CHAPTER 1

INTRODUCTION

1.1 Introduction

Globalization, short product lifecycles, short time-to-market, more customer-specific products and decreasing prices are some of the issues the electronics industry faces today. Over the past years, the Original equipment manufacturers (OEMs) in this industry have begun to outsource many more of their processes, and so the Electronics supply chain outlook has changed. The largest part of manufacturing outsourcing is transferred from these original equipment manufacturers to the Electronics Manufacturing Service providers (EMS), also called Contract Electronics Manufacturers (CEMs). The market for electronics manufacturing service provider companies is expected to show a large growth over the coming years.

Although from a complete supply chain perspective the role of an electronics manufacturing service provider was, is and will remain to be that of a specialist in operational excellence, an electronics manufacturing service provider does not need to focus on operational excellence only.

To differentiate itself from other electronics manufacturing service provider companies, and to enforce its competitive position, thereby meeting the high standard for operational excellence directed by the industry structure. By choosing a different strategy than competitors do, an electronics manufacturing service provider can become more appealing to its original equipment manufacturers customers.

An electronics manufacturing service provider can differentiate itself from other Electronics manufacturing service providers by an even stronger focus on operational excellence than competition, or by focusing its efforts on customer intimacy or product leadership. A focus on customer intimacy agrees with other electronics manufacturing service providers that create a relationship with the end customer. Sales, service, and fulfillment are handled (or coordinated) through the electronics manufacturing service

providers, and products do not touch the original equipment manufacturers anymore. The setup of **'new product introduction centers'** and joint R&D programs are perfect examples of electronics manufacturing service providers that focus more on product leadership.

It is important to realize that cost advantages are less perishable than customer binding or a product market leadership (Porter, 2001). Knowing this, an electronics manufacturing service provider can be attracted to shift its focus more towards customer intimacy or product leadership, while remaining operational excellent at industry standards level. By focusing on these activities, it does not only strengthen its competitive position, but it also has a way to achieve higher profit margins

Rapid introduction of new products that customers value has become a prerequisite for market success in today's global economy. Substantial investments in streamlining and shortening both the product development times and its time-to-market, has received the highest priority in many companies.

The influence of the design stage on the outcome of new product introduction project both technically and economically is extremely important. It is precisely in this phase where the customer's ideas and speculations are conceptualized into a physical model; defining his needs and requirements into procedures, drawings, and technical specifications.

However, the administration and engineering of new product introduction team have been barely explored and exemplified. In fact, numerous authors indicate that planning and control are substituted by chaos and improvising in new product introduction process, causing: poor communication, lack of adequate documentation, deficient or missing input information, unbalanced resource allocation, lack of coordination between disciplines, and erratic decision making. The new product introduction process fails to minimize the effects of complexity and uncertainty, to ensure that the information available to complete the tasks is sufficient, and to reduce inconsistencies within necessary documents. Even if the nature of the new product introduction process justifies some of these problems, this reality cannot be viewed as satisfactory.

Collaborative design turns out to be especially interesting for companies with an operational excellence or product leadership strategy. Nevertheless, the driving forces for collaborative design for those two solutions are quite different. An electronics manufacturing service provider, which starts to collaborate upon design, has as its main drivers design-for-manufacturability and design-for-testability. Under a product leadership strategy, time-to-market combined with a focus on new product introduction (NPI), and handling design complexity turn out to be very important.

Collaborative design, the process of designing new products together with suppliers and/or customers, can be very valuable for companies that operate with an operational excellence strategy. The reasons are diverse, but in generally caused by the gap between those who design (e.g. the original equipment manufacturers) and those who produce (e.g. the electronics manufacturing service provider). Tighter coupling of design and manufacturing can result in cost savings and more efficient production techniques. Note that about 75% of the costs of a product are linked to the original design (Cahn and Swanton, 2001; McKone and Tumolo, 2002).

Collaborative design might not only be valuable for companies with an operational excellence strategy focus; for companies that differentiate themselves as product leaders, it is absolutely necessary. Product leaders need to operate with state-of-the-art technology, with time-to-market pressures, and continuing new product introductions.

