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Customer Involvement in New Product Development:

Investigation of customer involvement in
the development of a product in a clean-
tech company in Sweden

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Master's Programme in Industrial Management and Innovation

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Abstract

Investigation of Customer Involvement in the Development of a Product in a Clean-Tech Company in Sweden



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Customer involvement in new product development is currently a thriving activity implemented by companies in order to fulfill customers' needs. By involving customer(s) in the new product development process, companies aim to get concepts and insights that allow them to improve an existing product or launch a new product in the market. Customer involvement in new product development is considered important for successful product development (Cooper 2001, and Alam, 2006).

The aim of this study is 1) to investigate and create an increased understanding of new product development processes concerning customer involvement in the development processes of U-DEC in a Clean-tech company in Sweden. 2) To examine the impact of customer involvement in the development of U-DEC. The result obtained from this study shows that customer involvement in new product development enhances product innovativeness, increases customer satisfaction, speeds up the product time to market, creates customer loyalty, and improves the relationship between the company and customer through interaction. The result also shows that lead user characteristics have positive effects on the degrees of customer involvement in new product development.

Keywords: New product development, customer involvement, customer relationship, customer satisfaction, customer value, and Lead-user.

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Summary

The importance of customer involvement in new product development is fast-growing, and this study clearly shows how customer involvement in new product development influences the new product development process. According to Hsieh and Chen (2005), to achieve superior new product development performance, it is important to involve customers in the new product development process.

This study is based on a qualitative case study conducted in a clean-tech company in Sweden. Before the empirical study could be conducted, a thorough literature review on new product development and customer involvement was done. The literature review showed that customer involvement in the new product development process has a great influence on new product development success. The roles and successes customer involvement contributes to, are also described in the literature review. The literature review argued for the use of Lead Users since they face needs that are general in the marketplace (Von Hippel, 1986).

The findings in this study indicate that customer involvement in new product development contributes significantly and positively to new product development success. The result shows that customer involvement is a crucial factor for companies to maintain, enhance, strengthen, and increase the effectiveness of Customer Relation Management. Customer involvement in new product development also improves customers' perception of the product quality. Involving customers in the new product development process, companies can easily meet customer satisfaction (since the customer needs or expectations of the product would be satisfied) and reduce the cost of the development. The study showed that customers provide valuable ideas that can advance product innovation and may also trigger the development process. From the findings, customer involvement is a strategic key to improve sustainability, not only in the development of the product but also in the understanding of the sustainable materials used in developing the product.

These findings are relevant not only for the researcher but company managers.

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Table of Content

Summary	iii
Acknowledgment	iv
1 Introduction	1
1.1 Background	1
1.2 Research Aim.....	3
1.3 Delimitations	3
2 Literature Review	4
2.1 Customer Value.....	4
2.2 Customers as “Lead Users”	5
2.3 Roles of Customers in New Product Development.....	6
2.4 Customer Relationship Management	8
2.5 Customer Satisfaction	10
2.6 Impact of Customer Involvement in New Product Development	10
2.7 New Product Development Processes.....	11
2.7.1 New Product Developing Strategy	12
2.7.2 Product Modification Strategy	12
3 Methodology	13
3.1 Research Approach	13
3.2 Research Strategy	13
3.3 Research Sampling	14
3.4 Qualitative Data Collection	15
3.4.1 Literature Review	16
3.4.2 Interview.....	17
3.5 Data Analysis	18

3.6 Ethical Considerations.....	19
4. Empirical Data.....	20
4.1 Company’s Background.....	20
4.2 Customer’s Background.....	21
4.3 Findings.....	21
4.3.1 Customer Involvement in New Product Development.....	21
4.3.2 Customer Relationship.....	22
4.3.3 Customer’s Role in New Product Development.....	24
4.3.4 Effect of Customer Involvement in New Product Development.....	25
4.3.5 Company’s New Product Development Process.....	26
5. Analysis.....	28
5.1 Customer Involvement and Relationship.....	28
5.2 Customer Roles and Satisfaction.....	30
5.3 Effect of Customer Involvement in New Product Development.....	32
5.4 Company’s New Product Development Process.....	33
6. Discussion.....	35
7. Conclusion.....	38
7.1 Theoretical Contribution.....	39
7.2 Managerial Implications.....	40
7.3 Limitation & Further Research.....	41
References:.....	42
Appendix I.....	48
Appendix II.....	49

1 Introduction

This report describes the results of the master thesis graduation project conducted in a clean-tech company based in Sweden. The company prefers to remain anonymous and will therefore be called Company W whereas the product will be called U-DEC (is an underwater decontamination robot) in the remainder of this report. This chapter describes the background of the research. Then the aim of this study is discussed which results in research questions. Finally, the delimitation of this study is stated.

1.1 Background

The role of customers in traditional marketing seemed to have been limited to a passive recipient of products as buyers and users. However, this traditional perception has been challenged by a new perspective in which customers are active co-creator, co-developer, and co-producers of the product they intend to buy and utilize. Customers have become active participants in the co-creation activities of organizations either in services or product development or in the promotion of the products and services (Berthon et al., 2007). Being an active co-creator, the customer actively contributes and/or selects the content of a new product in new product development processes. The customer's input plays a central role from the beginning of the product development to the end. Innovation has come to be an iterative process of customer-producer interaction (Lundvall, 1988). The role of customers has increasingly become significant in new product development as they are not only involved in idea generation for new products but also in co-creating the product, in the testing of a finished product, and in providing end-user product support.

The traditional new product development approach, in which firms are solely responsible for idea generation and for deciding which products should be marketed is increasingly being challenged by academics and practitioners in the field of innovation management (e.g., von Hippel & Katz, 2002; Chesbrough, 2003). Researchers like Von Hippel (2005) advocated the concept of democratizing innovation by giving customers a more active stake in new product development. The ability to develop and market a new product is critical for a firm, especially those in technology-related businesses. Research on new product development has shown that one of the most critical factors in new product development is to understand the customers' needs and integrate them into the new product design (Cooper, 1979). One of the bases for new product development research is determined on the view of the success and failure of the

development. Cooper (1979) argued that the absence of innovativeness (that is product benefits that are unique to a given product and are perceived as meaningful by customers) is an important basic explanation for new product failure. Some researchers opined that the rate of failure of new product development is high because it is a complex and difficult task. According to Page (1993), the whole success rate of new product development introduction is less than 60% and declines as the cost and risk of developing a new product increases. Page (1993) continued by saying 46% of all the resources provided for the new product development and commercialization are spent on the products that fail to generate enough financial return. According to Cooper (1993), 35% to 40% of all the products introduced to the market were removed from the market after a short period. Also, sometimes customers' needs are unattainable and for that, many new product development projects fail because they do not meet the need and expectations of the customers (Matzler & Hinterhuber, 1998). To avoid failure of new product development, Cooper and Kleinschmidt (1986) came up with an idea that it is important to evaluate the activities in the early stage of the new product development process and those early stages are, "initial screening, preliminary market assessment, preliminary technical assessment, detailed marketing research, and financial analysis".

In the late 70s, research into customers' involvement in new product development had its first breakthrough with Von Hippel's Customer Active Paradigm (Von Hippel, 1978). However, the customer's involvement has been giving increased attention and has become more relevant now than ever before. With the increase in market competition, the role of customers has changed tremendously from that of ordinary consumers to a multifaceted role as a customer, co-developer, co-producer, and co-creator of value which implies that customers are now much more important than ever before. The role of customers in new product development has increasingly become significant in the sense that it enables firms to develop improved products that meet the special needs and solutions to the problem of the customer to a greater extent. The concept of customer involvement in new product development has been seen as a way that the customer positively influences a firm beyond a transaction. But understanding customers' needs is often a costly and inexact process (Thomke & Hippel, 2002) and it is important to understand their requirements at the early stage. The customers' idea could be valuable in helping a firm's developing team to identify problems and to find the solution. According to Von Hippel, (1978) customers are the first to develop most new industrial and consumer products.

1.2 Research Aim

The aim of this research is, 1) to investigate and create an increased understanding of new product development processes concerning customer involvement in the development of U-DEC in a Clean-tech company in Sweden. 2) to examine the impact of customer involvement in the development of U-DEC. This study will highlight the customer value, the role of the customer in new product development, the role of customers as lead users, customer relationship management, customer involvement in new product development, Impact of customer involvement in new product development, customer satisfaction, the development strategies, and processes.

The following research questions have been formulated to enable us to get answers to the research problems:

1. Which method of customer involvement did Company W apply in the development process of UDEC?
2. What impact does customer involvement have on the new product development?

1.3 Delimitations

In this study, I have focused on customer involvement in new product development therefore this study will not discuss or show how the product is produced or its development process in detail rather how customer involvement influences the product development process and how the company uses the customer insight. The focus of this study is limited to one company (a clean-tech company) based in Sweden manufacturing underwater cleaning robots. The single case study may prevent the generalisation of the result.

2 Literature Review

In this chapter, I will present theories concerning new product development and customer-oriented product development. An increasing number of companies are now engaging their customers in the new product development process (Fang, 2008). To develop a new product or an existing product, many companies have realized the importance of collaborating with suppliers or customers for creating and sustaining a competitive advantage in the market. Market competence requires understanding what the customers need (Lagrosen, 2001). The market has now focused on collaboration with customers to co-create value (Prahalad & Ramaswamy, 2004). One of the most important things in collaboration is to create value through product development or innovation. For companies to develop a product that meets the customers' needs, company-customer interaction is very important (Von Hippel, 1988). For a company to succeed in product development, the company needs to understand the needs of the customers, which can be understood through interactions. There is now an increasing interest in the creation and delivery of value to customers and valuable management of the customer relationship.

