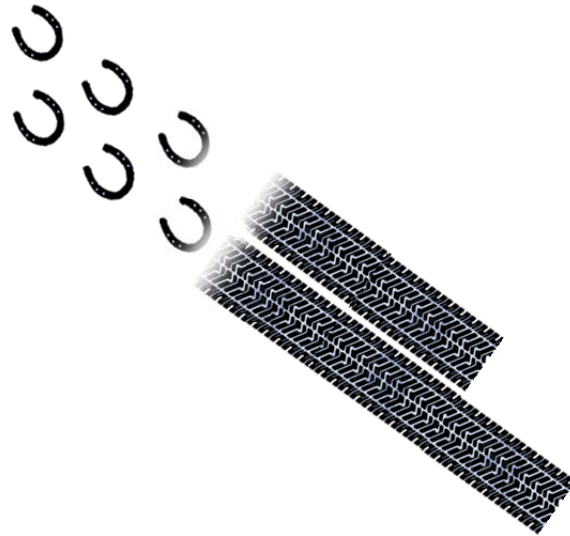# CHALMERS

Innovation, High-Tech Companies, and Faster Horses

Methods for Capturing and Integrating Customer Values and How They Are Used in Practice

Master of Science Thesis in the Master Degree Programme, Business Design

LOIS DIERKS
EMMA FOLKESTAD

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ABSTRACT

Innovation, High-Tech Companies, and Faster Horses
Methods for Capturing and Integrating Customer Values and How They Are Used in Practice

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Companies today are driven to deliver products to the market at increasingly higher rates, but product launch is often unsuccessful. Developing products that are well aligned with what the customer values is vital for company success. Furthermore, the creation of customer values is the primary driver of value for shareholders as well as for stakeholder. Having methods for capturing and integrating customer values is an important part in becoming a customer-focused company.

The purpose of this study has been to understand which methods are used in companies, and why they chose to use them. The hypothesis, that also helped scope the research, stated industry characteristics to affect the choice of method. Two characteristics that were deemed more interesting to study were customers and product lifecycle, as these two combined give a good picture of the value chain and covers both internal and external perspectives.

To answer the research question, four in-depth interviews were conducted with companies from two different industries, power tool and telecom, whereof both can be characterised as being technology intensive. The choice of semi structured, in-depth interviews was based on theory supporting these methods when the goal is to get an understanding of underlying reasons.

The methods described by theory and used in the surveyed companies are customer surveys, focus groups, storytelling, laddering, ethnographic studies, product analysis, and customer co-creation. Furthermore, the companies also used direct input on existing products and prototype testing. Most of these methods are of reactive nature; purely proactive methods are rarely used. According to theory, reactive methods are not enough to discover latent needs, which would provide a good foundation to develop innovative features. Utilizing new proactive methods, where the end user is involved in the product development process would make customer values truly beneficial.

Factors that have been found to affect the choice of method for capturing and integrating customer values include consumer characteristics and choice of business model and need not to be necessarily industry specific, but can instead be company specific. A company's business model affects the level of end-user contact and directly influences the importance of having established methods for capturing customer values.

Key words: *Customer values, technology development, new product development, customer co-creation, lead-user, industry characteristics, service-dominant logic, value-in-use.*

PREFACE AND ACKNOWLEDGEMENT

This thesis was carried out in collaboration with CIP Professional Services, Gothenburg, during the spring of 2012. In parallel, we performed an internship at the same company. We are grateful for the opportunity to work for CIP Professional Services and for the support we have gotten during the thesis writing process.

We hope this thesis will increase the understanding of the subject, and change the perspective of the customer as a source only suitable for incremental innovation and improvements. 90 years have passed since Henry Ford's spoke on what customer values are good for, creating faster horses, and it has been interesting to see how the perspective have changed. We hope that companies can learn from each other by finding similarities and differences in their methodology and include the customer to larger extent on the road to product innovation success.

First and foremost, we want to thank our academic supervisors, Jonas Lindgren and Emil Haldorsson for their input regarding scoping of the research area and keeping us on the right track. Emil Haldorsson's enthusiasm and continuous feedback have helped shaping this thesis both in content as well as in structure. This thesis would not have been the same without this valuable support.

We would also like to take the opportunity to direct great appreciation to the companies participating in the study that, without hesitation, agreed to openly share experiences and practices relating to management of customer values. Good input to the study was achieved and many interesting aspects were discussed.

Last but not least, we would also like to extend our gratitude to our friends and families for their continuous support during our years of study at Chalmers University of Technology. It has been five intensive years filled with challenges, and the thesis-writing period has not been an exception. With this thesis, we are leaving our university years behind us and look forward to the challenges that lay ahead.

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Lois Dierks & Emma Folkestad
Göteborg, June 12th, 2012

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1 INTRODUCTION

In this initial chapter, the background of the thesis will be presented. With this in mind, the purpose is derived. From this, the scope is set and the research questions posed. The limitations and delimitations done are explained. Finally, the disposition of the rest of the paper is described.

1.1 BACKGROUND

> *"If I had asked people what they wanted, they would have said faster horses."*
>
> - Henry Ford (Wikiquote, 2011)

Ensuring long-time profitability with high shareholder and stakeholder values are important to most companies. What should be remembered is that what enables all other kinds of values created in a company, is the creation of value for the customer (Khalifa, 2004). However, understanding what the customer will value is not always straightforward, as demonstrated in the classic Henry Ford quote above.

A traditional view on how to improve company profitability, and thereby shareholder and stakeholder values, is to look internally. The early 1980s saw a rise in popularity of methodologies focused on quality and operations management, aiming at streamlining organizational structure, speeding up internal processes, and thereby improving product quality. However, the customer of today is more demanding, competition has intensified as a result of globalization and emerging slow-growth economies calls for new ways to achieve and maintain a competitive advantage, seeking it beyond quality (Woodruff, 1997).

As a result of the changes on the market, companies are driven to reduce their product development cycle times (Flint, 2002). Novel products are introduced to the market with increasing speed, but the rate of financially unsuccessful products is high, in some categories as high as 70-80 %. Companies have adapted different strategies for solving this issue, with some aiming for improving the quality and performance of the offerings. Others have focused on being better at fulfilling the emotional needs of the customer. No matter which approach is used, a common denominator is that the customer is placed in centre, requiring companies to understand the external market (Lake & Lunde, 2008).

Narver & Slater (2009) showed that there is a relationship between market orientation and business profitability. A market-oriented company has the best chance of succeeding in effectively and efficiently creating superior value for customers. According to a poll made in 2007, the top concern of CEOs is building customer relationships in relation to stimulating innovation. This insight is crucial, as it builds on an understanding that innovation does not create business value unless it improves customer experience (Lake & Lunde, 2008). Similarly, allocating resources to improve internal processes to create a streamlined organization might be financially unjustified if factors related to these are not correlated with customer requirements and wishes (Woodruff, 1997).

1.2 PURPOSE

In light of this background, the increased importance of market orientation for companies is clear. Being able to capture customer values as well as to integrate these in the product development processes is a first step towards this goal. However, finding the appropriate approach to do this can be difficult. Some processes and methods for successfully capturing and implementing customer values in R&D decisions and technology planning are likely to be similar no matter industry context. On the contrary, some are likely to be modified to match industry characteristics. Identifying context based practice and underlying drivers will facilitate for companies to apply lessons from other industries, by identifying own industry characteristics and match these with drivers for methods and processes for capturing and integrating customer values. Consequently, the purpose of this study will be:

> *Identify methods and processes for capturing and implementing customer values and investigate to what extent these are independent or context dependent on industry characteristics. The purpose is to improve the strategic decision making process for R&D and technology planning.*

1.3 SCOPE AND RESEARCH QUESTIONS

Within the scope of this thesis there are three main research objectives. First, finding methods and processes used for capturing customer values in organizations with the purpose of utilizing these in technology planning strategies. Second, the study also aims to find industry characteristics that drive the organization's choice of these methods and processes. Finally, the third objective is to investigate the extent of practical utilization of the identified methods and processes. Elicited practices from different companies and industries will be analysed to determine which processes and choices that are independent, dependent on industry characteristics or if other factors influence the choice of company strategy regarding these questions.

The scope has been broken down into smaller parts, a main research question framed by three sub-questions, that facilitates addressing the core issue by dividing the overall subject into specified areas.

Research Question

> *What existing methodologies and processes for capturing and integrating customer values in technology planning, research and development are used by companies, and why are they used?*

To ensure that all relevant perspectives are taken into account when answering this primary research question, three sub-questions have been formulated:

> *To what extent is state of the art theory on capturing and integrating customer values in technology planning, research and development used in industry practice?*

> *Are there specific industry characteristics that directly influence the choice of methodologies used and how customer values are integrated in the product development process?*

Are current used practices for capturing and integrating customer values in strategic technology decisions depending on specific industry characteristics?

1.4 LIMITATIONS AND DELIMITATIONS

Out of the three behavioural components that Narver & Slater (1990) points out as parts of a market oriented company - customer orientation, competitor orientation and inter-functional coordination - competitor orientation is outside the scope of this thesis. In relation to inter-functional coordination, only those parts relating to technology development will be included.

For the empirical part of the study, four companies from two different industries will be studied. This is done to limit the amount of parameters that needs to be taken into account for the analysis. The companies assessed will be based in Sweden owing geographical constraints. A limited set of industry variables will be assessed in order to derive potential correlation between external factors and choice of internal processes.

Customer values can be used as a base for many strategic decisions within organizations, such as business modelling and design of market offers. However, the focus of this thesis will only be on how customer values are used for planning and conducting technology development. The study focuses on technology intensive companies who are heavily dependent on technology in the product development process. Finally, only existing methodologies and frameworks will be taken into account. It is not within the scope of this thesis to propose new ones.

1.5 DISPOSITION

CHAPTER 2 – METHOD

In the methodology chapter, applicable theories are described. The research process, how aforementioned theories relate to it and how the quality of the research has been ensured is also introduced. Criticism of chosen process and literature is included. The underlying logic of the chosen industries and characteristics is discussed.

CHAPTER 3 – THEORETICAL FRAMEWORK

The theoretical framework has been sorted into three main parts: company orientation, customer values, and methods for capturing these. Combined, they aim to provide a theoretical foundation to compare and analyse industry practices for capturing and analysing customer values.

The first part starts by introducing the concept of the market-oriented company, to provide a setting in which the following theory will be easier to understand. Common terms and concepts in relation to the research field of customer values areas are also described. The second part explains the concept of customer values from various angles, and argues for the importance of this concept. A contrasting approach to product improvement is presented in the form of Total Quality Management. This exemplifies the difference between customer focus and customer understanding explained from a company perspective, focused on technology-based companies and the importance of customer values. This section also includes an illustrative example based on Ericsson, Nokia and Motorola. The third and

final part focuses on different methods for capturing and integrating customer values. To provide a foundation, a description of the differences between reactive and proactive approaches to product development and customer value integration. Categorized by their dominant reactive or proactive nature, a wide range of methods is subsequently described with the purpose of identifying well-known methods theoretically available for companies to implement.

CHAPTER 4 – EMPIRICAL STUDY

This chapter presents the objective results from the case study interviews made. The interviews are presented separately for each company and are made anonymous. For each interview, company background, customer and lifecycle characteristics, and methods for capturing customer values are described.

CHAPTER 5 – ANALYSIS

The analysis compares the companies assessed in the empirical study in the previous chapter, highlighting similarities and differences, within industries as well as between industries. The empirical study results are also compared with the theoretical framework of chapter 3. Relating industry characteristics to the previously described company practices aim to distinguish context based and independent practices. Input from customer values are mapped according to the product development process to depict a clearer picture of driving industry characteristics and its influence on practices chosen for capturing and integrating customer values.

