 imitation. Top3 top management's new product experience has significant negative effect on pdt5 number of new products introduced and pdt10 frequency of new products introduced with new production process, but significant positive effect on pdt7 number of new product lines introduced and pdt12 product newness to firm.

Top4 top management's industry experience has significant positive effect on pdt10 frequency of new products introduced with new production process. Top5 top management's education level has significant positive effect on pdt8 frequency of new products introduced with new technology, pdt9 frequency of new products introduced with new design, and pdt10 frequency of new products introduced with new production process. Top9 top management capability has significant positive effect on pdt15 firm's own research and design, and significant negative effect on pdt16 imitation. From the mixed results, **hypothesis 4 testing is inconclusive**. Top management capabilities lead to both higher and lower degree of new product proactiveness.

**$H_5$ : There is significant positive interaction effect between technical capabilities and international marketing capabilities on new product proactiveness.**

The results show that there are significant positive interaction effects of technical capability on international marketing capability to pdt6 new products introduced as a percentage of total products, pdt11 new product time launched, and pdt13 new product characteristics, and vice versa. However, there is a significant negative interaction effect of technical capability on international marketing capability to pdt5 number of new products introduced, and vice versa. From the mixed results, **hypothesis 5 testing is inconclusive.** There are both significant positive and negative interaction effects between technical and international marketing capabilities on new product proactiveness.

**$H_6$ : There is significant positive interaction effect between technical capabilities and personnel capabilities on new product proactiveness.**

The results show that there is a significant positive interaction effect of technical capability on personnel capability to pdt5 number of new products introduced, and vice versa. However, there are significant negative interaction effects of technical capability on personnel capability to pdt7 number of new product lines introduced, pdt14 product newness to market, and pdt16 imitation, and vice versa. From the mixed results, **hypothesis 6 testing is inconclusive.** There are both significant positive and negative interaction effects between technical and personnel capabilities on new product proactiveness.

**$H_7$ : There is significant positive interaction effect between technical capabilities and top management capabilities on new product proactiveness.**

The results show that there are significant positive interaction effects of technical capability on top management capability to pdt7 number of new product lines introduced, and pdt16 imitation, and vice versa. However, there are significant negative interaction effects of technical capability on top management capability to pdt5 number of new products introduced and pdt13 new product characteristics, and vice versa. From the mixed results, **hypothesis 7 testing is inconclusive.** There are both significant positive and negative interaction effects between technical and top management capabilities on new product proactiveness.

**$H_8$ : There is significant positive interaction effect between international marketing capabilities and personnel capabilities on new product proactiveness.**

The results show that there are significant positive interaction effects of international marketing capability on personnel capability to pdt7 number of new product lines introduced, and pdt14 product newness to market, and vice versa. However, there are significant negative interaction effects of interaction effects of international marketing capability on personnel capability to pdt5 number of new products introduced, pdt6 new products introduced as a percentage of total products, pdt10 frequency of new products introduced with new production process, and pdt13 new product characteristics, and vice versa. From the mixed results, **hypothesis 8 testing is inconclusive.** There are both significant positive and negative interaction effects between international marketing and personnel capabilities on new product proactiveness.

**$H_9$ : There is significant positive interaction effect between international marketing capabilities and top management capabilities on new product proactiveness.**

The results show that there are significant positive interaction effects of international marketing capability on top management capability to pdt5 number of new products introduced, pdt8 frequency of new products introduced with new technology, and pdt10 frequency of new products introduced with new production process, and vice versa. However, there are significant negative interaction effects of interaction effects of international marketing capability on top management capability to pdt7 number of new product lines introduced, and pdt12 product newness to firm, and vice versa. From the mixed results, **hypothesis 9 testing is inconclusive.** There are both significant positive and

negative interaction effects between international marketing and top management capabilities on new product proactiveness.

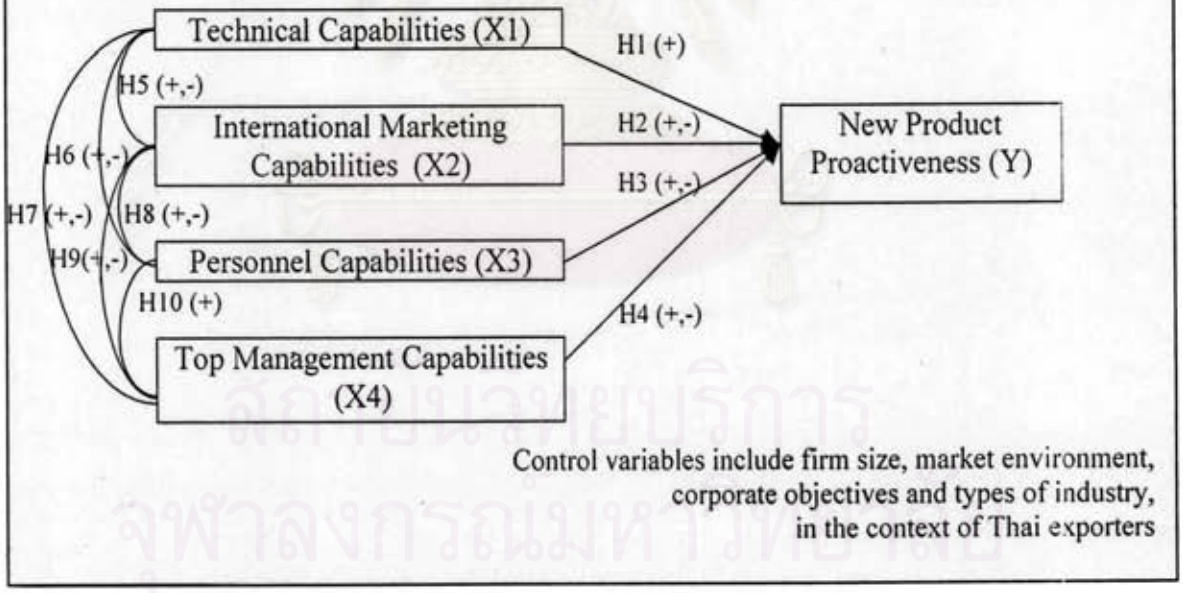
**$H_{10}$ : There is significant positive interaction effect between personnel capabilities and top management capabilities on new product proactiveness.**

The results show that there is a significant positive interaction effect of personnel capability on top management capability to pdt6 new products introduced as a percentage of total products, and vice versa. **This result partially supports hypothesis 10.** However, person 16 personnel and top9 top management capabilities do not have significant effect on pdt6 new products introduced as a percentage of total products. Therefore, interaction effect cannot be interpreted.

**Figure 5** shows the revised research model from multiple regression results:

**Figure 5**

**Revised Research Model**



# Chapter 6
# Discussion and Conclusion

This chapter includes discussion of results, implications of results to academic, businesses, and government policies, limitations of this study, future research, and conclusion.

## Discussions

There are two parts of discussions:

### 1. Discussion from Analysis of Variance Results

**Table 10** shows proactiveness differences between low and high capabilities for all industries. Comparing means of proactiveness in six dimensions between low and high firms' capabilities, the result shows that firms with high capabilities have higher proactiveness than firms with low capabilities.

There are only two exceptions. *First,* firms with low channel usage have higher product newness to market than firms with high channel usage. The channel usage in this study includes establishing branches or sales office in foreign countries, establishing plants abroad, and forming joint ventures with companies in foreign countries. Firms may have low channel usage because they just enter into new markets or launch new products to the market. Therefore, the products are new to the market than firms that have high channel usage. The firms that enter the markets for a long time may develop the channel strongly and expand it. By that time, the products are long established in the market and therefore, they are not so new to the market.

*Second,* firms with high technical, personnel, and top management capabilities have high imitation level than firm with low capabilities. Although imitation represents the reactive side of proactive continuum, the firms still needs imitation in order to compete in dynamic environments. The firms that have high capabilities still have to use imitation in launching out new products. Using only proactive strategy is not enough.

The firms need both proactive and reactive strategy. For example, the firm needs capabilities in order to develop new products by using their own research and design. At the same time, it needs to have capabilities to imitate competitor's products or improve from competitor's products. This is similar to licensing. If the firm is just based on own research and development (R&D), it may have to invest a lot of fund, yet it cannot still follow the competitors. But if it uses both own R&D and licensing, this will enhance its capabilities in developing new products. Firm needs to have capabilities in order to licensing technology from outside as well.

Technology and fashion changes so quickly. The firm cannot just develop new products by relying on itself. It needs to look around and adapt itself by using imitation and licensing in order to cope with the changing world. However, just imitation and licensing will not allow firm to have competitive advantage. It can be only follower at best. Therefore, it needs to have capabilities to develop its own R&D and launch good quality and unique design products in addition to imitation and licensing.

**Table 11.1 – 11.4** show proactiveness differences between low and high capabilities by industries. The results are similar to result in **Table 10.** However, there are some variances among industries. For example, in jewelry industry, firms with low personnel education level have lower product newness to market than firms with high personnel education level. This may be because education level is not an important factor for jewelry business. Personnel in jewelry industry should have high design skills instead of high education.

## 2. Discussion from Multiple Regression Analysis Results

New product proactiveness is a continuum of new product proactive and reactive strategies. Proactive strategy lead to better firm performance. Reactive strategy is also necessary and important. Firms need both strategies in order to cope with dynamic environments such as technology, competitors, and customers. Thai exporters already have reactive strategy. However, only reactive strategy is not enough. They need to have proactive strategy in order to be innovative and gain competitive advantage. **Table 14** shows continuum of new product proactiveness.

**Table 15 Continuum of New Product Proactiveness**

| More Reactive ◄ | Dimensions | ► More Proactive |
|---|---|---|
| Lower | New product introduced as % of total products | Higher |
| Less often | Frequency of introducing new products with new technology | More often |
| Less Often | Frequency of introducing new products with new production process | More often |
| Slower | New product time launched compared to main competitors | Faster |
| Less newness | Newness to firm | More newness |
| Less response to customers' needs, less reliable, etc. | New product characteristics | Greater response to customers' needs, more reliable, etc. |
| Less newness | Newness to markets | More newness |
| Use of less in-house and marketing research | Own research and design | Use of more in-house and marketing research |
| More imitation | Imitation | Less imitation |
| Less license technology from outside | Licensing | More license technology from outside |

The discussion is according to the regression results by hypothesis in **Table 13**. There are ten hypotheses as follows:

**$H_1$ : Technical capabilities have significant positive impact on new product proactiveness.**

Objective measures of technical capabilities do not have significant effect on new product proactiveness because most Thai exporters have few number of international standard certificates (such as ISO, HACCP) (mean = .03) and patents (mean = .02). Most of them also have low in-house research spending as a percentage of total sales. 34.2% of then has no in-house research (see **Table 8.2**).

There is little variance among Thai exporters in such objective measures. Therefore, the significant relationship between these objective measures and new product proactiveness cannot be found. These results depend on Thai exporter context.

Technical capability is variable from factor analysis, which consists of the capabilities of design, research and development, production process, research personnel and product designers. Technical capability has significant positive effect on product newness to market. Firms that have high technical capability can launch new products innovatively. Therefore, they can reach new markets and new customers in existing

markets. Moreover, they can serve to new customers' needs and come out with new promotion types.

**$H_2$ : International marketing capabilities have significant positive impact on new product proactiveness.**

Number of registered trademarks and internationally recognized brand names show the reputation of firms in customers' viewpoint. They are ones the objective measures of international marketing capabilities. However, the results show that they do not have significant effect on new product proactiveness. This is because most Thai exporters have few numbers of trademarks (mean = 1.05) and brand names (mean =1.41). Many Thai exporters export without brand names to foreign markets. With low variations among Thai exporters in both measures, the relationship between these measures and new proactiveness cannot be found.

Marketing research spending as a percentage of total sales has significant positive effect on new products introduced as a percentage of total products. The firm that conducts marketing research will know well about its customers and their needs. Therefore, it can come out with newer products to meet customers' needs.

Degree of channel usage is the variable from factor analysis, which consists of establishing branches, sales office, and plants abroad, and joint venturing with companies in foreign countries. Channel usage has significant positive effect on number of new product lines introduced, product newness to firm and imitation. Channel usage represents the international marketing capability of firm. Thai exporters that can access to foreign markets and set up branches, plants or joint ventures with local firms will gain competitive advantage over exporters that only export goods from their home countries.

Exporters that use these channels highly will know about markets and their needs, competitors, and environments in market countries as well. Therefore, they can introduce more new product lines and launch new products with new technology, new production process, and new design for the firms. This represents proactive side of new product proactiveness. Degree of channel usage also leads to more imitation, which represents reactive side. Imitation includes imitating and improving from competitors' products and reacting to customers' request. Being inside the market countries, firms know more about

customers, competitors and products in local market. Therefore, they can learn and adapt themselves according to customers' request and follow the product trends of that market.

**$H_3$ : Personnel capabilities have significant positive impact on new product proactiveness.**

Engineers' and technicians' experience in years has significant positive effect on frequency of new products introduced with new design, but significant negative effect on imitation. Engineers and technicians that have worked in the industry for a long time will be able to introduce new products with new design more frequently. They do not have to depend much on imitating or improving from competitors' products. They can design new products by themselves because of their accumulated experience.

Marketing personnel's experience in years has significant positive effect on new product characteristics. Marketing personnel that have worked in the industry for a long time know more about customers and their needs. Therefore, the firm is able to introduce new products with better characteristics, which include responding to customers' needs, having tight specification to customers' request, durable, and reliable.