The purpose of this literature review is to understand how customers are involved in the process of new product development and to examine the impact of customer involvement in the development process. This literature review will highlight Customer Value, Customers as “Lead Users”, Roles of Customers in new product development, Customer Relationship Management, Customer Satisfaction, Impact of customers' involvement in new product development, and New Product Development Processes.

2.1 Customer Value

Customer value is a customer's perceived desire for, and evaluation of, product attributes, attribute performances, and consequences in terms of the customer's goals and purposes (Woodruff, 1997). Customer's understanding of value represents a trade-off between the benefit they get in the product and the sacrifice they recognize in paying the price for the product. Customer value is an established bond between a customer and the manufacturer after the customer has used the product or service produced by that manufacturer and finds out that the product provided an added value (Butz & Goodstein, 1996). Some customers consider value at different times; when making a purchase decision and during or after the product performance; and each of these considerations' centers on a different customer

judgment task. When making a purchase, the customer requires distinguishing between product offer alternatives and evaluating which is preferred. During operation or after use, customers are more concerned with the performance of the product. Customers perceive value differently at the time of purchase than they do during or after use (Woodruff, 1997). Ulaga (2003) identified eight categories of value in business relationships as direct product cost (price), process cost, product quality, and delivery, time to market, personal interaction, supplier know-how, and service support. The eight categories of customer values have benefits to both the company and its customers. The ability to comprehend the features, functions, benefits, and use of the product increases the perceived value of the product during its purchase and consumption. The transaction experience is created through customer interaction with the salesperson and transaction system. Interactions can provide instrumental value such as taking a correct order from the customer. The company uses its understanding of value to strengthen performance thereby creating competitive advantages. For example, companies use their knowledge of value to put additional services, programs, and systems in their current market offering and to guide the development of the new offerings. Understanding and integrating all the customer values into marketing efforts, always help the company to gain new customers.

2.2 Customers as “Lead Users”

Lead users are a valuable bunch of customers and would-be customers who can contribute to identifying future opportunities and evaluation of the arising idea. Eric Von Hippel (1988) defined the lead users as those who display two characteristics: Lead users face needs that will be general in a market and those needs may take some time before the majority of the marketplace comes across them, and lead users are positioned to benefit significantly by obtaining a solution to those needs (Von Hippel, 1988).

Eric Von Hippel suggested that customers should be more active by solving problems and develop working prototypes. With this suggestion, Von Hippel came up with what he called the Customer Active Paradigm which states that under some conditions, the customers would start to innovate when they encounter a problem. First, the customer starts with idea generation on how to solve the problem and then develops a working prototype. This concept of the Customer Active Paradigm was expanded to an interaction standpoint or view called the Lead User Idea. This idea recommends cooperation with some customers for new product development. And these customers are characterized by the above definition of Lead Users.

According to Hippel, the best way of identifying Lead Users is to first identify the underlying trends which result in these customers having a leading position. Lead Users should not only be identified from within the usual customer base but beyond existing customers. Remember, lead users may have an interest in improving or changing some features or elements of a product. Using this Lead User concept can increase the success of new product development.

The concept of Lead User proves that interacting with customers contributes to the success of new product development and it also emphasizes the importance of choosing customers with specific features or quality for cooperation. Lead users are believed to bring good ideas that positively affect the newness (Olson & Bakke, 2001). Nevertheless, lead user involvement is very expensive and may sometimes have negative effects on market performance (Carbonell et al., 2012). According to Urban and Hippel (1988), it is often hard to identify lead users and the trend that will become common in the marketplace. But knowing the marketplace enables companies to easily identify those customers who demand special solutions or those who demand customized standard products to satisfy their needs. Von Hippel (1988) opined that the “right” customer may provide ideas to a firm which results in novel products. Apart from lead users, other types of customers may be beneficial for new product development. For example, involving financially attractive and close customers help improves the success of new product development (Gruner & Homburg, 2000). Customers' attributes play a vital role. Companies should involve customers who have assorted knowledge from different backgrounds, customers who face needs that will be general in a market, and customers who are very open to innovation (Lettl, 2007).

2.3 Roles of Customers in New Product Development

Different from the traditional approach of customer’s involvement where they serve as information sources, the new form allows the customer to be involved in the new product development process as co-developers, and they are engaged in joint problem-solving with the company’s employees to generate product solutions (Nambisan, 2002). According to the literature, customer roles can be characterized into two forms: customer involvement as an information source and customer involvement as co-developer (Jeppesen, 2005). In this approach of customer involvement as an information source, the product development team collects information on customers’ needs through interviews, focus groups, and market surveys (Griffin & Hauser, 1993). A customer provides information by sharing knowledge on the needs or wants for a new product. Then, the development team applies the information

gathered from the customers to the new product development process and thereby designs a product that meets the customer's needs. In the customer involvement as co-developer approach, the company transfers the customer information to the new product development team (the company and the customer development teams) before such information can be applied to product development.

The role of customers in new product development processes is limitedly applied in many high technology companies notwithstanding the evidence that suggests that customers are sometimes a magnificent source for new product ideas with great market potentials. Involving customers fully in the process of development greatly increases the rate of new product success (Cooper, 1996). Many studies of the key factors in the new product development indicate customers as a determinant of commercial success in new product development (Cooper & Kleinschmidt 1986; John & Storey 1998, Cooper & Kleinschmidt, 1994). These studies show that early interaction with customers leads to an exchange of customers' needs. The helpful role of the customer in new product development is well documented (Cooper & Kleinschmidt 1986; Cooper & Kleinschmidt, 1990). Gersuny & Rosengren (1973) identified customer roles as a resource, co-creator, co-developer, and co-producer. These roles include providing information to the company during the new product development process. To this extent, the customers' role is usually bound to the start or to the end of the product development cycle. Customers make vital suggestions for what they want, or what they want to change in the prototype. As co-developers, customers take part at the beginning of the product development process and their involvement composes a significant portion of the development task (Fang, 2008).

The concept of customer role as a co-producer or co-developer is that customers provide the action and supplies needed information for the new product development. This includes customers' mental, physical, and emotional inputs. This concept generates more value compared to that of a traditional new product development where the manufacturer solely develops a new product. In customer involvement as a co-developer, the customers partake in the new product development process in order to develop new products together with the company. This approach is where companies collaborate with some customers to develop a new product. In this approach, new product development becomes a collaborative process where a company works as a partner to develop a new product. The customers are involved in all the developmental processes especially in the design phase. The customer closely and

frequently interacts with the company's new product development team over a period; they engage in joint solutions and directly contribute to the product design. The customer is involved in various decisions making with the company's new product development team regarding the design of the product features, specification of the product interface requirement, and establishment of development process priorities (Lengnick-Hall, 1996). The development begins with a discussion between the company and its customer's development team and then goes through the 3 product development stages i.e., idea stage, development, and finally to launch stage. Some companies engage both approaches of customer involvement at the same time while some engage one of the approaches. In these new product development approaches, both the customer and the company are highly independent of each other in the process of product development (Bstieler & Hemmert, 2010).

2.4 Customer Relationship Management

Customer relationship management is a management approach to understand and determine customer behavior through significant communication in order to improve customer purchase, customer retention, customer loyalty, and customer profitability (Swift, 2000). Understanding how companies can profit from their customer relationship is highly important for both marketing practitioners and academics (Boulding et al. 2005; Payne & Frow, 2005). Customer relationship management is rebuilding the marketing field and advancing as a part of marketing's new dominant logic (Day, 2004). The customer relationship process involves getting customers, knowing them better, providing service to them, and expecting their needs (Teo et al, 2006). Customer relationship management helps the company to understand customer behavior and needs in detail. It facilitates the company to obtain comprehensive information about its customers and then utilizes knowledge gained from the information to meet the customer's needs in a better way than its competitors.

By assimilating customer relationship management into the framework of their operations, firms can minimize sales and service costs, increase buyer retention, and lower customer replacement expenditures (Reichheld, 1996). Reichheld argued that customer relationship management increases the length of beneficial customer-company relationships. Long term customer-company relationship has been found to reduce customer management cost thereby improving the company's revenue. Customer relationship management significantly reduces costs by eliminating waste associated with targeted unprofitable customers (Binggelt et al., 2002). For example, the company usually calculates and controls customer relationship costs

and then compares them to the profit each customer provides over its lifetime (Reinartz et al., 2004). By doing so the company identifies and focuses more on profitable customers.

Taking advantage of associating with customers helps companies to sustain a competitive advantage in the market (Mithas et al., 2005). Customer relationship creates value by strengthens the business strategies of the company which steers performance. Implementation of customer relationship management contributes to customer loyalty which in turn minimizes the volatility of demand and improves forecasting (Reichheld, 1996). Customer relationship management helps the company to understand its customer which is the key in deciding which customers to maintain or retain as well as to optimize operations and forecast demand. It also helps the company to know the customer's needs and preferences. Customer relationship affects the company's performance by increasing efficiency and lowering down the costs. Not forgetting, customer relationship management can also fail when a company has a few numbers of employees in the marketing department who are not committed to the initiative of customer relationship management. Since it has been pointed out that customer satisfaction has an impact on the relationship, I would like to review this dimension to have a complete overview of the relationship between and company and customers.

