New Product Development in the Mobile Device Industry

*Agility as the 10th Success Factor*

Master Thesis in Business Administration

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Jönköping May 2010
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Rik Vietsch & Jessica de Mol

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Abstract

Introduction
Existing literature points out the importance, yet also the difficulty of successful New Product Development (NPD). The authors question whether the theoretical success factors apply to the case of Sony Ericsson, a mobile device manufacturer. The significance of this research is that the mobile device industry is a preeminently competitive and innovative industry in which New Product Development fulfills an important role.

Purpose
The purpose of the study is to gain deeper understanding of NPD success factors in the mobile device industry.

Method
To question whether theoretical NPD success factors can be applied to the mobile device industry, an abductive, qualitative research approach is used. Exploratory research is conducted and the research strategy that is chosen is the case study approach. Data is collected through literature study, a survey and in-depth interviews. First, the survey was created as an orientation for the authors and to choose a mobile device manufacturer. Then, the theoretical framework was set as a basis for the interviews with Sony Ericsson, which acquired the empirical findings.

Conclusion
There are nine theoretical success factors in the NPD process that are most relevant for this study and can be applied to the mobile device industry. These are a high-quality NPD process, clear and well-communicated NPD strategy, adequate resources, senior management commitment, entrepreneurial climate, senior management accountability, strategic focus and synergy, high-quality development teams and cross-functional teams. All these theoretical success factors are applicable at mobile device manufacturer Sony Ericsson. Yet, an industry-specific success factor that is not mentioned in the theoretical success factors, but is apparent in the empirical findings, is agility. Agility and speed is of importance in the mobile device industry, as it is a highly innovative and competitive industry where the product life cycle shortens.
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1 Introduction and Background

This chapter aims to give an introduction and background to the topic of this study. The introduction is followed by the problem definition and purpose. The introductory chapter will end with the research questions that are used in this study.

1.1 Introduction to topic

New product development (NPD) has been a popular research topic over the last 40 years. Current literature on NPD points out the importance, yet also the difficulty, of new product development. Especially the importance of new product development is a popular topic. Cooper & Kleinschmidt (1987, p. 169), two gurus in the area of NPD, will go as far as saying that “managing NPD is, to a great extent, a process of separating the winners from the losers.” Furthermore, they claim that new products are central to the growth and prosperity of the modern corporation (Cooper & Kleinschmidt, 1993). Craig & Hart (1992) state that NPD is no longer a strategic option, but a necessity. Brown & Eisenhardt (1995) explain that NPD is among the essential processes for success, survival, and renewal of organizations, particularly for firms in either fast-paced or competitive markets. Trott (2008, p. 388) provides a very clear definition of NPD:

“The process of transforming business opportunities into tangible products.”

Furthermore, Trott (2008, p. 360) describes NPD as “a part of a web of strategies. It is linked to, and its objectives are derived from, marketing strategy, technology strategy and the overall corporate strategy. These other strategies provide the role, the context, the impetus and the definition of the scope of new product strategy.” Subsequently, NPD can be seen from different perspectives such as marketing, economics, production management, design & engineering, etc. This also becomes clear from the definition that Cooper & Kleinschmidt (2007, p. 57) provide:

“Those steps, activities and decision-points that new product projects follow from idea to launch and beyond.”

It is obvious that a new product ‘from idea to launch’ passes all the different departments of a company. Craig & Hart (1992) point out that the term ‘new product development’ is a term used by those in marketing and management. Those in Research & Development (R&D) would use ‘innovation’ and those in engineering ‘design’. This again reflects the interdisciplinary nature of new product development.

Trott (2008), Cooper & Kleinschmidt (1987, 1993, 2007), as well as Craig & Hart (1992) point out that NPD is a process that stretches throughout the organization. One can assume that any successful new product should perform well in all of these different areas. This characteristic might point out the difficulty of successful NPD. A ‘NPD department’ does not exist. The process needs to be incorporated in all different areas of the business.
1.2 Difficulty of NPD

Having a formal process for NPD is now the norm (Barczak, Griffin & Kahn, 2009), and one finds that there are many attempts in NPD literature to define good practices in NPD. Yet, these good practices are rarely put into practice in a way that provides new products the much-needed success. The before mentioned Dr. Robert G. Cooper and Dr. Elko J. Kleinschmidt have been doing research in this area for over thirty years, still the success rates of new products have not shown any increase over the years (Barczak et al., 2009). Also Craig & Hart (1992, p. 4), come to the conclusion that “any company embarking on an NPD faces a high risk of failure.” This risk is illustrated by Crawford, 1977 (cited in Craig & Hart, 1992), whom reports failure rates ranging from 20 per cent to as high as 90 per cent.

Since 1990, the Product Development & Management Association (PDMA) has conducted three best practice studies (Barczak et al., 2009). In 1990, firms commercialized one successful product for every 11 projects started. In 1995 only 6.6 ideas were required to generate a new product success. At this moment, more companies indicated that they used a formal NPD process; 61.5% compared to 55.6%. In 1995, companies started on average seven new NPD projects for every success in the marketplace. One can conclude that, despite the ubiquitous literature, there has not been any significant improvement in new product success.

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<th>2004</th>
<th>1995</th>
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<td>Percent successes</td>
<td>59</td>
<td>59</td>
<td>58</td>
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<tr>
<td>Percent Success-Profits</td>
<td>54.2</td>
<td>54.6</td>
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<tr>
<td>New Product Sales Percent of Total</td>
<td>28.0</td>
<td>32.4</td>
<td>32.6</td>
</tr>
<tr>
<td>New Product Profit Percent of Total</td>
<td>28.3</td>
<td>30.6</td>
<td>33.2</td>
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*Table 1. Success-Trends (Barczak, Griffin & Kahn, 2009, p. 6)*

The conclusion of the research conducted by Barczak et al. (2009) is that success rates and efficiencies have remained stable, although new products are contributing a lower percentage of revenues and profits than previously. When one takes into consideration the importance of NPD, as mentioned by Cooper & Kleinschmidt, Craig & Hart, etc, one can conclude that improvements in this process are of great relevance. A critical reader might also wonder whether the relevance of NPD literature should be questioned. Yet, failure in NPD often occurs when there is no formal NPD process in place.
1.3 Importance of NPD in Mobile Device Industry

Information technology research and advisory company Gartner (2010) claims in a report about the mobile device industry that in the last quarter of 2009 the global shipment of Smartphones grew to 54.5 million units. Compared to the same quarter in 2008 this was a growth of 39.0%. In the mobile device industry new models rapidly succeed each other. The firms in the mobile device industry are technology-intensive; their approach is based on exploiting technological innovation in a rapidly changing market (Trott, 2009). With increased competition, quickening pace of technological change and more narrow windows of opportunity, Cooper & Kleinschmidt (1993) point out that manufacturers in such an environment will have to rely on more new products that reach the market. The iPhone is the perfect example of a successful new product where the established brands were left behind. Gartner (2010) reported that Apple successfully captured market share from the other larger device producers, controlling 14.4 % of the worldwide Smartphone market. The iPhone has only first been introduced in 2007. Nokia describes Apple as a competitor with a high-end, vertically integrated offering supported by a large number of applications that are distributed through their proprietary application store (iTunes). By focusing on this lucrative high-end, high-margin segment, creating an applications ecosystem and offering consumers a modern, easy to use interface, Apple has been able to capture industry value share (Nokia Form 20-F, 2009).

According to Zirger & Maidique (1990) failures are more likely for products introduced into highly competitive markets. Gartner (2010) predicts that the mobile device industry will grow in 2010, increasing the pressure of competition, which had already been intense throughout 2009. Ernst (2002) points out that empirical studies point to high failure rates of new products, especially in consumer markets, such as the mobile device industry. Zirger & Maidique (1990) claim that NPD success is critical, especially in technology driven competitive industries, such as the mobile device industry. The characteristics mentioned above, together with the presence of one of the major players in our geographical surrounding form the basis of the research in this thesis.

Summarizing, this research studies the mobile device industry as this industry is preeminently an industry in which NPD is an important factor because of its dependency on innovation and high level of competition.
1.3.1 Mobile Device Industry

As mentioned before, successful NPD has proven to be a difficult process. For this study, the mobile device industry will serve as the area of focus. In this industry, NPD is preeminently a success factor. Competition in the mobile device industry is fierce. The success of new products is crucial due to the shortening product life. And finally, the industry is relying heavily on the commercialization of innovations.

1.3.2 Industry Trends

Currently, two major types of mobile devices can be identified; the traditional cell device and the Smartphone. In their annual report of 2009, market leader Nokia stated that the mobile communications industry is undergoing significant changes. The first change is the increasing maturity of the traditional mobile device market. The traditional mobile phone can be used for basic voice transfer and messaging. Manufacturers mostly compete on price, which is followed by design. It can be said, that there are no major innovations taking place in this sub-market of the mobile device industry.

The second change is the ongoing digital convergence and the resulting growth of the Smartphone and related services market. The Smartphone is also referred to as a converged mobile device. A Smartphone, broadly speaking, combines the functions of a PDA (personal digital assistant) with those of the traditional mobile device.

In contrast to competition of the traditional mobile devices, the Smartphone market involves advanced technologies. Additionally, firms in the Smartphone industry must be able to bring additional value to users of their devices through services, including applications and content developed by themselves and/or by third parties, and the quality of the overall user experience with their devices. The devices should offer, for example, Internet access, various means of messaging, media, music, entertainment, navigation, location based and other services (Nokia Form 20-F, 2009). In the first quarter of 2010 54.5 million Smartphones were sold (nu.nl, 2010).

The above increases the importance of technological innovation. The rise of the Smartphone has increased innovation, competition, and the origination of business opportunities. Elements from the mobile device industry, the Internet industry and the personal computer industry provide the opportunities in the mobile device-, and in particular the Smartphone industry. The media and content that were previously accessible on the Internet only through personal computers are now increasingly available for consumption on mobile devices. This has opened up new opportunities to create value for consumers through innovative new service offerings and user experiences. (Nokia Form 20-F, 2009) Consequently, NPD has become increasingly important in this technology-intensive industry.
1.4 Problem Definition and Purpose

Firstly, drawing from the introduction: NPD is critical in the success of a firm. The success in the mobile communications industry requires continuous introduction of new products and services and their combinations based on the latest available technology (Nokia Form 20-F, 2009). Secondly, although critical, success rates in NPD show significant room for improvement (Crawford, 1977 cited in Craig & Hart, 1992). Thirdly, NPD in technology driven and competitive industries seems especially critical. The mobile device industry meets both characteristics. The industry provides a perfect environment to put the theories into practice in order to develop new products successfully.

Cooper & Kleinschmidt (1993) state that forces external to the project, for example the attractiveness of the market place, the competitive situation, etc, surely influence the success of new product success. Yet, NPD literature points out that the NPD process, rather than external forces, is a dominant factor in the eventual success of new products (Cooper & Kleinschmidt, 1993). This makes it worth to align the success of a new mobile device with that of the NPD process. In almost 40 years of NPD literature, many authors have attempted to identify certain success factors for NPD. The amount of described drivers of success might leave a manager in the mobile device industry confused and uncertain of the implication of success factors. Furthermore, the vast amount of literature describes many different success factors; a manager in the mobile device industry might be confused about which apply for the mobile device industry.

Therefore the purpose of this thesis is:

*To gain deeper understanding of NPD success factors in the mobile device industry.*
1.5 Research Questions

To narrow down the purpose statement, research questions are stated. According to Saunders, Lewis & Thornhill (2009) one of the key criteria of research success is whether there is a set of clear conclusions drawn from the collected data. This emphasizes the importance of defining clear research questions at the beginning of the research process (Saunders et al, 2009).

A survey was conducted in order to select the most relevant mobile device manufacturer to study. After the selection of a mobile device manufacturer, a study was done to understand how different authors define success in NPD. With this data, a set of success factors was selected. Consequently, these success factors were studied in a literature review.