Number of in-house training courses has significant positive effect on number of new products introduced, frequency of new products introduced with new technology and imitation. In-house training increases employees' skills and knowledge. Therefore, firm can develop and introduce more new products and new products with new technology more frequently. In-house training also leads to more imitation. This may be because training broadens employees' ideas to know more about customers and competitors. Therefore, firm increases imitating or improving from competitors' products and reacting to customers' request (producing according to the specification). In-house training can increase the capability of employees and firms in order to meet the standard requested by customers.

Personnel capability is a variable from factor analysis, which consists of skills of marketing personnel, engineers, and technicians. Personnel capability has a significant positive effect on number of new product lines introduced, product newness to market, firm's own research and design, and imitation. Firm that has high skilled personnel can use its own research and design and also imitate or improve from competitors' products and react to customers' request. This combines both proactive and reactive strategies.

Therefore, personnel capability is the strategic factor that leads to right combination of strategies. The firm can imitate or improve from competitors' products or react to customers' requests to survive or make profit. However, if it wants to be leader or gain competitive advantage, only imitation is not enough. It needs to develop personnel capability in order to use its own research and design, which come out as innovative or unique products not available in market by competitors' products. Personnel capability also leads to more number of new product lines introduced and product newness to market. By using own research and design, firm can introduce products that are new to market, which makes products able to access to new markets or new customers in existing markets. Products can also serve new customers' needs.

Personnel's education level has significant positive effect on number of new product lines introduced and product newness to firm, but significant negative effect on number of new products introduced and new products introduce as a percentage of total products. Personnel's education level includes the education level of researchers, product designers, engineers, technicians, and marketing personnel. Personnel that have high education level have a lot of knowledge and skills. Therefore, they help firm introduce more product lines and introduce more frequency of new products with new technology, new production process and new design for the firm. This means higher education level brings more innovation to the firm. However, number of new products introduced decreases when personnel's education level increases because personnel with high education level emphasize on quality rather than quantity. They have to think carefully before launching out new products and to make sure that products have differential advantage.

**$H_4$ : Top management capabilities have significant positive impact on new product proactiveness.**

Top management's new product experience in years has significant positive effect on number of new product lines introduced and product newness to firm, but significant negative effect on number of new products introduced and frequency of new products introduced with new production process. Top management that have involved with new products for a long time will introduce new products less in number, but more newness to firm, which means introducing new products with new technology, new production process, new product lines, and new design for the firm. Top management with high new product experience knows well about new product development. Therefore, they know which products are good for their firm and customers. They do not have to change

production process often because they already set good production system, which may be flexible and advance enough. This is the advantage of top management's new product experience.

Top management's education level has significant positive effect on frequency of new products introduced with new technology, new design, and new production process. Top management with high education level is more flexible and receptive to changes in technology and consumer needs. Therefore, they introduce new products with new technology, new design and new production process.

Top management capability is a variable from factor analysis, which consists of knowledge about foreign markets, staff creativity encouragement, new product development support, open communication among department support, and changing environment response. Top management capability has significant positive effect on firm's own research and design, but significant negative effect on imitation. Top management with high capability will guide firm to use its own strength in in-house research, marketing research and come out with unique design. Therefore, firm depends less on imitating or improving on competitors' products, and reacting to customers' requests.

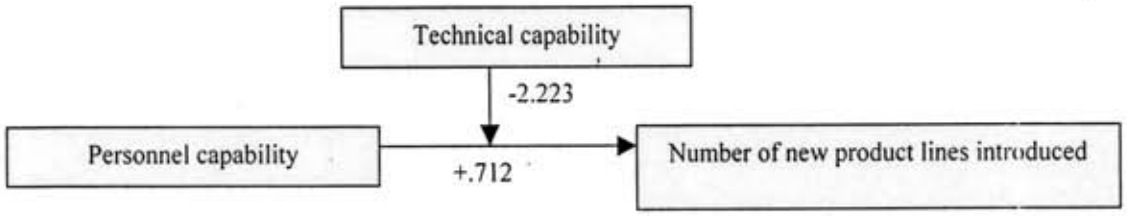
**$H_5$ : There is significant positive interaction effect between technical capabilities and international marketing capabilities on new product proactiveness.**

There are significant positive interaction effects between technical and international marketing capabilities on new products introduced as a percentage of total products, new product time launched, and new product characteristics. There is a significant negative interaction effect between technical and international marketing capabilities on number of new products introduced, product newness to market, and imitation. Technical and personnel capabilities do not have significant effect on number of new products introduced. Therefore, interaction effect cannot be interpreted.

**$H_6$ : There is significant positive interaction effect between technical capabilities and personnel capabilities on new product proactiveness.**

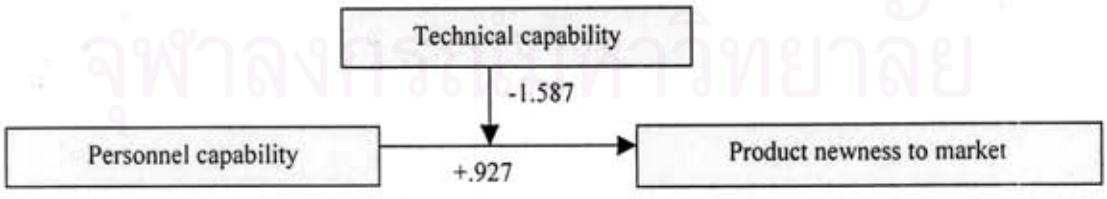
There is a significant positive interaction effect between technical and personnel capabilities on number of new products introduced. There are significant negative interaction effects between technical and personnel capabilities on number of new product lines introduced, product newness to market, and imitation. However, technical and

international marketing capabilities do not have significant effect on number of new products introduced. Therefore, interaction effects cannot be interpreted.




There is a significant negative effect of technical capability on personnel capability to number of new product lines introduced, and vice versa. Personnel capability has significant positive effect on number of new product lines introduced. Technical capability does not have significant effect on number of new product lines introduced. Therefore, technical capability has negative interaction effect on the relationship between personnel capability and number of new product lines introduced. Moreover, the size of negative interaction effect is bigger than the size of personnel capability effect on number of new product lines introduced. This makes personnel capability effect reverse to negative sign. Personnel capability alone leads to more number of new product lines introduced. However, interacting with technical capability, personnel capability leads to less number of new product lines introduced.

Technical capability is a variable from factor analysis, which includes capabilities of R&D, production process, design, research personnel, and product designers. With technical capability, firm may emphasize more on the existing product lines because it already has strength or core capability in producing and introducing them. Therefore, firm introduces less number of new product lines.

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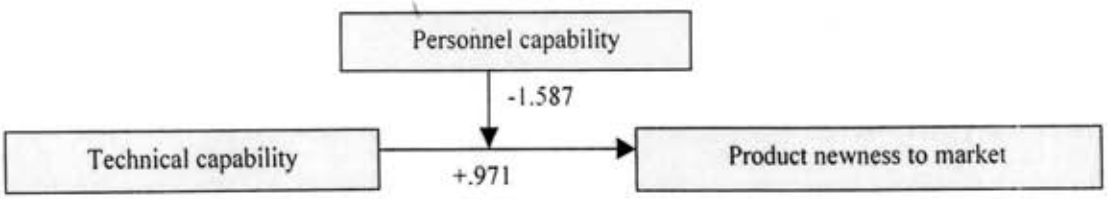
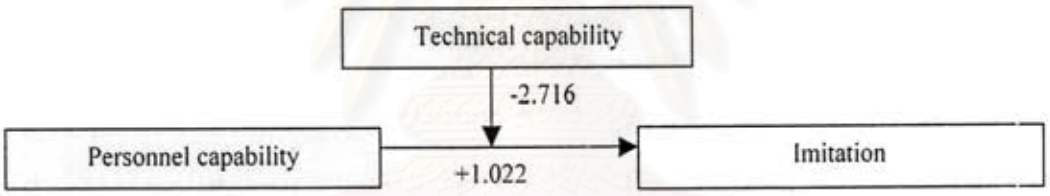


There is a significant negative effect of technical capability on personnel capability to product newness to market, and vice versa. Both technical and personnel capabilities have significant positive effects on product newness to market. Therefore, technical and personnel capabilities have negative interaction effects on each other to product newness to market. Moreover, the size of negative interaction effect is bigger than the size of main effect on product newness to market. This makes main effect reverse to negative sign.

Personnel capability or technical capability alone leads to more product newness to market. Firm with personnel or technical capability can introduce new products that are able to access new markets or new customers in existing markets and serve customers' new needs. However, interacting of each other, personnel and technical capabilities lead to less product newness to market. Firm, which has both personnel and technical capabilities, are very strong in its own R&D, production process, design, and personnel skills. Therefore, it does not have to extend the markets. It can emphasize on its existing markets and products and build reputation and customer loyalty.

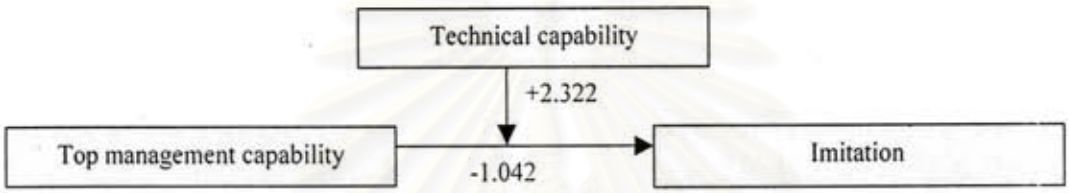



There is a significant negative effect of technical capability on personnel capability to imitation, and vice versa. Personnel capability has significant positive effect on imitation. Technical capability does not have significant effect on imitation. Therefore, technical capability has negative interaction effect on the relationship between personnel capability and imitation. Moreover, the size of negative interaction effect is bigger than the size of personnel capability effect on imitation. This makes personnel capability effect reverse to negative sign. Personnel capability alone leads to more level of imitation. However, interacting with technical capability, personnel capability leads to less imitation. This is because firm has both personnel and technical capabilities. Therefore, it does not have to depend on imitation. It can develop new products by using its own R&D and design.

In summary, firm should have both personnel and technical capabilities and both of them should interact together to build core capabilities of firm in order to depend less on imitation and use more of its own R&D and design.

**$H_7$ : There is significant positive interaction effect between technical capabilities and top management capabilities on new product proactiveness.**

There are significant positive interaction effects between technical and top management capabilities on number of new product lines introduced and imitation. There are significant negative interaction effects between technical and top management capabilities on number of new products introduced and new product characteristics. However. technical and international marketing capabilities do not have significant effect on number of new products introduced, number of new product lines introduced, and new product characteristics. Therefore, interaction effects cannot be interpreted.



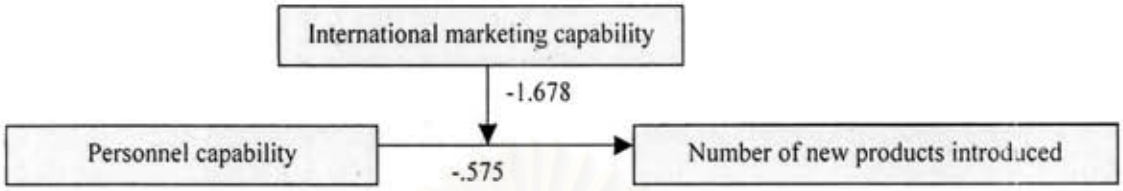

There is a significant positive effect of technical capability on top management capability to imitation, and vice versa. Top management capability has significant negative effect on imitation. Technical capability does not have significant effect on imitation. Therefore, technical capability increases the negative effect of top management capability on imitation.

Top management alone leads to less imitation. Interacting with technical capability, top management capability leads to much less imitation. This result shows that firm that has both top management and technical capabilities has high competitive strength. Therefore, it does not have to imitate or improve from competitors' products. It can develop its own products by using R&D and design capabilities and top management support.

**$H_8$ : There is significant positive interaction effect between international marketing capabilities and personnel capabilities on new product proactiveness.**

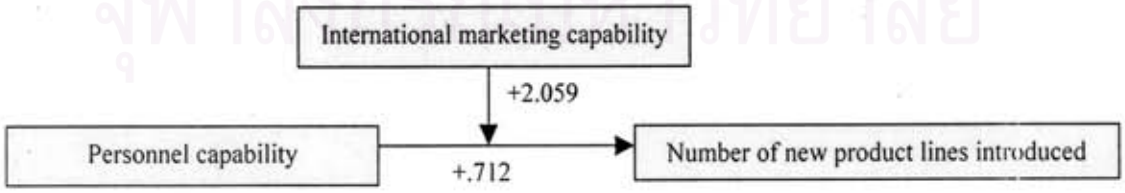
There are significant positive interaction effects between international marketing and personnel capabilities on number of new product lines introduced and product newness to market. There are significant negative interaction effects between international marketing and personnel capabilities on number of new products introduced, new products introduced as a percentage of total products. frequency of new products introduced with new production process. and new product characteristics.

However, international marketing and personnel capabilities do not have significant effect on new products introduced as a percentage of total products, frequency of new products introduced with new production process, and new product characteristics. Therefore, interaction effects cannot be interpreted.