Trust and commitment are foremost to the relationship between the company and the customer. Morgan & Hunt (1994) immensely impacted research on marketing relationships. Morgan & Hunt (1994) argued that an ineffective blending of the effects of trust and commitment in any relationship study automatically results in an inappropriate conclusion regarding the impact of commitment and trust on the outcomes. Trust and commitment seem to be foremost in building a relationship. Trust and commitment can also be key mediating variables due to the importance they have on the relationship Morgan & Hunt (1994). As mediating variables, trust and commitment enable the company to work with the customer in the long-term. Owing to wanting a long-term relationship, trust and commitment increase the company investment in order to work together with the customer with the aim of making benefits.

Moreover, Morgan & Hunt (1994) declared that the combination of trust and commitment develops better productivity and effectiveness. As mentioned above, the company and customer can only benefit from the relationship if both are willing to trust and commit to each other. According to Hennig et al., (2002), a relationship benefit is an approach suggesting that the company and customer must benefits from their relationship in order to have a long-term

relationship. According to Morgan & Hunt (1994), commitment and trust are important in creating a successful relationship with the customer in order to get benefits.

2.5 Customer Satisfaction

Customers are now more informed and enlightened; their basis for selection is unbending due to the great capacity of choice (Vega-Vazquez et al., 2013,). Because of this, it is very significant to take customer satisfaction into consideration in new product development. According to Anderson et al (1994), customer satisfaction is defined with two viewpoints: cumulative viewpoint and transaction-specific. Cumulative viewpoint is the gross evaluation of the assessment of the total purchase and consumption of goods or services while transaction-specific is the customer satisfaction regarding the post-choice assessment of a specific purchase event (Anderson et al., 1994). For this research, the cumulative viewpoint is more precise since it provides more evidence on the company's past, and current performance with a focus on the customer's relationship with the company. Anderson et al. (1994) suggested that improving customer satisfaction must be an investment instead of an expense due to the revenue loyalty customer satisfaction can provide.

It is very interesting to link customer satisfaction with co-development. From Anderson et al viewpoint, co-development allows a company to develop a new product that meets the customer's need and increase their satisfaction. Involving customers in the process of new product development has a positive influence on customer satisfaction. Jaworski & Kohli (2006) asserts that there is a high chance of increasing customer satisfaction when a new product is co-developed with a company. Therefore, involving a customer in the new product development process increases satisfaction and the relationship between the company and the customer. Hoyer et al., (2010) stated that, during co-development of a product with a customer, there is a significant amount of effort and knowledge provided by the customer. The review clearly shows that involving customers in new product development increases customer satisfaction.

2.6 Impact of Customer Involvement in New Product Development

How customer involvement impacts new product development (NPD) depends on the company's approach to learning new product development. The new product development process is a process of learning about a new product and searching for the right product as a

solution (Thomke, 2003). On the impact of customer involvement as a co-developer approach, three new product end results are considered: new product innovativeness, new product advantage, new product financial performance. New product innovativeness has to do with market discontinuity and technology; market discontinuity is a shift in any of the market forces that cannot be predicted by a continuation of documented trends and if that occurs, can affect the performance of a firm (Mahajan & Wind, 1989) and competitors are the major source of market discontinuity. For a company to overcome market discontinuity there must be new product innovativeness. A new product advantage is an extent to which the product is superiorly relative to other products in the market and meets the customer's needs (Kleinschmidt & Cooper, 1991). The company's new product must have some unique features that make it superior to other products in the market. New product financial performance is the product's ideal performance in the market in terms of its return on investment and sales (Moorman, 1995).

Involving customers in new product development has a lot of impacts as development relies on the diverse proficiency inputs because the combination of diverse perspectives can inspire novel insights (DeLuca & Atuahene-Gima, 2007). Customers' feedback is one of the sources of new product innovativeness because it brings new perspectives that are mostly different from those of the internal employees (Im & Workman, 2004). According to Kristenson et al., (2004), an essential motivation for involving customers in new product development is to harness their creativity. Involving the customer in new product development aggrandizes the innovativeness of the product because the company accesses the customer's knowledge and improves the diversity of the knowledge inputs in the new product development process. Conclusively, customer involvement in new product development influences new product advantage and new product financial performance via new product innovativeness.

2.7 New Product Development Processes

New product development is a process that offers innovation to customers from idea testing through distribution to the market. (Firth & Narayanan, 1996). There are two major new product development processes namely, new product development strategy and product modification strategy. These strategies are new or existing products that are been created or modified to invigorate an existing market in order to meet the needs of the market (Firth & Narayanan, 1996). Both strategies are initiated when there is no or less opportunity to offer new growth in the company's current market. When companies find themselves in this

situation, they are faced with three options: modify the existing product for the current market or develop a new product for the current and new market. From the company's perspective, these two approaches are employed in the product development approach.

2.7.1 New Product Developing Strategy

New product development strategy refers to the process of developing entirely a new product for either a current or new market. More specifically, in this strategy, the company aims to develop new product and process that involves exploring new possibilities (March, 1991). This entails building up technology assets and bridging market demands and technological possibilities. To develop a new product, the company must search widely and deeply in its network of knowledge to cope effectively with the uncertainty which is fundamental in new product development (Olso et al., 1995). To develop a new product, companies need a huge amount of investment in technology and the market (Cooper & Kleinschmidt, 1986). The investment facilitates exploratory activities that encourage technological learning and build brand equity to reduce customer unfamiliarity with the new product thereby helping in sustaining competitive advantage. Unlike modifying a product, developing a new product for a new market requires more resource commitment, has more risk, and has a longer development cycle.

2.7.2 Product Modification Strategy

Sometimes it is very difficult to introduce a new product into a new market and for this reason, most companies instead look at modifying the existing product for its current or new market. Product modification frequently responds to specific customer needs by adding some features or reducing costs. This development strategy usually involves the extension of prior knowledge and is normally associated with low resource commitment, low risk, and shorter development cycles (Cooper & Kleinschmidt, 1991). Some research shows that the impact of product modification can be either positive or negative (Banbury & Mitchell, 1995). The main aim of modifying a product is to increase the competitive advantage in the market. Product modification targets the existing market although it may capture new customers for the product. Product modification can be done in three major forms namely, functional modification, quality modification, and style modification.

3 Methodology

This chapter explains the research approach and strategy chosen for this thesis and it gives the reader a precise understanding of how the work and data collection was conducted. It also analyses the result of the research. A literature review was conducted to investigate the current research with respect to customer involvement in new product development. The knowledge gained from the literature review will guide the data collection.

3.1 Research Approach

According to Bryman and Bell, whether a researcher decides to use a qualitative or a quantitative research approach depends on the research's epistemologically grounded beliefs (Bryman & Bell, 2001). Since the purpose of this research is to investigate and increase understanding of customer involvement in new product development, I decided to use a thorough qualitative case study approach. A qualitative case study method of research is used to increase the understanding of contemporary phenomena. In this research method, an expert interview (i.e., to get the expert's view and insights on customer involvement) is used to incorporate views from several managers that have involved customers in product development and/or are targeting to implement new co-development practices in their company.

3.2 Research Strategy

The research strategy in this study includes the selection of the research design and the systematic plan of required actions. This strategy involves making a decision regarding the procedure of data collection and analysis (Creswell, 2009) which must fit the research study. This study is an exploratory study that helps in finding out "what's happening by asking questions, to seek new understanding, and to assess phenomena in a new light" (Saunders et al., 2007). The study is exploratory because it is used to gain familiarity with an existing phenomenon and to acquire an insight into the phenomenon to form an exact problem. It began based on the general concept of customer involvement in new product development and the outcome of the study is used to find out the related issues with the topic of the research. It explores the research questions and does not offer a conclusive solution to an existing problem.

The exploratory research method allowed me to be flexible and adaptable to change whenever the need arises. Being exploratory, the things I did was to problematise the study first; then identified the purpose of the study by formulating research questions and conducted further research in order to obtain relevant data that assisted me in the research process. Some of the methods I used in collecting data include literature, interview, reading of company documents, and online sources. The literature review was conducted by sourcing some academic resources such as articles, journals, textbooks, and publications mainly through online sources. Also, to understand fully how customers are involved in product development, the interview was conducted with some of the company's employees. The interview was conducted in person and was recorded by me in case I needed to go back to it and confirm specific information. The interview helped in a detailed analysis of the study. The interview was a source of knowing which method the company utilizes in involving its customers in the development of the product (UDEC) and the impact of customer involvement in the development of the product (UDEC). For the interviewees to comment or make opinions, the interview was in the form of interpretive and descriptive questions. The interview was a semi-structured interview because it provided the opportunity on the part of the interviewer to probe and expand the interviewee's responses" (Rubin & Rubin, 2005: 88).

3.3 Research Sampling

In this qualitative study, non-probability sampling was applied. The non-probability sampling method was applied because the research is qualitative research and as a qualitative research interview was conducted with particular individuals (individuals with the knowledge of customer involvement in product development). A non-probability sample is a sampling method in which the researcher selects samples strictly based on the subjective judgment of the researcher rather than random selection (Saunders et al., 2009), and the sampling method depends on the expertise of the researcher. Using a non-probability sampling method, I selected the interviewees from the company based on their knowledge of new product development.