As the purpose of this study is to gain deeper understanding of the NPD success factors in the mobile device industry, the following research questions are presented:

- What is success according to authors of NPD success factors?
- Which theoretical success factors are most relevant for this study?
- How can the theoretical success factors (TSF) be applied to a mobile device manufacturer?
- Are there industry-specific NPD success factors for the mobile device industry?
2 Frame of Reference

The purpose of this chapter is to gain a deeper understanding of the theoretical NPD success factors. The selection of theoretical success factors is explained, followed by the description of each of those factors.

2.1 Introduction to frame of reference

As mentioned before, there is no shortage of literature on NPD. Many authors point out the importance and the difficulty of the process. Craig & Hart (1992), Montoya-Weiss & Calantone (1994), Brown & Eisenhardt (1995), and Ernst (2002) have made attempts to organize and structure the existing literature at that point. Because of the large amount of research, Henard & Szymanski (2001) point out that it is difficult to develop a clear and comprehensive understanding of why some new products succeed and others fail. Yet, Craig & Hart (1992) concluded that the findings of NPD research have been quite similar and that it has pointed out the importance of NPD.

Much of the literature is focused on defining certain success factors for NPD. Conclusions tend to converge to a common set of success factors that return, in one form or the other, in the majority of research. Ernst (2002) has provided the most extensive and recent review of the empirical literature in the area of NPD. Ernst (2002) has noticed that over a period of nearly thirty years, the results of empirical NPD research have remained fairly constant and that findings by other authors barely differ from the findings of Cooper & Kleinschmidt (1987, 1993, 1995, 2007). For this reason, Cooper & Kleinschmidt can be seen as the current opinion leaders in the area of NPD. Despite the noticeable convergence of findings, Hauschildt (1993 cited in Ernst, 2002, p. 2) claims that “a universally valid theoretical framework for the network of correlations between variables and successful innovation does not exist.”

This literature review attempts to describe the theoretical success factors defined by Cooper & Kleinschmidt (1995). In the paragraph below the choice for these particular theoretical success factors will be explained. As mentioned before, the literature on NPD tends to converge on several points. Similar drivers of success are mentioned in different phrasing. For the sake of structure, this research will discuss the nine different success factors that Cooper & Kleinschmidt have defined in their latest research (Cooper & Kleinschmidt, 1995). In this literature review, these factors will be referred to as Theoretical Success Factors (TSF).

When discussing success factors, Ernst (2002) points out that his research only discusses those that can be influenced by management. To explain Cooper & Kleinschmidt’s success factors this research will also use the literature provided by other authors describing the same success factors. Furthermore, the literature will be structured by the identified success factors. The success factors are ordered by their impact on performance according to Cooper & Kleinschmidt (1995).
2.2 Selection of Success Factors

This literature review will continue with an explanation of the choice of the success factors that are used in this study. This will start with a brief description of the influential work by Cooper & Kleinschmidt. An explanation of the reasons why the success factors by these particular authors have been chosen will follow. For this selection an analysis of the most relevant ways of success measurement is necessary. Based on the success measurement, the success factors that influence this defined success have been selected; these will represent the success factors that are the subject of this study. Finally, the separate success factors are analyzed by use of the literature by Cooper & Kleinschmidt and that of other authors in this area.

2.2.1 Cooper & Kleinschmidt

Cooper & Kleinschmidt deserve to be mentioned specifically when one studies success factors in NPD. Cooper & Kleinschmidt have produced the majority of the literature in the field of NPD. Over the years Cooper & Kleinschmidt have altered their success measures and, consequently their success factors. Most of their work can be seen as confirmation and improvements of their preceding research. Ernst (2002) concluded that Cooper & Kleinschmidt have had a profound effect on NPD research and are among the most cited researchers in the area of NPD. Ernst (2002) has summarized Cooper & Kleinschmidt’s work from the 1970’s until the second half of the 1990’s as well as the findings of other relevant research with respect to NPD and concluded that these findings barely differ from those of Cooper & Kleinschmidt. His explanation for this is that most authors relied on the Cooper & Kleinschmidt’s preliminary conceptual work. To confirm this, the authors of this study have also identified and summarized the success factors by doing their own literature review.

2.2.2 Definition of success

There are many success factors described in current literature. In order to find the most relevant for this study, it is important what the different authors of current literature understand by success. Success can be measured at different levels, and not all of them provide a clear image of the success of a NPD program. To select the success factors that will be used for this research, this study first analyzes at which level measurement is most relevant.

2.2.3 Types of Success Measurement

Henard & Szymanski (2001) point out that in new product performance literature a variety of measurement factors are used. Griffin & Page (1993) report that in 1990 members of the Measures of Success and Failure Task Force assembled by the PDMA (Product Development and Management Association) identified articles that reported measures of success and failure, and extracted each measure used by each researcher. This generated 46 different success and failure measures as reported in 77 articles generated out of 61 different research projects.

The level of measurement is important concerning success factors. Here there are two options: micro and macro level. Montoya-Weiss & Calantone (1994), for example, use a micro, or project level of analysis. On the other hand, Cooper & Kleinschmidt (1995) provide three reasons to measure success at the macro, or company level. Firstly, success measures at the project level are not always linked to company level metrics. To illustrate this, Coop-
er & Kleinschmidt (1995) point out that, for example, “a company might have a string of successful new products (measured by return on investment), but because they were relatively small, incremental projects, and because the firm was so large, these “winners” had a relatively minor impact on the company’s total operation. And so the company is judged to have a mediocre new product performance, overall.” (Cooper & Kleinschmidt, 1995, p. 376) In other words, important practices, like creating an innovative climate and culture, are not readily apparent or measurable at the product level.

Secondly, “there may be company practices that are not apparent at the project level and yet are important to success; and these practices may be missed—simply not observed or measured—when the unit of analysis is the project.” (Cooper & Kleinschmidt, 1995, p. 376).

As an example, Cooper & Kleinschmidt (1995) mention the existence of a clear and solid corporate strategy for product innovation. This can hardly be noticed at project level.

Finally, “when pairs of successes and failures are selected from each firm, company characteristics that may be important to success will be common to both the success and the failure” (Cooper & Kleinschmidt, 1995, p. 376). As early as 1983, Cooper (1983) pointed out that concentrating only on the new product rather than the totality of the firm’s new product program could result in a “win the battle, but lose the war” outcome. For the reasons mentioned above, this study will use success factors that are derived from measuring success at the company level.

Besides Cooper & Kleinschmidt (1995), Griffin & Page (1993) have also generated a set of success and failure measures derived from three different sources. They listed the 46 measures researchers indicated to use, 34 measures that corporate practitioners indicated to use, and measures practitioners would like to use. They found that all three groups mentioned 16 core measures. Amongst these 16 core measures, there are five which are related to product-level success measurement, which, for the reasons of Cooper & Kleinschmidt (1995) are less relevant. The product-level measures are presented in the red box in figure 1.

Remaining from the performance measures from Griffin & Page (1993), are measures that are very similar to those of Cooper & Kleinschmidt (1995). Griffin & Page (1993) point out that the structure developed and used extensively by Cooper (1983) fits nicely into the program and firm-level categories of their own structure, these are presented in the green box in figure 1. The work by Cooper (1983) is an earlier study than the one that Cooper & Kleinschmidt (1995) used to construct the Performance Map, although the performance measures were surprisingly similar. Cooper & Kleinschmidt tend to make incremental improvements in their research. The similarities between the work of Griffin & Page (1993), which is a result from a summary of measures indicated by theoretical and practical ‘experts’, and the close connection between the early (Cooper, 1993) and later work (Cooper & Kleinschmidt, 1995) of Cooper & Kleinschmidt, validates the choice to use the performance measurement method provided by Cooper & Kleinschmidt in 1995.
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<th>Griffin and Page, 1993</th>
<th>Cooper &amp; Kleinschmidt, 1995</th>
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<tr>
<td>• Customer Acceptance</td>
<td>• % of sales by new products</td>
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<tr>
<td>• Customer Satisfaction</td>
<td>• Impact of NPD on annual Profit</td>
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<tr>
<td>• Met Revenue Goals</td>
<td>• Impact of NPD on annual Sales</td>
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<td>• Revenue Growth</td>
<td>• Success rate</td>
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<td>• Met market share goals</td>
<td>• Technical success rate</td>
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<td>• Met unit sales goals</td>
<td>• Program Profitability</td>
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<td>• Break-even time</td>
<td>• Profitability relative of spending</td>
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<td>• Attain margin goals</td>
<td>• Profitability relative to competitors</td>
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<td>• Attain profitability goals</td>
<td>• Success in meeting sales objectives</td>
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<td>• ROI</td>
<td>• Success in meeting profit objectives</td>
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<tr>
<td>• % of sales by new products</td>
<td>• Overall Success</td>
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**Product-Level Measures**

- Development costs
- Launched on time
- Product performance level
- Met quality guidelines
- Speed to market

**Company-Level Measures**
2.2.4 Success Measures

Following the success measures, Cooper & Kleinschmidt (1995) benchmarked the critical success factors in NPD, using ten different measures of NPD performance (see figure 2). They used two dimensions to determine in which of the four types a company can be placed: program impact and program profitability. In total they used ten performance measures, based on existing literature. All ten influenced the two factors, which equal the X- and Y-scale of a Performance Map (Cooper & Kleinschmidt, 1995, p. 379). The X-ax is the program profitability and the Y-ax stands for the program impact, meaning the impact of the total new product efforts on the business.

Subsequently, Cooper & Kleinschmidt (1995) grouped the companies with similar results in terms of their performance in the two performance factors resulting in four different clusters. They refer to these clusters as the four Performance Types; High-Impact Technical Winners, Dogs, Solid Performers, and Low-Impact Performers. From these four performance types, the Solid Performers represent the group with highest scores on all measures. With the Performance Map, Cooper & Kleinschmidt (1995) provide the clearest and most lucid way of measuring and organizing performance in NPD literature. Using their benchmarking study Cooper & Kleinschmidt (1995) could identify what distinguishes the Solid Performer from the rest. These results represent the success factors that will be analyzed in this study.

2.2.5 Three Cornerstones of Success

As mentioned before, Cooper & Kleinschmidt (1995) consider a firm successful in NPD when they score high in two different dimensions: the profitability of the new product ef-
forts, and the impact of the total new product effort on the business. To measure these two
dimensions they use the ten different performance measures in figure 3. To achieve this
they found nine different success factors that distinguish the best performing companies,
which score the highest in all ten performance measures. From these nine success factors
they created the three cornerstones of new product performance. They are the three suc-
cess factors with the highest correlation to performance.

![Figure 3. Three Cornerstones of New Product Performance (Cooper & Kleinschmidt, 1996, p. 467)](image)

From their research Cooper & Kleinschmidt (1995) concluded that these three had the
strongest effect on both measures. They mention that “merely having a formal new prod-
duct process in place had no effect on performance. It was the nature of the process, a high
quality process which built in the ingredients listed in the cornerstones of new product pe-
formance (figure 3), that made the difference.” (Cooper & Kleinschmidt, 2007, p. 65)

Furthermore, technology or new product strategy must be firmly linked to business strat-
egy. This means that “management must develop a new product strategy that ties new
products closely to the achievement of business goals, has clearly stated objectives, and de-
fines areas of strategic focus or thrust.” (Cooper & Kleinschmidt, 2007, p. 65)

Finally, adequate resources should enable the firm to realize its strategy. “The goal of a
high-performance new product effort and a high-quality new product process will not be
achieved unless the resources are in place.” (Cooper & Kleinschmidt, 2007, p. 65). The se-
lection process is summarized in figure 4.
Figure 4. Selection of Success Factors (Vietsch & de Mol, 2010)
2.3 Theoretical Success factors

Now that a certain set of success factors have been selected, each of them will be discussed separately. The nine success factors are: high-quality NPD process, clear and well-communicated NPD strategy, adequate resources, senior management commitment, entrepreneurial climate, senior management accountability, strategic focus and synergy, high-quality development teams, and cross-functional teams.

The description of Cooper & Kleinschmidt will be used, but also those of other authors that have discussed resembling or similar success factors.