CHAPTER 6 – DISCUSSION

Based on the logic correlations in the previous chapter, this section adds an argumentative perspective to the capturing and integration of customer values and driving forces affecting choice of practice. It discusses what industries can learn from each other, why companies' practices differ and whether it is possible to distinguish guidelines with regards to the choice of method. Opinions regarding the analytical results and the subject as such are presented. The relation between frameworks proposed by academia and the methodologies used by the interviewed companies is also assessed. In addition, the aim with this discussion is to elaborate on identified discrepancies in the analysis to derive causes, consequences and remedies that cannot be related to the assessed industry variables.

CHAPTER 7 – CONCLUSIONS

In the final chapter, the research questions are answered with the help of the analysis and discussion. The hypothesis driven approach will shape the answer to also verifying or falsifying the stated hypothesis in the introduction. Practiced methods are presented in combination with identified main drivers and causes. Without adding new information, the findings of the thesis will be summarized to provide condensed conclusions of the study.

2 METHODOLOGY

This section describes the methodology used in order to answer the research questions in section 1.3 and also measures taken to ensure quality of the study. Describing the methodology will provide the reader with information regarding how the study has been conducted, benefits of used method as well as limitations with the chosen approaches. At first, a summary of the research process is provided as a foundation for applying the chosen methodologies on. Subsequently, theory of chosen methodologies is presented followed by a detailed description of the research process, assessing the process step by step. Finally, actions for quality insurance of the study are presented from four perspectives.

2.1 RESEARCH METHOD

In brief, the chosen methodology is based on a literature study complemented with a qualitative study in the form of interview-based case studies. Initially, a theoretical foundation was made reading material in relation to customer values and relating methods followed by an empirical study where in-depth interviews have provided an applied industry perspective to the subject.

Before describing theoretical implications of the chosen research methodology, a short summary of the research process is outlined. In short, the research process contains the following steps:

1. Scoping of research area, formulation of hypothesis and phrasing of research questions.
2. Conducting a literature study to establish an overview of available frameworks and concepts in relation to customer values, its importance for product development, and industry practices used today.
3. Empirical research in the form of case studies of technology-intensive companies.
4. Theoretical and empirical findings are analysed to answer stated research questions and verify or falsify the hypothesis.

2.1.1 QUALITATIVE APPROACH

Qualitative research seeks to understand a given research problem or topic from the perspective of a local population and is effective in obtaining culturally specific information regarding values, opinions, and contexts (Denzin & Lincoln, 2000). Qualitative data is varied in nature and refers to any information possible to capture and that is not numerical.

Denzin & Lincoln (2000) describes the general framework of qualitative research methodologies to be explorative, using instruments allowing flexible and iterative style of eliciting and categorizing responses to questions such as semi-structured interviews. The analytical objectives are to describe variation and explain relationships. Questions are rather open-ended than closed. Also, some aspects of the study are flexible such as the wording of particular interview questions as the participant responses affect how and which questions that will be asked next. Finally, the study design is iterative, that is, data collection and research questions are adjusted according to what is learned.

The choice of using a qualitative approach in this study is based on the strength of qualitative research to provide textual descriptions of how people experience given research issues. The nature of the

research questions of this study, namely finding a variety of methods and processes; map out differences and similarities between industries; and understand the underlying rational of the chosen approaches, match well with the characteristics of a qualitative approach.

2.1.2 GROUNDED THEORY

The chosen standpoint is in grounded theory, a qualitative research approach originally developed in the 1960's, and aims to develop theory about the area of interest and also ground it in observation.

Trochim (2006) describes the generic grounded theory process in a series of steps.

1. Generative questions are raised with the intention of guiding the research and maintaining a dynamic approach to the research rather than confine the research or make it static.
2. As data is gathered, core theoretical concepts are identified.
3. Tentative linkages are developed based on the theoretical core concepts and data. As the early phase of the research is open it enables the research to target found problems.
4. Verification of the theoretical core concepts and summary of findings follow.

Taking a starting point in grounded theory enables the direction of the research to be based on information collected, as opposed to formulating a research question before data collection commences and focusing on finding information to answer that specific question. Within the chosen field, the area where further research development would be of relevance was not known when the study begun. Therefore, a foundation in grounded theory was deemed to be fitting to ensure a relevance of the study.

2.1.3 ITERATIVE PROCESS

As qualitative methodology requires a thorough understanding of important questions to ask, an iterative approach has been adopted. Initial research questions and thesis scope was modified according to theoretical findings, to better suit discovered limitations of current research available. Also, the interview process has been iterative, as questions have been emphasized or added based on learning and insights from the initial ones.

2.1.4 HYPOTHESIS DRIVEN

The initial part of the theoretical study provides an introduction to the concept of customer values and its importance in becoming a market oriented company. This introduction will constitute a foundation for deeper theoretical studies. It will also fulfil the function of being a basis for stating a hypothesis regarding choice of industries as well as for formulating interview questions. Further theoretical studies will be conducted to find frameworks for capturing and integrating customer values into technology development, which might be of use for companies involved and contribute to a best practice approach. For all theoretical studies, articles published in academic journals will be the main source of information.

With support in theoretical studies, a hypothesis regarding contrasting industries has been formulated to enable purposive sampling of companies.

> *The choice of methods and processes for capturing and integrating consumer values are dependent on specific industry factors, such as product or service orientation and supplier or end consumer focus.*

As the grounded theory approach lacks clear structure of when the study ends and how to conclude the findings, it is combined with a hypothesis driven approach. Using the initial theoretical studies as foundation, the core theoretical concepts of grounded theory have been formulated as hypotheses. In the analysis, industry variables will be correlated with the interviews in order to find patterns with the aim to find context based and independent best practice processes. This analysis will enable verification or falsification of the hypothesis.

2.1.5 IN-DEPTH INTERVIEWS

The interview methodology that has been chosen for this study is a blend between structured and unstructured interviews. Using an interview template containing both open ended- and detail specific questions, the interviews were modified depending on the responses provided by the interviewee. The same interview template was used in all interviews, but additional oral questions based on knowledge from previous interviews were included. However, using the same interview template ensured the acquisition of comparable and equivalent data. The interview template can be found in Appendix A.

Interviews have been conducted with four companies from two industries, categorized and chosen on factors that are derived from the preceding theoretical study. Eijvegård (2009) points out some of the benefits with a personal interview over a survey being the possibility for elaborated answers, greater openness, and opportunity to add questions during the interview. This has been important, as factors have been surfacing during interviews that were not previously considered, calling for further investigation. In order to derive potential correlation between external factors and choice of internal process, a number of industry variables have been assessed for all interviewed companies. To spur liberty to speech and to ensure the quality of the study, assessed companies have been made anonymous.

2.2   RESEARCH PROCEDURE

Breaking down the research process into work packages, the procedure can be divided into five different phases, each providing the foundation to proceed to the next step in the research process, collectively building on each other towards understanding customer values methodology. The five process steps are shown in Figure 1, providing an overview of sources, function and output.
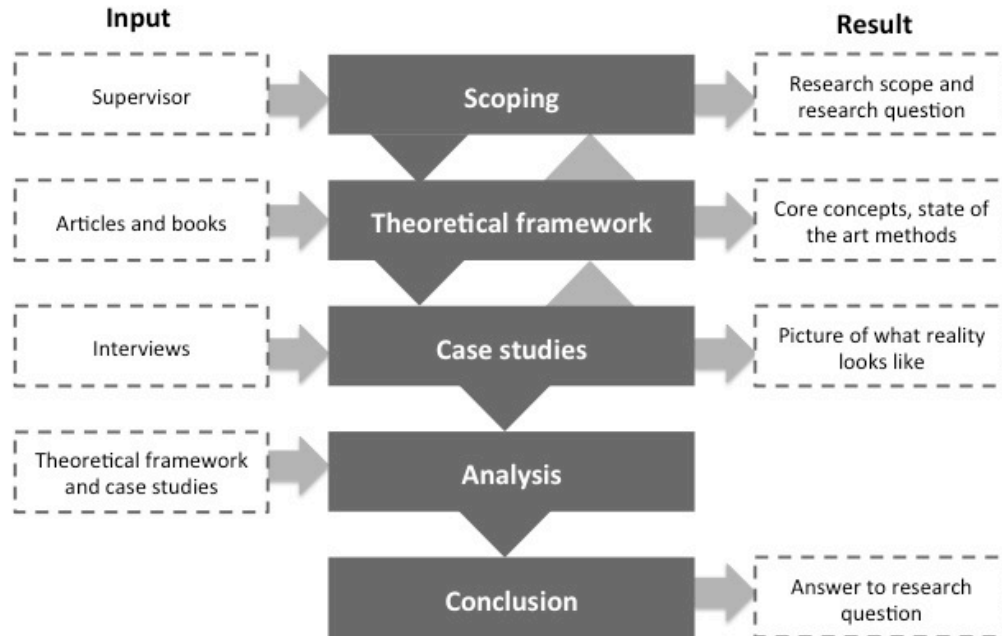
FIGURE 1 THE FIVE STEPS OF THE RESEARCH PROCESS WITH INPUT AND ACHIEVED OUTPUT FOR EACH PHASE. THE UPWARD POINTING ARROWS ILLUSTRATE ITERATIVE LOOPS.

2.2.1   SCOPING

Scoping the research has to be done for practical reasons such as time and geography restrictions. A well-scoped research question will also guide the research and ensure that focus is kept throughout theory, empirical studies, and the analysis resulting in an answer to the research question. The scoping process is visualised in Figure 2.

An iterative approach to scoping the research question has been undertaken. Initially, the scope was discussed with the company that assigned the thesis. This preliminary scope was the foundation of the initial theory studies, mainly focusing on the concept of customer values and how they relate to company success, with special focus on technology development and technology intensive companies. With a basis in this theoretical study, the scope was reassessed and clarified through continuous discussions and knowledge regarding theoretical standpoints.
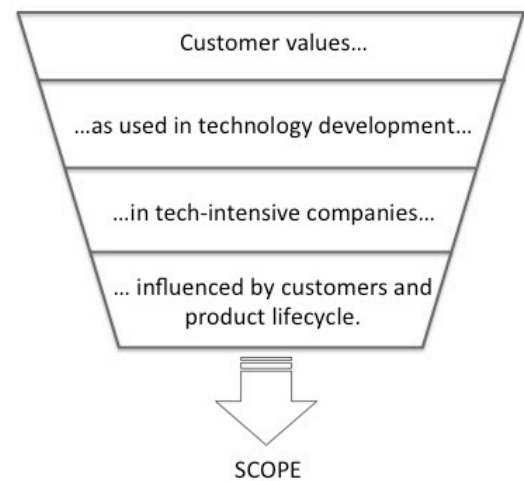
FIGURE 2 THE RATIONALE OF THE SCOPING PROCESS CAN BE ILLUSTRATED USING A FUNNEL, NARROWING AN INITIALLY BROAD PERSPECTIVE UNTIL A NARROW ENOUGH SCOPE HAS BEEN IDENTIFIED.

2.2.2 CREATING THE THEORETICAL OVERVIEW OF CUSTOMER VALUES AND RELATED METHODS

A literature study constitute the foundation of scientific research since it provides direction and relevance for the research performed. The literature study in this thesis was initiated to get an overview of the field of customer values, its importance for technology intensive companies and to map out existing methods for capturing these values.

The literature study was initiated as soon as a framework for the research scope was set and continued alongside with further specification of research scope and clarification of research questions. Also, the literature study has been reassessed based on results from the case studies, complementing with theory on methods discussed in the interviews.