From the literature, there are four types of non-probability sampling; and there are as follows; snowball, self-selecting, purposive, and convenience (Saunders et al., 2009, p. 236). Since qualitative research sampling must satisfy the aim of the research (Collongridge & Gantt, 2008), this study ties in with purposive sampling where I interviewed the individuals involved

in new product development. This sampling method was used because of the nature of the research i.e., qualitative case study research.

With time limit and difficulty in reaching the customer, the participants were selected from the Company. Company W is a small company with a total of eight employees whereas only three of the employees were involved in the product development process of the product. In order, to get a more precise result, it would have been good if many people were interviewed but unfortunately, I could not reach out to the customer’s development team due to the nature of the topic of the study and the secrecy of the customer involved in the development of the product. The sample group came from different backgrounds and countries (Sweden, France, and Norway) but works in the same company. These participants provided answers with a diverse inclination and they have both inside and outside views with the company perspectives. The participants are B2B experts. Both the participants and I speak English fluently and therefore the interview was conducted in the English language.

Table of Participants

Names	Position	How	Time	Country
A	Management	Face to Face	2Hr	Sweden
B	Product development Engineer	Face to Face	1:30Hr	Sweden
C	Sales Executive	Face to Face	1Hr	Sweden

3.4 Qualitative Data Collection

The main purpose of data collection was to gather information on the current processes of product development in the company. Two different ways of collecting data were used in this research i.e., primary data collection which was gathered through interviews while secondary data collection was through literature review and company’s internal document which provided information about the product i.e., the product design, specification, and development processes of the product.

In the form of an interview, I approached the interviewees through an interview in order to comprehend the interviewees' lives and their own perspectives with their own words (Kvale,1996). In doing so, I was able to describe the respondents' experiences with interpretations and meanings of the phenomena (Kvale, 1996,). A semi-structured interview was used to understand the perspectives of the respondents (Bryman & Bell, 2011). By using a semi-structured interview approach, I wanted to let the interviewees some amount of freedom during the interviews. The semi-structured interview is structured as it shows a list of questions that the researcher wants to cover with an interview guide (Kvale, 1996). I considered the semi-structured interview technique very suitable for this study because it allowed me to collect the data needed to provide a contribution to the literature.

Furthermore, another important source of data collection was my visiting experience in the company. During my visitations to the company, I collected valuable information concerning my study by reading the company's internal product development documents which have the following information about the development of UDEC, the cost of the development, product design and features, the development period and processes, product specifications, about the customer involved in the development of the product and the reason why the product was co-developed. I also collected information from the company's weekly meetings and briefings. Due to some restrictions from the company, the internal documents concerning the development processes of the product were not allowed or permitted to be included or publish in this thesis report; but the documents gave me a piece of first-hand information and knowledge about the product and the company's processes of product development. I learn a lot by often interacting with the development team of the company.

3.4.1 Literature Review

The research started with Secondary data collection which is a literature review; I started by reviewing books and articles. The literature review was the cornerstone of this research and its aim was to establish a base on what has been done before on customers' involvement in new product development and to identify factors that are important for the customer involvement in new product development. A database such as Google scholar, Uppsala Library, and Uppsala University Library has been an important source of finding interesting books and articles. Keywords such as Customer Value, Customer relationship, New Product Development, Customer Involvement, Customer Satisfaction, Impact, and Process were used to find the relevant sources.

3.4.2 Interview

As mentioned in the research sampling, only three interviewees with knowledge of product development from the company were chosen for the interview because the company is a small company with eight employees. According to Saunders et al. (2007), a semi-structured interview is a broader variety of an interview in which the interviewer starts with a set of questions but is ready to extend the questions asked with new questions in the context of the research questions". During the interviews, the questions were open-end questions in order to allow the interviewee to comment or lay their opinion rather than a straight answer to a straightforward question. I also had an interview guide that enabled me to cover the areas of interest during the interview. An interview guide helps a researcher to conduct an interview (Kvale, 1996). The interview guide contained the themes which I wanted to cover with the questions while being focus on the aim of the research. It was written in English and is structured under five main topics. In Preparing up my interview guide, first I started by determining themes from my literature review and brainstorming in order to come up with the questions I wanted to ask. I tried to relate the questions with my research questions and aim, to bring value to the questions. Therefore, my interview guide covered specific themes such as customers' involvement in new product development, the role of customers in new product development, the impact of the customer in new product development, customer's relationship, new product development strategy, and new product development process and started with a warm-up question. The interviewees were allowed to freely give their opinion and experiences. The sample of the interview was chosen on the company premises so that the interviewees would experience minimum inconvenience. The three persons I interviewed genuinely wanted to participate in the research and I believed that this person would give a good response. The interviewees were given an overview of the subject of the interview in order for them to get prepared for the interview beforehand.

The interview took place in the company compound and to be précised inside the participants' offices. As someone that is not used to conducting an interview, it was a bit hard to conduct a qualitative interview of this nature. I had to be a very good listener in order to be able to ask arising questions. It was a bit difficult to get the necessary information as this would expose the company strategy. The interviews were recorded as it was an oral interview. It is very significant to record interviews during the research (Kvale, 1996). Before recording, I informed the interviewees, and it was necessary to inform the interviewees and ask for their

consent if they were fine with being recorded (Bryman & Bell, 2011). They all agreed to be comfortable with the recording of the interview. The aim of recording instead of taking notes is to help me pick all the points discussed during the interview. In a qualitative research method, the recording of interviews does have some advantages and some disadvantages. Saunders et al (2009) opined that recording helps the researcher to re-listen the answers and get direct quotes and help the researcher to stay focus while on the other hand; the technical problem can be a disadvantage. The respondents were asked if they wanted to be anonymous or their names are written, and they all said they wanted to be anonymous which gave them a free and open mind during the interview. According to Kvale (1996), in order to have the interviewees' thoughts with a free and open-minded interview, it appears significant to ensure the anonymity of the interviewees if they ask for it.

I followed the ten criteria for conducting interviews according to Kvale (1996) which are clear, knowledgeable, gentle, sensitive, open, structuring, steering, critical, remembering, and interpreting. The interviews were structured in the same way. I started by thanking the interviewees for granting this interview for my research. Then I introduced myself, the research, and its aim. I then asked the respondent his details before going into the main interview questions. I presented the structure of the interview and the topics of the interview guide to the respondents. Normally, the first question was about ethical considerations such as confidentiality, anonymity, recording, and agreement to be interviewed. We spoke in clear and simple terms to avoid complex terms from the theories. For me to generate much knowledge, I came up with follow-up questions to acquire more elaborate answers from the interviewee (Bryman & Bell, 2011). At the end of the interviews, I let the interviewees express themselves if they wanted to ask any questions or to bring up some topics that we have not tackled. According to Bryman & Bell (2001), every qualitative interview has a different length and time. Table 1 shows the duration of different interviews. We can notice that our shortest interview lasted 1 hour and the longer duration of the interview is 2 hours. The interview helped in gaining more understanding of the theoretical factors and their impact on customer involvement in new product development.

3.5 Data Analysis

Data analysis from a qualitative research method must be established on the nature of the research. According to Kvale (1996), there is no standardized approach to analyze data but that the research had to consider the research questions, research strategy during the selection

of the method of analysis. Also, according to Saunders et al. (2009), the method of analysis depends on the research approach. One must take into consideration the different meanings of words from their abundance and their complexity when performing the qualitative analysis (Saunders et al., 2009). It is important to categorize the data in order to have a clearer view of the results make sense of it.

The following were done before the data was summarised and prepared for analysis. First, the data gathered from the interviews by recording was transcribed using the main words for the data analysis. Content analysis was done to structure the collected data and to enable me to draw conclusions. The purpose of doing the content analysis was to organize the quantities of the text into fewer content categories. This is a method for the categorization of verbal data by coding and classifying the data (Cooper et al., 2011). The categories were: customer involvement in new product development, customer relationship, customer roles in new product development, customer satisfaction and effect of customer involvement in new product development, and the company's strategy in new product development. Each of these categories consists of units of data gathered from the interviews and answers from the interviews were transcribed, summarised, and analysed, and compared to the existing theories to answer the research question.

3.6 Ethical Considerations

As researchers, we need to take into consideration the ethical aspect of how we conduct interviews at the time of the research (Flick, 2006). One should be aware of the nature and content of our research, which may raise some ethical concerns during the interview. During the interview, an emotional relationship was created between me and the interviewee, which called attention for the interview to be conducted with sensitivity while being responsible. I carefully considered ethics as a significant yardstick for my research. As my study centred on investigating the involvement of a customer in the development of a product, I made sure that my interviewees felt safe and confident about the answers they would provide to me. After informing the interviewee about the purpose of my research, I highlighted the implications of the research and gave them the choice to participate or not to participate. By given them the information about the study and the choice to participate, the interviewees were guided by the ethics of informed consent which is important to get relevant information from them.

4. Empirical Data

This chapter describes the company and customer's backgrounds, the results of the interviews and gives a clear overview of the major findings. The information discussed in this chapter will be further discussed in the analysis and will be linked to the theory. Before proceeding to the empirical findings, archival information will be presented in the form of the company and the customer backgrounds.