2.3.1 TSF 1: A high quality new product process.

As mentioned before, NPD literature tends to focus on certain success factors in NPD that drives the performance of new products. An often-mentioned success factor is the NPD process. This success factor is mostly mentioned by Cooper & Kleinschmidt (1995) and is the most important in their nine success factors, as well as the three cornerstones of performance (Cooper & Kleinschmidt, 2007, see figure 3). Ernst (2002) concludes that findings of other authors barely differ from those of Cooper & Kleinschmidt. From a review of the other literature, the authors of this study can only agree with this. The other authors either mention the high-quality NPD process, or factors that Cooper & Kleinschmidt give as ingredients of a high-quality NPD process (see Appendix 1). The first time Cooper & Kleinschmidt published about NPD process as a success factor was in 1979 and they have improved their work continuously resulting in certain characteristics of a high-quality NPD process.

As mentioned before, having a ‘high quality new product process’ is the driver with the highest correlation to new product success. Under this, Cooper & Kleinschmidt (1995) place the focus on quality of execution, a complete and thorough process, emphasis on up-front homework, a sharp and early product definition, tough go/kill decision point, and flexibility.

Cooper & Kleinschmidt (1995) emphasized that merely having a formal NPD process is not enough. They found that there is no correlation between having a formal product development process and performance results. Rather, it was the quality and nature of that process that really drove performance. Their conclusion was that having a high-quality and rigorous new product process was the strongest driver of success. According to Cooper & Kleinschmidt, doing up-front homework, having tough go/kill decision points, having a sharp and early product definition, showing flexibility, a focus on quality of execution, and a complete and thorough process can increase the quality of the NPD process.

This research shows that Cooper & Kleinschmidt (1995) put an emphasis on preparatory work in order to improve the quality of the NPD process. They refer to this as up-front homework. It includes those activities that occur before development begins. Cooper & Kleinschmidt (1995) refer to initial screening, market- and technical assessments, competitive studies, financial analysis, and technical and manufacturing appraisals. By performing these different activities, a firm builds up a business case. This homework stage should be built into the new product process. To achieve built-in steps, Cooper & Kleinschmidt (1993) suggest the Stage-Gate™ system. Many of the factors that contribute to a high-quality NPD process are features of the Stage-Gate™ system, which is developed by
Cooper (1990), and Cooper & Kleinschmidt (1993). This model will be described in the paragraph below.

### 2.3.2 Stage-Gate™ Systems

In a highly innovative and competitive market as the mobile device industry, improving the innovation process is a must. There is a need for a more disciplined approach to product development according to Cooper & Kleinschmidt (1993). One solution is the implementation of a Stage-Gate™ system, a conceptual and operational model for moving a new product from idea to launch (Cooper, 1990). Stage-Gate™ systems recognize that product innovation is a process and that innovation can be managed. Stage-Gate™ systems simply apply process-management methodologies to this innovation process (Cooper, 1990). Cooper and Kleinschmidt (1993) say that the performance results of investigated firms who implemented these processes are positive. The effects of the implementation of a Stage-Gate™ system are improved teamwork, less recycle, higher success rates and shorter cycle times. To implement such a system into a firm in the mobile device industry, the process from idea to successful launch of a new product needs to be clear. According to Cooper (1990) Stage-Gate™ systems usually involve from four to seven stages and gates, the stages are where the work is done and the gates ensure that the quality is sufficient. Each stage is usually more expensive than the preceding one and information becomes better and better, so risk is managed. A typical system is shown in figure 5.

![Figure 5. An overview of a Stage-Gate™ System (Cooper & Edgett, 2010)](image)

Cooper (1990) points out that product innovation will always be a high-risk endeavor. He indicates the Stage-Gate™ system is merely a discipline that builds the success ingredients into the innovation process by design rather than by chance. The results are better decisions, more focus, fewer failures, and faster developments. More recent studies introduce optimized Stage-Gate™ systems, a result of companies that have too many projects and not enough resources to do them well (Cooper, Edgett & Kleinschmidt, 2002). Cooper et al. (2002) show a new three scaled version of a Stage-Gate™ system with three processes: the significant customer request, fast track process, and full five-stage process. To ensure a firm is doing the right projects in the right way, the gates have to become the quality control checkpoints in the process. That’s why tough Go/Kill decisions need to be built into the new product process, where all projects are carefully scrutinized, and weak ones are really killed (Cooper et al., 2002).
2.3.3 TSF 2: A clear and well-communicated new product strategy

Cooper & Kleinschmidt (1995) found that ‘a clear and well-communicated new product strategy’ was the second most relevant performance driver. They explain that this means that there were goals defined for the new product program; what sales, profits, etc. of new products would contribute to the corporate goal. Cooper & Kleinschmidt (2007) mention the example of 3M having goals such as “30 percent of our division’s sales will come from new products introduced over the next three years”. Secondly, the role of new products in achieving company goals should be clearly communicated throughout the firm. Everyone in the organization should be aware of the goals in order to have a common purpose. Also Davidson, Clamen & Karol (1999) mention clarity as a principle that needs to be adopted for successful NPD. They state that this process must go beyond descriptions of stage and gate, and should specifically define what needs to be done, by whom, when and how. Thirdly, the specified areas of strategic focus of the new products, such as markets or technologies, should be clearly defined. Without this definition the search for specific new product ideas or opportunities is unfocused. Cooper & Kleinschmidt (2007) mention that, over time, the portfolio of new products is likely to contain a lot of unrelated projects. Finally, the new product program should have long-term thrust.

One question that arises from Cooper & Kleinschmidt’s (1995) view on this success factor is how a ‘new product strategy’ differs from any general company strategy. For this reason, the emphasis will be put on the communication aspect of this performance driver by analyzing findings of other authors discussing the same success factor.

Brown & Eisenhardt (1995) define three research streams; product development as rational plan, communication web, and disciplined problem solving. Research within each stream centers on particular aspects of product development. The rational plan research focuses on a very broad range of determinants of financial performance of the product, whereas the communication web work concerns the narrow effects of communication on project performance. Disciplined problem solving centers on the effects of products—a development team, its suppliers, and leaders on the actual product-development process. In this study, the focus will lie on product development as communication web, because of its similarities to Cooper & Kleinschmidt’s (1995) success factor.

Brown & Eisenhardt (1995) base their study on work by Allen (1971, 1977). According to the authors the underlying premise is that communication among project team members and with outsiders stimulates the performance of development teams. Therefore, the better that members are connected with each other and with key outsiders, the more successful the development process will be.

Internal communication between team members and different departments within the organization is important in the process of new product development. Internal group cohesion helps performance (Keller, 1986 cited in Brown & Eisenhardt, 1995) and teams with more thorough internal communication have superior performance (Ancona & Caldwell, 1992 cited in Brown & Eisenhardt, 1995). Research by Dougherty (1990 cited in Brown & Eisenhardt, 1995) states that individuals from different departments understood different aspects of product development, and they understood these aspects in different ways. This difference led to varying interpretations, even of the same information. Interestingly, what distinguished successful projects was not the absence or presence of these barriers, but rather how they were overcome. For successful products, cross-functional personnel combined their perspectives in a highly interactive, iterative fashion (Dougherty, 1990 cited in
Brown & Eisenhardt (1995). Katz (1982 cited in Brown & Eisenhardt, 1995) researched how communication affects the performance of teams over time and found out that decline in performance was significantly correlated with a decline in external communication. Zirger & Maidique (1990, p. 872) also point out that “successful development relies on strong communication links and cooperation between the functional groups in order to effectively manage the transition of the product through the various design and development stages.” To achieve this, Brown & Eisenhardt (1995, p. 358) found that “cross-functional teams that structure their internal communication around concrete tasks, novel routines, and fluid job descriptions have been associated with improved internal communication and successful products.”

Concerning communication, Craig & Hart (1992) refer to the coordination of marketing and R&D. This involves information sharing and decision agreement. Craig & Hart (1992, p. 32) claim that: “the most important mode for communication is informal, with much reference being made to telephone and informal discussions. Notably, successful project teams spend their time solving task-related issues and tend to ignore interpersonal problems.”

Finally, Troy, Szymanski & Varadarajan (2001) refer to the importance of communication concerning the generation of new product ideas. They point out that a high degree of information sharing within the organization can increase the value of the information, exponentially when members use it to generate new ideas. This is relevant because, according to Troy et al. (2001), the number of ideas is a key element in NPD. The greater the pool of ideas, the greater the possibility that a few high-quality ideas will emerge. The number of ideas has shown to be positively correlated with measures of performance. To achieve this, managers need to take away barriers from information flow and encourage integration between members from different functional backgrounds (Troy et al. 2001).

From the before mentioned, one can conclude that the sharing of information is an important factor in the NPD process. However, NPD handles information that is not yet open to the firm’s competitors, since the products are yet to be launched. Teece (1986), points out that it has long been known that patents do not work in practice as they do in theory and that they can easily be ‘invented around’ at modest cost. As an alternative to this, Teece (1986) suggests the use of trade secrets. Trade secrets only work when “a firm can put its product before the public and still keep the underlying technology secret.” (Teece, 1986, p. 287).

### 2.3.4 TSF 3 & 4: Adequate Resources & Senior Management Commitment

The third and fourth drivers of superior performance, according to Cooper & Kleinschmidt (1995), are the dedication of adequate resources of people and money and senior management commitment. Both success factors are closely related and Ernst (2002) places them both under the element of senior management commitment. Cooper & Kleinschmidt (2007) explain that top performing firms had the needed resources to undertake new products in place. Senior management had made the necessary resource commitment, and kept it. Concerning the role of senior management, Ernst (2002) remarks that support must be provided in material and non-material form.

Cooper & Kleinschmidt (1995) identified three ingredients that lead to resource adequacy. Firstly, senior management should devote the necessary resources in a way that they are
aligned with the business’s new product objectives and processes. Secondly, the R&D budgets should be adequate to achieve the stated objectives. Finally, the necessary people are in place, and release time is given for specific new products projects. (Cooper & Kleinschmidt, 1995) Assignments of personnel to specific projects are made realistically, and in full awareness of their duties and obligations. From a senior management point of view, it is important that they provide the necessary funds and resources are in place (Cooper & Kleinschmidt, 1995). By doing so, they show their commitment. According to Cooper & Kleinschmidt (2007), there are certain success factors in involving senior management: senior management should be committed to risk-taking and they should communicate the importance of NPD.

Henard & Szymanski (2001) also mention dedicated human resources and dedicated R&D resources as dominant drivers of new product success. They see this as important strategy characteristics that have the potential for providing the firm’s competitive advantage in the marketplace.

Zirger & Maidique (1990) found that the senior management must be committed in order to approve to allocate scarce staff and resources to new product development. Therefore, the development teams must be able to show significant market demand for their product early in the development process (Zirger & Maidique, 1990).

2.3.5 TSF 5: Entrepreneurial Climate

Although there are not many other authors that mention an entrepreneurial climate as a success factor, Cooper & Kleinschmidt (1995) did find that this was the fifth performance driver. To create an entrepreneurial climate Cooper & Kleinschmidt (1995) found several success factors; a new product idea scheme, free time for creative projects, resources available for creative work and skunk works.

According to Ernst (2002), derived from the literature, the culture of the organization should offer employees the possibility to set a portion of their workday for independent work developing their own ideas, as well as working on unofficial projects. Furthermore, internal ‘venture capital’ should be available for the realization of creative ideas. Ernst (2002) particularly addresses the phenomenon of the product champion; “individuals within the organization who believe in the new idea and who advance it through the organization with great personal commitment.” (Ernst, 2002, p. 32). Although often positively related to product success, the exact role of the product champion is unclear and will not be discussed in this study.

2.3.6 TSF 6: Senior Management Accountability

Cooper & Kleinschmidt (2007) found that senior management accountability helps to drive the profitability that the organization achieved for new products. According to Cooper & Kleinschmidt (2007, p. 64) state that “Management accountability captures the degree to which new product performance was measured, and senior management was held accountable for the program results.” To achieve this, firms should consider management’s personal objectives and performance measurement. Furthermore, Cooper & Kleinschmidt (2007) suggest relating new product performance to senior management compensation.
2.3.7 TSF 7: Strategic Focus and Synergy

According to Cooper & Kleinschmidt (1995), the top-performing firms have a new product portfolio that includes products that do not require technology that is totally new to the firm. This means that the products remain close to the firm’s base and existing markets.