Time-to-market pressures require product leaders to develop their products as fast as possible to get it to market quickly (Anon, 2000; Porter, 2001). Different specialists from different supply chain partners across locations work together on new products, and manufacturing and service organizations play a role as well. Furthermore, they have to focus on NPIs, and to prepare for the roll-out phase. Companies that deliver state-of-the- art technology are always facing the challenge of complexity. Knowledge sharing gets very important since this is an instrument to overcome complexity.

1.2 Statement of the problem

New product development is now a crucial concern for a growing number of companies. The Product Development and Management Association's (PDMA) 1990 survey of North American companies found respondents anticipating increasing reliance on new products to grow their businesses during the 1990s, with a typical firm expecting nearly 52% of sales in 1995 to be from products introduced since 1990 (Page, 1993). In the event, the most successful firms in a 1995 survey achieved 49.2% of sales from products less than five years old (twice the rate of the rest of firms), and expected this proportion to increase to 53.3% of sales for the next five years (Griffin, 1997). In many organisations issues such as time-to-market and customisation are high on the agenda (Hart and Berger, 1993; Clark and Fujimoto, 1989; Sasaki, 1991).

There is a large NPD literature. Much of the research into NPD over the last 20 years has looked at product success i.e. what makes for a successful product, in terms of both product attributes and process/program management (Johne and Snelson, 1988b; Johne and Snelson, 1988a; Cooper, 1992), or has considered innovation at the level of the organisation (Pavitt, 1991). More recently, in an attempt to meet the challenges faced by NPD, researchers have addressed particular aspects of NPD such as project management, communication, rapid prototyping and simultaneous engineering (Pearson and Ball, 1993; Moenaert and Caeldries, 1996; Costanzo, 1993; Pawar and Riedel, 1993; Swink et al., 1996).

At the same time there has been increasing recognition of the need to think of development activities in terms of a process (Davenport, 1993; Thomas, 1993; Wheelwright and Clark, 1992). Cooper and Kleinschmidt (1993) conclude that process, rather than external forces like market place and competition, "dominates the success equation". The literature on NPD processes mostly looks at templates or blueprints for NPD and covers a wide range of approaches, from phase review to stage gate to overlapping and parallel processing models (Saren, 1984; Cooper, 1988; Cooper, 1994; Cooper and Kleinschmidt, 1993; Imai, Nonaka et al., 1985; Thomas, 1993; Hart, 1995). In considering what will shape the next generation of new product processes, Cooper (1994) looks beyond structures to the implications these more flexible and complex

processes have in terms of, for example, risk taking, wider participation in decision making, and learning.

Many firms have been relatively slow to pick up on the messages about the importance of process for NPD. Cooper and Kleinschmidt (1993) found that a minority of firms used a formal product delivery process or 'stage-gate' system, while the PDMA's 1990 survey revealed that only 54.5% of the firms surveyed had a well-defined NPD process (Page, 1993) increasing to around 60% by 1995 (Griffin, 1997). Even among companies that do follow a process for NPD there is room for improvement. Cooper and Kleinschmidt (1991) claimed that "...there are *serious deficiencies* in the typical firm's new product process".

1.2.1 The need to improve new product development processes

Managers with responsibility for their firm's NPD process, or for specific tasks or phases within it, are under increasing pressure to improve performance of the process. The nature of the improvement sought varies between companies, but typical objectives include the following:

- Reduction in development cycle time;
- Reduction in development costs;
- Increase in product design quality;
- Greater innovativeness of design;
- Increased market share.

The 1990 PDMA survey found that although certain practices had improved during the 1980s the overall performance of the NPD activity within the surveyed companies had not improved (Page, 1993). The conclusion drawn was that the respondents may be running harder to stay in the same place. In another survey 87% of managers responsible for NPD said that the development process needed improving, although details of what they thought should be improved were not reported (Barclay, 1992b).

Over the years academics have addressed the questions of how to be more successful at developing new products, and how to improve particular activities within the NPD process. However, the NPD processes from all researchers were referring to the processes in the way of what OEM companies were performed.

Barclay (1992a) found that very few companies knew about, or had applied, the findings from research studies carried out into the NPD process since the 1950s. This can indicates that different companies may have their own new product introduction processes in which the success factors studied from previous researchers can be applied in some parts.

Thus the need to improve NPD processes remains very real, and indeed the issue of improvement grows ever more critical as competitive pressures continue to escalate.