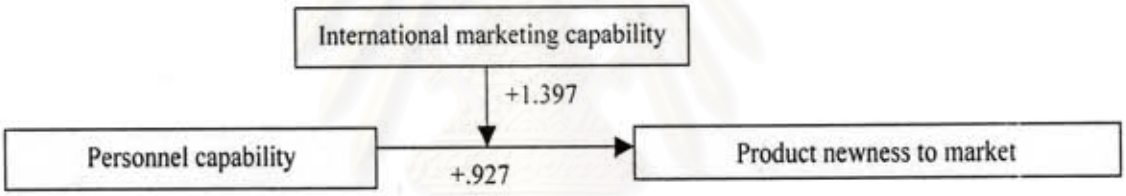

There is a significant negative effect of international marketing capability on personnel capability to number of new products introduced, and vice versa. Personnel capability has significant negative effect on number of new products introduced. International marketing capability does not have significant effect on number of new products introduced. Therefore, international marketing capability has negative interaction effect on the relationship between personnel capability and number of new products introduced. Moreover, the size of negative interaction effect is bigger than the size of personnel capital effect on number of new products introduced. This makes personnel capability effect reverse to positive sign.

Personnel capability alone leads to less number of new products introduced. However, interacting with international marketing capability, personnel capability leads to more number of new products introduced. Firm, which has both personnel and international marketing capabilities interacting together, has high skilled personnel and capabilities in promotion, marketing research, and distribution. Therefore, it can launch more number of new products to the markets.



There is a significant positive effect of international marketing capability on personnel capability to number of new product lines introduced, and vice versa. Personnel capability has significant positive effect on number of new product lines introduced. International marketing capability does not have significant effect on number of new product lines introduced. Therefore, international marketing capability increases the positive effect of personnel capability on number of new product lines introduced.

High skilled marketing personnel and technicians lead to more number of new product lines introduced. Personnel that also have promotion, marketing research and distribution capabilities lead to much more number of new product lines introduced because they themselves are capable of introducing new products. Moreover, they know more about their markets from marketing research. Firm also has strong distribution and promotion capabilities. These enhance personnel capabilities to introduce more number of new product lines.




There is a significant positive effect of international marketing capability on personnel capability to product newness to market, and vice versa. Personnel capability has significant positive effect on product newness to market. International marketing capability does not have significant effect on product newness to market. Therefore, international marketing capability increases the positive effect of personnel capability on product newness to market.

Personnel capability alone leads to more product newness to market. Marketing personnel and technicians who are capable have creative ideas. They come out with new products that can access to new markets, new customers in existing market, and serve new customers' needs. Interacting with international marketing capability, personnel capability leads to much more product newness to market. International marketing capability supports personnel capability by strong marketing research, promotion, and distribution capabilities.

**$H_9$ : There is significant positive interaction effect between international marketing capabilities and top management capabilities on new product proactiveness.**

There are significant positive interaction effects between international marketing and top management capabilities on number of new product introduced, frequency of new products introduced with new technology, and frequency of new products introduced with new production process. There are significant negative interaction effects between international marketing and top management capabilities on number of number of new product lines introduced, and product newness to firm.

However, international marketing and top management capabilities do not have significant effects on these dependent variables. Therefore, interaction effects cannot be interpreted.

**$H_{10}$ : There is significant positive interaction effect between personnel capabilities and top management capabilities on new product proactiveness.**

There is a significant positive effect between personnel and top management capabilities on new products introduced as a percentage of total products. However, personnel and top management capabilities do not have significant effect on new products introduced as a percentage of total products. Therefore, interaction effect cannot be interpreted.

## Limitations

This study has the following limitations:

1. Financial resources are excluded from this study because from preliminary interviews and pilot study, the respondents were not willing to reveal their financial secrets. However, financial resources are not so important for this model because they are not permanently tied to the individual firm. They can be quite easily transferred. They are not like other capabilities that have to be built up and accumulated specifically within firms.
2. The survey was conducted in only four industries, which were canned food/food in containers, garments, furniture, and gems/jewelry). Data were gathered from exporting companies in Thailand only. Generalization of results beyond these industries and Thailand itself should be made cautiously.
3. There is no statistics about firm sizes (total Baht sales and total employees) of population in this study. Firm sizes of sample cannot be compared to firm size of population. Therefore, it is impossible to test whether samples represent the population properly or test whether there is non-response bias. Generalization of results beyond the samples to industry should be made cautiously.
4. The conflict of results between firm's export years and top management's export experience may be due to the measurement problem. The question asked the frequency of new product introduction with new technology to market. The respondents might have perception of new technology differently. For example, one thought that purchasing new machine is new technology, another thought that new technology means changing the production process. When they interpreted differently, they answer different numbers.

## Implications

Thailand is facing economic crisis at the present. It is losing its competitive advantage to neighbor countries. The labor costs are no longer cheap (Jirapaeth 1996). Moreover, in the year 2000, Thailand opens itself to free trade by reducing tariff rate and giving more allowance. Therefore, more foreign direct investment comes to Thailand. These foreign firms have good reputation in brand names and strong financial and management resources. While Thailand opens itself to free trade, it faces the trade barriers from other countries.

Facing the crisis plus strong competition, Thai exporters have to improve themselves in order to survive and develop sustainable competitive advantage. One important strategy is to develop new products in more proactive ways which have good quality and meet customers' needs, so that Thai exporters can pass through trade barriers of other countries and develop customer loyalty. They should also develop their own brands in order to have more value-added to their products. Thailand needs innovation and industrial restructuring in order to compete globally.

Implications of this study will be useful to three parties:

### Implications for the Academic

There are three implications for academic as follows:

1. This study creates a new model by linking resource-based theory to new product strategy, which has never been done before.
2. This study operationalizes capability constructs in an extensive way. Previous studies had only subjective measurements and asked straightforward questions. For example, our company's R&D skills were more than adequate (Song and Parry 1997). This study has both objective and subjective measurements and explores several dimensions of each construct.
3. This study tests firm capabilities toward new product proactive and reactive strategies empirically. The results will be useful for scholars as reference for future research.

## Implications for Export Firms

The results of this study will be useful for manufacturing exporters in Thailand. By reading the results, they will know which capabilities are needed to develop in order to be more proactive or more reactive. For example, technical capability leads to greater product newness to market. International marketing capability leads to greater product newness to firm, number of new product lines introduced, and imitation.

Personnel capability leads to more frequency of new product introduction with new design and better new product characteristics. However, personnel's education level leads to lower number of new products introduced. Top management capability leads to more frequency of new product introduction with new design, greater use of firm's own research and design, and lower use of imitation.

The results from analysis of variance among industries show that garment industry has the least overall capabilities and proactiveness. Therefore, it should improve its own capabilities in order to be more proactive, not only be reactive.

From the preliminary interviews and pilot study, exporters reviewed that customers did not satisfy with the product quality. Customers stated that Thai garment exporters still emphasized on only low cost, but they did not improve product quality and design to increase value-added of the products. From the results, in order to be more proactive, firms need to develop their own capabilities, not just only emphasize on low cost or imitation. Firms' capabilities will lead to more proactive as well as reactive strategies in order to compete with worldwide competitors.

## Implications for Government Agencies

Government agencies, which relate directly to export firms, are the Department of Export Promotion (DEP), Ministry of Commerce and Board of Investment (BOI). The results from this study will be useful for government agencies so that they can know which capabilities must be built. They can then support manufacturing exporters by encouraging them to build these capabilities in order to be competitive in world markets. The Department of Export Promotion has a Product Development Center to help exporters directly. This center can support exporters by training their personnel to increase their

capabilities. The center also has design contests in several products such as furniture and jewelry. This will help firms develop new ideas and design their own products.

Government agencies can help exporters by supplying funds for research and development (R&D) or they may have cooperative research with exporters. This will enhance the Thai exporters' capabilities.

## Suggestion for Future Research

Future research can be conducted as follows:

1. Applying this model to other industries or countries to find out to compare the results with this study. Other industries such as high tech industries, which have different characteristics from the four industries in this study. Therefore, the results will be more useful and generalizable.
2. Improving the construct operationalization of new product proactiveness. For example, give definitions of new product strategy and technical terms, such as new technology, so respondents will have the same understanding.

## Conclusion

This study originated from an interest in linking resource-based theory to new product proactive and reactive strategies in the Thai exporter context. Resource-based theory is well known among strategic management scholars. However, there are only a few empirical studies that have applied it. None of the previous academic studies has yet linked this theory to new product strategy.

Thailand's exports have changed from agricultural product to industrial product orientation. A study of Thailand's exports by Nanak et al. (1997) showed that export growth rates of many products have tended to decline since 1996. Exports of technology-intensive products grew by 10.73 percent, while traditional agri-product exports grew by only 2.94 percent. Industrial product exports rose by 2.10 percent, and those of labor-intensive industrial products by 3.31 percent. Among these, garments and footwear have faced serious problems. This decline is due to the entry of new competitors to both labor- and capital-intensive sectors in the Asian market. Thailand's major competitors include India, China, Malaysia and Indonesia.

Jirapaeth (1996) stated that higher labor costs, with a five-year average growth rate of 10.04 percent (1991-1995) and the problem of labor shortages are the cause of higher production costs. Production of export goods in Thailand relies extensively on imported capital goods and raw materials. This is considered the major obstacle to the development of the country's export production. Any changes in government policy or measures, along with the value of the Baht, will have impacts on exporters' production costs. These factors have resulted in Thailand losing its competitive advantage in the world market.

Therefore, Thai exporters cannot only compete by low cost anymore. They need to develop their capabilities in order to have value added to their products and emphasize high quality products instead of cheap products. The results of this study will show how firms' capabilities impact on new product proactiveness of Thai exporters, so that exporters may place greater emphasis on the capabilities that lead to increased proactiveness. The results of this study will encourage exporters to build and invest in critical capabilities so that they can compete internationally according to their own strengths.

This study attempted to understand the role of capabilities towards new product proactive and reactive strategies of Thai exporters. Four industries were chosen for study, which were canned food, garments, furniture, and gems/jewelry out of a total of seventeen industries on the basis of potentiality and local resources. This study included three steps in data collection : preliminary interview, pilot study, and mail survey. Response rate was 15%. There were 243 usable questionnaires. Data analysis included analysis of variance and multiple regression analysis to test hypotheses.

There are two research questions in this study:

1. Do firms' capabilities have significant positive effects on new product proactiveness?
2. Are there significant positive interaction effects among firms' capabilities toward new product proactiveness?

From **research question 1**, the answer is inconclusive. Firms' capabilities lead to both positive and negative effects on new product proactiveness. The results show which capabilities lead to the more proactive strategy and which capabilities lead to the more reactive strategy. For example, technical capability leads to greater product newness to market. International marketing capability leads to greater product newness to firm, number of new product lines introduced, and imitation.

Personnel capability leads to more frequency of new product introduction with new design and better new product characteristics. However, personnel's education level leads to lower number of new products introduced. Top management capability leads to more frequency of new product introduction with new design, greater use of firm's own research and design, and lower use of imitation.

From **research question 2,** the answer is inconclusive. There are both significant positive and negative interaction effects between capabilities on new product proactiveness. The results show that there are significant positive interaction effects of technical capability on international marketing capability to new products introduced as a percentage of total products, new product time launched, and new product characteristics, and vice versa. However, there is a significant negative interaction effect of technical capability on international marketing capability to number of new products introduced, and vice versa.

There is a significant positive interaction effect of technical capability on personnel capability to number of new products introduced, and vice versa. However, there are significant negative interaction effects of technical capability on personnel capability to number of new product lines introduced, product newness to market, and imitation, and vice versa.

There are significant positive interaction effects of technical capability on top management capability to number of new product lines introduced, and imitation, and vice versa. However, there are significant negative interaction effects of technical capability on top management capability to number of new products introduced and new product characteristics, and vice versa.

There are significant positive interaction effects of international marketing capability on personnel capability to number of new product lines introduced, and product newness to market, and vice versa. However, there are significant negative interaction effects of interaction effects of international marketing capability on personnel capability to number of new products introduced, new products introduced as a percentage of total products, frequency of new products introduced with new production process, and new product characteristics, and vice versa.

There are significant positive interaction effects of international marketing capability on top management capability to number of new products introduced, frequency of new products introduced with new technology, and frequency of new products introduced with new production process, and vice versa. However, there are significant negative interaction effects of interaction effects of international marketing capability on top management capability to number of new product lines introduced, and product newness to firm, and vice versa.

There is a significant positive interaction effect of personnel capability on top management capability to new products introduced as a percentage of total products, and vice versa.

The result of this research will help develop a better understanding of this relationship and guide export companies and public policy decisions in improving the new product strategies of Thai manufacturing exporters.