According to Zirger & Maidique (1990), strategic focus contributes to NPD success. Firms should build upon the firm’s existing technological, marketing and organizational competence. Zirger & Maidique (1990, p. 873) found that “entry into new markets or technologies generally requires the establishment of new customer/company connections, and if new personnel are brought in, new patterns of coordination required in the new product development loop can be significantly disrupted by the organizational restructuring that entry into new markets and technologies generally requires”.

2.3.8 TSF 8 & 9: High-quality new product development teams & Cross-functional Teams

Cooper & Kleinschmidt (1995) place high-quality new product project teams as the eighth driver of performance. This is closely related to the ninth performance driver of having cross-functional teams. “A cross-functional team is made out of members from different functions in the company, with a leader that is accountable for all facets of the project from the beginning to the end.” (Cooper & Kleinschmidt, 1995, p. 377).

Ernst (2002) concludes from his literature review that the NPD teams should be cross-functional to encourage interfunctional communication and cooperation. By this they can contribute to the resolution of possible interface problems.

Consequently, a high quality new product team should be cross-functional and should have the characteristics described below. Cross-functional teams highly contribute to the quality of the project team, which is why both success factors are discussed in the same paragraph.

Cooper & Kleinschmidt (1995) describe that a high-quality new product team means that the team leader is dedicated to one project instead of trying to lead many projects. The team should interact and communicate well and often, with frequent project update meetings. Finally, decisions made by outsider groups or people should be handled quickly and efficiently. This means that the team should enable outside decision makers to make quick decisions through internal marketing, communication, persuasion and a minimum of bureaucracy. (Cooper & Kleinschmidt, 1995)

Brown & Eisenhardt (1995) base their study on research by Imai, Ikuijiro & Takeuchi (1985 cited in Brown & Eisenhardt, 1995) that when the development team was composed of members with varied functional specializations, team members had access to more diverse information. In addition, cross-functional teams permitted the overlap of development phases, which also quickened the pace of product development. Furthermore, the authors observed that product development was accelerated by overlapping of development phases and cross-functional teams only if supported by continuous communication among project members. This communication increased the information flow among team members, making it easier for team members to understand each other’s specialties and to coordinate overlapped development phases (Imai, Ikuijiro & Takeuchi, 1985 cited in Brown & Eisenhardt, 1995, p. 17).
3 Methodology

This chapter aims to provide an overview of the methodological approaches, research design and data collection for application to the study on the success factors of the NPD process in the mobile device industry.

3.1 Introduction

The method for data collection is carefully structured in order to increase the validity of the thesis. Starting with the research background, followed by the research design, which describes whether exploratory, descriptive or explanatory research will be conducted. The research approach will explain the choice for an inductive, deductive and/or abductive approach and the strategy will clarify how to answer the research questions and meet the research objectives. The options for qualitative and quantitative research methods are mentioned in the data collection paragraph. Finally, the credibility and validity of the research findings, and the research ethics are described and clarified.

3.2 Research Background

Prior to this study, a survey was conducted in order to get an overview of the mobile device industry. The goal of this survey was to gauge opinions of consumers about their mobile devices and to gain understanding for the success of a mobile device. This survey showed that Nokia (31%), closely followed by Sony Ericsson (27%), were the two major players in the population of the survey. Since Sony Ericsson is located in Sweden and the authors have a connection within the firm, Sony Ericsson is chosen to serve as the subject of a case study. (The results of the survey can found in Appendix 2).

In this study, the traditional mobile phone will not play a big role. The market for traditional mobile phones is driven by the growth of the increased penetration of mobile devices in emerging markets, instead of innovations. In developed countries, the market is an increasing maturity. Therefore, the importance of new products is higher in the development of Smartphones. (Gartner, 2010)

It needs to be mentioned that with the introduction of Smartphones, net sales and profitability are increasingly driven by the user experience, which depends more on software that makes the device easier to use and services that allow users to personalize their devices, rather than hardware-based features such as cameras, general design, and aesthetics. Since Smartphones have the capacity to have different software installed on them some firms leverage their software expertise to continuously bring new innovations to market at a rapid pace, faster than typical hardware development cycles. (Gartner, 2010) A good example is the software updates that Apple spreads for its iPhones. Currently Apple will launch OS 4.0 offering innovations without providing new mobile devices (Apple, 2010). This part of the industry will not be discussed in this thesis. Nevertheless, the authors have chosen to study those aspects, which contribute to the success of a mobile device in relation to NPD.

3.3 Research Design

To turn the research questions, which can be find in chapter 1.5, into a research project, the focus must be on the process of research design. The classification of research purpose most often used in the research methods’ literature is the threefold one of exploratory, descriptive and explanatory (Saunders et al., 2009). In this study, exploratory research will be
conducted. An exploratory study is a valuable means of finding out ‘what is happening; to seek new insights; to ask questions and to assess phenomena in a new light’ (Robson, 2002 cited in Saunders et al., 2009, p. 139). This research design is chosen because through literature study, interviews and a survey the research questions will be answered. Thus, this study is not descriptive or explanatory, as the purpose of this research is not to produce an accurate representation of persons, events or situations nor focuses on studying a situation or a problem in order to explain the relationships between variables.

3.4 Research Approach

The selection of the research approach is, according to Creswell (2009) a critically important decision. The research approach does not simply inform the research design but it gives the researcher the opportunity to critically consider how each of the various approaches may contribute to, or limit, his study, allow him/her to satisfy the articulated objectives and design an approach which best satisfies the research’s requirements (Creswell, 2009).

When choosing the research approach a deductive, inductive or abductive approach are the options. In the deductive approach a theoretical or conceptual framework is developed which will be subsequently tested using data. When using the inductive approach, data will be explored to develop theories that will be related to the literature. (Saunders et al., 2009)

Instead there is chosen to follow the abductive approach, which means going back and forth between theory and the empirical material. Patel & Davidson (2003) and Alvesson & Sköldberg (1994) describe abductive research as an approach with its own characteristics while at the same time resembles a combination of the inductive and deductive approach.

According to Saunders et al. (2009) experience it is often advantageous and perfectly possible to combine deduction and induction within the same piece of research. There is a wealth of literature about new product development from which a theoretical framework can be defined. In this study the authors move from theory to data collection, which mean this theory will be compared to practice.

3.5 Research Strategy

The goal of creating a suitable research strategy is to be able to answer the research questions. According to Saunders et al. (2009) the choice of research strategy will be guided by the research questions, the extent of existing knowledge, the amount of time and other resources available, as well as the philosophical underpinnings of the researchers.

The research strategy that is chosen is the case study approach. According to Stake (2000) case studies have become one of the most common ways to do qualitative inquiry (Denzin & Lincoln, 2000). A case study is both a process of inquiry about the case and the product of that inquiry (Stake, 2000 cited in Denzin & Lincoln, 2000).

This study gains a deeper understanding of the success factors of the NPD process in the mobile device industry. A case study is the most suitable approach when gaining a better and rich understanding of this phenomenon. In this study, the case is mobile device manufacturer Sony Ericsson, that has a presence on both the Swedish and global mobile device market.
3.6 Data Collection

Quantitative data is predominantly used as a synonym for any data collection technique or data analysis procedure that generates or uses numerical data. In contrast, qualitative data consists of any data collection technique or data analysis procedure that generates or uses non-numerical data. (Saunders et al., 2009)

As an introduction to this study a survey is created to serve as an orientation of what is important from the customer's perspective. The purpose of this survey is solely for the authors to get insight in the most sold mobile devices, the motivation behind this purchase and the respondent’s use of their mobile device. The survey strategy is a form of quantitative research, a popular and common strategy in business and management research and is most frequently used to answer who, what, where, how much and how many questions (Saunders et al., 2009).

According to Denzin & Lincoln (2000), qualitative research is a field of inquiry in its own right. A complex, interconnected family of terms, concepts, and assumptions surround the term qualitative research. There are separate and detailed literatures on the many methods and approaches that fall under the category of qualitative research, such as case study, politics and ethics, participatory inquiry, interviewing, participant observation, visual methods, and interpretive analysis. (Denzin & Lincoln, 2000)

Data is collected by using mainly a qualitative research method in the form of in-depth interviews. The use of interviews, according to Saunders et al. (2009), can help gathering valid and reliable data that are relevant to the research questions. Several types of interviews can be conducted, depending on the purpose of the research and adopted strategy (Saunders et al., 2009).

The amount of empirical data is heavily influenced by the current situation at Sony Ericsson. In this period they are launching devices that are crucial to the future of the company. For this reason, it is extremely difficult to set up interviews with employees of Sony Ericsson. Yet, the empirical findings are relevant to this study and allow the authors to answer the research questions.

3.6.1 Survey

According to Sills & Song (2002) Internet surveys have the potential to become a practical and valuable resource for social scientists. For select populations who are connected and technologically savvy, the cost, ease, speed of delivery and response, ease of data cleaning and analysis all weigh in favor of the Internet as a delivery method for survey research (Sills & Song, 2002).

Within the quantitative research a questionnaire was created using a free survey tool on the Internet. The questionnaire is made by the authors of this thesis and has the purpose of selecting a manufacturer in the mobile device industry that can serve as a case study in this research.

These questionnaires were distributed through email to approximately 3500 persons, which includes all JIBS students and the thesis author’s Facebook friends. This population is chosen because they are easy to reach as they use Internet on a daily basis. A downside of this population is that most respondents are students and in the age between 18 and 30, which
causes a small sampling error. This means that it does not truly fit the population (Sills and Song, 2002). In this case, the authors have chosen for this population, because the vast majority owns a mobile device and is sensitive for innovations and new products on the market. When closing the survey, 371 responses were collected and analyzed. This means there’s a response rate of 10,6%. The final total response rates for a business survey conducted by Ernst & Young (2004, 2005 in White & Luo, 2005) were respectively 4,7% and 15,6%. Hence, the response rate of the survey in this study is consistent with other business surveys. The results of the survey can be found in appendix 2.

3.6.2 Interviews

The method used for qualitative information gathering in this research is to conduct interviews. Interviewing is a method for data collection that can stand on its own or can be a follow up process (Swetnam, 1998). Saunders et al. (2009) state that interviews may be highly formalized and structured, using standardized questions for each research participant, or they may be informal and unstructured conversations. In between there are intermediate positions.

In-depth interviews will be held at Sony Ericsson, a provider of mobile devices, which arose from a 50/50 joint venture of Sony Corporation and LM Ericsson, (Datamonitor, 2010). Saunders et al. (2009) refer to in-depth interviews as unstructured and informal. There is no predetermined list of questions to work through in this situation, although needed is a clear idea about the aspects that have to be explored (Saunders et al., 2009).

Many authors have taken up the issue of “how to do” qualitative or in-depth interviewing, and most additionally affirm the importance of the researcher’s goals and purposes, the researcher’s moral commitment to seek out what is true, and the researcher’s ethical imperative to examine his or her own personal ideas, occupational ideologies, assumptions, common sense, and emotions as crucial resources for what he or she “sees” or “hears” in a particular research interview or project (Johnson, 2002 cited in Gubrium & Holstein, 2002).

The goal of in-depth interviews in this study is to find out whether the theoretical success factors are applied in the NPD process at Sony Ericsson. Interviews are held with Mr. Anders Grynge, Head of Development Support and Mr. Jesper Cederholm, Strategic Buyer. Mr. Grynge is globally responsible for designing the NPD processes. Since he is the one designing the processes, there will be a control interview with Mr. Cederholm. He is not directly involved in the design of the NPD process and will therefore be able to answer whether the NPD process by Mr. Grynge can be verified. The goal of these interviews is to illustrate the NPD process and the importance of the different NPD success factors at Sony Ericsson.