This will lead to the studying of factors that affect and contribute to the fast and effective new product introduction process; thus leading to a successful new product introduction process for an EMS company.

1.3 Research Objectives

Objective of this study are as follows;

1. To find the factor that affect and contribute to fast and effective new product introduction process; thus leading to a successful new product introduction process for an EMS company.

2. To study current situation of new product introduction in the case company and suggest from finding which factors are critical for an EMS company to improve new product introduction process.

1.4 Research Questions

The research questions are as follows;

1. Do company's capabilities have significant affect and contribute to the fast and effective new product introduction process; thus leading to a successful new product introduction process?
2. Which improvements should be implemented to improve these practices?

1.5 Operational Definitions in This Study

Operational definitions in this study consist of two main constructs as following;

1. **New Product Introduction (NPI)**

New product introduction refers to the complete business process of introducing new products to market. It spans the entire product life-cycle from initial identification of market/technology opportunity, conception, design and development through to production, market launch, support, enhancement and retirement.

According to the Product Development and Management Association Hand Book 2nd Edition, New Product Introduction (NPI) is the launch or commercialization of a new product into the marketplace. Takes place at the end of a successful product development project.

A number of alternative terms are used to describe the NPI Process, such as New Product Development or NPD Process, Innovation Process or Product Creation Process. The exact meaning of the terms will vary from company to company, as will the degree of integration across different departments.

In an EMS perspective, new product introduction will refer to the process which primarily concerned with the conversion of the customer product design into a functional and manufacturable reality. As such, new product introduction tends to have more of a manufacturing focus, dealing with the application of new

technology and the creation and testing of functional prototypes through mass production.

Nowadays, NPI is more likely to be seen as a vital cross-functional business process, involving both internal groups and external groups such as customers and suppliers.

2. **New Product Introduction Process**

   In an EMS perspective, new product introduction process will refer to the process which consist of 5 phases;

   Phase 1: Product, Plan and Define

   Phase 2: Manufacturing Process Design and Development

   Phase 3: Process design/ development review

   Phase 4: Process design/development verification

   Phase 5: Process design/development validation

3. **Success**

   Success refers to a product that meets customer goals and performance expectations. In this study success refers to fast and effective new product introduction process.

4. **Capabilities** are Knowledge Integration, Problem Solving and Uncertainty Reduction, Continuous Concurrency, and Simplicity.

   1. **Knowledge Integration**

      A company's ability to integrate and embed in External knowledge, Internal knowledge, and Past knowledge.

      - **External knowledge** such as knowledge about customers and markets, new technologies, and supplier capabilities;

- **Internal knowledge** such as the company's available technology and internal capabilities in R&D and production;

- **Past knowledge** such as knowledge about old mistakes and good solutions from previous projects.

2. **Problem Solving and Uncertainty Reduction**

   A company's ability to identify and solve problems early and the ability to avoid and reduce uncertainty already in the early phases.

3. **Continuous Concurrency**

   A company's ability to overlap tasks in the early phases and keep relevant people and functions continuously involved from the early to the late phases; thereby reducing the target setting lead-time, assuring that targets are shared, accurate and feasible, and enable continuous learning throughout the project. Supports early knowledge integration and uncertainty reduction.

4. **Simplicity**

   A company's ability to reduce complexity in products, processes, systems, documentation, and organization, and by this reducing the overall development task and making the individual tasks simpler, thus enabling the other capabilities.

1.6 Scope of the study

The study is focused on:

- Assess the influence of Knowledge Integration in new product introduction process.
- Assess the influence of Problem Solving and Uncertainty Reduction in new product introduction process.

- Assess the influence of Continuous Concurrency in new product introduction process.
- Assess the influence of Simplicity in new product introduction process.
- Suggest from the finding which factors are critical for an EMS company to improve new product introduction process.

1.7 Benefit of the study

This thesis will help the Electronics Manufacturing Service providers (EMS) to further develop strategies and practices for fast and efficient new product introduction.

1.8 Expected contributions of the study

The contributions of this thesis will be:

1. A summary and analysis of existing new product introduction process in the case company.
2. An overview of critical factors influencing the fast and effective new product introduction process.