4.1 Company's Background

Company W is a Swedish Clean-tech company that offers solutions and products for underwater cleaning. The company was established in 1919 in Sweden. The company specializes in manufacturing underwater cleaning robots with automatic and semi-automatic robots. The company has over 50 years of experience in the manufacturing of pumps for underwater usage. The company has a total of eight employees: the CEO, the technical manager, one marketing officer, two finance officers, and three engineers. The company has 8 different products namely, W5, B6, W2, VR-5, VR-6, YT-6, YT-8, and UDEC. The products are used in cleaning pools, reservoirs, irrigation, cooling towers, fish tanks, nuclear reactor tanks, aquatic parks, fountains, walls, etc. The products can be used in fully automatic mode and/or controlled by remote control when required. Concerning the product in this study, UDEC is an underwater decontamination cleaner that is designed to remove radioactive aerosols from the bottom and the walls of the reactor tank. UDEC is developed with WEC in Sweden. The cleaner is easily controlled by remote control and its high manoeuvrability allows for easy access to surface cleaning. The machine may be operated in recirculation or a once-through mode depending on the plant system and cleaning requirement.

Company W's business activity is divided into two, the public sector and the industrial sector. The public sector is meant for all types of commercial (sometimes private) pool cleaning, while the industrial sector is for the cleaning of reactor tanks in nuclear power stations, reservoirs for irrigation, cooling tower tanks, glassworks, fountains, etc. Company W's business idea is to offer all its customers solutions and underwater cleaning products that are efficient, durable, reliable, affordable, and environmentally friendly.

4.2 Customer's Background

Description of the customer, WEC is an American electric company founded in 1886 in the USA. And the company expanded to the nuclear power sector in 1999. The company has 9000 employees around the world with its headquarter in East Pittsburgh Pennsylvania USA. The company has over 100 years of experience in industrial engineering and innovation. The company's goal is to provide solutions to its customer plants with safe, reliable, and efficient functioning. They also help their customers or clients to meet the need of their own customers. The company is committed to quality, safety, and innovation.

The company's over 100 years of experience is in electrical engineering but not specifically in underwater cleaning robots. The company product portfolio includes turbines, generators, motors, switch gear for generation, transmission, and use of electricity, nuclear plant, nuclear fuel, plant automation, and operating plant products. Both the company and customer have previously established a relationship as a customer/supplier relationship. WEC is the supplier of electrical parts for other products to Company W.

4.3 Findings

This section provides detailed qualitative insight into the case study of the involvement of a WEC in the development process of UDEC in a Clean-tech Company in Sweden.

4.3.1 Customer Involvement in New Product Development

Here the respondents were interviewed on the general concept of involving a customer in new or existing product development and the reason why they co-developed UDEC with WEC. First, I also asked the respondents if any of their products have been developed with any customer. The respondents submitted that most of their products are been developed by their engineers with little or no collaboration with customers or suppliers. Continuing, the respondents indicated that UDEC was fully co-developed in collaboration with WEC. According to respondent A *"I believe in the idea of involving a customer in the development process of new or an existing product as it gives the customer a sense of sharing the ownership of the ideas, and it makes the development process much easier"*. Respondents A and C explained that involving WEC in the development process of U-DEC gave WEC a good feeling of being involved in the development of a modern underwater cleaning robot.

Concerning the reason for involving WEC in co-developing UDEC, respondent B said the reason is that *“the company wanted to go outside its existing product field and develop a new product for a new market field and that the needed WEC technical and financial input in the development process”*. As mentioned above, the company specializes in the manufacturing of semi-automated cleaning machines that clean pools but recently decided to develop a new product for a new market field which is referred to as the industrial sector. The industrial sector includes the cleaning of nuclear power reactor tanks, reservoirs, and fish tanks. Respondent B said, *“developing the product (UDEC) for a new market requires idea generation, idea screening, concept development, and testing, business analysis, market strategy development, product development, test marketing, and then commercialization and that the company needed collaboration with one of their customers that has capabilities to develop the new product”*. When asked what stage of the development process the company involved WEC, the respondents opined that WEC was involved in the whole development process. In product development processes, some customers do not get involved in all the stages of the development especially the design and engineering stages of the new product development process due to a lack of technological know-how. But in the development of UDEC, the customer as an industrial company that possesses all the engineering knowledge (engineering knowledge of product development, project management, AutoCAD, material science, market research, etc.) of new product development needed was involved from the beginning to the end of the development process and it made the development easier. Also, respondent C stated that *“it was good to involve WEC from the start of the development process because WEC idea for the product development is generated on the basis of market needs and it helped them in determining consumers’ requirement”*.

From the assertion of the respondents, co-developing UDEC with WEC brought many benefits to the company; according to respondent B *“collaborating with WEC in the development of UDEC significantly cut the cost of the development for us and it minimized the rate of failure of the development as the combination of both companies’ development experts brought the best innovative idea and it increases the rate to the marketplace”*.

4.3.2 Customer Relationship

When discussing customer relationships, first, the respondents were asked if both companies had an existing relationship and how long. The respondents stated that both companies had an existing relationship of over 10years prior to the development of UDEC. Continuing, the

respondents were asked if the involvement of the WEC in the development of UDEC enhanced the relationship between the company and the customer. Respondent B presented that *“co-developing UDEC with WEC increased our relationship and the relationship helped us in improving our operation by reducing manufacturing, sales and service cost”*. Here we have the idea that co-development can enhance the relationship between a company and its customer thereby reducing the cost of new product development. Respondents A and C also talked about being transparent and genuine. They argued that being transparent during the development process increased their relationship, and by doing so, the customer began to see the company as genuine. Respondent B appended the concept of trust as an element of building a better relationship. From the response of respondent B, co-developing UDEC with WEC created much more of a relationship compared to when WEC only purchased product or supplied electrical components because it gave WEC the feeling that they are part of the development of the product. Also, co-developing UDEC with the company gave WEC the impression that the product is being developed to meet their needs. Respondent C stated that, *“involving a customer in the development process of a product enhances a long term relationship”*. The respondent explained that co-development is a good approach to achieving a better result in new product development and that it enhances company/customer relationships.

Further, I asked the respondents the steps they took in enhancing a good relationship in the process of new product development, Respondent B, stated that *“it is about being open to the customer by making him know what the goal of the project is, getting everyone along, and creating the development plan with the customer”*. He also emphasized building trust and respect; according to him *“we need to build trust and respect and make sure the development process of the product is a win-win situation for the company and the customer”*. The respondent raised the significance of building trust and respect in order to create a conducive environment for the product development process. Respondent A explained the importance of trust with the customer in the process of new product development. From the respondents’ view, the company created trust by having an open and frank discussion with WEC about the development process of UDEC; according to respondent C, *“being honest and open made us both developing teams to feel comfortable and freely express our viewpoints and sharing of knowledge”*. By letting WEC have access to the company development information meant that WEC was aware of the development plan and goal. According to respondent A, *“the information document contains the development plan of the UDEC in detail”*. Writing a

memorandum of understanding before the development process also created a trust for both the company and the customer.

On the other hand, respondent B declared that a lack of trust could also come from the customer as the employees have a mandate to do their job. He empathized that lack of trust could come from opportunistic behavior. Opportunistic department can create a lack of trust during new product development, and this behavior can either come from the company or the customer. Trust creates value but it can be jeopardized when the company fails to clearly define the co-development project plan.

4.3.3 Customer's Role in New Product Development

During the interview, the respondents were asked to mention the roles WEC played in the development process of U-DEC. Respondent B stated that WEC played two main roles i.e., the role of co-developer and resource provider. According to respondent B, their role as a co-developer and resource provider was not limited to only supporting the development of UDEC with funds but also providing important information (market and engineering information) needed for the development. Respondent B stated that *"the customer provided important information during the development process"*. According to respondent A, *"WEC recommended some changes in the design of the product, for example, they recommended some changes in the design of UDEC by adding new features that would make the machine remove radioactive aerosols from the walls and the bottom of the reactor tank compared to the existing product"*. Also, respondent C stated that *"WEC did not only provide information about their needs but also provided knowledge that helped in developing UDEC"*. The information from WEC which was also a description of their needs generated new ideas for the product. The respondents also stated that WEC was involved in decision making regarding the design, product features and specifications, and the establishment of the development process priorities. According to respondent A, *"both development teams prepared the development plan"*. The development team from WEC worked in collaboration with marketing, technical and manufacturing expert in the company throughout the development process. Respondent C stated that *"the combined knowledge in engineering and business of both development teams helped them in developing UDEC"*.

4.3.4 Effect of Customer Involvement in New Product Development

During the interview, the respondents were asked if the involvement of WEC in the development process of U-DEC had any effect or impact on the new product development process. Respondent A stated that *“the participation of WEC was significantly positive as it maximized the good relationship with us; and also increased customer satisfaction”*.

Involving WEC in the development process of UDEC increased the relationship between the company and WEC. The respondents were asked if customer satisfaction is attributed to the effect of co-developing U-DEC. The respondents agreed that co-developing UDEC helped in satisfying the customer’s need. The respondents also agreed that satisfying the customer need increased the perception of the product to the potential customers as WEC was a lead user. This influence helped the product in reaching the market easily thereby increasing the company’s revenue by selling more products.