Merely two interviews were held due to an extremely busy period at Sony Ericsson. A lot of effort was put into scheduling interviews, which was unfortunately very difficult. Due to time limitations from Sony Ericsson, interviews were conducted by phone. The interviews were recorded in order to be analyzed.
3.6.3 Case study

Robson (2002 cited in Saunders et al., 2009, p. 145) defines a case study as ‘a strategy for doing research which involves an empirical investigation of a particular phenomenon within its real life context using multiple sources of evidence’. The case study strategy will be of particular interest when wishing to gain a rich understanding of the context of the research and the processes being enacted (Morris & Wood, 1991 cited in Saunders et al., 2009, p. 146).

In this research, a single case will be studied which Yin (2003 cited in Saunders et al., 2009) mentions when distinguishing between four case study strategies. A single organization, Sony Ericsson, is used in this study to get a better understanding of the NPD process in the mobile device industry. Saunders et al. (2009) argue that a case study strategy can be a very worthwhile way of exploring existing theory. A well-constructed case study strategy can enable you to challenge an existing theory and also provide a source of new research questions (Saunders et al., 2009). Sony Ericsson is chosen as a case study because of multiple reasons. First, the survey created by the authors of this study pointed Sony Ericsson as the second most owned mobile device among the respondents. Second, the Creative Design Centre’s is located in Lund, Sweden (Sony Ericsson, 2010), and thus easy to reach. And finally, the authors have a contact person at Sony Ericsson.

3.7 Credibility and Validity of Research Findings

Saunders et al. (2009) state that good research design is important. A threat in the research findings is that one can not know if the evidence and conclusions will stand up to the closest scrutiny. To reduce this possibility it means that attention has to be paid to two particular emphases on research design: reliability and validity. Reliability refers to the extent to which the data collection techniques or analyses procedures will yield consistent findings. Validity is concerned with whether the findings are really about what they appear to be about. (Saunders et al., 2009)

The established validity and credibility of the used instrument to create the survey means whether one can draw meaningful and useful inferences from scores on the instruments (Creswell, 2009). Creswell (2009) mentions three traditional forms of validity to look for, which are content validity, predictive or concurrent validity and construct validity. Content validity means whether the items measure the content they were intended to measure, predictive or concurrent validity asks if the scores predict a criterion measure and if results correlate with other results. Construct validity questions whether the items measure hypothetical constructs or concepts (Creswell, 2009). The outcomes of the survey in this study measures the content it was intended to measure, as the questions and multiple choice answers were stated very clear. Furthermore, the scores will serve a useful purpose in this study and have positive consequences for the research progress of this study. This concludes that the conducted survey contains all three forms of validity Creswell (2009) describes.

Qualitative validity means according to Gibbs (2007 cited in Creswell, 2009) that the researcher checks for the accuracy of the findings by employing certain procedures, while qualitative reliability indicates that the researcher’s approach is consistent across different researchers and different projects.
The interviews held are reliable as the findings are consistent. The findings are really about what they appear to be about, because the NPD process will be described the same way by different interviewees.

### 3.8 Research Ethics

In the context of research, ethics refers to the appropriateness of the behavior in relation to the rights of those who become subject of the work, or are affected by it (Saunders et al., 2009). Ethical questions are apparent today in such issues as personal disclosure, authenticity and credibility of the research report, the role of researchers in cross-cultural contexts, and issues of personal privacy through forms of Internet data collection (Israel & Hay, 2006).

In this research no human rights are violated and the rights of participants were protected during data collection. The respondents of the survey are anonymous; the only personal data conducted is about gender, age and education. The questionnaire is based on questions about the respondent’s mobile device purchase and motivation, which is in most cases not a private matter. All interviewees may be anonymous when preferred and no personal details will be used when not permitted by the interviewee.
4 Empirical Findings

In this section, the empirical data is presented. This part starts with a brief profile of the organization where the interviews were conducted, followed by the outcomes. Subsequently, the empirical findings will be presented per theoretical success factor.

4.1 Sony Ericsson

Sony Ericsson Mobile Communications is a global provider of mobile multimedia devices, including feature-rich phones, accessories and PC cards. Sony Ericsson Mobile Communications was established in 2001 by telecommunications leader Ericsson and consumer electronics powerhouse Sony Corporation. The company is owned equally by Ericsson and Sony and announced its first joint products in March 2002. (Sony Ericsson, 2010).

Sony Ericsson was late to catch on to the popularity of touch-screen devices, which has led to loss of market share (Datamonitor, 2010). Sony Ericsson returns to profitability in the first quarter of 2010 and the improved cost structure generates better margins (Sony Ericsson, 2010). According to GetJar (2010), the world’s largest cross platform app store, the market share of Sony Ericsson in April 2010 is 12.97%.

According to Datamonitor (2010), opportunities for Sony Ericsson lie within the launch of new products that will get them into the touch-screen devices and will complete their product portfolio (see table 2.)

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<tr>
<th>Strengths</th>
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<td>- Ownership of leading players</td>
<td>- Weak product portfolio</td>
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<tr>
<td>Strong technological and operational synergies from its parent companies</td>
<td>Late with touch-screen devices</td>
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<tr>
<td>- Financial position</td>
<td>Limited Smartphone portfolio</td>
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<th>Opportunities</th>
<th>Threats</th>
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<td>- Expanding content services business</td>
<td>- Intense competition</td>
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<tr>
<td>- New product launches</td>
<td>- Economic slowdown affecting spending</td>
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Table 2. Swot Analysis Sony Ericsson (Datamonitor, 2010)
4.2 Empirical Data

The empirical data is structured per TSF that Cooper & Kleinschmidt (1995) have defined. Many of the points mentioned in the empirical data fall under these defined success factors. Yet, data was also collected that was not covered by the theory. This additional topic is mentioned at the end of the paragraph and will be further discussed in the empirical analysis.

4.2.1 Introduction to the NPD process at Sony Ericsson

Sony Ericsson has a formal new product development process, which Mr. Grynge describes as a traditional one. He indicates that the same process has been applied for a long time and that this is basically proxy based thinking. The process has tollgates and milestones where the NPD process is controlled. A lot of activities are connected to these steps in the process. The tollgates are commercial checkpoints where is checked whether the assumptions that the project is build on are still valid. At the milestones technical parts are checked and estimation is made whether the process has come as far as planned and if there’s a need for change or improvement. There are clearly defined owners of the different tollgates and where decisions are made during the process. These owners are always the same people who function as gatekeepers of the NPD process within Sony Ericsson. The process of a new mobile device from start to launch begins with the “start-up” as Mr. Grynge explains. In this phase the entire product portfolio is been looked at with all upcoming products. This phase takes about 6 months. After this, there’s the “tollgate start” where conceptions are being discussed. Then comes the “tollgate define”, where one concept is chosen and for each new product the concept has to be refined, detailed and planned. The execution starts at the “product development start” phase. When there is an actual product that can be shown to customers that has fulfilled the quality requirements, the product goes to the next checkpoint. That is the “product development acceptance” where they go into validation and interact with customers, with the goal to get validated and accepted by customers. The next checkpoint is “product development ship” where the products are shipped to the customers. Finally, there’s a “high volume management” phase where is taking care of the product during the rest of its lifetime. The process is schematically displayed in figure 6.

![Figure 6. NPD Process Sony Ericsson (Vietsch & de Mol, 2010)](image)

Mr. Cederholm explains that at the concept stage a mobile device is placed within the different segments of a portfolio. As a strategic buyer, he buys the hardware of the device. At the “tollgate define”, which is a stage in the NPD process, the project manager should have done research to say pass or no pass to the concept of a new product. When the concept is
finalized and approved, a budget is given to the development of that new product. That’s when Mr. Cederholm can start planning to buy the hardware for the new product.

4.2.2 TSF 1 High quality new product process

Sony Ericsson uses a form of a Stage-Gate™ system with checkpoints, tollgates and milestones. This contributes to a high quality new product process where concepts are chosen, quality requirements are set, and where the new product is interacted with the customers. Success of a new product is measured by using a Balanced Score Card (BSC), which is followed on a monthly basis. There are clearly defined targets, both for line functions and product projects to fulfill. There’s strict controlling at both product level as line organization. According to Kaplan & Norton (1992, p. 32) the Balanced Scorecard (BSC) is “a new framework or structure created for integrating indicators derived from the strategy, that continues to retain financial indicators of the past actions, completed with indicators of future financial actions”. The inductors, which include the customers, the processes and the perspectives of learning and growth, are derived from an explicit and rigorous translation of the strategy of the organization into tangible objectives and indicators (Kaplan & Norton, 1992).

Mr. Grynge also mentions “requirement handling” as the key success factor of the NPD process, which he explains later in the interview. Requirement handling is a much-discussed topic according to Rönkkö (2002 cited in Dittrich, Floyd & Klischewski, 2002). Within development, Rönkkö (2002 cited in Dittrich et al., 2002) state that the overall approach for handling the role of requirements and the whole development process could be described as devoted to the idea of rigor and control. Methods have been developed to guide and control software development work. In models of this kind, requirements are the sole starting point for the development process. Developers should be able to handle them without further knowledge of the use context or the history of a project; a formulaic approach to requirements is emphasized. (Rönkkö, 2002 cited in Dittrich et al., 2002)

When talking about the first theoretical success factor, a high quality product process, Mr. Cederholm is not familiar with the term “requirement handling” as referred to by Mr. Grynge. He believes it is connected with the requirements of a new product and the way of working towards achieving those requirements. In the early concept stage there are preliminary market and technical assessments, where the market share for all products is being researched. After this, Sony Ericsson fits the product into the market, and tries to anticipate how many consumers would like this mobile device.

4.2.3 TSF 2 Clear and well communicated New Product Strategy

Another key success factor is the communication ability within the different lines, the different development streams, and different line functions within the organization. Communicating between each other is important and Sony Ericsson invites these things to happen, says Mr. Grynge. A miscommunication can occur when, for example, the technical department gets requirements and they are doing the development of the different requirements and then something turns out wrong or didn’t work as planned. When that is not communicated, it could happen that someone who is also depending on that has a problem. To evade these things to happen there’s a very strict follow-up and governance of the verification activities and also governance of the whole product system. So there are very
well defined fora and checklists on what should be done and what should not be done on different checkpoints, milestones and maturity points.

The communication within the different locations of Sony Ericsson has to be separated in what you can and cannot communicate. All the commercial parts are strictly confidential and these are not communicated on a global basis. However, performance requirements, quality requirements and propositions are widely spread and communicated within the projects so that everyone working on the project has a very clear understanding of it. Employees are more careful about spreading too much information outside of the project.

Mr. Cederholm thinks the most important success factor is a strategic fit, which he explains as communicating the same goals throughout the organization. The product planning and strategy is clearly communicated according to Mr. Cederholm. He says ten new mobile devices are coming out each year, which are placed in different segments in the market. The management team clarifies there is a need for a mobile device in a particular segment, and others in different kind of segments. Then the actual value of the device is what categorizes the needs and functions that will get into the mobile device. The new products Mr. Cederholm worked with each had 35 criteria made by the product planner in which is weighed which function is the most important for this product to be a success. It's clearly communicated from the management team what the strategy is, which products are coming out, in which segment the product has to be in, the available resources, and the functions a product has to have.

Secrecy and hiding information can be an obstacle for Mr. Cederholm to do his job. The reason he gives for hiding of information is money. In his field, the mobile devices are getting smaller and the number of layers in the material of the product need to increase, which is much more expensive. When a department communicates that there’s a certain amount of space for the hardware of the new product, Mr. Cederholm has to take this into consideration when buying this hardware. If this is not clearly communicated, it could lead to a problem.

4.2.4 TSF 3&4 Adequate Resources & Senior Management Commitment

From a resource point of view, Mr. Grynge explains that there is always at all the different checkpoints a full resource commitment from line management, otherwise the process can’t continue. This goes all the way up to the highest top management. Basically, there’s a strict monthly follow up where resources are allocated and very strictly put on the line organizations to make sure that they are what they promised to be.