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# Appendices

# Appendix 1

# Document from Department of Export Promotion

## โครงการสร้างเครือข่ายกระจายสินค้าที่มีชื่อทางการค้าของตนเองในต่างประเทศ
## (Distribution Network For Brand Name)

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1. ชื่อโครงการ โครงการสร้างเครือข่ายกระจายสินค้าที่มีชื่อทางการค้าของตนเองในต่างประเทศ (Distribution Network For Brand Name)

2. สรุปความเป็นมา ในอดีตที่ผ่านมาการส่งออกของสินค้าไทยมีลักษณะเป็นผู้รับจ้างผลิตสินค้าและขายผ่าน Importer แต่เพียงอย่างเดียว โดยไม่มีอำนาจต่อรองทางด้านราคากับผู้ซื้อทำให้ไม่สามารถสร้างชื่อทางการค้าของตนเอง (Brand Name) ประกอบกับสถานการณ์ทางการค้าที่มีการแข่งขันอย่างรุนแรงในประเทศต่าง ๆ ทำให้การแข่งขันของไทยลดลง ดังนั้น จึงมีความจำเป็นที่จะต้องดำเนินการด้านตลาดด้วยเครื่องหมายการค้า (Trademarks) พร้อมทั้งสร้างเครือข่ายการกระจายสินค้าที่มีมีชื่อทางการค้าของตนเองในตลาดต่างประเทศ โดยกรมส่งเสริมการส่งออกได้มีนโยบายที่จะผลักดันการขยายเครือข่ายการกระจายสินค้าในต่างประเทศ และส่งเสริมให้มีการจดทะเบียนเครื่องหมายการค้าในต่างประเทศ เพื่อเป็นการปกป้องและคุ้มครองผลประโยชน์ให้กับผู้ผลิตสินค้าที่มีชื่อทางการค้าของตนเอง

3. วัตถุประสงค์
   3.1 เพื่อขยายและพัฒนาช่องทางการจำหน่ายสินค้า โดยนำระบบเครือข่ายการกระจายสินค้า (Distribution Network) เพื่อก่อให้เกิดข้อได้เปรียบในการแข่งขันของคู่ค้าผู้กระจายสินค้า
   3.2 เพื่อให้สินค้า Brand Name ของสินค้าไทยที่มีศักยภาพ 7 กลุ่ม เป็นที่รู้จักแพร่หลายในตลาดโลก
   3.3 เพื่อปกป้องผลประโยชน์ของผู้ค้าผู้ผลิตโดยการจดทะเบียนเครื่องหมายการค้า

4. สินค้าเป้าหมาย กลุ่มสินค้าที่มีศักยภาพ ยกตัวอย่าง เช่น เฟอร์นิเจอร์ อาหาร อัญมณีและเครื่องประดับ เครื่องหนัง เสื้อผ้าสำเร็จรูป เครื่องใช้ไฟฟ้า ชิ้นส่วนและอะไหล่ยานยนต์

5. ตลาดเป้าหมาย ละตินอเมริกา อาฟริกา ยุโรป สหรัฐอเมริกา เอเชีย ตะวันออกกลาง และเอเชียตะวันออก

6. วิธีการดำเนินการ

   1. การคัดเลือก
      - เปิดรับสมัครบริษัทที่มีชื่อทางการค้าของตนเอง (Brand Name)
      - คัดเลือกบริษัทที่มีชื่อทางการค้าของตนเอง (Brand Name) เข้าร่วมโครงการ ในกลุ่มสินค้าที่มีศักยภาพ
      - จัดทำสัญญาโดยมีข้อตกลงว่าจะต้องปฏิบัติตามเงื่อนไข ภายในกำหนด 3 ปี

2. การสำรวจข้อมูลในต่างประเทศ
   - ศึกษาความต้องการของสินค้าในตลาดที่จะดำเนินการ
   - ศึกษากฎระเบียบและอัตราภาษี
   - มาตรฐานของสินค้าที่แต่ละตลาดกำหนดไว้
   - จัดหารายชื่อผู้ผลิต ผู้ร่วมลงทุน ได้แก่
     1) Partner
     2) Joint Ventures
     3) Dealers
     4) Distributors
     5) Sale Reps.
3. การสรรหาและคัดเลือกคู่ค้าในต่างประเทศ (Distribution Partner)
   - การประชาสัมพันธ์โครงการและจัดจ้างผู้เชี่ยวชาญ เพื่อสรรหาและจัดทำนัดหมายผู้กระจายสินค้าที่เหมาะสมในตลาดญี่ปุ่น
   - จัดทำ Home page ผ่าน Internet เพื่อเป็นสื่อกลางในการผลักดันการสร้างตัวแทนเครือข่ายธุรกิจในต่างประเทศ
   - การจัดทำ Thai Business Directory ในอเมริกา ยุโรป และเอเชีย เพื่อเป็นสื่อข้อมูลในการเชื่อมโยงธุรกิจระหว่างนักธุรกิจไทยและต่างประเทศ
   - การจัดทำนัดหมาย ประสานงานและการรับรอง
   - การจัดคณะผู้แทนการค้าเดินทางไปพบคู่ค้าที่สนใจขายสินค้า Brand ของไทยในต่างประเทศ
   - เชิญคณะผู้แทนการค้าที่สนใจขายสินค้า Brand ของไทยมาพบผู้ส่งออกไทย
4. การจัดกิจกรรมส่งเสริมการขายร่วมกับผู้จำหน่ายสินค้า Brand ของไทยในต่างประเทศ
   - การจัดส่งเสริมการขายสู่ผู้บริโภคในรูป Instore Promotion ในร้านค้าที่จำหน่ายสินค้า Brand Name ของไทย
   - การเข้าร่วมงานโดยแสดงสินค้าร่วมกับคู่ค้า
   - การจัดให้มีบริการหลังการขาย (บางสินค้า)
   - การส่งเสริมการขายโดยผ่านระบบอินเตอร์เน็ต
   - การลงทุนประชาสัมพันธ์ร่วมกับคู่ค้า
   - การจัดทำเอกสารเผยแพร่
5. การพัฒนาสินค้า
   - การจัดจ้างผู้เชี่ยวชาญเพื่อพัฒนารูปแบบของสินค้าให้สอดคล้องกับแนวโน้มและความต้องการของผู้บริโภค
   - พัฒนาคุณภาพของสินค้าในด้านมาตรฐานระหว่างประเทศ เช่น ISO
   - พัฒนาบรรจุภัณฑ์
6. การจัดสัมมนาเชิงวิชาการในการส่งเสริมกิจกรรมของโครงการ

# Appendix 2

# Exported Products of Thailand

## Ten Important Exported Products of Thailand

| | Unit : Million Baht | | | | | Growth Rate (%) | | | | Proportion (%) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Products** | **1994** | **1995** | **1996** | **1997** | **1998[1]** | **1995** | **1996** | **1997** | **1998[1]** | **1994** | **1995** | **1996** | **1997** | **1998[1]** |
| 1. Computer and parts | 94,590.2 | 131,241,3 | 167,673.9 | 220,302.7 | 158,862.5 | 38.7 | 27.8 | 31.4 | 85.9 | 8.3 | 9.3 | 11.9 | 12.2 | 13.5 |
| **2. Garments** | **100,679.3** | **102,019.3** | **79,875.4** | **97,135.9** | **62,574.5** | **1.3** | **-21.7** | **21.6** | **65.9** | **8.9** | **7.3** | **5.7** | **5.4** | **5.3** |
| 3. Electronic circuits | 45,310.8 | 58,181.8 | 58,538.6 | 75,837.7 | 48,602.8 | 28.4 | 0.6 | 29.6 | 48.9 | 4.0 | 4.1 | 4.1 | 4.2 | 4.1 |
| 4. Rice | 39,187.3 | 48,626.8 | 50,734.8 | 65,093.4 | 45,641.6 | 24.1 | 4.3 | 28.3 | 85.1 | 3.4 | 3.5 | 3.6 | 3.6 | 3.9 |
| **5. Canned Seafood** | **31,995.8** | **33,294.8** | **34,244.3** | **49,309.3** | **32,343.5** | **4.1** | **2.9** | **44.0** | **110.2** | **2.8** | **2.4** | **2.4** | **2** | **2.8** |
| 6. Automobiles and parts | 33,348.6 | 27,760.6 | 29,230.9 | 48,419.6 | 31,478.4 | -16.8 | 5.3 | 65.6 | 75.5 | 2.9 | 2.0 | 2.1 | 2.7 | 2.7 |
| 7. Rubber | 41,824.0 | 61,260.7 | 63,373.0 | 57,450.0 | 31,276.9 | 46.5 | 3.4 | -9.3 | 19.6 | 3.7 | 4.4 | 4.5 | 3.2 | 2.7 |
| 8. Radios and Televisions and parts | 28,031.9 | 31,589.2 | 34,626.8 | 43,578.8 | 30,286.9 | 12.7 | 9.6 | 25.9 | 80.4 | 2.5 | 2.2 | 2.5 | 2.4 | 2.6 |
| 9. Frozen shrimps | 49,155.6 | 50,302.0 | 43,404.5 | 47,183.9 | 29,492.0 | 2.3 | -13.7 | 8.7 | 64.3 | 4.3 | 3.6 | 3.1 | 2.6 | 2.5 |
| **10. Gems and Jewelry** | **47,088.7** | **52,498.6** | **54,272.9** | **55,622.3** | **29,296.0** | **11.5** | **3.4** | **2.5** | **27.8** | **4.1** | **3.7** | **3.8** | **3.1** | **2.5** |
| Total 10 products | 511,121.1 | 596,775.6 | 615,975.1 | 759,933.6 | 499,855.2 | 16.7 | 3.2 | 23.4 | 68.0 | 44.9 | 42.4 | 43.7 | 42.1 | 42.5 |
| Other Products | 626,389.5 | 809,534.5 | 795,064.2 | 1,046,751.8 | 675,052.7 | 29.2 | -1.8 | 31.7 | 58.3 | 55.1 | 57.6 | 56.3 | 57.9 | 57.5 |
| **Total Export** | 1,137,601.6 | 1,406,310.1 | 1,411,039.3 | 1,806,685.4 | 1,174,907.9 | 23.6 | 0.3 | 28.0 | 62.3 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |

**Source :** International Trade Statistics of Thailand 1998, Commercial Statistic Center, Ministry of Commerce.

[1] Year 1998 January - June only.

## Total Exported Products of Thailand (Partial)

| | Unit : Million Baht | | | Growth Rate (%) | | | Proportion (%) | | |
|---|---|---|---|---|---|---|---|---|---|
| **Products** | **1996** | **1997** | **1998[1]** | **1996** | **1997** | **1998[1]** | **1996** | **1997** | **1998[1]** |
| 1. Agricultural products | 230,658.8 | 257,562.6 | 163,190.0 | -0.3 | 11.7 | 55.4 | 16.3 | 14.3 | 13.9 |
| 2. Industrial agricultural products | 142,029.7 | 170,500.4 | 111,008.1 | 7.5 | 20.0 | 49.1 | 10.1 | 9.4 | 9.4 |
| **2.1) Canned and processed seafood** | **40,461.4** | **57,392.5** | **37,273.5** | **3.3** | **41.8** | **100.4** | **2.9** | **3.2** | **3.2** |
| **2.2) Canned and processed fruits** | **15,059.1** | **13,987.9** | **8,961.2** | **14.7** | **-7.1** | **36.2** | **1.1** | **0.8** | **0.8** |
| **2.3) Canned and processed vegetables** | **5,125.5** | **5,800.6** | **3,058.1** | **9.9** | **13.2** | **42.4** | **0.4** | **0.3** | **0.3** |
| 2.4) Others | 81,383.7 | 93,319.4 | 61,715.3 | - | 14.7 | - | 5.8 | 5.2 | 5.3 |
| 3. Industrial products | 993,958.5 | 1,280,045.0 | 838,800.3 | -2.2 | 28.8 | 63.2 | 70.4 | 70.9 | 71.4 |
| **3.1) Textiles and garments** | **137,225.6** | **170,285.6** | **107,994.3** | **-14.7** | **24.1** | **60.3** | **9.7** | **9.4** | **9.2** |
| **3.2) Gems and jewelry** | **54,272.9** | **55,622.3** | **29,296.0** | **3.4** | **2.5** | **27.8** | **3.8** | **3.1** | **2.5** |
| **3.3) Furniture and parts** | **18,851.7** | **22,180.4** | **12,492.1** | **0.7** | **17.7** | **33.0** | **1.3** | **1.2** | **1.1** |
| 3.4) Others | 783,608.3 | 1,031,956.7 | 689,017.9 | - | 31.7 | - | 55.5 | 57.1 | 58.6 |
| 4. Other products | 44,392.30 | 98,577.40 | 61,909.50 | - | 122.1 | - | 3.1 | 5.5 | 5.3 |
| **Total Export** | 1,411,039.3 | 1,806,685.4 | 1,174,907.9 | 0.3 | 28.0 | 62.3 | 100.0 | 100.0 | 100.0 |

**Source :** International Trade Statistics of Thailand 1998, Commercial Statistic Center, Ministry of Commerce.

[1] Year 1998 January - June only.