There are aspects to consider when undertaking a literature study: reading various sources, authenticity, credibility, and representativeness (Denscombe, 1998). Authenticity of the material is considered to be high, as it mostly constitute of academic articles derived from universities and industry journals accessed through university databases. Multiple sources has been used, however, information regarding proactive methods, describing product development processes involving the customers, are to large extent derived from publications by a single group of researchers within the field. While using the latest research, which few have had time to respond to or conduct similar research on, it is a risk of obtaining biased material.

2.2.3 CASE STUDIES

The research method of case studies is defined by Yin (2004 p.15) as *"… a way of investigating an empirical topic by following a set of pre-specified procedures"*. Trochim (2006) identifies the concept of case studies as an intensive study of a specific context and states that it can be conducted using a combination of methods, whereof interviewing and written documents have been chosen. Furthermore, Yin argues case studies to be a good method when answering explorative questions such as how and why. Hence, the case study should be seen as a suitable approach for our purpose to investigate *how* companies capture customer values, *how* these are implemented, and *why* they choose these methods. The explorative nature of case studies emphasizes the importance of understanding the complexity and context of the case that one is studying. Hence, the interviews constituting the case studies were not conducted until the theoretical framework was set. Extensive preparations, by reading each company's annual report, webpage, and other information found important, was performed prior each interview.

2.2.4 SELECTION OF INDUSTRIES AND DIFFERENTIATING CHARACTERISTICS

From reading current literature on customer values, the importance of this concept for organizations, and how to use customer values in the technology development process, it was unclear how companies could implement the processes and methods described. Aspects relating to the business model was not assessed at all and surprisingly little critique was to be found on the matter. After discussion, the choice of differentiating

Customer characteristics	Product lifecycle characteristics
• Segments • Customization • Risk of substitution • Acquisition of new customers • Relation with customers	• Time between releases • Drivers of new technology • Development time

FIGURE 3 SUMMARY OF INDUSTRY CHARACTERISTICS CHOSEN FOR ASSESSMENT IN THE CASE STUDIES.

characteristics to investigate in the case study fell upon customer segment characteristics and product lifecycle characteristics, as seen in Figure 3. These two characteristics combined give a good picture of the value chain and covers both internal and external perspectives of a company's business model. The customer perspectives aims to investigate the relationship between company and customer, what segments the company targets, how sales are made, who the end user is, if the relationship is continuous and the level of technology push vs. market pull. As a complement, the lifecycle characteristic aims to provide understanding of the timeframe of technology development and purchase patterns. Development time from ideation to product launch is assessed as well as frequency of product replacement, technology durability and ratio between technology upgrades and new, disruptive product launches.

The two industries selected for the case study, telecom and power tools, where chosen as it was hypothesized that there would be a difference in the two characteristics depending on industry. The customer of telecom companies makes their product a part of a system that is then communicated to the end user. This differs from power tool companies, where the end user uses the product as the company has manufactured it. The telecom industry is more characterized by new innovations and high-tech solutions, while the power tool industry is more traditional, which hypothetically should make a difference in lifecycle. Both companies are technology intensive, meaning that they are heavily dependent on technology in the product development process. As the purpose of the study is to investigate customer values in relation to the technology development process, these type of companies were seen as being more relevant.

To ensure that the companies interviewed will have input on the concept of customer values, the focus has been on finding companies that are large and that mention customer focus in their official material, such as annual reports.

2.2.5 CASE STUDY INTERVIEWS

Out of four interviews, two have been conducted face-to-face and two using telephone. At first, the assessed companies have been openly approached to find the most suitable interviewee for the subject of the thesis. By sending a detailed description of the interview topic along with example questions, it has been ensured that the interviewee is knowledgeable about the field. This has been considered essential, as the interview questions have been of both structured and open nature, probing for further insights and company specific approaches. The structure of the questions have been ensuring consistency in the interview results and enabled the interviewee to highlight areas that has been emphasized in the theoretical study and as well as by other companies. The open-ended questions have ensured to capture industry and company specific details that potentially not would be covered in the preceding studies made.

2.2.6 ANALYSIS AND DISCUSSION OF EMPIRICAL RESULTS

The purpose with the case interviews was to gain insight in how the company values and practically use customer values in their product development process. Also, underlying rational to why these approaches are chosen was assessed from the perspective of characteristics relating to product lifecycle and customers. The interviews were aimed to understanding the work procedure and the focus of the company rather than obtain a detailed process description.

The analysis first compared the two companies within each industry to find similarities, both in characteristics and in how they work with customer values. This was then the basis for comparing the two industries with one another to find similarities and differences. The findings from the literature study were compared with the results of the case studies to find where they coincide and where there are disparities. In a discussion, the analysis was used to answer the research question and give suggestions for future research.

2.3 QUALITY OF RESEARCH

To ensure the quality of research studies, there are some aspects that should be assessed. Traditionally, the four concepts of reliability, objectivity, internal-, and external validity are discussed in relation to quality assurance of case studies (Yin, 1994). However, owing the qualitative nature of the chosen research methodology, the proposed four criteria of Guba and Lincoln for judging soundness of qualitative research will instead be assessed; credibility, transferability, dependability, and confirmability (Trochim, 2006).

2.3.1 CREDIBILITY

This criterion establishes the credibility or believability of the qualitative research results from the perspective of the research participant. Since qualitative research aims to describe or understand the field of interest from the participant's eyes, only the participant can judge the credibility of the results (Trochim, 2006). How the interviewees were chosen has already been discussed in section 2.2.5. The method used meant that the interviewee made the decision that they were able to give credible answers to the questions.

As the interviews have been extensive, much information has been summarized. For readability and clarification purposes, and to ensure the anonymity of the interviews, some details have been removed. In order to make sure this is an accurate summary of company methods and processes, each company representative has confirmed the summarized version before publication and has been able to contribute with feedback and corrections.

In order to generate a more valid study, triangulation in the meaning of multiple sources has been used to synthesize information. Empirical studies at different companies as well as literature studies consisting of books, papers and other electronic sources constitute this variety.

2.3.2 TRANSFERABILITY

This criterion refers to what degree the qualitative research can be generalized or transferred to other contexts. The researcher can enhance this factor by thoroughly describing the research context and assumptions central to the research. Providing this information will increase the understanding of the prerequisites for where the information is valid if a reader would like to transfer the information (Trochim, 2006).

Within the scope of the thesis, an evaluation of the context of the interviewed companies is included. In the study, underlying rationale as well as contexts affecting the answers are thoroughly mapped and analysed. The level of transferability is high as the conclusions explicitly states what methods that are context dependant. Furthermore, the thesis relies on the hypothesis of companies varying their approach to customer values depending on industry characteristics. Owing the research method, this underlying assumption is also thoroughly discussed in the conclusions of the study.

2.3.3 DEPENDABILITY

When conducting quantitative research, repetitiveness is a concern, i.e. whether the same results would be achieved if the same research process were repeated. A qualitative approach, on the other hand, emphasizes the need for the researcher to account for changes occurring in the research setting and how these changes affected the outcome (Trochim, 2006).

An iterative approach has been used throughout the study, most significantly in the initial phases restructuring the research questions but also when conducting the interviews for the case studies. After the initial interview, some questions have been added to encourage further clarification. Also, while the first two interviews were conducted face-to-face the final two interviews were telephone interviews.

2.3.4 CONFIRMABILITY

Confirmability refers to the risk of researcher bias. To enhance the confirmability, the researcher can document procedures for checking data multiple times during the study or having the study confirmed by a third, independent party (Trochim, 2006).

All interviews have been recorded and transcribed for confirmability purposes. However, the transcribed interviews is not included in the appendix for two reasons; first, for space purposes and secondly, owing the anonymity of the assessed companies. As mentioned earlier, the summary of the interviews presented in the empirical results have been approved by each company and also, the detailed transcriptions have been thoroughly checked and rechecked. Finally, the thesis is subject to horizontal evaluation and critique where persons outside the research group evaluate emerging results and provide comments. In this particular study, both the assigners at the host company, a formal mentor at Chalmers University of Technology as well as opposition students have provided critique.

3 THEORY

The theoretical framework is in three parts, and all combined to give a basis to answering the research question. The first part provides an introduction to the market oriented company, and three other recurring concepts. The second part explains the concept of customer values from different angles, and provides arguments for the concept's importance. A brief case study presentation further emphasizes this argument. The final part describes different methods for capturing and integrating customer values, structured by a proactive versus reactive view on technology development.

3.1 THE MARKET ORIENTED COMPANY

The concept of market orientation is described by Saleem (2011) as an organizational culture focused on identifying and meeting stated or hidden needs or wants of customers. Before launching new products, companies study customer needs aiming to create long-term relationships and, in the long run, maximizing profits. In comparison to having a product or sales oriented company culture, where production, supply, or promotion of these are in focus of management's attention, being market oriented is stated to improve organizational innovativeness, new product success, and overall organizational performance.

Saleem breaks down market orientation into two categories, proactive and reactive, and depending on which the company embraces, customers plays an either active or passive part (Witell et al., 2011). A reactive market orientation refers to a company's attempt to capture, understand, and implement expressed needs of customers. To practice this, a company is required to possess the ability to formulate intelligent questions and make careful observations of customer behaviour, enabling tailoring products or services to enhance customer value (Kristensson et al., 2008). This market orientation puts the customer in a passive role.

Proactive market orientation, on the other hand, targets hidden, latent, needs of customers resulting in opportunities for customer value of which the customer is oblivious. This will require the customer to play a long term, active role, as a collaborating partner, jointly co-creating value based on discovered latent needs in collaboration with the company (Saleem, 2011).

A study conducted by Narver in 2004 concluded that the impact of proactive market orientations is larger on new-product success than that of a reactive orientation. The practice of both orientations is important to attract and retain customer according to Kristensson et al. (2008). However, since a reactive approach in general is easier for a business to implement, the larger challenge for companies lies in discovering and identifying latent customer needs.

3.1.1 SERVICE-DOMINANT LOGIC PERSPECTIVE

Unlike a goods-dominant logic view starting with an existing market offering, a service-dominant logic view origins with an understanding of the customer's problem and identifies products and services that can solve these problems (Witell et al., 2011). When viewing value from a service-dominant logic perspective, an idea for future offerings is formulated in terms of a service (a value-offering) rather than

in terms of goods (description of technical content and requirements). The service-based idea is based on a functional perspective, where the customer wants to accomplish something by using a product. In order to succeed with this rationale, a greater understanding of customers' problems and needs relating to the actual use situation is needed. The service-based approach aims to increase the value-in-use, the concept explained in the next section.

3.1.2 VALUE-IN-USE

Value is created when a customer utilizes a product or good, and this process is referred to as value-in-use. The attractiveness of a market offering is dependent on whether it captures its value-in-use, and its true value can only be evaluated from a customer perspective. Consequently, the focus is not on the market offering itself but rather on the customers' value creating process. Woodruff (1997) discusses the value-in-use concept from a hierarchy perspective. His framework, the customer value hierarchy, helps to specify exactly what managers should learn from their customers and targets motivations of purchase beyond key buying criteria based solemnly on attributes. The value hierarchy argues that the seller should learn about consequences in use situations that customers want or want to avoid and the goals to where these consequences lead up to.

By recognizing that the product does not create value itself but rather when the customer uses the product induces a new perspective to product development. When focus is placed on customer perception and experience rather than product features, greater value-in-use can be created.

3.2 CUSTOMER VALUES

In this section, definitions of customer values from various perspectives are explained. Underlying rationale to the concept is provided as customer values are described in a company context and exemplified using a case study. An alternative approach introduced to market-oriented product improvement is introduced, Total Quality Management (TQM). This methodology was introduced in the 1980s and was embraced by many companies. In this report, TQM serves to provide a reference to what framework many companies are working with today and what processes the concept of customer values will build upon. The chapter ends with a closer look at the importance of understanding customer values for technology-based companies, as this is the focus of the study.