Mr. Cederholm believes that there is a good mix of adequate resources to perform his job. He indicates there’s a good mix of people to develop a new product. Of course, he says, more money and more people would lead to better performance. Top management thinking is how many products can be delivered instead of how much money can be saved on a project. He also believes that top management is committed and directly involved in the NPD process. Also, commitment from top management and having a really strong ownership of different projects is important. An owner that is committed, has full responsibility and is accountable for every decision that is taken is another success factor. Mr. Cederholm prefers a flat organization where people are not afraid to take decisions, especially within the mobile device industry this is of importance.
4.2.5 TSF 5 Entrepreneurial Climate

When it comes to performance drivers, Mr. Grynge indicates that giving incentives for ideas stimulates an entrepreneurial climate. There are also incentives for reaching patents, which can be fairly lucrative as some patents can gain a lot of money. Mr. Cederholm says that every valuable new idea is rewarded with an amount of 200 American dollars, which stimulates innovative thinking. When an idea becomes part of a new mobile device, the creator of that idea receives more money. When it comes to patents, it is in the contract that the patents are owned by Sony Ericsson and not by the inventor.

4.2.6 TSF 6 Senior Management Accountability

When it comes to senior management accountability, the product owner is accountable for a part of the success of a new product. Once a product has been shipped, the product owner is accountable for it. Of course he is part of the product since the “tollgate start” and he is the one who puts down the orders and requirements on what the product should do and contain. But there’s a sharing responsibility where the Head of Development and line organization are having a lot of accountability in the execution phase as well. There are 3 lines of development within the NPD process at Sony Ericsson. When it comes to responsibility there are 3 development processes, which are core-platform, applications of platform and products. Those 3 always have high accountability. When it comes to the decision part, which is the governance and the tollgates, 3 different owners are accountable, Head of Product Management, Head of Development and the Head of Cost Creation.

Senior management is not accountable enough according to Mr. Cederholm. He explains there’s cross-functional thinking at Sony Ericsson where there’s one project manager who can allocate the resources on a global basis. He has a total ownership for a product and tries to make profit for this product. Currently, there are a lot of stakeholders involved in the NPD process and nobody has the overall responsibility for the actual new mobile device. Thus, nobody has to make up for a bad decision that has been made. Mr. Cederholm thinks that an organization has to be agile and decisions have to be taken fast within the organization because of the short NPD process and the short product life cycle. There is a need for an owner who is strict, who can push people, and make them deliver. One person responsible throughout the whole process would be better according to Mr. Cederholm, but that's not how it is right now. There are different stakeholders, but there is not one owner that owns the whole concept and budget for this phone. This is split into different departments where they drive their own budget.

4.2.7 TSF 7 Strategic Focus and Synergy

The performance driver strategic focus and synergy is also important. There can be really good agility, really good control, really good requirement handling, really good communication, but when the implementation of the product is wrong, a product could lack success. There’s not one reason when a new product doesn’t succeed, but a combination of more factors. A reason could be not being able to make a good portfolio roadmap or a wrong prediction of what is going to be the new trend. Mr. Grynge explains that Sony Ericsson missed out on touch screen and slipped a little bit behind. The combination of having the wrong platforms and coping with serious quality problems for a while has led to less success on some of the products.
The focus for the new mobile devices is on the low high-end segments, says Mr. Cederholm. He refers to Smartphone’s, which are relatively cheap for a high-end device. The company is not aiming for the volume part, but the revenue per mobile device.

4.2.8 TSF 8 & 9 High-quality development teams & Cross-functional teams

There are 3 heads of the organization that have the ownership of different tollgates. At the “tollgate start” and “tollgate define” there’s the Head of Creation who is the owner and caretaker of those tollgates. At the execution phase the Head of Research & Development takes those tollgates. And some of the tollgates for validation, the “product development acceptance” phase, are delegated to some site managers across the globe that takes the decisions during that phase. The Head of Product Business Management has the responsibility of a couple of these tollgates. There is not one single department that makes the decision of the execution of a new product. There are portfolio plans, which are continuously being updated during a period of 6 months, and proposition plans. The first meeting with the portfolio committee, where the tollgates start, is with a cross-functional committee, which represents different parts of the organization. At this meeting concepts of new products are being discussed.

4.2.9 Agility and Speed

Currently Sony Ericsson is driving a completely new way of working to improve the success of new products. They are extremely tough on following up on Key Performance Indicators (KPI’s), which represent a set of measures focusing on those aspects of organizational performance that are the most critical for the current and future success of the organization (Parmenter, 2010). These KPI’s have to make sure that the concepts and portfolios are up-to-date and that the processes are a little bit faster. Mr. Grynge gives the example that a slow process is a reason why Sony Ericsson missed out on touch screen.

Mr. Grynge says that a success factor within the NPD process of Sony Ericsson is the change in the process and the new way of working. There are three very clearly separated processes: platform development, software development and from product development. This is called “decoupled development.” Through this separation, a much faster turn-round time is reached. Also, decisions on functionalities and features of new products are made at a much later point of time, which leads to a much higher responsiveness towards the customers and where the market is moving.

Mr. Grynge explains “decoupled development” as 3 separate processes and 3 separate development streams. Of course there’s interdependence between them and the way it is controlled is by having really good control on requirement handling, that’s the absolute key success factor. When there’s no good control of the requirements handling it doesn’t matter which model your operating in and what you’re doing, the NPD process will fail. With requirement handling Mr. Grynge means all requirements during the process, whether they are technical, market, legal, customization requirements, they are all extremely important.

The ability of having agility in the organization, making decisions on features and contents and having the possibility of changing them fairly rapidly is the basics of success. In order to manage the “decoupled development” and the agility that they’ve changing into, good
communication, a very strict control of the process, and requirements handling is needed. If those things are into place Sony Ericsson sees quite good results according to Mr. Grynge.

Mr. Cederholm says one of the key advantages and thus success factor is the speed in the NPD process. Being the first one on the market is important to beat competitors. For example, it’s crucial for Sony Ericsson to get their new product, the X-10 mini, on the market before Apple comes with the new Iphone. The product life cycle of a mobile device, as Mr. Cederholm explains, is 9 to 12 months, so updating is the key. Another example Mr. Cederholm gives is Sony Ericsson doing collaboration with Android, which is an operating system for mobile devices. The goal is to align with this system and to bring the first mobile device on the market with the newest version of that operating system.
5 Analysis per TSF

In this section the empirical data is analyzed per success factor. The data is compared to the literature. From the comparison of the empirical data to the success factor literature, a tenth success factor was defined. This is based on data that has shown to be critical for Sony Ericsson, yet had not been described in the literature. The tenth success factor is discussed at the end of the paragraph as Success Factor 10: Agility. The analysis is summarized in table 3.

5.1 Success Factor 1: High-quality new product process

It is apparent from the interview with Mr. Grynge that Sony Ericsson applies many of the described success factors. Mr. Grynge refers to a tollgate system with certain milestones. This indicates that Sony Ericsson uses a system similar to the Stage-Gate™ system. This highly contributes to the quality of the NPD process, which Cooper & Kleinschmidt (1995) defined as “the strongest common denominator among high-performance business.” (Cooper & Kleinschmidt, 2007, p. 57).

Sony Ericsson’s ‘start-up’ phase takes six months in which they define tollgates and show that the new product fulfills customer requirements. This phase takes place before the development begins and contains market and technical assessments. One can place these activities under up-front homework, which is an important ingredient for a high-quality process.

Sony Ericsson uses two tools that ensure a focus on quality of execution and thoroughness of the process; their strict monthly scorekeeping by using the Balanced Scorecard (BSC) and their idea of Requirement Handling. The BSC keeps employees to set objectives of quality, while requirement handling incorporates the idea of rigor and control.

Overall, Sony Ericsson uses many of the elements described in the literature to secure the quality of the NPD process. One can conclude that Sony Ericsson applies the major theoretical ingredients that contribute to the high-quality NPD process success factor.

5.2 Success Factor 2: Clear and well communicated new product process

Mr. Grynge agrees with Cooper & Kleinschmidt (1995), Brown & Eisenhardt (1995), Craig & Hart (1992), and Troy et al. (2001) that communication is a key success factor. The NPD strategy is communicated through well-defined fora and checklists on what should be done and what should not be done on different checkpoints. During the start up phase, Sony Ericsson takes six months to refine, specify and detail a new product concept. In this period they clearly define goals for milestones, which, according to Cooper & Kleinschmidt (1995) highly contribute to the new product strategy.

Craig & Hart (1992) and Troy et al. (2001) point out the importance of sharing information. Yet, Mr. Grynge explains that Sony Ericsson strictly separates what can and cannot be communicated internally. This can highly jeopardize the success of the second most relevant success factor. The strategy can be perfectly defined, but when this is not properly
communicated it could still undermine the firm’s performance. Mr. Cederholm indicates that hiding of information can form obstacles in the NPD process.

It speaks for itself that secrecy within a highly competitive industry, such as the mobile device industry, is crucial. NPD obviously is about new products that may contain innovations that competition is not yet aware of. Teece (1986), pointed out that patents, in practice, do not work as they theoretically should. Unfortunately, NPD literature does not discuss the treatment of valuable and sensitive information. In other literature however, there are many suggestions. Barringer & Ireland (2007) mention that trade secrets handle information that provides the owner with a competitive advantage in the marketplace. When deciding on whether to share certain information, Sony Ericsson should consider how broadly the information is known, what measures there are to protect it, and the ease of which other companies could get it (Barringer & Ireland, 2007). In order to handle this information, Barringer & Ireland (2007) suggest the use of restricting access, labeling of documents, passwords, logbooks, and overall security. Finally, Sony Ericsson could make use of a non-disclosure and non-compete agreement. When these policies are in place, internal sharing of information could be improved.

5.3 Success Factor 3: Adequate Resources

Mr. Grynge describes that for each project there is a full resource commitment from top management, exactly how it is defined in the NPD literature. In their study, Cooper & Kleinschmidt (2007, p. 62) quote a manager who says that “even the best game plan in the world comes to nothing if there aren’t players on the field!” Top management at Sony Ericsson prefers an increase in delivered products, rather than cost saving. This view ensures an adequate allocation of resources.

5.4 Success Factor 4: Senior Management Commitment

Mr. Grynge explains that at all the different checkpoints, line management is fully committed to the new product, otherwise the process cannot continue. In this case the project will be killed. This goes all the way up to the highest top management. There is a strict monthly follow up where resources are allocated and very strictly put on the line organizations to make sure that they are what they promised to be. If they are, management is committed to pull through. Here, it is clear that senior management is involved in the go/kill points, which is described by Cooper & Kleinschmidt as an ingredient for senior management commitment. It also shows, that when a project does meet all the requirements at the milestones, it will receive full back-up and commitment from senior management which is the key of this success factor as described by Cooper & Kleinschmidt (2007)
5.5 Success Factor 5: Entrepreneurial Climate

At Sony Ericsson there are incentives for ideas as well as for reaching patents. The firm rewards 200 American dollars for every valuable idea suggested by its employees. This stimulates innovative thinking and is closely related to the success factors in the literature. The employees that were interviewed for this study indicated that there was no free time to work on creative projects of their own choice, or that there were resources available for projects of this sort. Sony Ericsson also does not encourage skunk works. Both these factors, were also included in the description of an entrepreneurial climate (Cooper & Kleinschmidt, 2007). These factors might be encouraged in the R&D department of Sony Ericsson. Unfortunately, this study does not provide a clear view of this department.

5.6 Success Factor 6: Senior Management Accountability

Senior management of Sony Ericsson is accountable for the success of products. This fits with the success factors described in the literature that says that senior management should be accountable for the performance of new products. Cooper & Kleinschmidt (2007) note that it is important to measure the new product performance in order to hold someone accountable. To do this, Sony Ericsson makes use of the Balanced Scorecard.

There are three lines of development within the NPD process at Sony Ericsson. When it comes to responsibility there are 3 development processes, which are core-platform, applications of platform and products. Those three always have high accountability. When it comes to the decision part, which is the governance and the tollgates, 3 different owners are accountable, Head of Product Management, Head of Development and the Head of Cost Creation. This structure provides some clarity.