# Appendix 3

# Questionnaire

ที่ พณ. 0906/2583

สำนักบริการส่งออก
กรมส่งเสริมการส่งออก
22/77 ถนนรัชดาภิเษก
จตุจักร 10900 กรุงเทพมหานคร

14 กันยายน 2542

เรื่อง ขอความร่วมมือในการตอบแบบสอบถาม

เรียน ท่านผู้จัดการบริษัท

ด้วย อาจารย์อภิรดี เมธารมณ์ อาจารย์ประจำคณะพาณิชยศาสตร์และการบัญชี มหาวิทยาลัยธรรมศาสตร์ ปัจจุบันเป็นนิสิตปริญญาเอก สาขา International Business ของโครงการ The Joint Doctoral Program in Business Administration (JDBA) ซึ่งเป็นโครงการร่วมมือระหว่างจุฬาลงกรณ์มหาวิทยาลัย มหาวิทยาลัยธรรมศาสตร์ และสถาบันบัณฑิตพัฒนบริหารศาสตร์ โดยขณะนี้ อาจารย์อภิรดี เมธารมณ์ กำลังทำวิทยานิพนธ์ปริญญาเอกเรื่อง "ความสามารถและกลยุทธ์ผลิตภัณฑ์ใหม่ของผู้ส่งออกไทย"

การวิจัยนี้มีวัตถุประสงค์เพื่อศึกษาถึงบทบาทของความสามารถที่มีต่อกลยุทธ์ผลิตภัณฑ์ใหม่ของผู้ส่งออกไทย พร้อมทั้งนำเสนอแนวทางในการปรับปรุง และพัฒนาผลิตภัณฑ์ใหม่เพื่อการส่งออกให้สามารถแข่งขันได้ในตลาดต่างประเทศในระยะยาว

ในการนี้ สำนักบริการส่งออกพิจารณาแล้วเห็นว่า ผลของการศึกษานี้จะเป็นประโยชน์ต่อธุรกิจต่าง ๆ โดยเฉพาะอย่างยิ่งธุรกิจส่งออกไทย จึงใคร่ขอความร่วมมือจากท่านในการตอบแบบสอบถาม เพื่อจะได้ข้อมูลอันเป็นประโยชน์ต่อการวิจัยครั้งนี้

จึงเรียนมาเพื่อโปรดพิจารณา

ขอแสดงความนับถือ

(นายอรัญ นิลกำแหง)
ผู้อำนวยการสำนักบริการส่งออก

โทรศัพท์ 513 0069
โทรสาร 512 2234

สภาอุตสาหกรรมแห่งประเทศไทย
THE FEDERATION OF THAI INDUSTRIES

9 กันยายน 2542

เรื่อง ขอความร่วมมือในการตอบแบบสอบถาม

เรียน ท่านสมาชิกสภาอุตสาหกรรมแห่งประเทศไทย

ด้วยอาจารย์อภิรดี เมธารมณ์ อาจารย์ประจำคณะพาณิชยศาสตร์และการบัญชี มหาวิทยาลัยธรรมศาสตร์ ปัจจุบันเป็นนิสิตปริญญาเอก สาขา International Business ของโครงการ The Joint Doctoral Program in Business Administration (JDBA) ซึ่งเป็นโครงการร่วมมือระหว่างจุฬาลงกรณ์มหาวิทยาลัย มหาวิทยาลัยธรรมศาสตร์ และสถาบันบัณฑิตพัฒนบริหารศาสตร์ โดยขณะนี้ อาจารย์อภิรดี เมธารมณ์ กำลังทำวิทยานิพนธ์ปริญญาเอกเรื่อง "ความสามารถและกลยุทธ์ผลิตภัณฑ์ใหม่ของผู้ส่งออกไทย"

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ในการนี้ สภาอุตสาหกรรมแห่งประเทศไทยพิจารณาแล้วเห็นว่าผลของการศึกษานี้จะเป็นประโยชน์ต่อธุรกิจต่างๆ โดยเฉพาะอย่างยิ่งธุรกิจส่งออกไทย จึงใคร่ขอความร่วมมือจากท่านสมาชิกในการตอบแบบสอบถามเพื่อจะได้ข้อมูลอันเป็นประโยชน์ต่อการทำวิจัยครั้งนี้

จึงเรียนมาเพื่อโปรดพิจารณา

ขอแสดงความนับถือ

(นายเชมทัต สุคนธสิงห์)
เลขาธิการสภาอุตสาหกรรมแห่งประเทศไทย



ศูนย์การประชุมแห่งชาติสิริกิติ์ โซน ซี ชั้น 4 60 ถนนรัชดาภิเษกตัดใหม่ เขตคลองเตย กรุงเทพมหานคร 10110 โทร. (662) 229-4255 โทรสาร. (662) 229-4941-2
Queen Sirikit National Convention Center, Zone, C, 4th Floor, 60 New Rachadapisek Rd., Klongtoey, Bangkok 10110, Tel: (662) 229-4255, Fax: (662) 229-4941-2

THE JOINT DOCTORAL PROGRAM IN BUSINESS ADMINISTRATION

Graduate School of Business, National Institute of Development Administration (NIDA)

Faculty of Commerce and Accountancy, Chulalongkorn University

Faculty of Commerce and Accountancy, Thammasat University

September 14, 1999

Subject : Questionnaire survey

Dear : Chief Executive Officer or the Owner

Attachment : One set of questionnaire and envelope

I am a full-time lecturer at Faculty of Commerce and Accountancy, Thammasat University. Now I am studying for the doctoral degree at the Joint Doctoral Program in Business Administration (JDBA) and working on my dissertation about exporters in Thailand. This research attempts to understand the role of capabilities towards new product strategy of exporters and also suggest ways to improve and develop new products for export to improve their long-term competitive ability in foreign markets.

As the executive with skills and experiences in marketing and exporting, your contribution to this questionnaire will result in the success of this dissertation. Please answer all the questions fully and send it back to me.

As the appreciation for your response, a certificate from the JDBA program will be sent to you with the summary of results. Please complete form below and attach your business card with this questionnaire. I would like to thank you very much for your cooperation.

**Please be assured that individual responses will remain strictly confidential and only aggregate results are reported.**

Sincerely Yours,

(Miss Apiradee Metharom)

JDBA student

Contact number : Phone 5790926, 9410399 Fax 2252109
Mobile phone 01-3438879

**Respondent :**

Name _____ Position _____

Company _____ Tel. _____

Address _____

_____

Would you like the summary of result ? [ ] Yes [ ] No



The JDBA OFFICE : The Graduate School of Business Administration, National Institute of Development Administration (NIDA)
Bangkapi, Bangkok 10240, Thailand Tel.(662)377-7889, 377-7400-19 Ext. 2443,2267,2272,2278 Fax.(662)374-3282

**Instruction : Please circle only one for each of the following questions. For the questions with blank spaces, please fill in the number. If your company does not have the persons or things asked, please write number '0'.**

## A. Company Background

1. What industry is your company in?

   1) canned food  2) garments  3) furniture  4) gems/ jewelry  5) other (please specify)_____

| **2. Please circle the degree of importance of the followings to your corporate objectives.** | not important | | neutral | | very important |
|---|---|---|---|---|---|
| 2.1) Responding to competitive pressure---------- | 1 | 2 | 3 | 4 | 5 |
| 2.2) Improving company's market share position---------- | 1 | 2 | 3 | 4 | 5 |
| 2.3) Increasing the profitability of the company---------- | 1 | 2 | 3 | 4 | 5 |
| 2.4) Concentrating on existing products or markets---------- | 1 | 2 | 3 | 4 | 5 |
| 2.5) Extending your markets overseas---------- | 1 | 2 | 3 | 4 | 5 |

## B. Market Environment includes market potential and competitive intensity. Please answer the following questions according to the main target market of your company.

**• Please specify one country which is your main target market_____**

- **Market potential :** refers to the attractiveness of the main target markets.

1. Please estimate the growth rate of your main market compared to the present sales revenue.
   Year 1999 _____% 2000 _____% 2001 _____%

| | low | | Medium | | high |
|---|---|---|---|---|---|
| 2. How many potential customers for your company's products in the main market?---------- | 1 | 2 | 3 | 4 | 5 |
| 3. How much are the need of potential customers for your company's products?---------- | 1 | 2 | 3 | 4 | 5 |

- **Competitive intensity** within the firm's main target market.

1. Is there a dominant competitor (strong and has large market share) in the main market? □ yes □ no

| | low | | Medium | | high |
|---|---|---|---|---|---|
| 2. Number of your firm's competitors in the main markets-------- | 1 | 2 | 3 | 4 | 5 |
| 3. How is price competition in the main market?---------- | 1 | 2 | 3 | 4 | 5 |

## C. Capabilities can be divided into four parts : technical, international marketing, personnel, and top management. Please answer the following questions according to the capabilities of your company.

- **Technical capabilities :** relate to research and development (R&D), design, and production.

1. How many international standard certificate(s) (such as ISO, HACCP) does your company have?

   _____ certificates. Please specify_____

2. How many manufacturing patent(s) does your company have? _____ patents

3. How much did your company spend on in-house research as a percentage of total sales ?
   1996 _____% 1997 _____% 1998 _____%

4. How much does your company allow employees to engage in job-related experimental activities ?
   1) very low  2) low  3) medium  4) high  5) very high

**5. Please circle how you perceive the following capabilities of your company relative to Thai exporter that is your main competitor.**

| | much lower | | similar | | much higher |
|---|---|---|---|---|---|
| 5.1) Research and development capabilities | 1 | 2 | 3 | 4 | 5 |
| 5.2) Design capabilities | 1 | 2 | 3 | 4 | 5 |
| 5.3) Production process capabilities | 1 | 2 | 3 | 4 | 5 |

**6. Please circle the degree of importance of the following to new product development of your company.** (For example, in developing new products, how important are the design capabilities ?)

| | not important | | neutral | | very important |
|---|---|---|---|---|---|
| 6.1) Research and development capabilities | 1 | 2 | 3 | 4 | 5 |
| 6.2) Design capabilities | 1 | 2 | 3 | 4 | 5 |
| 6.3) Production process capabilities | 1 | 2 | 3 | 4 | 5 |

- **International marketing capabilities**

1. How much is total Baht sales of your company (both in Thailand and export)?

   1996 _____Baht 1997 _____Baht 1998 _____Baht

2. How much is the export ratio of your company (export sales/total sales)?

   1996 _____% 1997 _____% 1998 _____%

3. How long has your company exported to foreign markets ? _____ years

4. Number of foreign markets in which your company exports to _____ countries

5. Which are your overseas markets? Please estimate the percentage of export sales of your company to those markets last year.

   5.1) NAFTA (USA, Canada, and Mexico) _____%
   5.2) Mercosur (Brazil, Argentina, Paraguay, Uruguay) _____%
   5.3) The Andean Pact (Bolivia, Chile, Ecuador) _____%
   5.4) EU (West Germany, France, England, Austria, Belgium, etc.) _____%
   5.5) Eastern Bloc (Poland, Russia, Czechoslovakia, Yugoslavia, etc.) _____%
   5.6) Africa (Kenya, Nigeria, Sudan, Congo, Uganda, etc.) _____%
   5.7) OPEC (Iraq, Iran, Saudi Arabia, Egypt, etc.) _____%
   5.8) ASEAN (Malaysia, The Philippines, Indonesia, Brunei, Singapore, etc.) _____%
   5.9) Japan _____%
   5.10) China and Hong Kong _____%
   5.11) Korea _____%
   5.12) Taiwan _____%
   5.13) Australia, and New Zealand _____%
   5.14) Others (please specify) _____ _____%

6. How much did your company spend on advertising and promotion as a percentage of total sales ?

   1996 _____% 1997 _____% 1998 _____%

7. How much did your company spend on marketing research as a percentage of total sales?

   1996 _____% 1997 _____% 1998 _____%

8. How many registered trademark(s) does your company have?

   1996 _____ trademarks 1997 _____ trademarks 1998 _____ trademarks

9. How many brand name(s) of your products that are internationally recognized?

   1996 _____ brand names 1997 _____ brand names 1998 _____ brand names

**10. Please circle the degree of channel usage of your company**

| | low usage | | | | high usage |
|---|---|---|---|---|---|
| 10.1) Use of export trading company---------- | 1 | 2 | 3 | 4 | 5 |
| 10.2) Direct distribution to customers ---------- | 1 | 2 | 3 | 4 | 5 |
| 10.3) Sales through agents---------- | 1 | 2 | 3 | 4 | 5 |
| 10.4) Sales through dealers or distributors---------- | 1 | 2 | 3 | 4 | 5 |
| 10.5) Established branch or sales office in foreign countries-------- | 1 | 2 | 3 | 4 | 5 |
| 10.6) Establish plants abroad ---------- | 1 | 2 | 3 | 4 | 5 |
| 10.7) Joint venture with companies in foreign countries---------- | 1 | 2 | 3 | 4 | 5 |

**11. Please circle how you perceive the following capabilities of your company relative to Thai exporter that is your main competitor.**

| | much lower | | similar | | much higher |
|---|---|---|---|---|---|
| 11.1) Distribution capabilities---------- | 1 | 2 | 3 | 4 | 5 |
| 11.2) Advertising and promotional capabilities---------- | 1 | 2 | 3 | 4 | 5 |
| 11.3) Marketing research capabilities---------- | 1 | 2 | 3 | 4 | 5 |

**12. Please circle the degree of importance of the following to new product development of your company.** (For example, in developing new products, how important are marketing research capabilities?

| | not important | | neutral | | very important |
|---|---|---|---|---|---|
| 12.1) Distribution capabilities ---------- | 1 | 2 | 3 | 4 | 5 |
| 12.2) Advertising and promotional capabilities ---------- | 1 | 2 | 3 | 4 | 5 |
| 12.3) Marketing research capabilities ---------- | 1 | 2 | 3 | 4 | 5 |

- **Personnel capabilities.** If your company does not have the persons or things asked, please write number '0'.

1. How many full-time or equivalent full time employees in your company? _____ persons
2. How many research personnel and product designers in your company? _____ persons
3. How many engineers and technicians in your company? _____ persons
4. How many marketing personnel (not included sales representative) in your company?_____persons
5. Average years of experience of research personnel and product designers are _____ years
6. Average years of experience of engineers and technicians are _____ years
7. Average years of experience of marketing personnel are _____ years
8. How many in-house training courses did your company provide for employees?
   1996 _____ courses 1997 _____courses 1998 _____courses
9. How many employees did your company send to training courses outside company?
   1996 _____ persons 1997 _____persons 1998 _____persons
10. What is the average educational level of research personnel and product designers?
    1) High school or lower 2)Professional Certificates 3) Bachelor Degree 4) Master Degree 5) Ph.D.
11. What is the average educational level of engineers and technicians?
    1) High school or lower 2)Professional Certificates 3) Bachelor Degree 4) Master Degree 5) Ph.D.
12. What is the average educational level of marketing personnel?
    1) High school or lower 2)Professional Certificates 3) Bachelor Degree 4) Master Degree 5) Ph.D.