Continuing, respondent B stated that, *“customers have certain expectations in using a product and if the value provided in the product meets with their expectations, the customer will be satisfied; in this regard, WEC was more than satisfied as U-DEC met all their expectations”*.

The respondents agreed that the involvement of WEC in the development process of U-DEC gave a better end-result because the company was more precise about what WEC wanted.

Respondents B stated that, *“jointly solving problems during the development process generated collective creativity beyond the capabilities of our Company or WEC team alone”*.

However, respondent B opined that such collective creativities depended on the effectiveness of the information sharing between the company development team and WEC. Without effective information sharing and closer interaction, the customer’s diverse mastery cannot be successfully blended to achieve collective innovation. Respondent A stated that closer interaction with WEC helped both companies to know the level of performance of each company at different stages.

Furthermore, we also discussed the challenges the company faced during the development process. According to the respondents, some of the challenges the company faced in involving WEC in the development of U-DEC was 1) difficulty in processing a large amount of detailed information from WEC, and 2) having only 3 employees (3 out of 8 employees) with the knowledge of product development made the time of processing a large amount of the detailed information from WEC to be longer i.e., time-consuming. Respondents A and C agreed that there were some complexity in applying all the information from WEC during the

development process. According to respondent A, *“the difficulty in blending the whole information from WEC almost affected the smooth developmental process but for the managerial skills from both sides, the situation was handled professionally”*. Even when a customer has valuable information or knowledge, sometimes it is very difficult for them to transfer such complex information to the company. The difficulty in integrating all the customer information can impact the effectiveness of the decision making which is a necessary condition for the new product development process. It is very important to develop a formal conceptualization of the process of customer information in order to advance understanding.

Finally, the respondents reveal that customer involvement in new product development from the ideation stage to the launch stage improved the product's financial performance and accelerated the time of the product to the market. Involvement of WEC in the development of U-DEC helped them in generating creative ideas for the product, improved product performance, and reduced the risk of a new product development failure or not meeting the needs of the market. In conclusion, involving the customer in new product development makes the development process more effective.

4.3.5 Company's New Product Development Process

When asked about the processes the company used in developing U-DEC with WEC, the respondents said the company used a product modification strategy. According to respondent B, *“the company used product modification strategy because U-DEC was an existing product which the customer wanted new features to be added on”*. As observed in the literature, product modification is the improvement of an existing product by making some changes in that product that could meet the customers' needs and attract new customers thereby facing the competitors effectively. Respondent A stated that *“the purpose of the product modification was to meet WEC demands and also to maintain the existing customer (WEC) as it helped in increasing the sales of U-DEC which increased the company's revenue”*.

Furthermore, I asked the respondents how the product modification strategy was applied to the existing product (U-DEC). All the respondents stated that in order to apply the product modification strategy, two changes were done on U-DEC i.e., functional modification (features improvement) and Quality modification. Concerning the functional modification of UDEC, respondent B stated that *“some changes were made on U-DEC to satisfy the need of*

WEC". According to the respondents, the following changes were made the design of U-DEC was slightly changed in manna that the new design became smaller and attractive to WEC and potential customers. New features like underwater cameras to facilitate long-distance operation from the operation point were added on U-DEC, a wide nozzle which can be connected from the discharge point of U-DEC to the water treatment system or mobile filtration was added in U-DEC and filter bags which collect debris at any time were also added on U-DEC". From the respondents' viewpoint, the changes made on U-DEC were made for a better working operation to satisfy the customer's need. These additional changes are referred to as functional changes that meet up the customer's need.

Concerning the quality modification of U-DEC, the respondents stated that U-DEC quality was modified by introducing new material changes which is more environmentally friendly. When asked if the change in material affected the quality and price of the product; the respondent said it did not affect much rather it gave the company a market advantage with its sustainable features. In terms of sustainability, the respondents stated that UDEC now has a longer life span (durable) compared to the previous machine; concerning the environment, the company has a return policy which means that customer can return the used and wear machine to the company and get some amount of money. This policy is meant to discourage users from disposing of the used and wear machine anyhow and anywhere which may have a negative effect on the environment. The sustainable materials (e.g., the plastic brush was replaced with a brush made from bamboo) used in developing U-DEC made the product to be more durable, recyclable, and that gave the company a market advantage.

5. Analysis

This chapter analyses the data collected from the empirical findings and compared them to theoretical reviews. Having presented my empirical findings in chapter 4 above, I created thematic networks in-order to analyze the information gathered from the qualitative data. Based on my empirical findings, I identified four themes i.e., Customer involvement and relationship, customer roles and satisfaction, the effect of customer involvement, and the company strategy. This chapter will clearly show the overview of the themes in order to have a better understanding of the research.

5.1 Customer Involvement and Relationship

As mentioned in the literature review, customer involvement is characterized into two forms; customer involvement as an information source and customer involvement as co-developer (Jeppesen, 2005; Nambisan, 2002). In contrast to the traditional strategy of involving customers in new product development as an information source customer involvement as a co-developer offers more benefits but also faces weighty challenges (Gemser and Perks, 2015). The benefit that is often mentioned is the quality of the product and customer involvement has a positive effect on the quality of the product (Carbonell et al. 2009, Feng et al, 2010). According to Feng et al. (2008), engaging a customer in new product development improves product innovativeness. However, some research also recognized some issues that prevent the company from benefiting from customer involvement in new product development; some of those issues are the possibilities of excess information (Hoyer et al., 2010) and the complexity of new product management (Nambisan, 2002).

In the case of Company W, the customer (WEC) was involved as a co-developer where they both collaborated to develop an existing product (U-DEC). In this approach, new product development becomes a collaborative process where Company W worked as a partner with WEC (the customer). A co-development union is a collaborative relationship enjoined by two companies to create value by combining their know-how related to new product development (Link and Bauer, 1989). In terms of the stages of the development process of U-DEC, WEC was involved in all the developmental stages from the ideation stage to the lunch stage. According to Cooper (1993), the overall logic of most development processes is to start with an ideation stage and end with the lunch stage.

According to Von Hippel (1994), to find a solution for a problem, necessary information and problem-solving competence must be gathered at a single position. For the development of UDEC, it was important for Company W to identify the customer's (WEC) needs through the gathering of relevant information that is required for a smooth development process. Sometimes this information can be sticky in the sense that the information can be costly and hard to implement in a new place. This relevant information was obtained by steady interaction between Company W and WEC. WEC closely and frequently interacted with Company W's new product development team as they engaged in joint a solution that contributes to the development of the product. Through the interaction, Company W acknowledges the knowledge and resources possessed by WEC thereby creating value and these results in co-development. Compared to the traditional way of co-development, this implies a shift in perspective, i.e., a shift from a customer and a developer to one of a co-developer. (Wikstrom et al.,1994).

In line with my empirical findings, customer relationship matters for Company W. In co-development activities, some customers are selected without contemplating the kind of relationship they have with the company. In the case of Company W, it is shown in the empirical finding that the company had over 10 years of relationship with WEC prior to the development of UDEC. Some researchers have argued that trust is an important factor or element for a successful relationship (Martinez & Bosque, 2013). From my empirical findings, the involvement of the customer in the development of the product strengthened the relationship they had with the company, and also affected the market in terms of loyalty. Vargo and Lusch (2004) agreed that co-developing a product creates a stronger relationship between the company and the customer involved. To build a better relationship with WEC, the company created trust with WEC. From the empirical finding, trust was created by being open and honest in discussing the development process of the product, sharing detailed development information and allowing the customer to have access to the company, and writing the memorandum of understanding. Trust was also created by sharing of knowledge, and technological know-how among the development teams. In an environment where both the company and the customer are being open and honest, both would feel comfortable and freely express their viewpoints and build on each other's concept.

From the theoretical finding, a new product development process requires knowledge of leadership, relationship, and communication management; in order to maintain a very good

relationship with a customer, it is very important to know how to manage the relationship through leadership and communication. Communicating a new concept is a major starting point for customer involvement in new product development. According to Huck (2004), communication through images, examples, and best practices show the possibilities that are related to new ideas, technology, and product.

My finding shows that trust is essential for fertile customer relationship management, and this trust can sometimes be created with the use of formal contracting. From the empirical finding, it is shown that Company W built trust with the customer by making the development plan together with the customer. So, trust is very important in maintaining good customer relationships during the co-development. In order to gain loyalty, creating trust is important for the company (Reichheld and Scheffer, 2000). In line with the findings, by incorporating customers' relationships into the framework of the new product development process, the company minimizes the sales and service cost thereby increasing buyer retention. From the empirical finding, customer relationship influences new product development, and in the case of Company W; the respondents stated that involving the customer in the development of the product had a positive effect on the development process.

5.2 Customer Roles and Satisfaction

From the empirical finding, the respondents stressed the role of customers in the new product development process which appears to be a very significant factor to be taken into consideration during new product development. Indeed, companies involve customers in new product development in order to satisfy the customer needs and for easy market penetration. Customers are involved in co-development to put new concepts, knowledge, and information about their needs. The share of information between the customer and the company represents one of the features of co-development. The customer plays the following roles during the new product development process; as co-developer, resource, and as a buyer (Nambisian, 2002).