5.7 Success Factor 7: Strategic focus and Synergy

Sony Ericsson’s portfolio includes mobile devices in different segments on the market, says Mr. Cederholm. By doing so, Sony Ericsson tries to be strong in the low and high-end segment on the market. The newly developed products remain close to the firm’s base and existing market, which corresponds with Cooper & Kleinschmidt (1995) and Zirger & Maidique (1990), who imply that top-performing firms have a product portfolio with products that not require technology that is totally new to the firm. Mr. Grynge adds that the implementation of a new product should go well in order for the product to be successful. In order to do so, Zirger & Maidique (1990) indicate that entering new markets can be risky and time consuming; it’s recommended to stick to the existing market.
5.8 Success Factor 8&9: High-quality development teams & Cross-functional teams

Both interviews indicate that project teams are assigned to the development of new products. Heads of different departments are there to take care of tollgates in the process and to make decisions. Yet, neither Mr. Grynge, nor Mr. Cederholm discuss the presence of a high-quality development team where a team leader is dedicated to one project, which is described by Cooper & Kleinschmidt (1995). Hence, Mr. Cederholm would like to see one team leader who is totally responsible for a new product throughout the whole process, which isn’t the case at the moment.

A cross-functional committee, which represents different parts of Sony Ericsson, comes together at the tollgate-start, where the concepts of new products are being discussed, according to the interview with Mr. Grynge. This corresponds with Cooper & Kleinschmidt (1995) who say a cross-functional team is made out of members from different functions in the company.

Mr. Cederholm thinks speed in the NPD process at Sony Ericsson is an important success factor, which is elaborated in the empirical findings. Imai et al. (1985 cited in Brown & Eisenhardt, 1995) indicate this as well when they say that cross-functional teams permit the overlap of development phases, which quickens the pace of product development.

5.9 Success Factor 10: Agility

Besides the nine success factors that Cooper & Kleinschmidt (1995) have defined with their benchmarking study, this empirical analysis also uncovered an additional success factor which is frequently mentioned in the empirical data. This success factor has not been included by Cooper & Kleinschmidt in the nine factors that distinguish better performers (Cooper & Kleinschmidt (1995, 1996). Since this additional success factor is mentioned in the empirical data, it will be included in the success factors for NDP.

As the product life cycles are reduced and continuously shrinking (McDonough & Barczak, 1991; Menon, Chowdhury & Lukas, 2002; Richardson & Gordon, 1980 cited in Helo, 2004), there is a greater need for a short new product development cycle. For companies, this can lead to significant cost reduction, greater market segment coverage, and a dominant leadership role in the marketplace (Menon et al., 2002). According to McDonough & Barczak (1991) a faster new product development may be especially vital for companies with a technological orientation. The stepped up pace and unpredictability of today’s technologies also require that companies be able to move fast and change directions quickly in order to retain their technological edge (McDonough & Barczak, 1991). The need for flexibility and speed is identified by Goldman & Nagel (1993 cited in Burgess, 1994), among others, as key contributors to agility. Gunasekaran’s (1998 cited in Helo, 2004, p. 567) definition of agility is “the capability of reacting to unpredictable market changes in a cost-effective way, simultaneously prospering from the uncertainty.” According to Vokurka & Fliedner (1998 cited in Helo, 2004, p. 567) “agility is the ability to produce and market successfully a broad range of low cost, high quality products with short lead-times in varying lot sizes, which provide enhanced value to individual customers through customization”. Sharifi & Zang (1999) conclude that agility or agile manufacturing is the ability to cope with unexpected changes, to survive unprecedented threats of business environment, and to take advantage of changes as opportunities. They say agility comprises two main factors:
responding to change in proper ways and due time, and exploiting changes and taking advantage of them as opportunities. An agile manufacturer, in this way, is an organization with a broad vision on the new order of the business world, and with a handful of capabilities and abilities to deal with turbulence and capture the advantageous side of the business. (Sharifi & Zang, 1999)

To put agility into action and make itself agile, a company should take the following steps according to Sharifi & Zang (1999): detect, analyze and recognize the change(s); determine the required capabilities to challenge and overcome the change(s); define the required strategy(ies), if necessary; determine the practice(s) or initiative(s) that could help in achieving the required capabilities, and put them in the company’s action plan; measure and evaluate its performance in agility; and make correction based on the performance measurements results.

The capabilities that an agile organization should have to be able to make appropriate response to changes taking place in its business environment are basically divided into four major categories. These are responsiveness, competency, flexibility and quickness. (Sharifi & Zang, 1999)

Concluded in Sharifi & Zang’s (1999) research is that agility is a vital ability in the revolutionary turning of the business environment into a turbulent place of competition and struggle for success. Agility is the ability to detect changes in the business environment, and respond to them by providing the appropriate capabilities (Sharifi & Zang, 1999).
### Summary of implementation of TSF’s at Sony Ericsson

<table>
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<tr>
<th>TSF</th>
<th>Theoretical Implementation</th>
<th>Implementation at Sony Ericsson</th>
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<tr>
<td>1. A high quality new product process</td>
<td>- Focus on quality of execution&lt;br&gt;- Complete and thorough process&lt;br&gt;- Emphasis on up-front homework&lt;br&gt;- Sharp early product definition&lt;br&gt;- Tough go/kill decision points&lt;br&gt;- Flexible process</td>
<td>- Tollgates &amp; Milestones&lt;br&gt;- Definition of Tollgates in concept stage&lt;br&gt;- Balanced Scorecard&lt;br&gt;- Concept refinement&lt;br&gt;- 6 month pre-development phase</td>
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<tr>
<td>2. A clear and well-communicated new product strategy</td>
<td>- Goals/objectives&lt;br&gt;- Clearly communicated&lt;br&gt;- Specified areas of strategic focus&lt;br&gt;- Long-term&lt;br&gt;- Information sharing&lt;br&gt;- Decision agreement&lt;br&gt;- Idea generation&lt;br&gt;- Concrete tasks</td>
<td>- Strict follow-up on communications&lt;br&gt;- Checklists at milestones&lt;br&gt;- Strict control of valuable information</td>
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<td>3. Adequate resources</td>
<td>- Back-up by senior management&lt;br&gt;- Adequate R&amp;D budgets&lt;br&gt;- Dedicated human resources&lt;br&gt;- Time&lt;br&gt;- Aligned with business objectives</td>
<td>- Full resource commitment&lt;br&gt;- Involvement of top management</td>
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<td>4. Senior management commitment</td>
<td>- Strongly committed to new products&lt;br&gt;- Intimately involved in go/kill points&lt;br&gt;- Committed to risk-taking&lt;br&gt;- Communicate the importance of NPD&lt;br&gt;- Demonstration of demand</td>
<td>- Ownership of projects&lt;br&gt;- Full commitment</td>
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<td>5. Entrepreneurial climate</td>
<td>- New product idea suggestions from employees&lt;br&gt;- Free time&lt;br&gt;- Bootstrapping&lt;br&gt;- Skunk works</td>
<td>- Incentives for patents&lt;br&gt;- $ 200, for ideas&lt;br&gt;- No free time for creative projects</td>
</tr>
<tr>
<td>6. Senior management accountability</td>
<td>- Personal objectives&lt;br&gt;- Performance measurement&lt;br&gt;- Compensation</td>
<td>- Product ‘owner’ is accountable&lt;br&gt;- 3 development processes, with accountable managers&lt;br&gt;- No clear responsibility</td>
</tr>
<tr>
<td>7. Strategic focus and synergy</td>
<td>- New products stay close to existing base and markets&lt;br&gt;- No totally new technology&lt;br&gt;- No new customer/company connections</td>
<td>- Implementation of product must be right&lt;br&gt;- Portfolio roadmap</td>
</tr>
<tr>
<td>8. High-quality development teams</td>
<td>- Dedicated team leader&lt;br&gt;- Communication&lt;br&gt;- Quick outside decisions</td>
<td>- Ownership of different tollgates&lt;br&gt;- Not one team leader</td>
</tr>
<tr>
<td>10. Agility</td>
<td>- Broad vision&lt;br&gt;- Detect, analyze, recognize change&lt;br&gt;- Measure/evaluate performance in agility</td>
<td>- 3 development processes (decoupled development)&lt;br&gt;- Requirement handling&lt;br&gt;- Later decision points on functionalities and features&lt;br&gt;- Communication&lt;br&gt;- Strict control</td>
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*Table 3. Summary of implementations of TSF’s at Sony Ericsson (Vietsch & de Mol, 2010)*
6 Conclusion

The purpose of this study is to gain deeper understanding of NPD success factors in the mobile device industry. The aim of this chapter is to answer the research questions through the empirical findings of this study.

What is success according to authors of NPD success factors?

Success has many definitions in current literature and many authors give a different explanation or description. Success in a firm can be measured on micro and macro level. In this study, success is measured at company, in other words macro level. This study uses success measurement at company level because Cooper & Kleinschmidt (1995, p. 376) noted that “important practices, like creating an innovative climate and culture, are not readily apparent or measurable at the product level.” Secondly, “there may be company practices that are not apparent at the project level and yet are important to success; and these practices may be missed—simply not observed or measured—when the unit of analysis is the project.” And finally, “when pairs of successes and failures are selected from each firm, company characteristics that may be important to success will be common to both the success and the failure.” (Cooper & Kleinschmidt, 1995, p. 376)

Success in NPD is according to Cooper & Kleinschmidt (1995) a high score in the profitability of the new product efforts, and the impact of the total new product effort on the business.

Which theoretical success factors are most relevant for this study?

As success is measured on macro level, Cooper & Kleinschmidt (1995) use ten measures of NPD, which are set in the two dimensions mentioned before: impact and profitability. These two dimensions are used to determine in which of the four performance types a company can be placed. Based on the benchmark study by Cooper & Kleinschmidt (1995), the Solid Performers are the basis for the success factors in this study. Thus, the nine most relevant theoretical success factors for this study are:

1. High-quality NPD process,
2. Clear and well-communicated NPD strategy,
3. Adequate resources,
4. Senior management commitment,
5. Entrepreneurial climate,
6. Senior management accountability,
7. Strategic focus and synergy,
8. High-quality development teams,

How can the theoretical success factors (TSF) be applied to a mobile device manufacturer?

This research uses mobile device manufacturer Sony Ericsson as a case study to gain deeper understanding of the NPD success factors in the mobile device industry. The empirical
findings and analyses point out that all theoretical success factors are important in the NPD process of Sony Ericsson.

Having a high-quality NPD process manifests itself in the Stage-Gate™ system Sony Ericsson uses. This includes tollgates and milestones, where tough go/kill decision points are set. Success is measured on a monthly base using the Balanced Scorecard, which contributes to the thoroughness and quality of execution in the process.

A clear and well-communicated product strategy is of importance for the firm’s performance. At Sony Ericsson, the same goals are communicated throughout the organization, and the product planning and strategy are clear. Yet, in this industry secrecy is crucial and can be an obstacle in the NPD process, which can lead to miscommunication between departments.

At Sony Ericsson adequate resources are allocated throughout the different departments within the organization. Corresponding with the literature, there is a full resource commitment from top management for each project.

Giving incentives for new ideas stimulates the entrepreneurial climate at Sony Ericsson. When patents are reached, a bonus in the form of money is rewarded.

The literature indicates that senior management accountability helps to drive the profitability that the organization achieves for new products. This accountability shows itself at Sony Ericsson in the presence of product owners who are accountable for a part of the success of a new product. However, there are still a lot of stakeholders involved in the NPD process and there is an absence of one person who has the overall responsibility of a new product and has to justify bad decisions.

To realize strategic focus and synergy, the implementation of a new product must be correctly performed. Sony Ericsson’s portfolio focuses on low high-end segments in the market.

Sony Ericsson works with cross-functional committees, where at the beginning of the NPD process concepts are being discussed. These committees represent different parts of the organization, which agrees with the description of a cross-functional team according to the literature.