**13. Please circle how you perceive the following capabilities of your company in relative to main competitor in the main market.**

| | much lower | | similar | | much higher |
|---|---|---|---|---|---|
| 13.1) Research personnel's and product designers' skills ---------- | 1 | 2 | 3 | 4 | 5 |
| 13.2) Engineers' and technicians' skills ---------- | 1 | 2 | 3 | 4 | 5 |
| 13.3) Marketing personnel's skills ---------- | 1 | 2 | 3 | 4 | 5 |

**14. Please circle the degree of importance of the following to new product development of your company.** (For example, in developing new products, how important are research personnel's and product designers' skills?

| | not important | | neutral | | very important |
|---|---|---|---|---|---|
| 14.1) Research personnel and product designers' skills ---------- | 1 | 2 | 3 | 4 | 5 |
| 14.2) Engineers and technicians' skills---------- | 1 | 2 | 3 | 4 | 5 |
| 14.3) Marketing personnel's skills---------- | 1 | 2 | 3 | 4 | 5 |

- **Top management capabilities**

1. How many management members (from department managers to CEO) in your company?____persons

2. How many years of exporting experience does top management have on average ? _____ years

3. How many years of new product development does top management have on average?_____ years

4. How long has top management been involving in this industry on average? _____ years

5. What is the average educational level of your top management members ?
   1) High school or lower 2)Professional Certificates 3) Bachelor Degree 4) Master Degree 5) Ph.D.

**6. Please circle how you perceive the following capabilities of top management of your company.**

| | low | | medium | | high |
|---|---|---|---|---|---|
| 6.1) Top management has knowledge about foreign markets------- | 1 | 2 | 3 | 4 | 5 |
| 6.2) Top management encourages staff creativity---------- | 1 | 2 | 3 | 4 | 5 |
| 6.3) Top management supports the new product development------ | 1 | 2 | 3 | 4 | 5 |
| 6.4) Top management supports the open communication among R&D, manufacturing, finance, and marketing departments- | 1 | 2 | 3 | 4 | 5 |
| 6.5) Top management is well-prepared to response to the changing environment (such as consumer tastes, technology) | 1 | 2 | 3 | 4 | 5 |

**7. Please circle the degree of importance of the following to new product development of your company.** (For example, in developing new products, how important are the top management's knowledge about foreign markets?

| | not important | | neutral | | very important |
|---|---|---|---|---|---|
| 7.1) Top management has knowledge about foreign markets------- | 1 | 2 | 3 | 4 | 5. |
| 7.2) Top management encourages staff creativity---------- | 1 | 2 | 3 | 4 | 5 |
| 7.3) Top management supports the new product development------ | 1 | 2 | 3 | 4 | 5 |
| 7.4) Top management supports the open communication among R&D, manufacturing, finance, and marketing departments- | 1 | 2 | 3 | 4 | 5 |
| 7.5) Top management is well-prepared to response to the changing environment (such as consumer tastes, technology) | 1 | 2 | 3 | 4 | 5 |

## D. New Product Strategy

**1. Please circle the level of doing the following things in developing new products of your company.**

| | Low | | medium | | high |
|---|---|---|---|---|---|
| 1.1) By using technology from outside (such as licensing)---------- | 1 | 2 | 3 | 4 | 5 |
| 1.2) By conducting cooperative research with other firms or government---------- | 1 | 2 | 3 | 4 | 5 |
| 1.3) By using in-house research---------- | 1 | 2 | 3 | 4 | 5 |
| 1.4) By reacting to the customer request (i.e., customer gives the specification, then the company produce according to the specification)---------- | 1 | 2 | 3 | 4 | 5 |
| 1.5) By imitating the competitors ---------- | 1 | 2 | 3 | 4 | 5 |
| 1.6) By improving from competitors' products---------- | 1 | 2 | 3 | 4 | 5 |
| 1.7)By conducting the marketing research (i.e., find out what consumers' needs, then respond to their needs) ---------- | 1 | 2 | 3 | 4 | 5 |

**2. Please circle the perceived degree of <u>newness to market</u> of your firm's overall new products introduced last year.**

| | low | | medium | | high |
|---|---|---|---|---|---|
| 2.1) Number of new customers in existing market---------- | 1 | 2 | 3 | 4 | 5 |
| 2.2) Number of new markets ---------- | 1 | 2 | 3 | 4 | 5 |
| 2.2) Customers' new needs being served ---------- | 1 | 2 | 3 | 4 | 5 |
| 2.3) New types of advertising and promotion---------- | 1 | 2 | 3 | 4 | 5 |

**3. Please circle the perceived degree of <u>newness to firm</u> of your firm's overall new products introduced last year.**

| | low | | medium | | high |
|---|---|---|---|---|---|
| 3.1) The firm introduced new product category ---------- | 1 | 2 | 3 | 4 | 5 |
| 3.2) The firm used new technology for new products---------- | 1 | 2 | 3 | 4 | 5 |
| 3.3) The firm came out with new product design ---------- | 1 | 2 | 3 | 4 | 5 |
| 3.4) The firm used new production process ---------- | 1 | 2 | 3 | 4 | 5 |

**4. Please circle the characteristics of your company's new products introduced last year compared to Thai exporter that is your main competitor.**

| | much lower | | similar | | much higher |
|---|---|---|---|---|---|
| 4.1) Unique design or attributes in customers' view ---------- | 1 | 2 | 3 | 4 | 5 |
| 4.2) Response to customers' needs ---------- | 1 | 2 | 3 | 4 | 5 |
| 4.3) Tight specification to customer's request---------- | 1 | 2 | 3 | 4 | 5 |
| 4.4) Strength---------- | 1 | 2 | 3 | 4 | 5 |
| 4.5) Durability---------- | 1 | 2 | 3 | 4 | 5 |
| 4.6) Reliability ---------- | 1 | 2 | 3 | 4 | 5 |

5. How many new products had your company introduced to the markets?
   1996 _____ products 1997 _____products 1998 _____products

6. How many new products introduced as a percentage of total products?
   1996 _____% 1997 _____% 1998 _____%

7. How many new product line(s) or category(s) had your company introduced to the markets?
   1996 _____ lines 1997 _____lines 1998 _____lines

8. How often does your company usually introduce new products with new technology to the markets ?
   Every _____year(s) _____month(s)

9. How often does your company usually introduce new products with new design to the markets ?
   Every _____year(s) _____month(s)

10. How often does your company usually introduce new products with new production process to the markets ? Every _____year(s) _____month(s)

11. Your company usually launches similar products to the main competitor (please choose either before or after)

□ before main competitor by _____ year(s)_____ month(s)

□ after main competitor by _____ year(s)_____ month(s)

***Thank you very much your cooperation.***

THE JOINT DOCTORAL PROGRAM IN BUSINESS ADMINISTRATION

Graduate School of Business, National Institute of Development Administration (NIDA)

Faculty of Commerce and Accountancy, Chulalongkorn University

Faculty of Commerce and Accountancy, Thammasat University

14 กันยายน 2542

เรื่อง ขอความกรุณาในการตอบแบบสอบถาม

เรียน ท่านผู้บริหารระดับสูงสุด หรือท่านเจ้าของบริษัท

สิ่งที่แนบมาด้วย แบบสอบถามพร้อมซองจำนวน 1 ชุด

ดิฉันเป็นอาจารย์ประจำคณะพาณิชยศาสตร์และการบัญชี มหาวิทยาลัยธรรมศาสตร์ ขณะนี้ดิฉันกำลังศึกษาต่อในโครงการร่วมผลิตบัณฑิตระดับปริญญาเอกด้านบริหารธุรกิจ(JDBA) สังกัดคณะพาณิชยศาสตร์และการบัญชี จุฬาลงกรณ์มหาวิทยาลัย และกำลังทำวิทยานิพนธ์เกี่ยวกับผู้ส่งออกไทย การวิจัยนี้มีวัตถุประสงค์เพื่อศึกษาถึงบทบาทของความสามารถที่มีต่อกลยุทธ์ผลิตภัณฑ์ใหม่ของผู้ส่งออกไทยพร้อมทั้งนำเสนอแนวทางในการปรับปรุงและพัฒนาผลิตภัณฑ์ใหม่เพื่อการส่งออกให้สามารถแข่งขันในตลาดต่างประเทศได้ในระยะยาว

ในฐานะที่ท่านเป็นผู้บริหารที่มีความรู้ความชำนาญและมีประสบการณ์ด้านการตลาดและการส่งออก การให้ความร่วมมือเสียสละเวลาตอบแบบสอบถามของท่านจะส่งผลต่อความสำเร็จของงานวิจัยนี้ ขอความกรุณาท่านตอบแบบสอบถามนี้โดยครบถ้วนและส่งกลับมาที่ดิฉันด้วย

เพื่อเป็นการตอบแทนในความกรุณาของท่าน ทางโครงการJDBA ขอมอบกิตติบัตรขอบคุณแด่ท่านโดยจะส่งมอบให้ท่านพร้อมกับผลสรุปจากการวิจัยครั้งนี้ โปรดกรอกข้อมูลเกี่ยวกับตัวท่านในแบบฟอร์ม และแนบนามบัตรมากับแบบสอบถามนี้ด้วย ดิฉันขอขอบพระคุณล่วงหน้าเป็นอย่างสูงในความร่วมมือตอบแบบสอบถามของท่านเพื่อความสำเร็จในการทำวิทยานิพนธ์ครั้งนี้

ขอรับรองว่าจะเก็บข้อมูลของแต่ละบริษัทในการตอบแบบสอบถามนี้เป็นความลับ และจะรายงานผลการวิจัยโดยภาพรวมเท่านั้น

ด้วยความเคารพอย่างสูง

(อภิรดี เมธารมณ์)

นิสิตปริญญาเอก โครงการJDBA

เบอร์ติดต่อ : โทรศัพท์ 5790926, 9410399 แฟกซ์ 2252109 มือถือ 01-3438879

ผู้ตอบแบบสอบถาม :

ชื่อ _____ตำแหน่ง _____

บริษัท _____ โทรศัพท์ _____

ที่อยู่ _____

_____

ท่านต้องการผลสรุปจากการวิจัยหรือไม่ [ ] ต้องการ [ ] ไม่ต้องการ



The JDBA OFFICE : The Graduate School of Business Administration, National Institute of Development Administration (NIDA)
Bangkapi, Bangkok 10240, Thailand Tel.(662)377-7889, 377-7400-19 Ext. 2443,2267,2272,2278 Fax (662)374-2282

**คำชี้แจง** โปรดวงกลมเพียงข้อเดียวสำหรับแต่ละคำถามต่อไปนี้ สำหรับคำถามที่เว้นช่องว่างไว้ โปรดใส่ตัวเลขเป็นคำตอบ ถ้าบริษัทของท่านไม่มีบุคคลหรือสิ่งที่ถาม โปรดใส่เลข "0"

## ส่วนที่ 1 ข้อมูลเกี่ยวกับบริษัท

1. บริษัทของท่านอยู่ในอุตสาหกรรมใด

   1) อาหารกระป๋อง 2) เสื้อผ้า 3) เฟอร์นิเจอร์ 4) อัญมณี 5) อื่นๆ (โปรดระบุ) _____

2. โปรดวงกลมระดับความสำคัญของหัวข้อต่อไปนี้ที่มีต่อวัตถุประสงค์ของบริษัทของท่าน

| | ไม่สำคัญ | | สำคัญปานกลาง | | สำคัญม |
|---|---|---|---|---|---|
| 2.1) ตอบสนองต่อแรงกดดันจากการแข่งขันทางการค้า---------- | 1 | 2 | 3 | 4 | 5 |
| 2.2) เพิ่มส่วนแบ่งตลาดของบริษัท---------- | 1 | 2 | 3 | 4 | 5 |
| 2.3) เพิ่มกำไรของบริษัท---------- | 1 | 2 | 3 | 4 | 5 |
| 2.4) เน้นการขายผลิตภัณฑ์ที่มีอยู่เดิมหรือตลาดที่มีอยู่ในขณะนี้----- | 1 | 2 | 3 | 4 | 5 |
| 2.5) เพื่อขยายตลาดต่างประเทศ---------- | 1 | 2 | 3 | 4 | 5 |

## ส่วนที่ 2 สิ่งแวดล้อมด้านตลาด แบ่งเป็นศักยภาพของตลาดและความรุนแรงของการแข่งขัน

โปรดตอบคำถามต่อไปนี้เกี่ยวกับตลาดต่างประเทศที่เป็นเป้าหมายหลักของบริษัทของท่าน

* โปรดระบุตลาดหลักต่างประเทศของบริษัทของท่าน 1 ประเทศ _____

- ศักยภาพของตลาด เกี่ยวกับความน่าดึงดูดของตลาดเป้าหมาย

1. โปรดประมาณอัตราการขยายตัวของตลาดเป้าหมายหลักของบริษัทท่าน เมื่อเทียบกับยอดขายเดิม

   2542 _____ % 2543 _____ % 2544 _____ %

| | น้อย | | ปานกลาง | | มาก |
|---|---|---|---|---|---|
| 2. ตลาดเป้าหมายหลักมีลูกค้าเป้าหมายสำหรับผลิตภัณฑ์ของบริษัทท่านเท่าใด---------- | 1 | 2 | 3 | 4 | 5 |
| 3. ลูกค้าเป้าหมายมีความต้องการในผลิตภัณฑ์ของบริษัทท่านเพียงใด | 1 | 2 | 3 | 4 | 5 |