3.2.1 DEFINITION OF THE CONCEPT CUSTOMER VALUES

There is not a singular definition of customer values in literature, but some common ground can be found in that customer values are determined by customers rather than determined by the supplier (Woodruff, 1997). The difficulty in defining the concept can be derived to the concept being dynamic and evolving over time (Khalifa, 2004). In his article, Khalifa finds that definitions can be grouped into three areas: value component models, benefits/cost ratio models, and means-end models. It should be noted that neither one of these models are complete by themselves, but rather give three different angles in which to approach the subject.

Value components models regard the sum of want, worth and need as the determiners of a purchase decision by the customer. Another view that fits under this label is Kano's model with dissatisfiers, satisfiers and delighters (Khalifa, 2004). Dissatisfiers are characteristics or features that are taken for granted in a product or service for the customer to consider buying it, but it does not provide any additional value once it is there. Satisfiers are expected, and the better they are, the higher the customer satisfaction. Delighters are not expected, but if they are there, they provide a positive surprise and thereby increased satisfaction. This model can be correlated to types of customer values, dissatisfiers and satisfiers are often wants and needs the customer can express while delighters are derived from latent ones (Khalifa, 2004).

Benefits/cost ratio models see customer value as the difference between received benefits and occurred sacrifices, as perceived by the customer. The benefits can be both tangible and intangible, and the sacrifices can be both monetary and nonmonetary. These benefits and costs can occur in preparing for the purchase, the actual purchasing moment, and the continued use (Khalifa, 2004).

The third type of customer value models identified by Khalifa is the **means-ends model**. This is described by Reynolds and Gutman (1988) as being focused on the connection between attributes that products have, *means*, and the consequences that they lead to for the consumer. The consequences will in turn affect personal values, *ends* held by the consumer, either in a positive or negative way. These connections are often done subconsciously, and can be learned by use of certain products or services.

3.2.2 THE IMPORTANCE OF CUSTOMER VALUES

The connection between customer values and profitability is apparent from many different angles. Shareholder and stakeholder values are both important to companies, but it is worth bearing in mind that they in turn are driven by customer value. Being able to deliver superior customer value will lead to loyal customers, which in turn is a driver of financial performance. Customers will only remain loyal for as long as they get superior value from a company as compared to its competitors. Focusing on customer retention is logical, since a small increase in customer retention can be connected to a major increase in net present value profits. All this taken together is likely the reason for most business strategy models highlighting the importance of creating value for the customer (Khalifa, 2004).

Another argument for the importance of customer values is related to its connection to new product development (NPD). Companies are driven to reduce cycle time within their NPD processes to bring new products to the market faster; however, at the same time, new products on the market are failing at a high rate. This could be the result of the offerings being based on internally generated creative ideas without a foundation in an understanding of customer values. Tying in to the discussion about customer retention above, for companies to be able to retain customers they need to modify their existing products and develop new ones. NPD takes time; consequently, companies benefit from predicting early what changes in customer values that is likely to occur. A reactive approach will put the company in the risk of losing customers to competitors that are better at predicting change. Still, many companies lack formal processes for anticipating future customer needs. Traditionally, companies ask the customers about product attributes, which customers may have a hard time predicting, especially in markets characterized by rapid technical change (Flint, 2002). Trott (2005) highlight the importance for

companies to challenge their existing products and markets by pushing current product concepts. However, no matter how well a company meets articulated needs of current customers there is a great risk of not understanding the views customers yet cannot express, unexploited opportunities as shown in Figure 4.

The product development cycle includes several phases, from brainstorming, to development, and after launch. The early part of the process road mapping, also known as the fussy front end, could benefit a great deal from implementation of customer value understanding. Improving later parts of the process will make little sense if the

FIGURE 4 THE OPPORTUNITY TO EXPLOIT BUSINESS OPPORTUNITIES BY ASSESSING CUSTOMERS UNARTICULATED, LATENT, NEEDS (TROTT, 2005).

ideas generated in the first stages do not have a firm foundation in customer values. Often the first step is connected to brainstorming, creativity, and scenario exercises. If these activities are seen as a second step after capturing customer values, and participants are able to use these values, the outcome is likely to produce ideas and concepts of higher value-in-use. Thereby, likelihood of repeated success can be increased, giving shorter product development cycle (Flint, 2002).

Market offerings based on forecasted context of use are more likely to generate products and services of new market categories and thereby a better competitive position (Witell et al., 2011). One example of this is the iPad released by Apple in 2010. Besides selling 3 million iPads in 80 days, Apple reinforced their position as an innovative market leader by creating a product falling outside any product category, targeting latent needs in their user base (Gruener, 2010).

Kristensson et al. (2008) brings up two telecommunication firms that undertook projects aiming to capture ideas and values from users. The companies were interested in identifying real needs of ordinary people, their users, rather than relying on views of professional product developers who are removed from everyday utility contexts and needs based in real life settings. The fundamental benefit with user involvement is generation of solutions to real-life experiences and problems resulting in original and valuable ideas, focusing on value-in-use over product specification. As infrastructural technology solutions are standardized, these will not provide a distinguishable competitive advantage. Besides listening to customer's expressed needs, understanding latent needs taps in to a pool of untapped opportunities and facilitate launching innovative products with high value-in-use. To be able to shift focus in product development from reactive market orientation to proactive, requires active engagement. Proactive market orientation requires more than an annual survey exploring retrospective needs but rather active collaboration with users (Kristensson et al., 2008). Witell et al. (2011) argues that, if possible, customers should be active in market research themselves, being encouraged to take their own initiatives. The company will be able to create innovative market offerings that fewer competitors can match. Hence, these offerings are more profitable and have the potential to provide distinguishable competitive advantage.
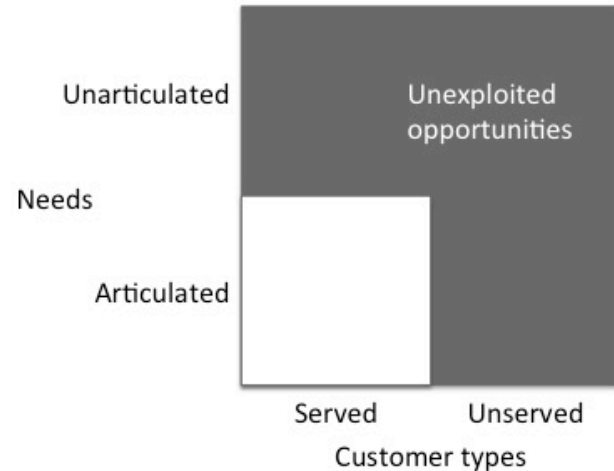
3.2.3 CASE STUDY - ERICSSON, NOKIA AND MOTOROLA

An example of the importance of understanding customer values, as well as being able to capture these needs and wants of users, can be derived from the telecom market's largest players in the second half of the 1990s. Being the world's largest mobile telephone provider, Motorola had a well-implemented total quality management, TQM, system and was one of the pioneers in the US, developing the quality management framework six-sigma. Ericsson had won the Swedish Quality Award on several occasions and was known for their superior quality.

The studied period was very successful for Nokia, increasing their market share with 50 percent while Motorola radically dropped their market share with 27 percent units and Ericsson was struggling in the same market position. The change in market share is illustrated in Figure 5. Lagrosen (2001) argues that Ericsson and Motorola did not lack customer focus but rather customer understanding and that a profound understanding of customers' situation is vital to foster innovation of real value.
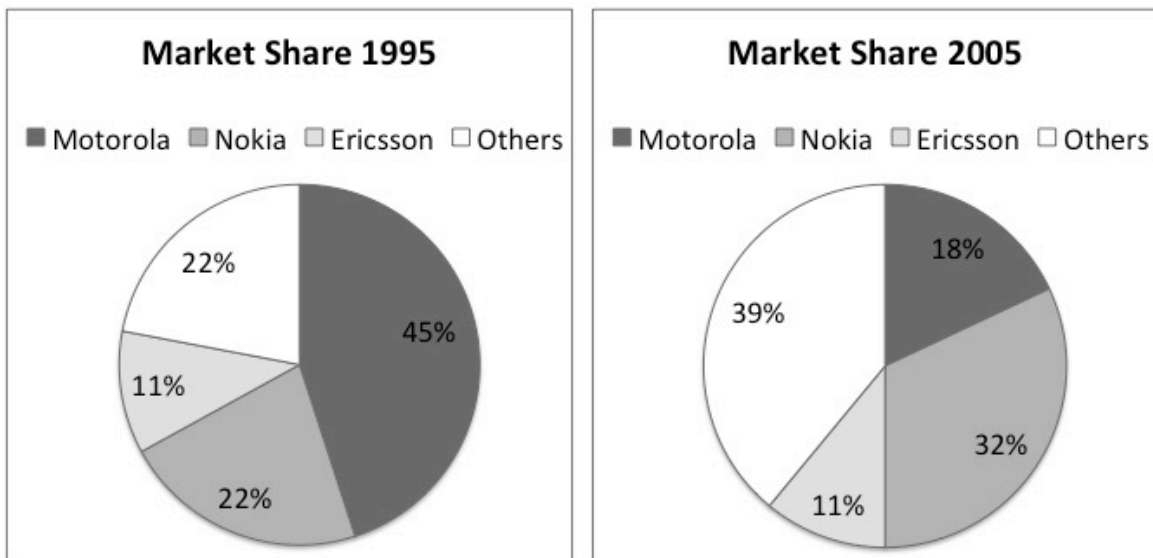
FIGURE 5 CHANGES IN MARKET SHARE FOR SELECTED ACTORS, 1995-2005

Many companies, especially in engineering, might have a well-implemented TQM system and be considered as leading in quality. However, this type of quality is not grounded in the needs and wants of the customers, but in the wants of their personnel. For an innovation to be successful and provide maximum value, it must be related to the customer (Lagrosen, 2001).

Several companies also regard themselves as being customer focused. This means that the activities of the company are intended to benefit the customer, but the customer is still seen from the company's perspective. Information about the needs and wants of the customer is collected, but it is made to match with a view on the product and its features that originates from the company. Instead, companies should strive for customer understanding, getting insight into the customer's perspective on the product, and using the customer's own framework (Lagrosen, 2001).

3.2.4 TECHNOLOGY-BASED COMPANIES AND CUSTOMER VALUES

Kristensson et al. (2008) identifies technology based companies to be facing particular difficulties in capturing customers' expressed and latent needs. While traditional companies frequently can use personal interactions to facilitate successful new service development based on customer learning, the lack of face-to-face interaction for technology-based businesses has several implications, illustrated in Figure 6.
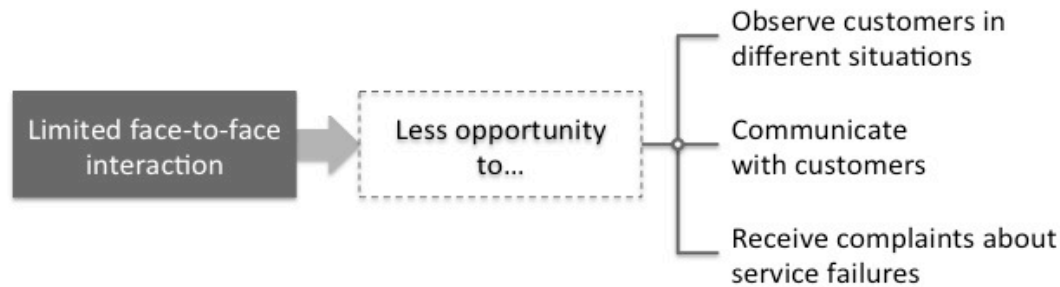
FIGURE 6 IMPLICATIONS OF LIMITED FACE-TO-FACE INTERACTION.