**Are there industry-specific NPD success factors for the mobile device industry?**

As shown in the previous research question, all theoretical success factors can be applied into the mobile device industry. However, an industry-specific success factor that is not mentioned in the theoretical success factors, but is apparent in the empirical findings, is agility. The ability of agility and speed is especially of importance in an industry that is highly innovative and competitive, and where the product life cycle shortens. In the mobile device industry the NPD process has to be faster and shorter in order to keep up with competitors, and ideally, to be the first one on the market with a new product. An agile mobile device manufacturer is able to cope with unexpected changes, to survive unprecedented threats of business environment, and to take advantage of changes as opportunities.
7 Discussion

This study shows that, in many ways, Sony Ericsson acts the way that best practices are described in the literature. However, there are factors mentioned in the literature that Sony Ericsson does not apply, and vice versa. Interestingly, the factor of speed and agility, which is crucial in the mobile device industry, was not prominently mentioned in the literature. In the literature, the emphasis lies on the quality of the process, rather than the speed. Sony Ericsson was late to catch on to the popularity of touch-screen devices, which has led to loss of market share (Datamonitoror, 2010). This does show how agility, which increases market responsiveness, influences a firm’s success. It is not clear, whether the quality of the NPD process, which is the number one success factor in this study, or any of the other success factors contribute to agility. For this reason, it has been mentioned as a separate success factor. Sony Ericsson showed that, as a result of their NPD process, they are able to push back the choice of functionalities and features, which increases the responsiveness and agility. When authors claim that NPD is particularly important in innovative and highly competitive industries, agility in NPD should not be neglected in the mobile device industry.

Literature points out that having a clear NPD strategy and communicating this throughout the firm is the second-most important success factor. Having a magnificent NPD strategy might become useless when the employees are not aware of it. Secrecy plays a large role within Sony Ericsson. Teece (1986, p. 287), points out that “patents do not work in practice as they do in theory”, which validates Sony Ericsson’s caution with their information. So how can sensitive and important information be shared within Sony Ericsson? Since NPD handles information that is not yet open to competitors, security has to be in place. NPD literature does not discuss this to an extent that it is clear for managers.

Finally, this study has shown that NPD is a difficult topic for firms, even without concentrating on agility. Success rates and development efficiencies have remained stable over a period from 1990 to 2003 and after 40 years of NPD literature, there is still a low success rate (Barczak et al, 2009). Ernst (2002) concluded from his literature review that, over a period of nearly thirty years, the results of empirical NPD research have remained fairly constant. Furthermore, Ernst (2002) concluded that findings by other authors barely differ from those of Cooper & Kleinschmidt (1987, 1993, 1995, 2007). The empirical data shows the activities that distinguish best performers from the rest, unfortunately there is no data of companies that are performing badly and put the factors into place. This places the quality and relevance of NPD literature in a debatable position. On the other hand, some of the success factors might also not seem surprising and can strike as obvious. Yet, Cooper & Kleinschmidt (2007) were surprised about how few firms from their empirical data actually applied the success factors.

Future research should show how relevant NPD literature is and in what ways its implementation can be improved. The authors of this study suggest that agility and the communication of sensitive information should be amongst the topics for further research.
References


Appendix

Appendix 1. Overview literature Success Factors

<table>
<thead>
<tr>
<th>Factor 1</th>
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<th>Factor 7</th>
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</tbody>
</table>
Appendix 2. Results Survey

1. What is your gender?

2. What is your age?

3. What is your highest level of education?
4. Which brand of mobile phone do you own?

<table>
<thead>
<tr>
<th>Brand</th>
<th>Count</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sony Ericsson</td>
<td>102</td>
<td>27%</td>
</tr>
<tr>
<td>Nokia</td>
<td>116</td>
<td>31%</td>
</tr>
<tr>
<td>Samsung</td>
<td>46</td>
<td>12%</td>
</tr>
<tr>
<td>LG</td>
<td>11</td>
<td>3%</td>
</tr>
<tr>
<td>Apple</td>
<td>53</td>
<td>14%</td>
</tr>
<tr>
<td>RIM (Blackberry)</td>
<td>14</td>
<td>4%</td>
</tr>
<tr>
<td>HTC</td>
<td>11</td>
<td>3%</td>
</tr>
<tr>
<td>Motorola</td>
<td>9</td>
<td>2%</td>
</tr>
<tr>
<td>Other</td>
<td>9</td>
<td>2%</td>
</tr>
<tr>
<td>I don’t own a mobile phone (Go to question 12)</td>
<td>0</td>
<td>0%</td>
</tr>
</tbody>
</table>

5. How old is your mobile phone?

<table>
<thead>
<tr>
<th>Age Range</th>
<th>Count</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 - 6 months</td>
<td>97</td>
<td>26%</td>
</tr>
<tr>
<td>6 - 12 months</td>
<td>84</td>
<td>23%</td>
</tr>
<tr>
<td>1 - 1.5 years</td>
<td>75</td>
<td>20%</td>
</tr>
<tr>
<td>1.5 - 2 years</td>
<td>51</td>
<td>14%</td>
</tr>
<tr>
<td>Older than 2 years</td>
<td>64</td>
<td>17%</td>
</tr>
</tbody>
</table>
6. Why did you buy this particular mobile phone?

![Image with table showing reasons for purchase]

<table>
<thead>
<tr>
<th>Reason</th>
<th>Count</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>The phone was the newest one on the market</td>
<td>60</td>
<td>12%</td>
</tr>
<tr>
<td>The phone was the “hottest” one on the market</td>
<td>64</td>
<td>13%</td>
</tr>
<tr>
<td>The phone’s price-quality ratio was good</td>
<td>173</td>
<td>35%</td>
</tr>
<tr>
<td>The phone is easy to operate</td>
<td>80</td>
<td>16%</td>
</tr>
<tr>
<td>Other</td>
<td>115</td>
<td>23%</td>
</tr>
</tbody>
</table>

7. What is the advantage of your mobile phone according to you?

![Image with table showing advantages]

<table>
<thead>
<tr>
<th>Advantage</th>
<th>Count</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>The phone has unique features</td>
<td>68</td>
<td>24%</td>
</tr>
<tr>
<td>The phone is a new model and highly innovative</td>
<td>42</td>
<td>12%</td>
</tr>
<tr>
<td>The phone is hot/trendy</td>
<td>30</td>
<td>8%</td>
</tr>
<tr>
<td>The phone is superior to competing phones in the same price range</td>
<td>98</td>
<td>27%</td>
</tr>
<tr>
<td>Other</td>
<td>106</td>
<td>29%</td>
</tr>
</tbody>
</table>

8. How satisfied are you with your current mobile phone?

![Image with table showing satisfaction levels]

<table>
<thead>
<tr>
<th>Satisfaction Level</th>
<th>Count</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very satisfied</td>
<td>133</td>
<td>36%</td>
</tr>
<tr>
<td>Satisfied</td>
<td>183</td>
<td>50%</td>
</tr>
<tr>
<td>Undecided</td>
<td>25</td>
<td>7%</td>
</tr>
<tr>
<td>Dissatisfied</td>
<td>21</td>
<td>6%</td>
</tr>
<tr>
<td>Very dissatisfied</td>
<td>7</td>
<td>2%</td>
</tr>
</tbody>
</table>
9. What defines high quality in a mobile phone according to you?

![Bar chart showing battery life, look and feel, number of functions, internet connectivity, quality of keyboard, use of materials, and other categories with percentages.]

10. What is the disadvantage of your mobile phone according to you?

![Bar chart showing the screen is too small, the phone is slow, the phone’s menu is confusing/unclear, the phone has too few features, the phone is too expensive, and other categories with percentages.]
11. What function on your mobile phone do you use the most?

<table>
<thead>
<tr>
<th>Function</th>
<th>Count</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Calling</td>
<td>320</td>
<td>29%</td>
</tr>
<tr>
<td>Sms</td>
<td>332</td>
<td>30%</td>
</tr>
<tr>
<td>Mms</td>
<td>27</td>
<td>2%</td>
</tr>
<tr>
<td>Taking pictures</td>
<td>85</td>
<td>8%</td>
</tr>
<tr>
<td>Internet</td>
<td>98</td>
<td>9%</td>
</tr>
<tr>
<td>Games</td>
<td>47</td>
<td>4%</td>
</tr>
<tr>
<td>Music</td>
<td>96</td>
<td>9%</td>
</tr>
<tr>
<td>Navigation</td>
<td>30</td>
<td>3%</td>
</tr>
<tr>
<td>Agenda</td>
<td>51</td>
<td>5%</td>
</tr>
<tr>
<td>Other</td>
<td>31</td>
<td>3%</td>
</tr>
</tbody>
</table>

12. What do you use internet on your mobile phone for?

<table>
<thead>
<tr>
<th>Activity</th>
<th>Count</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Email</td>
<td>136</td>
<td>21%</td>
</tr>
<tr>
<td>Social networking (Facebook)</td>
<td>110</td>
<td>17%</td>
</tr>
<tr>
<td>Encyclopedia (Wikipedia)</td>
<td>45</td>
<td>7%</td>
</tr>
<tr>
<td>Youtube</td>
<td>43</td>
<td>7%</td>
</tr>
<tr>
<td>Route planning</td>
<td>46</td>
<td>7%</td>
</tr>
<tr>
<td>Looking up apps</td>
<td>48</td>
<td>7%</td>
</tr>
<tr>
<td>I don't use internet on my phone</td>
<td>181</td>
<td>28%</td>
</tr>
<tr>
<td>Other</td>
<td>40</td>
<td>6%</td>
</tr>
</tbody>
</table>
13. How important are the following success factors of a mobile phone to you on a scale from 1 to 5?

![Success Factors of a Mobile Phone](image)

14. Which brand of mobile phone are you likely to purchase next?

![Brand Preference Chart](image)
15. Why would you choose that particular brand?

<table>
<thead>
<tr>
<th>Reason</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Because I’m loyal to one brand and always buy a phone of that brand.</td>
<td>82</td>
<td>23%</td>
</tr>
<tr>
<td>Because that brand has the newest phone on the market</td>
<td>37</td>
<td>10%</td>
</tr>
<tr>
<td>Because I’m not satisfied with my current phone and want to try a different brand</td>
<td>29</td>
<td>8%</td>
</tr>
<tr>
<td>Because that brand has the best price-quality ratio</td>
<td>77</td>
<td>21%</td>
</tr>
<tr>
<td>Because that brand was recommended by family/friends</td>
<td>42</td>
<td>12%</td>
</tr>
<tr>
<td>Other</td>
<td>92</td>
<td>26%</td>
</tr>
</tbody>
</table>
Appendix 3. Interview Master Thesis Innovation & Business Creation

This master thesis is about New Product Development (NPD) in the mobile device industry. According to the literature NPD is the process of transforming business opportunities into tangible products. NPD spans throughout the whole organization from marketing to engineering. The process needs to be incorporated in all different areas of the business. The authors attempt to analyze theoretical NPD succes factors and want to study if they apply for an organization like Sony Ericsson.

1. Does Sony Ericsson have a formal New Product Development (NPD) process? (For example a Stage-Gate system?) How does it look like/how does it work?
2. What do you believe are the most important components of this NPD process?
3. Could you briefly describe what happens with a phone from idea to launch at Sony-Ericsson?
4. How does Sony Ericsson stimulate its employees/idea generation?
6. Is there one person responsible for NPD? Is there an NPD manager?
7. Which phone has been successful and why do you think it was successful?
8. Can you provide us with the following data to place Sony Ericsson in this model by Cooper & Kleinschmidt? (See model 2 and 3)
9. Do the following success factors apply to Sony Ericsson? How are they used in the process?
   a. Presence of formal/informal NPD process
   b. Quality of planning before the beginning of the actual development stage
   c. Preparatory work including initial evaluation of ideas, technical- and market feasibility studies, and commercial evaluation.
   d. Project concept, target market and customer benefits must be clearly described
   e. Continual evaluation throughout the process, terminating projects that do not meet goals.
   f. All process steps are aligned with the market requirements
   g. Dedicated project organization
   h. Team members have enough time to work on the project
   i. Cross-functional teams
   j. Project leader has the necessary qualifications and sufficient know-how.
   k. Substantial autonomy and responsibility for the NPD team
   l. Material support from the senior management for the NPD program
   m. NPD program should have long-term thrust, including long-term NPD projects.