- ความรุนแรงของการแข่งขันภายในตลาดต่างประเทศที่เป็นเป้าหมายหลัก

1. ในตลาดเป้าหมายหลัก มีคู่แข่งรายใหญ่(คือมีส่วนแบ่งตลาดสูงและแข็งแกร่ง)หรือไม่ ☐ มี ☐ ไม่มี

| | น้อย | | ปานกลาง | | มาก |
|---|---|---|---|---|---|
| 2. จำนวนบริษัทคู่แข่งของบริษัทท่านในตลาดเป้าหมายหลัก-------- | 1 | 2 | 3 | 4 | 5 |
| 3. การแข่งขันด้านราคาในตลาดเป้าหมายเป็นอย่างไร---------- | 1 | 2 | 3 | 4 | 5 |

## ส่วนที่ 3 ความสามารถ: แบ่งเป็น 4 ประเภทคือ ด้านเทคนิค การตลาดระหว่างประเทศ บุคคลากร และผู้บริหารระดับสูง โปรดตอบคำถามต่อไปนี้เกี่ยวกับความสามารถของบริษัทของท่าน

- ความสามารถด้านเทคนิค: เกี่ยวกับการวิจัยและพัฒนาผลิตภัณฑ์ (R&D), การออกแบบและการผลิต

1. บริษัทของท่านได้รับประกาศนียบัตรด้านมาตรฐานสากล (เช่น ISO, HACCP)จำนวน_____ ประกาศนียบัตร มีอะไรบ้าง โปรดระบุ _____
2. บริษัทของท่านมีสิทธิบัตร(patents) ในการผลิตสินค้าเป็นจำนวน _____ สิทธิบัตร

3. บริษัทของท่านใช้จ่ายในการทำวิจัยเกี่ยวกับผลิตภัณฑ์คิดเป็นกี่เปอร์เซ็นต์ของยอดขายรวม

2539 _____ %  2540 _____ %  2541 _____ %

4. บริษัทของท่านเปิดโอกาสให้พนักงานได้ทดลองอะไรใหม่ ๆ และใช้ความคิดสร้างสรรค์ที่เกี่ยวกับงานเพียงใด

1) ต่ำมาก  2) ต่ำ  3) ปานกลาง  4) สูง  5) สูงมาก

5. โปรดวงกลมระดับความสามารถต่อไปนี้ของบริษัทท่านเมื่อเทียบกับผู้ส่งออกไทยที่เป็นคู่แข่งหลักของท่าน

| | ต่ำกว่ามาก | | ใกล้เคียงกัน | | สูงกว่ามาก |
|---|---|---|---|---|---|
| 5.1) ความสามารถด้านการวิจัยและพัฒนาผลิตภัณฑ์ (R&D)------ | 1 | 2 | 3 | 4 | 5 |
| 5.2) ความสามารถด้านการออกแบบผลิตภัณฑ์ ---------- | 1 | 2 | 3 | 4 | 5 |
| 5.3) ความสามารถด้านกระบวนการผลิต---------- | 1 | 2 | 3 | 4 | 5 |

6. โปรดวงกลมระดับความสำคัญของความสามารถต่อไปนี้ที่มีต่อการพัฒนาผลิตภัณฑ์ใหม่ของบริษัทท่าน (เช่น ในการออกผลิตภัณฑ์ใหม่ ความสามารถด้านการออกแบบผลิตภัณฑ์มีความสำคัญเพียงใด)

| | ไม่สำคัญ | | สำคัญปานกลาง | | สำคัญมาก |
|---|---|---|---|---|---|
| 6.1) ความสามารถด้านการวิจัยและพัฒนาผลิตภัณฑ์ (R&D)------ | 1 | 2 | 3 | 4 | 5 |
| 6.2) ความสามารถด้านการออกแบบผลิตภัณฑ์---------- | 1 | 2 | 3 | 4 | 5 |
| 6.3) ความสามารถด้านกระบวนการผลิต---------- | 1 | 2 | 3 | 4 | 5 |

- **ความสามารถด้านการตลาดระหว่างประเทศ**

1. บริษัทท่านมียอดขายรวมประมาณเท่าใด (ทั้งในและต่างประเทศ)

2539_____บาท  2540_____บาท  2541_____บาท

2. อัตราส่วนการส่งออกของบริษัทท่านเป็นเท่าใด (ยอดส่งออก/ยอดขายรวม)

2539 _____ %  2540 _____ %  2541 _____ %

3. บริษัทของท่านได้ส่งสินค้าไปยังตลาดต่างประเทศมานานเท่าใด _____ปี

4. บริษัทของท่านได้ส่งสินค้าไปยังตลาดต่างประเทศเป็นจำนวน _____ประเทศ

5. เมื่อปีที่แล้ว บริษัทของท่านได้ส่งสินค้าไปยังตลาดใดบ้าง โปรดประมาณเปอร์เซ็นต์ของยอดส่งออกของบริษัทท่านสำหรับตลาดต่อไปนี้

| | |
|---|---|
| 5.1) NAFTA (อเมริกา, แคนาดา, และ เมกซิโก) | _____ % |
| 5.2) Mercosur (บราซิล, อาร์เจนตินา, ปารักไกว, อูรุกไกว) | _____ % |
| 5.3) The Andean Pact (โบลิเวีย, ชิลี, เอกวาดอร์) | _____ % |
| 5.4) EU (เยอรมันตะวันตก, ฝรั่งเศส, อังกฤษ, ออสเตรีย, เบลเยียม เป็นต้น) | _____ % |
| 5.5) Eastern Bloc (โปแลนด์, รัสเซีย, เชคโกสโลวาเกีย, ยูโกสโลวาเกีย เป็นต้น) | _____ % |
| 5.6) Africa (เคนย่า, ไนจีเรีย, ซูดาน, คองโก, อูกานด้า เป็นต้น) | _____ % |
| 5.7) OPEC (อิรัก, อิหร่าน, ซาอุดิอาระเบีย, อียิปต์ เป็นต้น) | _____ % |
| 5.8) ASEAN (มาเลเซีย, ฟิลิปปินส์, อินโดนีเซีย, บรูไน, สิงคโปร์ เป็นต้น) | _____ % |
| 5.9) ญี่ปุ่น | _____ % |
| 5.10) จีนและฮ่องกง | _____ % |
| 5.11) เกาหลี | _____ % |
| 5.12) ไต้หวัน | _____ % |
| 5.13) ออสเตรเลียและนิวซีแลนด์ | _____ % |
| 5.14) อื่นๆ (โปรดระบุ) _____ | _____ % |

6. บริษัทของท่านใช้จ่ายในการโฆษณาและส่งเสริมการตลาดเป็นกี่เปอร์เซ็นต์ของยอดขายรวม

2539 _____ %  2540 _____ %  2541 _____ %

7. บริษัทของท่านใช้จ่ายในการวิจัยตลาดเป็นกี่เปอร์เซ็นต์ของยอดขายรวม

2539 _____ %  2540 _____ %  2541 _____ %

8. บริษัทของท่านมีเครื่องหมายการค้าจดทะเบียน(registered trademark) จำนวนเท่าใด

2539 _____ เครื่องหมายการค้า  2540 _____ เครื่องหมายการค้า  2541 _____ เครื่องหมายการค้า

9. สินค้าของท่านมีตรายี่ห้อที่เป็นที่รู้จักในต่างประเทศ (international brand name) จำนวนเท่าใด

2539 _____ ยี่ห้อ  2540 _____ ยี่ห้อ  2541 _____ ยี่ห้อ

10. โปรดวงกลมระดับของการใช้ช่องทางการจัดจำหน่ายแบบต่าง ๆ ของบริษัทของท่าน

| | ใช้น้อย | | ใช้ปานกลาง | | ใช้มาก |
|---|---|---|---|---|---|
| 10.1) ใช้บริษัทการค้า (trading companies)---------- | 1 | 2 | 3 | 4 | 5 |
| 10.2) จำหน่ายสินค้าโดยตรงไปยังลูกค้า(direct distribution)------- | 1 | 2 | 3 | 4 | 5 |
| 10.3) ขายสินค้าผ่านตัวแทน (agents)---------- | 1 | 2 | 3 | 4 | 5 |
| 10.4) ขายสินค้าผ่านผู้จัดจำหน่าย (dealers, distributors)--------- | 1 | 2 | 3 | 4 | 5 |
| 10.5) มีสาขาหรือสำนักงานขายในต่างประเทศ ---------- | 1 | 2 | 3 | 4 | 5 |
| 10.6) มีโรงงานผลิตในต่างประเทศ---------- | 1 | 2 | 3 | 4 | 5 |
| 10.7) มีการร่วมลงทุนกับบริษัทในต่างประเทศ---------- | 1 | 2 | 3 | 4 | 5 |

11. โปรดวงกลมระดับความสามารถต่อไปนี้ของบริษัทท่านเมื่อเทียบกับผู้ส่งออกไทยที่เป็นคู่แข่งหลักของท่าน

| | ต่ำกว่ามาก | | ใกล้เคียงกัน | | สูงกว่ามาก |
|---|---|---|---|---|---|
| 11.1) ความสามารถด้านการจัดจำหน่าย---------- | 1 | 2 | 3 | 4 | 5 |
| 11.2) ความสามารถด้านการโฆษณาและส่งเสริมการตลาด -------- | 1 | 2 | 3 | 4 | 5 |
| 11.3) ความสามารถด้านการวิจัยตลาด ---------- | 1 | 2 | 3 | 4 | 5 |

12. โปรดวงกลมระดับความสำคัญของความสามารถต่อไปนี้ที่มีต่อการพัฒนาผลิตภัณฑ์ใหม่ของบริษัทท่าน (เช่น ในการออกผลิตภัณฑ์ใหม่ ความสามารถด้านการวิจัยตลาดมีความสำคัญเพียงใด)

| | ไม่สำคัญ | | สำคัญปานกลาง | | สำคัญมาก |
|---|---|---|---|---|---|
| 12.1) ความสามารถด้านการจัดจำหน่าย---------- | 1 | 2 | 3 | 4 | 5 |
| 12.2) ความสามารถด้านการโฆษณาและส่งเสริมการตลาด-------- | 1 | 2 | 3 | 4 | 5 |
| 12.3) ความสามารถด้านการวิจัยตลาด---------- | 1 | 2 | 3 | 4 | 5 |

- ความสามารถของบุคคลากร : ถ้าบริษัทของท่านไม่มีบุคคลหรือสิ่งที่ถาม โปรดใส่เลข "0"

1. บริษัทของท่านมีพนักงานประจำหรือเทียบเท่าพนักงานประจำ _____ คน
2. บริษัทของท่านมีจำนวนผู้ทำวิจัยและผู้ออกแบบผลิตภัณฑ์ _____ คน
3. บริษัทของท่านมีจำนวนวิศวกรและผู้ชำนาญด้านเทคนิค _____ คน
4. บริษัทของท่านมีจำนวนพนักงานด้านการตลาด (ไม่รวมพนักงานขาย) _____ คน
5. ประสบการณ์ของผู้ทำวิจัยและผู้ออกแบบผลิตภัณฑ์โดยเฉลี่ยเป็นระยะเวลา _____ ปี
6. ประสบการณ์ของวิศวกรและผู้ชำนาญด้านเทคนิคโดยเฉลี่ยเป็นระยะเวลา _____ ปี
7. ประสบการณ์ของพนักงานด้านการตลาดโดยเฉลี่ยเป็นระยะเวลา _____ ปี

8. บริษัทของท่านได้มีการจัดอบรมภายในบริษัท(in-house training)ให้กับพนักงานเป็นจำนวนกี่ครั้ง

2539 _____ ครั้ง 2540 _____ ครั้ง 2541_____ ครั้ง

9. บริษัทของท่านได้มีการส่งพนักงานออกไปอบรมข้างนอกเป็นจำนวนกี่คน

2539 _____ คน 2540 _____ คน 2541_____ คน

10. ระดับการศึกษาของผู้ทำวิจัยและผู้ออกแบบผลิตภัณฑ์โดยเฉลี่ยคือระดับใด

1) มัธยมปลายหรือต่ำกว่า 2) ปวช/ปวส 3) ปริญญาตรี 4) ปริญญาโท 5) ปริญญาเอก

11. ระดับการศึกษาของวิศวกรและผู้ชำนาญด้านเทคนิคโดยเฉลี่ยคือระดับใด

1) มัธยมปลายหรือต่ำกว่า 2) ปวช/ปวส 3) ปริญญาตรี 4) ปริญญาโท 5) ปริญญาเอก

12. ระดับการศึกษาของพนักงานด้านการตลาดโดยเฉลี่ยคือระดับใด

1) มัธยมปลายหรือต่ำกว่า 2) ปวช/ปวส 3) ปริญญาตรี 4) ปริญญาโท 5) ปริญญาเอก

13. โปรดวงกลมระดับความสามารถต่อไปนี้ของบริษัทท่านเมื่อเทียบกับผู้ส่งออกไทยที่เป็นคู่แข่งหลักของท่าน

| | ต่ำกว่ามาก | | ใกล้เคียงกัน | | สูงกว่ามาก |
|---|---|---|---|---|---|
| 13.1) ความสามารถของผู้ทำวิจัยและผู้ออกแบบผลิตภัณฑ์---------- | 1 | 2 | 3 | 4 | 5 |
| 13.2) ความสามารถของวิศวกรและผู้ชำนาญด้านเทคนิค---------- | 1 | 2 | 3 | 4 | 5 |
| 13.3) ความสามารถของพนักงานด้านการตลาด---------- | 1 | 2 | 3 | 4 | 5 |