In addition, most users of technology-based services have limited technological knowledge that would create additional value. These factors combined results in technology-based companies experiencing significant difficulties initiating co-creation and, often, great efforts are required for even capturing the expressed needs of customers. As a conclusion, Kristensson et al. (2008) regards technology-based companies to benefit greatly from user involvement in their new product development process where they can provide useful information, enabling these companies to meet customers' latent as well as manifested needs. Kristensson et al. also highlight the importance of capturing latent customer needs for technology-based companies since customers may not understand exactly how to benefit from or use technology in the future.

3.3 METHODS FOR CAPTURING AND INTEGRATING CUSTOMER VALUES

Saleem's (2011) differentiation between proactive and reactive market orientation, as described in section 3.1, can also be applied when differentiating types of methods for capturing and integrating customer values. Reactive methods can be considered to be the more traditional way of viewing consumer research, where the goal is to capture values considering products that are already on the market or map *explicit* needs for what is missing. These customer values are then used as input for product development.

As contrast, the goal with proactive methods is to capture *latent* needs in the customers and often to make the customers take an active part in product development. Naturally, the distinction between these two types of methods is not absolute, for example reactive methods that elicits latent needs surrounding current products can be used in a proactive manner when developing new products.

This section starts by explaining differences between reactive and proactive product development methods. The structure of the section is by sorting methods on their reactive or proactive nature, giving an indication of when they are to be used in the product development process.

3.3.1 REACTIVE MARKET ORIENTED PRODUCT DEVELOPMENT

The typical process of a reactive market research is to show recent product launches or finished prototypes in order to trigger responses. Customers are expected to respond to pre-designed questions rather than to take own initiative. All participants receive the same types of questions and focus is on attitudes relating to product or service related aspects. Kristensson et al. (2008) list key strategies for reactive market-oriented product development in order to enable gathering of *valuable* customer knowledge.

1. Different customer responses should be classified into different customer segments
2. Reaching different kinds of customers
3. Motivating customers to participate
4. All participants answers the same pre-designed questions
5. Questions are focused on product related aspects
6. Focus on retrospectively recalled situations to answer questions

3.3.2 PROACTIVE MARKET ORIENTED PRODUCT DEVELOPMENT

Documented experiences and general strategies in relation to proactive market research is more of a scarcity compared to its reactive equivalent. However, the underlying strategy is to make the customers active in knowledge creation and not provide the same guidance as in reactive market research. As described by Kristensson et al. (2008):

1. Customers should be active in knowledge creation and not get the same guidance
2. Participators should be users with high degree of technology readiness, "leading users"

Instructions such as how to initiate a market research project like this or under which forms customers can share their information are difficult to find. While the outcome of close collaboration with customers is well documented, the lack of strategic recommendations makes it difficult for managers to identify changes needed and identify requirements to become more market oriented in their product development processes.

3.3.3 PROACTIVE APPROACH COMPARED TO REACTIVE APPROACH

Some of the common market research techniques used by companies to capture customer values include in-depth interviews, surveys and focus groups (Witell et al., 2011). These methods are examples of a reactive market orientation as they focus on capturing customers' previous experiences of a product or service by providing company-related stimuli. The company deciding what questions should be asked limits the opportunity to provide new insights and thoughts that lie outside the prepared interview guide or questionnaire. Customer responses will be related to previous usage, which is not really suitable when predicting future usage. Furthermore, reactive methods have elicited volumes of data on performance attributes, facilitating incremental improvements, but provide limited insight of surprising and delighting attributes.

While reactive methods capture consumers' spoken needs, proactive methods seek to capture both expressed and latent needs. In order to capture spoken needs, methods such as in-depth interviews and focus groups are sufficient but to capture the latent needs of customers, other methods such as laddering or ethnographic studies, are to prefer. The lead user method originally described by Von Hippel in 1986, is commonly brought up as an example of a proactive market research technique. In this method, the user is active and engaged in problem solving in the environment where needs are present, increasing the likelihood for latent needs taken into account in the presented solution. Witell et al. (2011) argue that the likelihood of new development project success increases as value is co-created with customers by giving them greater flexibility to make own discoveries. Market offerings developed based on market research techniques embracing customers' value-in-use are more likely to provide ideas beneficial for innovation.

Naturally, various methods have different strengths and weaknesses. It has been discovered that market research techniques affect a project's success in a number of way and that the output content varies depending on the role of the customer in development projects. One way of overcoming these issues could be to use triangulation, where several methods are used in combination to overcome method drawbacks and to obtain a clearer picture of customer wants and needs (Lagrosen, 2001). As market research plays such an important role, a deliberate approach should be taken to selecting the appropriate technique.

In a study conducted by Witell et al. (2011), three methods for market research were evaluated in relation to each other. Focus groups were discovered to make several participants create ideas together. Co-creation resulted in ideas considered to have a high degree of originality but providing less customer value. Out of the ideas that were produced, service oriented ideas were deemed more original than goods based ones. However, the practical feasible and possible financial return was considered to be lower. Nevertheless, the study found that new market offerings developed using co-creation based market techniques are more profitable than those traditionally developed, the ideas derived by active customer involvement made a significant contribution to the firm in the study. Also, active customers in the development process produce ideas scoring significantly higher on the innovation scale than those generated using traditional means. In Figure 7 below, proactive and reactive methods are shown in relation to a standard product development process. Reactive methods give input on products that has been introduced to the market or that are in a late prototype stage. As a contrast, proactive methods give input in the earlier stages of product development, such as roadmapping and creation of a product concept.
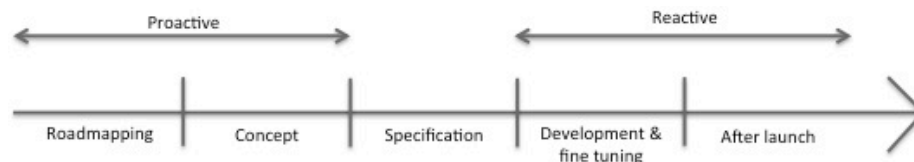
FIGURE 7 PROACTIVE AND REACTIVE METHODS RELATED TO THE PRODUCT DEVELOPMENT PROCESS.

While capturing customer values are done using both proactive and reactive methods, the implementation of them in the product development process varies. Reactive methods list customer needs and reactions and is commonly used as feedback or foundation for improvements. Proactive methods on the other hand many times, weave the capturing of values with product development, integrating customer needs and values earlier in the idea creation process of completely new offerings. In order words, the product development process is based on customer values from very early stages; the entire process is impeded with these. As a consequence, implementation methods for customer values are integrated in proactive approaches and added to reactive approaches.

3.4   REACTIVE METHODS FOR CAPTURING CUSTOMER VALUES

For each method, the description will start by explaining how the method can be used. Benefits of using the method, and settings in which it is the most beneficial, will be described, followed by disadvantages of using the method.

3.4.1   CUSTOMER SURVEYS

Kennet & Salini (2012) describes the concept of a survey to be a detailed and structured study of a market with the purpose of gathering data on attitudes, opinions or satisfaction by polling a section of a population. The process of conducting customer surveys can be broken down into four main stages, as shown in Figure 8.

FIGURE 8 THE FOUR PHASES OF CUSTOMER SURVEYS (KENNET & SALINI, 2012).

In the planning phase, a clearly defined purpose with the study should be formulated and an assessment of what variables that constitute the purpose of the study. Especially, variables relating to latent needs are not obvious and hence formulation of questions is key. This will constitute the foundation for the questions formulated. Modern surveys collect data using a variety of techniques, such as telephone, self-reported paper questionnaires, email questionnaires, internet-based surveys or face-to-face interviews. When sampling a population, a sample can be drawn from a cluster, systematically or just randomly. Answer analysis can be made using statistical methods to derive clusters. The rationale behind answers and a trend analysis are key components of the final presentation. Kennett & Salini (2012) suggest three questions to be asked to control the quality of the survey:

1.   Is the questions properly designed?
2.   Has the survey been properly conducted?
3.   Has the data been properly analysed?

Benefits: The benefit of telephone or mail surveys in new product planning is mostly in regards of precise estimation of potential demand in the later stages of the product planning process (McQuarrie & McIntyre, 1986).

Disadvantages: For getting input on how a given idea should be developed and refined to appeal to potential customers, customer surveys are more limited. McQuarrie & McIntyre (1986) states that the reason for this is the difficulty of explaining a new concept over the phone or in a questionnaire. Owing the date of publication, it can be assumed that this might have changed with the possibility to conduct surveys over the internet, enabling description of the new offering in image as well as video. Selection bias prior conducting the surveys can be a particular challenge (Kennett & Salini, 2012).

3.4.2 FOCUS GROUPS

A focus group interview involves six to ten people led by a moderator, discussing a product or service (Kristensson et al, 2008). Introducing a new product to a focus group will give different reactions from the various participants, simulating how the product will be accepted on the market. There will be persons that are "early adopters" and in discussion will explain their positive or negative view to the rest of the group. Comments from other group members will trigger reactions. Discussion amongst the participators can be enhanced. A moderator can for example create arguments by inviting participants to disagree with views expressed by another participant (McQuarrie & McIntyre, 1987). Due to the small number of participants and that the responses will depend on each other, the results will not be possible to validate or analyse statistically (McQuarrie & McIntyre, 1986). Therefore, focus groups should not be used to forecast market share or how common different opinions are likely to be, but instead to map what types of perspectives that exist.

Benefits: Although focus groups can be used for products that already exist, the possibility to simulate a new product's acceptance on the market makes it fitting for situations where a product concept exists and needs to be developed and refined. This is especially true if the product is complex, demand involvement of the buyer, and is quite expensive. The benefits of the focus groups are also that they are flexible, does not require much time and are low cost, compared to a comparable number of individual interviews (McQuarrie & McIntyre, 1986). Lagrosen (2001) derives the popularity of focus groups to their potential to be a source of knowledge, its practicality as well as to its economic feasibility.

Disadvantages: Kristensson et al. (2008) states that traditional brainstorming techniques can result in creative but rather meaningless ideas. McQuarrie & McIntyre (1986) point out that focus groups are not ideal in idea generation; if the goal is to generate a vast amount of ideas, individual interviews are more effective. Neither is the method suitable for idea screening, since a group of non-experts are not likely to provide usable advice on a large amount of ideas.

It should be remembered that the setting is artificial; when a product is introduced to the market it is not normal for people to sit and discuss product features. There is also a risk of participants saying what they believe that the moderator wants them to say, so that they do not sound uninformed or unintelligent (Seymour, 1987). However, this can be said about most research techniques that are characterized by direct inquiry with consumers (McQuarrie & McIntyre, 1987). Due to the group setting, peer pressure can occur, which can give the impression that a certain expressed opinion is shared by everyone in the group, although it is more social compliance than individual choice (Seymour, 1987). On the other hand, peer pressure can be positive as it magnifies views held by the individual. Due to the unstructured form of the interviews, the data may be hard to summarize and analyse.

3.4.3 INDIVIDUAL INTERVIEWS

GroupQuality (2011) describes how and when to use individual interviews. When the goal is to elicit detailed information about the participants' feelings, thoughts and perceptions most interviews have a loose structure in comparison to the rigid structure of a survey. In this environment the interviewee is less likely to feel any pressure to conform to group opinion; consequently, the answers will not be influenced by the opinions expressed by others in a group. In some instances the advantage of conversations generated by a group dynamic is desirable, but in others it is important to understand the views and opinions expressed by the individual. As these concerns are not likely to be easily revealed by a direct line of questioning, an interviewer must exercise tact in getting this kind of information from the participant. For example, the interviewer could ask the participant about their ideal life, or vision of a perfect world. Based on their answer, the interviewer can continue their line of questioning to determine what traits would be excluded from their perfect life. For example, determining that the participant would not like to feel awkward in a social setting, a manufacturer of aftershave might emphasize the product's attractiveness to the opposite sex, and is likely to get the participant's attention more than emphasizing packaging or style.