Moreover, from the empirical finding, WEC played two major roles (as co-developer and resource provider) during the development process of U-DEC. According to Nambisian (2002), the role of a customer as a buyer is less relevant in the new product development process since attention rest on the customer as a resource and co-developer rather than a buyer. From the empirical finding, the customer as a resource provided information that

helped in generating the idea for the product development. WEC provided information in terms of descriptions of their needs, knowledge, and new concepts of the product. This information is described by ideas that go back and forth between the customer and the company in order to improve product development. In line with the theoretical and empirical findings, the Customer role as a co-developer is more evident in this study. In this context, WEC was involved in the development process because it is an industrial company with a good and long knowledge of new product development, and having the finance needed to support the development process of the product was a plus. Concerning decision making, from the empirical finding, it is discovered that WEC played a role in decision making by involving in various decisions with the company's new product development team regarding the design and product features, specification of product requirement, and establishment of the development process priorities. This is confirmed by Nambisian (2002) who states that the customer role can be done in a variety of ways i.e., validates the design, prioritizes the features of the product, and specified product requirements (Nambisian, 2002). The development team from WEC worked in alliance with marketing, technical and manufacturing expert in the company throughout the development process.

Concerning customer satisfaction, the co-development process entails customer satisfaction, and connecting them is very interesting. As evidenced in the findings, co-development allows the company to develop a new product that meets the customer's needs and increases their satisfaction. Because of that, their satisfaction is a consequence of the process (Grönroos 2008). Vazquez (2013) explained that a customer's active involvement in the value creation process has a positive influence on customer satisfaction with the company. This satisfaction can be provided by addressing the customer's needs. From my empirical finding, the respondents agreed that customer satisfaction influenced the perception of U-DEC to potential customers and users. It helped in reaching the market easily thereby increasing the purchase of the product. Fang, et al., (2008) argued that customer satisfaction could help in reducing the product time to market thereby given the company a competitive advantage.

Furthermore, the respondents agreed that Company W used its understanding of the needs of the customer to create customer satisfaction. From the finding, the information provided by both companies was used in modifying the product by adding new features, providing policy (return policy) in its current market offering, and guiding the development of the new offering. Understanding and integrating all the customer information into new product

development helped the company to create the needs the customer wanted as mentioned. In co-development, more value or features are added to the product (Vargo & Lusch, 2004).

Before the development, WEC had a certain goal in using the product, and they expected a certain performance of the product. Since U-DEC produces the expected performance, WEC had achieved its expected goal which is referred to as customer satisfaction. On the other hand, empirical finding also shows that dissatisfaction of a customer could be as a result of the negative expected performance of the product (U-DEC). In conclusion, the involvement of WEC in the development process of U-DEC satisfied their need and helped in making them have the sense that they were part of the development. According to Jaworski and Kohli (2006), there is a high chance of increasing customer satisfaction when a product is co-developed.

5.3 Effect of Customer Involvement in New Product Development

Unlike the traditional form of customer involvement where the customer is seen as an information provider only, the new approach empowers the customer to be involved in the new product development process as a co-developer with the internal employees of the company to generate a product that fits the customer needs (Fang, 2008; Nambisan, 2002). From the empirical finding, customer involvement in the development of U-DEC was very important as it helped in manufacturing a product that fits the customer's needs. The involvement of the customer in the development of U-DEC minimized the product's time to market and increases product performance. Some researchers have argued that more dependence on customer input can help in generating innovative ideas and improve product performance (Kristensson et al., 2004, & Nishikawa et al., 2013).

The empirical finding clearly shows that customer involvement in the development process of U-DEC enabled both the company and the customer to identify what information needed to be shared and how they could work cooperatively i.e., it amplified the level of collaboration. From the viewpoint of collaboration, the customer closely and steadily interacts with the company development team over a long period of time (Knudsen, 2007). By closer interaction, both parties closely monitored each other's performance during different stages of the new product development process which served as a mechanism in advancing future product development investment. The closer the company interacts with its customer the more chances they have in discovering investment opportunities. According to Nambisan (2002),

continuous interaction does not only generate a large amount of information but also provides an opportunity to develop a detailed knowledge of the customer's needs.

Since the new product development process relies on diverse knowledge inputs, customer involvement inspires a novel insight. The engagement of both Company W and WEC in problem-solving contributes to product design. According to Fang (2008), customer contribution constitutes a significant portion of new product development efforts. As seen in my empirical finding, customer involvement enhanced the relationship bond between the company and the customer. However, during the development process of U-DEC, there were some challenges; and the challenges were how to fully implement the information provided by the customer into the development process and this generated some complexity. From a theoretical viewpoint, a substantial amount of customer information increases the difficulty of information processing (Hoyer et al., 2010); and this may lead to miscommunication that could influence the use of customer information (Nambisan, 2002).

5.4 Company's New Product Development Process

The term new product development can mean different things; in line with my theoretical finding, there are two major processes in new product development i.e. product modification strategy and development of a new product (Firth & Narayanan, 1996). According to Crawford & Benedetto (2010), new products can include new-to-the-world (development of new products) as well as minor repositioning and cost reductions (product modification). From the empirical finding, Company W applied a product modification strategy in the development of U-DEC as it was an existing product. This strategy is not as expensive compare to creating a new product because a lot of resources and time have already been committed to the development of the existing (original) product. Using a product modification strategy, Company W made what is called functional modification and quality improvement in the development of U-DEC. The functional modification makes the product more useful (fulfills the customer needs) to the customer and the potential customers by adding new features (slight change in the design, underwater cameras, a wider nozzle, filter bags, etc.) to the product. Functional modification puts a product in a favourable competitive position by delivering the benefits that other products cannot offer. Adding new features to an existing product help companies to maintain a continuing image. Concerning quality strategy; Company W improved U-DEC by making some changes in the material (using sustainable material this time) used in developing the product, and the production process. From the

finding, changing the product quality, and using sustainable materials gave the company an advantage over competing brands.

According to the respondents, the main purpose of modifying the product was to increase the competitive advantage in the existing market thereby targeting and capturing new customers for the product. This confirms the statement of Crawford & Benedetto (2010) that companies get a high percentage of their sales and profits from a new product. Abbie Griffi's (1997) study showed that, on average, about a third of company sales come from products introduced within the past five years. Also, a study by Cooper (2001) showed that the top-performing companies did even better, gaining over 49 percent of current sales from new products. Companies with a specific product development strategy perform better (Cooper and Kleinschmidt 1995; Griffin, 1997).

6. Discussion

According to my analysis, customer involvement in new product development has been defined as a collaborative engagement in joint problem solving between the company and the customer to generate product solutions (Nambisan, 2002). The process of customer involvement in new product development is implemented by the company in order to provide a better end-result compared to the traditional development of products (Brockhoff, 2003).

From my theoretical review and empirical data, I assume that customer involvement in new product development is beneficial for both customers and the company. From the company perspective, the involvement of the customer in the development process helped in understanding and learning about the customer and the market trends and thereby delivered a new product in relation to the customer need and expectation as stated by the customer (Witell et al., 2011). The respondents agreed that customer involvement speed up the company's new product development process and reduce the cost and risk of product failure. For this fact, I say that customer involvement help companies to boost the marketing effect. The respondents discussed the idea of "telling the story of the product" by the customer involved in the development process i.e., for the customer involved to tell the story of the development process of the product to the new or potential customer in order to promote the product and to reach a larger market which will influence the purchase performance.

The statement concerning the benefits of involving customers in new product development was confirmed in the literature review. According to the respondents, the involvement of WEC helped the company to develop a precise product that meets the customer needs. The respondents discussed their experience with the customer during the development process; they stated that the development process provided feelings of happiness, trust, commitment, being valued, and properly engaged. The respondents opined that communication was a major driver during the product development process. Communication between the customer and the company must be two ways (Gustafsson et al., 2012). To properly manage the development process, it is important for the development teams (from the company and customer) to establish an interactive dialogue. Through this interactive dialogue, the teams would be able to have better communication thereby sharing information properly.

According to Cooper and Kleinschmidt (1994), communication between customers and suppliers concerning customers' choice is a key requirement for new product value creation.

Also, in order to avoid misunderstanding during the development process, the respondents believe that it is good to clarify specific information such as the expected outcome of the product development to the customer. This relates to the fact that Company W needed to be very transparent throughout the development process thereby avoiding the information asymmetry confirmed by Von Hippel (2005).

Transparency was brought up several times during the interviews. Transparency in this context is the process of being open and honest about the development process. It is important for the company to be open to co-developer because by being open the company creates a feeling of trust and commitment towards the customer. Hence both the theoretical and qualitative data showed that trust and commitment appeared to be very important during the new product development process. In this research, I included the variable trust and commitment since my research aims to investigate customer involvement in new product development and to also obtain an overview of their (trust and commitment) effects on the relationship between the company and the customer.

Concerning Lead User, from the qualitative data, the process of selecting the customer was by the Lead-user Involvement method. According to Hippel (1986), the Lead User method is more suitable to be utilized in the B2B market. Company W being a B2B company, it was necessary to use the Lead-user method in the new product development process. Since the customer (WEC) had the need for the product and at the same time has the technological know-how, their involvement in the development of U-DEC was justifiable. Von Hippel (1986) confirmed the above statement by suggesting that companies should collaborate with lead users, who face needs before others in the marketplace and benefit from finding a solution to their needs. In this research, it is discovered that there was only one Lead-User and research shows that this method is perceived as highly positive by an experienced customer. From the finding, Company W took advantage of the Lead-user involvement method because they (WEC) faced the needs before other customers in the marketplace. The Lead-user method of involving customers in new product development ameliorates the effectiveness of the development process by decreasing the development time to the market (Fang et al., 2008).