14. โปรดวงกลมระดับความสำคัญของความสามารถต่อไปนี้ที่มีต่อการพัฒนาผลิตภัณฑ์ใหม่ของบริษัทท่าน(เช่น ในการออกผลิตภัณฑ์ใหม่ความสามารถของผู้ทำวิจัยและผู้ออกแบบผลิตภัณฑ์มีความสำคัญเพียงใด)

| | ไม่สำคัญ | | สำคัญปานกลาง | | สำคัญมาก |
|---|---|---|---|---|---|
| 14.1) ความสามารถของผู้ทำวิจัยและผู้ออกแบบผลิตภัณฑ์-------- | 1 | 2 | 3 | 4 | 5 |
| 14.2) ความสามารถของวิศวกรและผู้ชำนาญด้านเทคนิค---------- | 1 | 2 | 3 | 4 | 5 |
| 14.3) ความสามารถของพนักงานด้านการตลาด---------- | 1 | 2 | 3 | 4 | 5 |

- ความสามารถของผู้บริหารระดับสูง

1. บริษัทของท่านมีจำนวนผู้บริหาร (ตั้งแต่ผู้จัดการแผนกจนถึงผู้บริหารระดับสูงสุด) _____ คน
2. ผู้บริหารระดับสูงมีประสบการณ์ด้านการส่งออกโดยเฉลี่ยเป็นระยะเวลา _____ ปี
3. ผู้บริหารระดับสูงมีประสบการณ์ด้านการพัฒนาผลิตภัณฑ์ใหม่โดยเฉลี่ยเป็นระยะเวลา _____ ปี
4. ผู้บริหารระดับสูงได้ทำงานอยู่ในอุตสาหกรรมนี้โดยเฉลี่ยเป็นระยะเวลา _____ ปี
5. ระดับการศึกษาของผู้บริหารระดับสูงสุดโดยเฉลี่ยคือระดับใด

1) มัธยมปลายหรือต่ำกว่า 2) ปวช/ปวส 3) ปริญญาตรี 4) ปริญญาโท 5) ปริญญาเอก

6. โปรดวงกลมระดับความสามารถต่อไปนี้ของผู้บริหารระดับสูงของบริษัทของท่าน

| | น้อย | | ปานกลาง | | มาก |
|---|---|---|---|---|---|
| 6.1) ผู้บริหารระดับสูงมีความรู้เกี่ยวกับตลาดต่างประเทศ-------- | 1 | 2 | 3 | 4 | 5 |
| 6.2) ผู้บริหารระดับสูงสนับสนุนให้พนักงานมีความคิดสร้างสรรค์--- | 1 | 2 | 3 | 4 | 5 |
| 6.3) ผู้บริหารระดับสูงส่งเสริมการพัฒนาผลิตภัณฑ์ใหม่--------- | 1 | 2 | 3 | 4 | 5 |
| 6.4) ผู้บริหารระดับสูงส่งเสริมให้มีการพูดคุยกันอย่างเปิดกว้างระหว่างฝ่ายวิจัยและพัฒนา ฝ่ายผลิต ฝ่ายการเงิน และฝ่ายการตลาด-- | 1 | 2 | 3 | 4 | 5 |
| 6.5) ผู้บริหารระดับสูงมีความพร้อมในการตอบสนองต่อการเปลี่ยนแปลงในสิ่งแวดล้อม (เช่น ความชอบของผู้บริโภค และเทคโนโลยี)- | 1 | 2 | 3 | 4 | 5 |

7. โปรดวงกลมระดับความสำคัญของความสามารถต่อไปนี้ที่มีต่อการพัฒนาผลิตภัณฑ์ใหม่ของบริษัทท่าน(เช่นในการออกผลิตภัณฑ์ใหม่ ความรู้เกี่ยวกับตลาดต่างประเทศของผู้บริหารระดับสูงมีความสำคัญเพียงใด)

| | ไม่สำคัญ | | สำคัญปานกลาง | | สำคัญมาก |
|---|---|---|---|---|---|
| 7.1) ความรู้เกี่ยวกับตลาดต่างประเทศของผู้บริหารระดับสูง------ | 1 | 2 | 3 | 4 | 5 |
| 7.2) ผู้บริหารระดับสูงสนับสนุนให้พนักงานมีความคิดสร้างสรรค์--- | 1 | 2 | 3 | 4 | 5 |
| 7.3) ผู้บริหารระดับสูงส่งเสริมการพัฒนาผลิตภัณฑ์ใหม่--------- | 1 | 2 | 3 | 4 | 5 |
| 7.4) ผู้บริหารระดับสูงส่งเสริมให้มีการพูดคุยกันอย่างเปิดกว้างระหว่างฝ่ายวิจัยและพัฒนา ฝ่ายผลิต ฝ่ายการเงิน และฝ่ายการตลาด-- | 1 | 2 | 3 | 4 | 5 |
| 7.5) ผู้บริหารระดับสูงมีความพร้อมในการตอบสนองต่อการเปลี่ยนแปลงในสิ่งแวดล้อม (เช่น ความชอบของผู้บริโภค และเทคโนโลยี)- | 1 | 2 | 3 | 4 | 5 |

## ส่วนที่ 4 กลยุทธ์ผลิตภัณฑ์ใหม่

1. โปรดวงกลมระดับการทำสิ่งต่อไปนี้ในการพัฒนาผลิตภัณฑ์ใหม่ของบริษัทของท่าน

| | น้อย | | ปานกลาง | | มาก |
|---|---|---|---|---|---|
| 1.1) โดยใช้เทคโนโลยีจากภายนอกบริษัท (เช่น license)---------- | 1 | 2 | 3 | 4 | 5 |
| 1.2) โดยการทำวิจัยผลิตภัณฑ์โดยร่วมมือกับบริษัทอื่นหรือองค์กรรัฐ-- | 1 | 2 | 3 | 4 | 5 |
| 1.3) โดยการทำวิจัยผลิตภัณฑ์ภายในบริษัทเอง (in-house research)-- | 1 | 2 | 3 | 4 | 5 |
| 1.4) โดยการทำตามที่ลูกค้ากำหนดมา (ลูกค้าให้รายละเอียดมาแล้วบริษัทผลิตตามนั้น)---------- | 1 | 2 | 3 | 4 | 5 |
| 1.5) โดยการเลียนแบบคู่แข่งขัน---------- | 1 | 2 | 3 | 4 | 5 |
| 1.6) โดยการปรับปรุงจากผลิตภัณฑ์ของคู่แข่ง---------- | 1 | 2 | 3 | 4 | 5 |
| 1.7) โดยการทำวิจัยตลาด (หาความต้องการของผู้บริโภคแล้วตอบสนองความต้องการนั้น)---------- | 1 | 2 | 3 | 4 | 5 |

2. โปรดวงกลมระดับ<u>ความใหม่สำหรับตลาด(new to market)</u> ของผลิตภัณฑ์ใหม่โดยรวมของบริษัทของท่านที่ออกสู่ตลาดเมื่อปีที่แล้ว

| | น้อย | | ปานกลาง | | มาก |
|---|---|---|---|---|---|
| 2.1) จำนวนลูกค้าใหม่ในตลาดเดิม---------- | 1 | 2 | 3 | 4 | 5 |
| 2.2) จำนวนตลาดใหม่---------- | 1 | 2 | 3 | 4 | 5 |
| 2.3) การตอบสนองความต้องการใหม่ ๆ ของลูกค้า---------- | 1 | 2 | 3 | 4 | 5 |
| 2.4) การโฆษณาและส่งเสริมการตลาดแบบใหม่---------- | 1 | 2 | 3 | 4 | 5 |

3.โปรดวงกลมระดับ<u>ความใหม่สำหรับบริษัท(new to firm)</u>ของผลิตภัณฑ์ใหม่โดยรวมของบริษัทของท่านที่ออกสู่ตลาดเมื่อปีที่แล้ว

| | น้อย | | ปานกลาง | | มาก |
|---|---|---|---|---|---|
| 3.1) ออกสินค้าประเภทใหม่สำหรับบริษัท ---------- | 1 | 2 | 3 | 4 | 5 |
| 3.2) ออกสินค้าโดยใช้เทคโนโลยีใหม่สำหรับบริษัท ---------- | 1 | 2 | 3 | 4 | 5 |
| 3.3) มีการออกแบบผลิตภัณฑ์ใหม่สำหรับบริษัท ---------- | 1 | 2 | 3 | 4 | 5 |
| 3.4) ใช้กระบวนการการผลิตใหม่สำหรับบริษัท ---------- | 1 | 2 | 3 | 4 | 5 |

4. โปรดวงกลมลักษณะของผลิตภัณฑ์ใหม่ของบริษัทของท่านที่ออกสู่ตลาดเมื่อปีที่แล้วเมื่อเทียบกับผู้ส่งออกไทยที่เป็นคู่แข่งหลักของท่าน

| | ต่ำกว่ามาก | | ใกล้เคียงกัน | | สูงกว่ามาก |
|---|---|---|---|---|---|
| 4.1) มีการออกแบบที่เป็นเอกลักษณ์หรือมีคุณลักษณะเฉพาะในสายตาของลูกค้า---------- | 1 | 2 | 3 | 4 | 5 |
| 4.2) สามารถตอบสนองต่อความต้องการของลูกค้าได้---------- | 1 | 2 | 3 | 4 | 5 |
| 4.3) ทำตามที่ลูกค้ากำหนดมาได้เที่ยงตรง---------- | 1 | 2 | 3 | 4 | 5 |
| 4.4) ความแข็งแรง---------- | 1 | 2 | 3 | 4 | 5 |
| 4.5) ความทนทาน---------- | 1 | 2 | 3 | 4 | 5 |
| 4.6) ความเชื่อถือได้---------- | 1 | 2 | 3 | 4 | 5 |

5. บริษัทของท่านออกผลิตภัณฑ์ใหม่(new products) สู่ตลาดเป็นจำนวนเท่าใด

2539 _____ ผลิตภัณฑ์ 2540 _____ ผลิตภัณฑ์ 2541_____ ผลิตภัณฑ์

6. จำนวนผลิตภัณฑ์ใหม่ที่บริษัทของท่านออกคิดเป็นกี่เปอร์เซ็นต์ของผลิตภัณฑ์ทั้งหมด

2539 _____ % 2540 _____ % 2541_____ %

7. บริษัทของท่านออกสินค้าประเภทอื่นนอกเหนือจากผลิตภัณฑ์เดิม(new product lines) เป็นจำนวนเท่าใด

2539 _____ ประเภท 2540 _____ ประเภท 2541_____ ประเภท

8. โดยปกติ บริษัทของท่านออกผลิตภัณฑ์ใหม่โดยใช้เทคโนโลยีใหม่บ่อยเท่าใด---ทุก ๆ ____ปี ____เดือน

9. โดยปกติ บริษัทของท่านออกผลิตภัณฑ์ใหม่โดยมีการออกแบบใหม่บ่อยเท่าใด- ทุก ๆ ____ปี ____เดือน

10. โดยปกติ บริษัทของท่านออกผลิตภัณฑ์ใหม่โดยใช้กระบวนการการผลิตใหม่บ่อยเท่าใด

ทุก ๆ ____ปี ____เดือน

11. บริษัทของท่านมักออกผลิตภัณฑ์ใหม่ที่คล้ายคลึงกันกับคู่แข่งหลัก (โปรดเลือกก่อนหรือหลัง)

☐ ก่อนคู่แข่งหลักเป็นระยะเวลา _____ ปี _____ เดือน

☐ หลังคู่แข่งหลักเป็นระยะเวลา _____ ปี _____ เดือน

**ขอขอบพระคุณอย่างยิ่งที่ท่านกรุณาตอบแบบสอบถามนี้**

# Appendix 4

# Summary of Preliminary Interviews

From the preliminary interviews with the top executives from four leading export firms, the researcher gets insight views about the capabilities and new product development of these firms.

The leader in jewelry industry has high capabilities for every types. It always comes out with the new products and new designs. It does marketing research and launches out new product to meet customer's needs.

The furniture leader does not conduct in-house research much, but it uses licensed technology from abroad. However, it does a lot of product design to be uniqueness and high quality to customers' eyes. It also has its own international brand name and emphasizes in international marketing because it also sells directly to customers.

The garment leader does all product design and also improve production process . It does not have its own international brand. It sells to 20 famous international brands. It has to be proactive in order to come out with new design and good quality that meet customers' needs.

The canned food leader emphasizes in in-house research, but also use licensed technology. It has international brand name and production facilitates abroad. It has joint ventures with local companies in some countries which helps it in marketing and distribution.

# Biography

Miss Apiradee Metharom was born in Bangkok on March 30, 1971. She holds the Bachelor Degree in Business Administration majoring in Accounting with Magna Cum Laude (second class honors) from Assumption University, completed in May 1992. She received a scholarship from Assumption University and Wollongong University to study for the Master Degree in Commerce majoring in Marketing at Wollongong University, Australia and graduated in November, 1993. From January 1994 to May 1996, she was a lecturer in the Accounting Department, Faculty of Business Administration, Assumption University. She then joined the Joint Doctoral Program in Business Administration (JDBA) majoring in International Business in June 1996 with a partial scholarship from the JDBA program.