Another example of an important interviewing technique is "symbolic analysis" where the interviewer attempts to find out an objects symbolism to a participant, by asking about the object's opposite. This is a technique for finding out what things really mean to the participant.

Benefits: The benefits of the method are that it allows for good sample size and standardized collection of information, which leads to the possibility of quantification. When the goal is to probe people's deepest thoughts, feelings and emotions in order to come up with new product or service extensions or get guidance to what questions that would be asked in a survey, in depth interviews are a good choice (GroupQuality, 2011). Lagrosen (2001) points out the usefulness of the individual interview to be higher due to the ability to investigate further into the mind of the participant.

In the new product development process, individual interviews are good in the idea generation stage as many ideas can be elicited. The method can also be used for simulating how a potential buyer will react when the product enters the market, and thereby an understanding of how the customer becomes aware and what misunderstandings that may arise can be obtained (McQuarrie & McIntyre, 1986).

Disadvantages: Several sources (McQuarrie & McIntyre, 1986; Lagrosen, 2001; Seymoure, 1988) points out that in-depth interviewing is more resource intensive than a comparable number of focus groups. Further, the method can be time consuming (Seymour, 1988).

3.4.4 LADDERING

With a foundation in the means-end model of customer values, laddering is an in-depth interviewing and analysis methodology for uncovering means-end hierarchies. The method tries to provide an answer to how consumers translate the attributes of products into meaningful associations. This connection is illustrated in Figure 9 (Reynolds & Gutman, 1988).

The goal with the laddering technique is to create a Hierarchical Value Map that shows how different attributes are connected to different personal values. This can be done by one-on-one interviews with customers in which normally two or three ladders per respondent are created by such methods as eliciting distinctions between brands and asking follow-up questions in the form of

FIGURE 9 CONNECTIONS BETWEEN ATTRIBUTES AND VALUES (REYNOLDS & GUTMAN, 1988).

"why?". These individual ladders can then be analysed and combined to create the Hierarchical Value Map (Reynolds & Gutman 1988).

Benefits: The use of the method is in giving an understanding of consumers' underlying personal motivations with respect to a given product class, and not just the product of a specific company. The elicited attributes/means can be product specific, but the higher-level elements that are elicited are not brand specific. Based on this, the model provides the opportunity to differentiate a specific brand by better communicating how it delivers higher-level consequences and is personally relevant (Reynolds & Gutman, 1988).

Disadvantages: In practice, the continuous question of why can be tedious for participants and this becomes especially true when the answer to the question is obvious. Therefore, Hawley (2009) recommends, based on his own experience, to inform the participants of the method to relieve potential frustration and tension. Additional difficulties with the method are that sometimes participants cannot answer why an attribute was important or what the consequences of an attribute were.

3.4.5 STORYTELLING

In order to capture less accessible associations, a storytelling technique can be used. This method is based on the premise that people think narratively. Respondents are provided with a stimulus and are then asked to either write down or orally share a story that comes to mind. Fragments of the story are then coded to enable compilation. The associations captured tend to be centred on usage imagery, functional benefits and experiential benefits (Koll et al., 2010).

FIGURE 10 STORYTELLING TECHNIQUE (KOLL ET AL., 2010).

Another version of this type of technique is hermeneutics. It is an interviewing technique often used in marketing, but that could also be used for technology planning. The basis is to regard consumption stories as narratives, with the objective to see what products and experiences really mean to customers. The technique involves narrative plotlines where a comparison is made between symbolic meanings within the story and also between different interviews. With phenomenological interviews, which also are focused on stories about customer experiences, the focus can be either on current products and improvements that can be made there, or on future customer values. The goal then is to find out what benefits are sought after and which sacrifices that should be limited, rather than actual attributes that will make reaching these goals possible (Flint, 2002).

Benefits: For experiential brands of products, where the respondents interact frequently and for longer periods of time, the storytelling approach is well suited. The method also has the benefit of being able to answer from where the respondent derives the association. The interview setting can be either face-to-face or online, but the latter limits some of the benefits such as the possibility for the interviewer to ask for more in-depth explanations (Koll et al., 2010).

Disadvantages: Even though the method allows for the capture of less accessible associations, it should be remembered that some feelings and thoughts are hard to express in speech or in writing as they are too vague, too complex, or too intense (Koll et al., 2010).

3.4.6 ETHNOGRAPHIC AND PARTICIPANT OBSERVATION

Hy Miriampolski defines ethnography as follows: "Ethnography can be understood as a methodical orientation that emphasizes direct contact of the consumer in the natural context of product acquisition and usage" (Miriampolski, p. 7, 2006). In ethnographic studies, a great deal of time is spent with the customer during service or product use. It provides an opportunity to understand customer wants and needs, and which of these that are unfulfilled. As earlier described, customers might find it difficult to clearly express their needs and wants if asked directly. By objective monitoring, this method provides deep understanding of a few, representative cases (Flint, 2002). This type of on-site user study is highlighted as a helpful tool for documenting consumer practices, when discovering new market realities. Process intensive and interaction intensive categories such as healthcare and purchase decisions are particularly well suited owing their complexity (Miriampolski, 2006). Also, as this method mean observations on site, it is targeting actual behaviour rather than idealized or socially approved behaviour. One example of this is a telephone survey that reported that 95% of all people washed their hands after being to bathroom. When an ethnographic study was made observations resulted in 62%. For the observer, the level of involvement range from observing only to taking active part in the experience. Flint stated that this practice is uncommon in new product development.

Benefits: Enables the observer to experience real life settings rather than lab settings, providing enriched understanding of the experience. Owing the explorative nature of ethnographic studies, it is more natural for the observer to gain insights rather than confirming a hypothesis. The method is able to capture nuances and details which otherwise are largely overlooked or unanticipated, such as habitual actions not reflected on by the user or interactions prior purchase decisions (Miriampolski, 2006).

Disadvantages: Owing the dynamics of the market, results from ethnographic studies have short effective life, as people are quick to adapt to new technology advancements and new realities. Also, on-site visits risk evoking negative emotions, as the observed object feels monitored. Finally, sending research team into multiple markets requires commitment of company resources (Miriampolski, 2006).

3.4.7 PRODUCT ANALYSIS

An alternative way of understanding what customers value is by examining products or services that are known to already be valued by the customer. This will mainly give a view of what customer preferences are today, but it can be combined with a trend analysis to forecast the future. One example would be to see what type of products that grows in sales volume the most quickly. The outcome of this process can be products that are new to the firm but not entirely new to the market place, meaning that it is suitable for a reactive rather than proactive strategy (Flint, 2002).

Benefits: Product analysis is a simple way of catching up on competitors, which seem to perform well in certain areas. Also, the financial viability of product feature has already been proven (Flint, 2002).

Disadvantages: Assessing existing products are not likely to provide new insights leading to disruptive innovations. The method is not suitable for companies in market leading position. In fast paced technology development industries, it is too late to use this type of information to capture sales as the revised product will not be released to the market until it has become yesterday's news (Flint, 2002).

3.5 PROACTIVE METHODS FOR CAPTURING CUSTOMER VALUES

Purely proactive methods are identified by a greater amount of participation from the customer, over a prolonged period of time. The process often starts in the ideation phase of the new product development process, and is a continuous effort whilst the product is being developed. In this section a selection of proactive methods are presented. Since the field is relatively new, compared to reactive methods, there is less focus on well-developed models and more on strategies and ways of thinking.

3.5.1 CO-CREATION

The potential of having customers as active contributors in new product development has long been recognized and referred to using concepts such as co-opting customer competence, user involvement, consumer involvement, customer interaction and co-development (Witell et al. 2011).

Kristensson et al. (2008) states that if a user is involved in the production of a good or service, the end value will be enhanced since the customer can tailor the product as he or she desires. Furthermore, co-creation is compared with the notion of customization. Even though the concepts are similar, the distinguishable factor is the degree of customer involvement; the customer plays a less active role in customization than in co-creation. The former favour customer involvement at the end of the innovation phase and will usually result in incremental changes to an almost complete product. The role of the customer is often reactive and focused on answering questions imposed by the manufacturer. In contrast, co-creation refer to the customer playing the part of an active collaborator from the beginning of the innovation process, enabling the customer to suggest innovative ideas for upcoming products or share consumption experiences influencing re-organization of current product and service portfolios.

As a result, there is an important distinction in the underlying logic. Customization regards value to be something that is built into a product or service in a production process and thus, value is exchanged when a product is offered to the customer. A perspective valid in the product based economy, but less so in a service or knowledge economy. Owing the market focused perspective of co-creation; value is created by the user during the consumption/usage process (Kristensson et al., 2008). Co-creation constitutes one of the fundamental premises of the service-based logic, implying a mode where an organization collaborates with its customers towards a shared goal.

3.5.2 KEY STRATEGIES FOR PROACTIVE, CUSTOMER CO-CREATION

Many scholars highlight the importance of user involvement in new product development and much literature can be found on the subject of market-oriented innovation and the positive effects these approaches have on company success. Identifying key strategies for user involvement in new product development processes is important since there is a lack of consensus on what the concept really means, which strategic requirements that are needed to achieve desirable results, and what procedures that should be used for capturing the innovative capabilities residing within users (Kristensson et al., 2008).

A case study presented by Kristensson et al. (2008) discussed conditions for successful user involvement during early phases of new service development at Ericsson Consumer Lab and Telia Sonera, two companies within telecommunications. The first one is the consumer research department at both Ericsson and SonyEricsson and the later an operator and provider of mobile phone services. Seven key strategies were proposed in the study, summarized in Figure 11.

Key strategies
1. Derivation from user situation
2. Derivation from various roles
3. Analytical tools
4. Apparent benefit
5. Avoiding negative brainstorming effects
6. Limited expertise
7. Ensuring heterogeneity
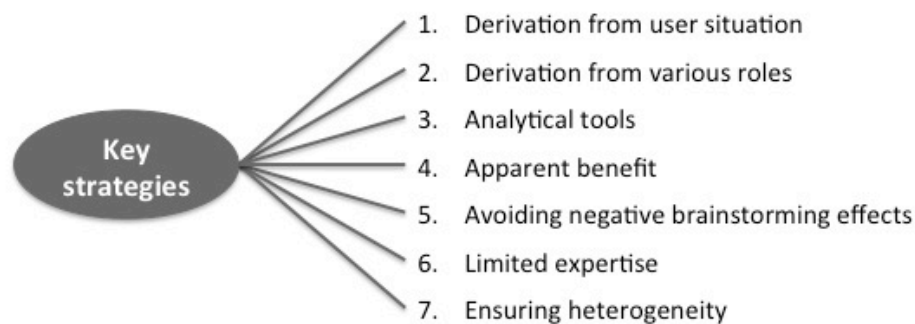
FIGURE 11 KEY STRATEGIES FOR PROACTIVE CUSTOMER CO-CREATION (KRISTENSSON ET AL., 2008).

1. Derivation from user situation

Idea descriptions should be combined with explanations of how they were derived to demonstrate a clear link between the situations where a need is apparent and a solution/idea is created. In line with the concept of value-in-use, experiencing the situation is of great significance for users when developing ideas for innovative product development. When engaging in various activities, users learn about their own needs, which in turn stimulates ideas based on these. Insights like these are difficult to evoke in hindsight and this is the limitation of traditional market research approaches.