1.9 Structure of the Master Thesis

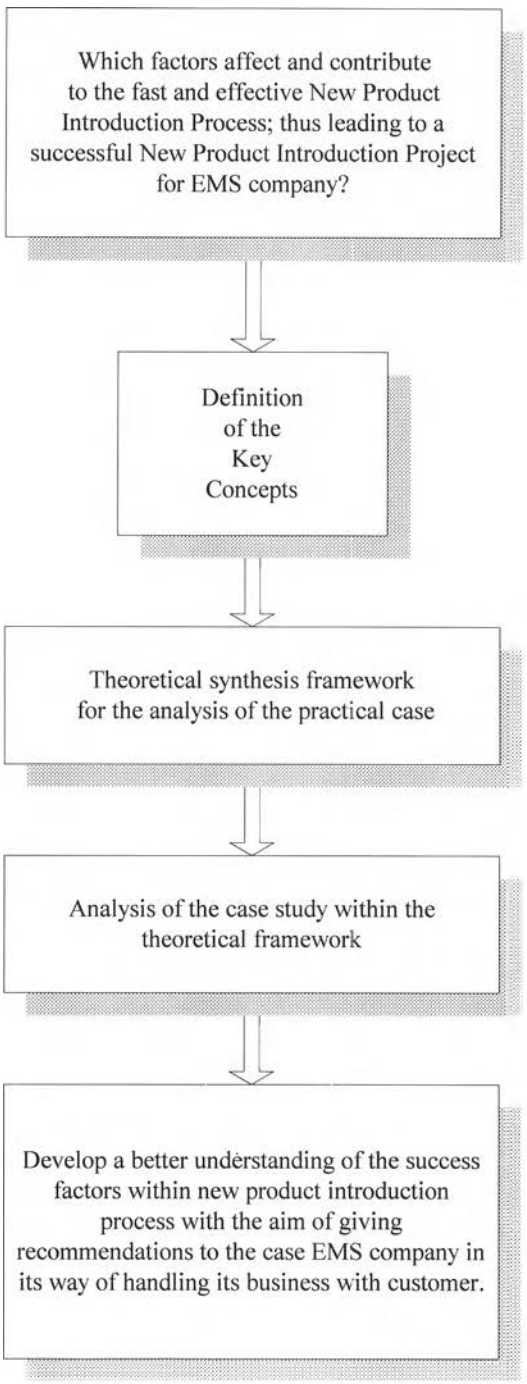

Figure 1.1: Structure of the Master Thesis

1.10 General Outline of the Master Thesis

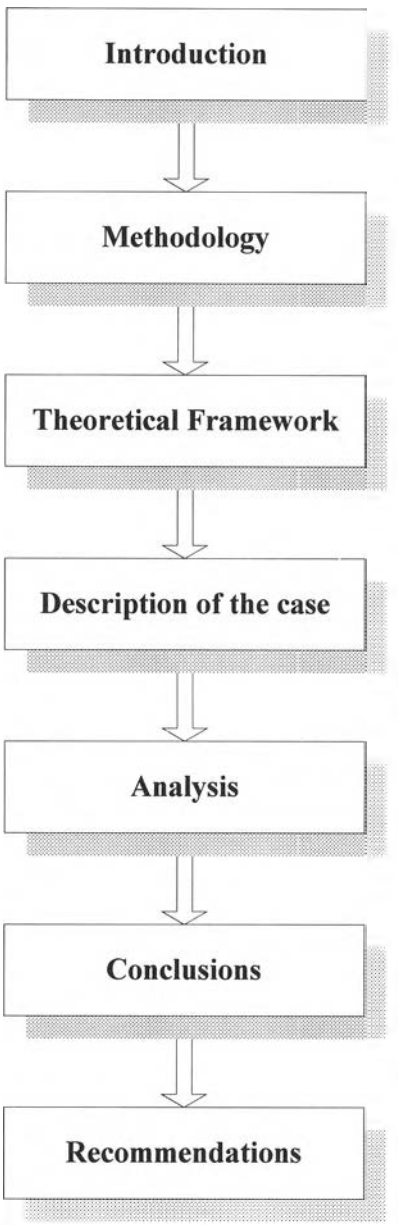

Figure 1.2: General Outline of the Master Thesis