In this study, it is observed that customer involvement aims to make the most of the customer's role as a co-developer, resource, and buyer in-order to improve the development output and improves the development process by providing resources. The theoretical and

empirical findings suggest that the new product development process requires openness and flexibility that allows the company and customer teams to understand each other. Also, information that ensures novel insight should be effectively be integrated and implemented into the general product solution.

From the theoretical and empirical findings, the involvement of a customer in the new product development process results in delivering a higher value to the customer compared to the traditional new product development. However, some downsides can affect the development process and the relationship between the company and the customer. A high level of communication allows the company to reinforce the relationship between the company and the customer Hoyer et al, (2010). Therefore, miscommunication is one of the downsides that can negatively affect the relationship between the company and the customer. Although there was no miscommunication during the development process, the respondents, however, stated that miscommunication can occur through a lack of transparency from the company. Filieri (2013) stated that transparency leads to a feeling of trust.

Although a lack of transparency can be intentionally done by the company to keep or protect some vital information from the customer, this can lead to project failure as well. It is already established that customers feel good when they are valued by the company, and if the company does not create the impression that the customer is valued, it could negatively affect the end-result of the development because the customer could think the company does not take them seriously.

7. Conclusion

In this chapter, I will answer the two research questions to the best of my ability based on the theories and empirical data collected. I will give some conclusions that I discovered during this study. Finally, I will provide some implications for management, theory, and future research.

As mentioned earlier, the aim of this research was to investigate and create an increased understanding of new product development processes concerning customer involvement in the development processes of U-DEC in a Clean-tech company in Sweden and to examine the impact of customer involvement in the development of U-DEC. To fulfill this aim, the study was divided into a literature study and empirical findings. The literature study shows a current study on customer involvement in new product development generally. However, since the focus of my study was to investigate customer involvement in new product development in a particular company, I conducted a qualitative case study from the company's perspective. I explored the vision of the interviewees' co-development process through their experiences. From the interview I conducted, I was able to gain an extensive understanding of the subject from different perspectives and to answer my research questions.

From the finding, co-development can be a complex process if not properly planned. I discovered that the development process depends on the context of the development and value. Through the analysis, I derived four themes that served as the basis for my analysis. With these four themes, I was able to investigate and gain an understanding of customer's involvement in the development of UDEC, the company's method in co-developing a product, and the impact of involving the customer in the development of UDEC. The finding shows that Company W used the method of customer involvement as co-developer (CIC) in developing UDEC. The finding also shows the impact of the customer (WEC) involvement in the development of UDEC. These impacts are as follows:

- It increased the relationship between company W and WEC.
- It increased customer satisfaction by providing the needs of WEC on the product.
- The customer been a lead user, it helped the product in reaching the market easily thereby increasing the company's revenue by selling more products.
- It gave a better end-result.

- It helped them in generating creative ideas for the product, improved product performance, and reduced the risk of the development failure or not meeting the needs of the market”.
- Involving WEC in the development of UDEC made the development process more effective.
- It reduced the cost of developing UDEC from the company’s side.

Furthermore, a new product development concept where customers are invited to participate in new product development is increasingly being implemented in many companies. This concept promotes creativity that leads to substantial ideas that ultimately give added value to a product. Customer involvement in new product development creates customer satisfaction since the product is developed to serve a purpose and satisfy the customer’s need. Customer involvement in new product development processes contributes to the fact that companies can expect a sustainable relationship with the customer if the customer needs and requirements are carefully met.

Meeting customer’s needs and providing customer satisfaction is pivotal for the long-term sustainability of a company. Economically, from the finding, customer involvement in the development of UDEC reduced the cost of the development whereby meeting customer needs and satisfaction. It increased the speed of the product to the marketplace and decreased the development failure of the product. From an economically sustainable viewpoint, it is profitable to co-develop a product than developing alone. Environmentally, as obtained from the company’s internal document of the development process, UDEC was developed with a longer life span compared to other products of the company, and sustainable materials such as brush made from bamboo which is recyclable were used in the development of the machine. By using environmentally friendly materials such as brushes made from bamboo shows that the company cares about sustainability, ensuring the longevity of the equipment used in manufacturing facilities can also be important in sustainability.

7.1 Theoretical Contribution

This study has contributed to the knowledge of the literature field by getting a deeper understanding of customer involvement in the new product development process. Throughout the literature review and empirical findings, I have been able to show that customer involvement in the new product development process has an impact on the development

process; the impacts are clearly stated in chapter 7 above. With the findings, this study confirms that customer involvement has a direct impact on the new product development process.

7.2 Managerial Implications

The aim of this study has been to investigate and gain a deeper understanding of customer involvement in new product development and to examine the impact of customer involvement in new product development process of a product in a clean-tech company in Sweden. In addition to my theoretical contribution, I can offer recommendations to managers that are willing to involve their customer in the co-development process. Throughout my findings, I have shown the complexity of co-development; with this study I certify that customer relationship and satisfaction are very important factors to be considered during the co-development process. It is very significant to consider that the process of co-development has a degree of uncertainty. Hence, I recommend managers to be aware that co-development can result in unexpected negative end-result and thereby affecting the company's relationship with the customer involved. Managers should clarify the co-development plan (the role, period of development, and expectations) to the customer involved before the start of the co-development.

Furthermore, it is important for managers to provide feedback or have steady interaction with the customer in order to strengthen the relationship between them. By providing feedback, the customers are informed. It is also advisable for managers to make sure that the customer involved has a strong level of trust and commitment to run the development to the end. Managers should always involve Lead-users in co-development processes because Lead-users face the needs that will be general in a market. Co-development requires the knowledge and skills that are needed to identify potential needs and to learn from the customer's experience, behavior, and preference. In this view, managers should select teams from different backgrounds; engineering, marketing, finance, behavioral science (behaviorist), etc. Sustainability can increase the complexity of new product development; co-development with customers can enable a company to identify and evaluate a greater option in sustainable new product development to reach the best solution.

In conclusion, this study has investigated customer involvement in new product development, examined the impact of customer involvement and contributed on how to successfully involve

the customer in new product development. This study has emphasized customer selection and suggested that managers should often involve lead users in new product development. Managers should emphasize building a trustful relationship and commitment with the customer throughout and beyond the development process. Managers should implement a co-development process that will reinforce the relationship between them and the customer. Managers must strategically align the company toward delivering sustainable products with the customer.

7.3 Limitation & Further Research

This research focused only on the company viewpoint and did not investigate the customers' viewpoint. During this thesis, I experienced some difficulties conducting the interviews, in order to have another perspective; I wanted to interview the customer who already has been involved into the co-development process with the company but to no avail. Also, this study focused on one product and a particular company, so the result does not consider other companies with different products therefore the result is applied to the specific company and product (U-DEC). The samples came from Company W alone, and no extension was made to other companies. The analysis is restricted to the company context and the content of information transferred in the customer-company interaction was not addressed.

All the empirical data are collected from the company's side even though some researchers have called for a dyadic perspective (Covielli & Joseph, 2012). This bias is shown on the topics which this study focuses on. To address these limitations, I recommend a qualitative study that includes company and customer perspectives. The company benefits in customer involvement are vastly documented while the customer perspective is not studied. Further studies should be conducted on the benefits that customers get from co-development. This will help in knowing the factors that motivate customer involvement.

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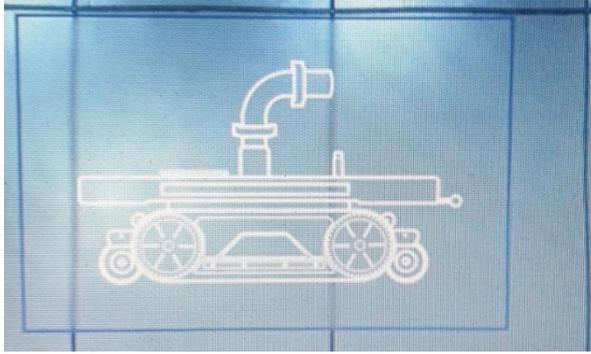
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Appendix I

Product prototype and the end product- U-DEC



Appendix II

Interview Guide –

Background question:

What is your name and background?

What is your position in the company?

Do you have any knowledge of customer involvement in new product development?

Theme: Customer involvement in new product development

Have your company involved customer(s) in any new product development process?

What is the reason for involving the customer?

At what stage of the development process was the customer involved?

Theme: Customer Relationship.

Does your company have an existing relationship with WEC prior to the development of UDEC?

Does the involvement of WEC in the development process of UDEC enhance the relationship between your company and the customer?

Which steps did your company take in enhancing the relationship with the customer before and during the new product development process?

Theme: Customer's Role in New Product Development.

What role(s) did WEC play during the development process of U-DEC?

Theme: Effect of customer involvement in new product development.

Would you say the involvement of WEC in the development of U-DEC had any effect on the development process?

Would you say the challenges the company faced during the co-development process of U-DEC?

Theme: Company's strategy in new product development.

Which strategy did your company use in developing U-DEC with WEC?

How did your company apply product modification strategy?

General questions:

Is there something I forgot to ask about and you think I should know regarding WEC involvement in the development U-DEC?