2. Derivation from various roles

It was found that the circumstances in which ideas were generated varied with the roles users were playing and that these change multiple times during a day. For example, safety issues became more important when children were present and less so when spending time with adults at work. These heterogeneous roles are likely to be different than those played by product development team members, and different roles should be encouraged to widen the range of original and value-creating ideas for future services.

3. Analytical tools

By providing participants with analytical tools, such as information regarding opportunities and limitations of technology or expertise regarding platforms or components, the effectiveness of user involvement can be enhanced. When instructed to elaborate on how these tools can be used to meet their own ideas in different settings, the ideas generated by the participants are more likely to be more easily implemented compared to ideas created with no knowledge or consideration of technical feasibility.

4. Apparent benefit

Users tend to contribute ideas that promise an apparent benefit, and research has shown that motivated users outperform unmotivated users during innovative tasks. Intrinsic motivation (taking part of activities that are personally stimulating in themselves) improves the capability of problem-solving while extrinsic motivation (taking part in activities that represent a means to an end or reward) has a negative effect on the same capability.

This is the underlying rationale to why so called "lead users" are considered to be outstanding problem solvers. Motivation is triggered by interest in the technology as well as personal benefit of ideas created. Traditional product development is not organized this way since professional developers are employed to predict what other people will need. This results in professionally prepared solutions searching for problems to solve rather than taking a starting point in the needs of motivated users seeking a solution.

5. Avoiding negative brainstorming effects

In the study, the best ideas originated from real-life situations and problems rather than from brainstorming sessions. Participant explicitly asked to come up with new ideas are less likely to produce worthwhile and meaningful ones. The goal with user involvement projects is to generate ideas that are valuable and feasible, not only unique and novel. As described earlier in the first key strategy, user involvement will be more successful if users are connected to their everyday contexts rather than in isolated brainstorming exercises.

6. Limited expertise

Limited expertise is not a barrier to applicable, creative thinking but rather the opposite since expertise can have its drawbacks in the form of predictable thinking. Creative solutions lying outside the domain of knowledge becomes increasingly more difficult to produce as familiarity with a particular domain increases. This is a problem for product developers who often have developed the technology that underlies their services, as they are too aware of all problems associated with the development of new

ideas. Furthermore, Witell et al. (2011) states that providing examples actually decreases the likelihood to achieve original product ideas. Cognitive approaches to idea generation are more likely to result in ideas perceived as original or innovative.

7.   Ensuring heterogeneity

Kristensson et al. (2008) describes the difficulty for a homogeneous set of product developers to foresee the variety of problems encountered by the wide range of people using cell phones. Some services could be easily implemented if they were thought to be valued. Especially within the mobile phone industry, the customer range and needs is vast. Examples include children valuing staying in touch with parents, professionals using their phone for business purposes, elderly arranges transport, and teenagers listening to music. In an attempt to meet these various needs, companies often segment markets into smaller categories with similar needs. However, this might not be enough. In addition, the needs in focus often belong to the largest market segment or the segment best matching the profiles of the product developers. Consequently, it is of utter importance that participants represent a broad spectrum of potential customers, ensuring diverse ideas for future services, for customer co-development to be successful. This strategy is likely to be more expensive than traditional approaches; however, Kristensson et al. (2008) recommends the costs and benefits to be weighed against those of a unsuccessfully launched service.

Kristensson et al. (2008) concludes that it is no longer advisable for companies to produce value in product and believe that this later can be exchanged to their customers as the service-oriented logic calls for customer to be invited to share all kinds of experiences and knowledge when co-creating. As this form of co-creation is more likely to lead to the discovery of latent needs, it should be considered as an appropriate method for market-oriented new product development.

3.5.3 CO-CREATION FOR OTHERS

Kristensson et al (2008) further distinguishes the concept of co-creation by dividing the concepts into two main sub-concepts, co-creation for use and co-creation for others. Co-creation for use occurs through shared inventiveness or co-design and takes place when a customer advises a company on for example cell phone utility, wanted functions, and features. This leads to value-in-use. To further follow the service-dominant logic, it is necessary to shift focus from production and transaction to relationship formation and consumption behaviour. Co-creation for others is defined by Witell et al. (2011) as "activities in which customers actively participate in the early phases of the development process by contributing information about their own needs and/or suggesting ideas for future services that they would value being able to use". According to Kristensson et al. (2008), this aspect, the actual creation of the market offering, is commonly excluded when discussing co-creation.

3.5.4 LEAD-USER METHOD

The term lead-user was coined in 1986 by professor von Hippel and refers to a specific type of user of a product or service possessing two characteristics:

1. Leading edge of important market trends and faces needs a long time before the bulk of that marketplace encounters them.
2. Having strong incentives and are expected to benefit by finding a solution to those needs.

These characteristics result in lead users being in a situation where they have to develop products and services they need for themselves, and thus becoming user-innovators but also that these developed products often become a basis for important commercial products when lead-user needs become mainstream (leaduser.com, 2006). When needs are evolving rapidly, as is the case in high technology products, Herstatt and von Hippel (1992) highlight the benefit with using users at the front of the trend, who will experience tomorrow's needs today.

Owing the knowledgeable, innovative and creative features of lead users they are a source of new product ideas and concepts for companies. The lead-user method is a technique that facilitates identification and integration of lead users. Projects based on this method are stated to result in eight times higher projected sales than projects with traditional methods.

Herstatt and von Hippel have divided lead-user market research method into four steps, as illustrated in Figure 12.

FIGURE 12 THE LEAD-USER MARKET RESEARCH METHOD (HERSTATT & VON HIPPEL, 1992).

1. Specify lead-user characteristics within the product/market segment of interest
A first step in finding users matching the two criteria of a lead-user is to identify important trends in the evolution of user needs in relation to a certain product range or service. With the use of a brief market analysis, a category of experts can be identified that are in the forefront of where the technology is headed. To find candidates matching the second criteria, identified experts can be asked whether they have modified a product to match their needs. If the right field of experts has been chosen, there will be surprisingly many who match this statement.

2. Identify a sample of lead users fitting these criteria
Lead users are found by first defining a user segment of the product or service and then contact companies employing these. These companies are scrutinized to find the leading expert within the field at the company, actively using the product or service in question, and these are interviewed with the purpose to match the two lead user characteristics. By asking about the trends extracted by the expert panel and for any ideas for improvement of the product, the lead users are elected to participate in the final lead user panel.

3. **Arrange for lead users to meet with company engineering and marketing personnel to engage in-group problem solving**

As the lead users have been identified, the next step is to bring these together with in house expert personnel in product development in a concept generation workshop.

The workshop starts with a trend review and the group is set to define problem areas in relation to the product or service. The group is divided into subgroups, taking on a topic each. The following workshop content is a mix between specific problem solving, general problem solving and team building activities. Created ideas were presented for the group and were subject to evaluation. The ideas found to be the most original and comprehensive were elected for further conceptualization. As a final result, all concepts are merged into one concept, constituting the result of the workshop.

4. **Test whether the concepts found by lead users will be valued by more typical users in the target market**

The last step in the lead user process involves testing whether routine users in the market place find the product or service concept developed attractive. Internal evaluation of commercial potential should be complemented with a review of routine users.

3.6 CHAPTER SUMMARY

This chapter has described a wide variety of methods for capturing customer values and the integration of these in product development. Choosing a method comes with trade-offs, such as time, cost, desired depth of information, and whether incremental or disruptive innovations are sought. While this presents a theoretical foundation and arguments to why customer values should constitute the foundation in product development, the extent of practical implementation has not been assessed. The theoretical frameworks contain benefits and disadvantages with each method but do not provide further explanation of company or industry dynamics that needs to be taken into consideration before implementation.

4 EMPIRICAL RESULTS

This chapter presents the results generated through qualitative studies of four large and technology-intensive companies situated in Sweden. These case studies were performed in order to obtain an understanding of what methods that are currently used today for capturing customer values and integrating these into technology development activities. The companies are chosen to represent two different industries, telecom and power tools[1], which will facilitate to derive steering industry characteristics in the choice of methodology.

The scope of the case study is not limited to capturing customer values and the integration of these into the product development process but provides an overview the latter for each company as well. The purpose of this is to provide a full picture of when customer values are used in the product development process and how they are integrated for each specific case study.

4.1 COMPANY A – CASE STUDY

4.1.1 THE COMPANY AND ITS PRODUCTS

Company A is a global leader in construction power tools and a subsidiary to one of the world's oldest companies with a product focused legacy. Company A manufactures and sells power tools and add-ons together with complementary products. Starting as a small unit, Company A have grown through an extensive acquisition program during the last decade. The product development has been consolidated to one location and employs 80 people. The company serves the global market by having geographically spread subsidiaries and market managers dividing the global market.

4.1.2 INDUSTRY CHARACTERISTIC: CUSTOMERS

Company A have divided the market for power tools into two target segments, *heavy users* and *rentals*. The heavy users segment is approached through personal selling where the salesman must be knowledgeable about the customer's power tool fleet and its condition. In contrast, the rental segment is constituted of large companies that let out power tools to private users as well as construction companies, which rent tools rather than owning them themselves with increased frequency.

Customers placing large orders can require modifications such as special decorations or different colours. These customers are aware of their high bargaining power and there have been occasions where Company A has been required to reconstruct machines to suit for example height requirements of customers.

Customers are actively targeted for the purpose of selling consumables during the lifecycle of the power tool. Since blades are worn out and needs changing continuously, this provides a significant source of revenue. Furthermore, customer service constitutes a point of interaction with the customers.

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[1] A power tool is a tool where additional power is used, not only manual labour. They are often used for construction work. Examples of power tools range from hand-held electric drills to wall-mounted saws requiring a license to use.

Some products require training before use and product specific training is provided. As the product development department has been consolidated, system thinking has emerged combining machine, power pack and control unit. Compatibility between products has added complexity to the product development and also an attempt to create a buyer lock in, tying the customer to Company A's systems. To enhance product cohesiveness, Company A has initiated branding efforts aligning the product line through design and performance.

4.1.3 INDUSTRY CHARACTERISTIC: LIFECYCLE

The lifespan varies depending on geographic region and type of machine, but in Sweden, a drill will last for 3-4 years. Cutting machines get a facelift every 3rd year and new model is released every 7th year. Over the lifetime of the product, the cost for supplies can be ten times higher than the machine itself.

Updates on classic technology are driven by cheaper manufacturing methods and material improvements, for example a blade being able to survive slightly longer and possibility to increase cutting speed. Methods, which first have been considered dangerous and unsafe, have become accepted, resulting in new types of cutting machines being launched. User-friendliness has been another key driver for innovation.

4.1.4 INTEGRATION OF CUSTOMER VALUES IN PRODUCT DEVELOPMENT

Company A describes their product development as *business driven*; 50 % of all input to the product development derives from customers and 50 % are derived internally. While recognizing that this ratio would benefit from being heavier towards customers, Company A does not want to disregard ideas just because they are internally derived. When capturing customer values, the company is striving to target end users rather than purchasers and aims to understand the need of the customer before they do so themselves. High volume customers, mainly the rental segment, are direct in their requirements of modifications and product specifications.

FIGURE 13 THE PRODUCT DEVELOPMENT PROCESS OF COMPANY A.

The product development process of Company A is illustrated in Figure 13. As a first stage, customer values are captured. The product manager compiles the information he regards as important in a product requirement list. The requirement list together with its underlying rationale is presented in a product development meeting. A process of standardizing the tools in favour for cost reduction and negotiation regarding features is measured against customer benefits. The product manager is responsible for matching customer values and product requirements. There have been situations where the product manager has missed important aspects such as brands that are difficult to sell in certain regions. The product manager is responsible for initiating product developments, which are presented as business cases at bi-annual product meetings, describing the underlying business idea and a financial calculation or potential revenues. Also, the product manager is responsible for listing product requirements.

4.1.5 METHODS FOR CAPTURING CUSTOMER VALUES

Seven methods for capturing customer values have been identified:

1. **Ethnographic studies**

As a first method, Company A visits users globally to obtain greater understanding of their work environment and tool fleet. For other products, the same approach can result in visiting private users and make in depth interviews. The customers are divided into segments and are named based on their characteristics, e.g. Joe in Mexico, to facilitate internal discussions regarding needs of different customers, what they think is important and what their power tools look like today. Naming the segments makes it easier for product development staff to picture the end user, useful for product managers as they are creating a product based business model on user-generated data, leading to a product requirement list in the product development process.

2. **Customer surveys**

Company A has tried to outsource data collection to an institute with expertise in formulating and analysing questionnaires. However, experience states poor response quality, as the phrasing of questions is difficult. Even if the questions are successfully phrased obtaining trustworthy data can be a challenge. When targeting rental firms, one questionnaire provided inconclusive answers since the respondents regarded the questions to cover sensitive information. One key question that Company A now ask themselves when formulating questions is; if we get this answer, what kind of conclusions can we derive? Company A experience the major difficulty to be interpretation of customers' answers. All questions are not easy to answer honestly. Another observation is how people utilize scaled questions, on a scale from 1-10, people have a tendency to answer about 7 and thus 7 should be interpreted as average. A score of 6 or 5 indicates poor performance and 9 is excellent. Another difficulty using questionnaires is that they are not filled in as thoroughly as wished. The number of work hours is also in general overestimated greatly, up to 10 times the actual amount. Owing this, understanding your data can be time consuming.

3. **Customer service feedback**

Responsibility for handling customer service calls regarding new products was placed upon the product development department. Everyone was on call, from upper management to programmers. This method was considered to be very successful as customers were pleased with the professional help they got and the product development unit learned much about customer needs. This project was run for 2-3 years, was easy to implement and did not require much resources to conduct.

4. **Focus groups**

Company A have used focus groups to gain insight in how customers perceive the future and for segmentation, as understanding driving forces is essential to appeal to a broader audience. As an example, participants in the focus groups were invited using an ad in a daily newspaper and were divided into two groups based on positive or negative attitudes towards the product. There were two focus group evenings at three different geographical locations, but surprisingly little conclusions were derived and the assessed product was not modified at all.

5. Customer driven product development

Currently, in the development of one product, the responsible product specialist use his/hers network and involve customers who can be considered as specialists. Customers have previously been approaching the company with ideas and inventions but there is no established process or procedure for involvement of customers in product development.

6. Prototype testing

In the final stages of Company A's product development process, pilot products are handed out to users for testing and debugging, resulting in customer input. This processes is intended for minor modifications only as factory, material and colours already have been decided. After trying the pilot, users fill out and send in a questionnaire. However, the quality of the replies is not sufficient and therefore Company A can make complementary onsite visits and reclaim the tools for evaluation.

7. Product feedback

When improving already existing products, Company A conduct meetings assessing product feedback. Opinions regarding products are collected from different functions. Level of importance and impact of feedback are assessed and packaged together for future development efforts. Critical issues are immediately modified.
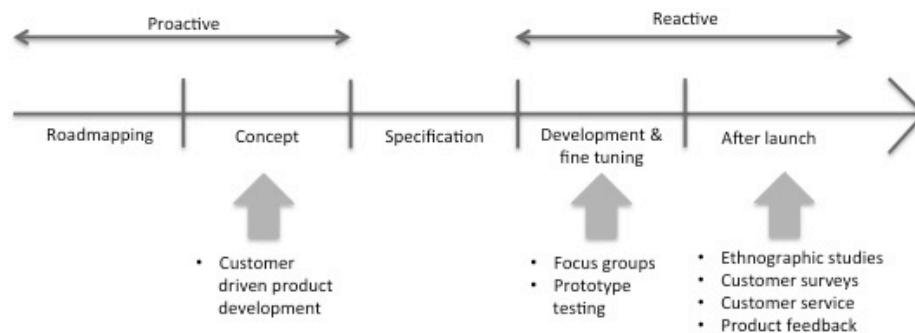
FIGURE 14 PROACTIVE AND REACTIVE INPUTS TO TECHNOLOGY DEVELOPMENT FOR COMPANY A.

The customer driven product development conducted at Company A can be seen as a proactive method since it is a source of input at an early stage. The rest of the methods used are more focused on fine tuning already existing products or getting input on how the customer uses products that are already out on the market, giving them a more reactive nature.

4.1.6 CUSTOMER VALUES AND THE COMPANY

Company A's customers are not very dependent on brand and branding since there are on-going discussions regarding product performance and which jobs it is suitable for.

Company A states their choice of methodology to be much of a coincidence but highlight discussions with end users, subsidiaries and resellers as key to understanding customers. Time is experienced as a limiting factor in their work with customer values. Upper management highlights the importance of profound customer knowledge. However, achieving this is a challenge, especially for a global company.

4.2 COMPANY B - CASE STUDY

4.2.1 COMPANY DESCRIPTION/PRODUCTS

Founded in the middle of the 20th century, Company B is a privately owned company with brand-focused legacy that develops, manufactures, and sells construction power tools and complementary products. Operating on a global level, market and sales subsidiaries are divided by region and sales are made through personal customer contact. Product development is centrally located and conducted at the company headquarter. The Swedish subsidiary is responsible for regional sales and marketing and employs 250 people.

4.2.2 INDUSTRY CHARACTERISTIC: CUSTOMERS

Company B exclusively sells to professional users within industries such as construction, installation, plumbing, electricity and industry. Due to the nature of the Swedish construction industry, most of the company's customers are big companies. The larger the customer company, the easier Company B finds it to market added values. Sales are conducted by direct contact with the customer, through the homepage and through own stores. Segmentation of customer is done depending on industry and on geography. In general, no customization to fit individual customers is made.

Company B strives to have long-term business relations, which is reflected by frequent contact between sales personnel and customers. Feedback on products is collected and additional sales opportunities are assessed. All tools have two years free service, where the tools are serviced in Company B's own workshops. This enables the company stay in control of their products, ensuring a high level of quality. It is also possible for the customer to rent tools instead of buying them. Also, the customer will need to buy several consumables such as drill bits during the lifetime of a tool and Company B works actively to ensure that the highest efficiency is reached when combining tools and consumables from the own brand.

To be able to use some of the tools, a license is required. Company B provides product specific training and issues licenses on these. Competitor tools based on the same technology are also covered.

Company B has a well-renowned, strong brand with a reputation of making high quality products. In some product segments, the brand is a significant reason to company leadership.

4.2.3 INDUSTRY CHARACTERISTIC: LIFECYCLE

Three times per year, Company B releases new products on the market. Each launch constitutes of 3-10 products mixing new technology and incremental upgrades. The cycle times between new technology releases are product segment dependent; heavy tools and traditional products are updated less frequently and other products such as high tech measurement tools experience quicker development. Depending on user intensity, a product is replaced after 2 to 5 years. Often a user buys a new product not because of abrasion but due to better options becoming available on the market. The sales force will recommend upgraded products like these arguing for health, safety, ergonomics and better performance. There are legislative requirements on tool material and work safety which influences product development as well.

The development time for new products, from idea to being ready for sales, varies between a few up to 10 years. The long development time is partly due to the company wanting to ensure good quality through careful testing, so as to not risk the brand or the trust of the customers.

4.2.4 INTEGRATION OF CUSTOMER VALUES IN PRODUCT DEVELOPMENT

Company B regard customer expectations and feedback as their greatest assets in product development. This in combination with product function intelligence where potential areas for product development are assessed, such as reduced size, improved ergonomics or new technology. Product development department are pushing for refined products based on technology development but fundamentally, all competence regarding the products are derived from customers.

In order to capture customer values, there is an organization of product managers where local, regional and global product managers collaborate. When a product idea originates at a market, a business case has to be built based on the local market showing the potential revenue from developing the product. This business case is then presented to the global department, where a decision is made based on an analysis of global need and financial requirements. This process is illustrated in Figure 15.
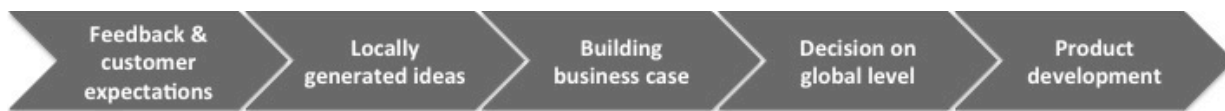
FIGURE 15 THE PRODUCT DEVELOPMENT PROCESS OF COMPANY B.

4.2.5 METHODS FOR CAPTURING CUSTOMER VALUES

Four methods for capturing customer values have been identified:

1. On site sales meetings
The main source of input of customer values is through regular meetings between sales force and end users. These meetings result in feedback on present products and ideas on improvements and new products. The targeted industries are conservative and thus, most of the input is suggestions for improvements rather than disruptive innovations. There is a constant flow of input from customers entering through the sales force and continuing through the organization as described above.

2. Product feedback
Company B has own workshops for product maintenance and fault searches. Many products are serviced here owing beneficial service agreements in relation to sales and thus, continuous feedback on quality and functionality is derived from these workshops.

3. Customer survey
Twice a year a global customer satisfaction survey is conducted regarding quality and how well Company B conducts business with their customers. The products constitute a part of this, but the survey assessed this on a rather general level.

4. Prototype testing

When a prototype has been made, it will first be tested in-house to guarantee functionality and safety. The product is then brought out to selected customers who get to test the product in real situation and then provide feedback. The feedback is collected through interviews where the sales force, together with regional and global product managers, regional and global, meet with the customer to discuss their experience. This is done relatively early on in the process when it is still possible to change things. The feedback that is received leads to modification of the product, and a new prototype is then sent out. This process continued until everyone is satisfied.

5. Sales demonstrations

Customers are invited so that Company B can show new products and solutions for the purpose of sales, but there are no meetings with customers with the purpose to theme-based discussions such as utility area or products.
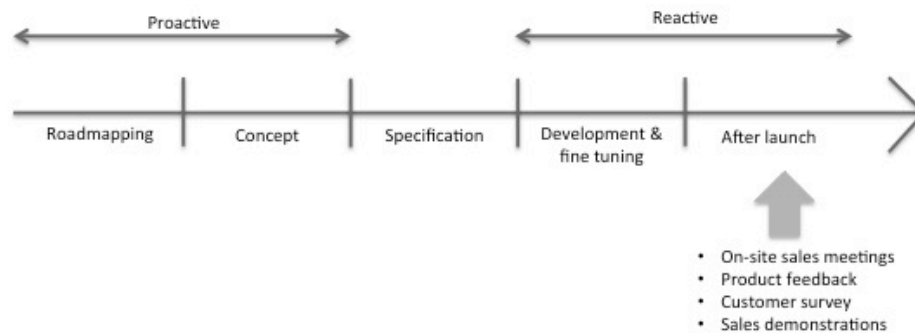
FIGURE 16 PROACTIVE AND REACTIVE INPUTS TO THE PRODUCT DEVELOPMENT OF COMPANY B.

All methods for collecting customer values used at Company B are reactive in nature since they focus on the experience customers have with products that are already on the market.

4.2.6 CUSTOMER VALUES AND THE COMPANY

Company B is a vertically integrated company, taking ownership of all steps from product development to sales to end users. This business model enables closer interaction with end users compared to competitors selling products to distributers, disconnecting themselves from the utility situation. As the business model is costly, it is suitable for sales of high-end products. With regard to quality, performance and productivity, the company targets being amongst top 3 in all their product ranges. As a leading company in the power tool industry, the customers also expect Company B to take lead in innovation. Providing innovative premium products is important to the company brand, and a key competitive aspect of the business model.

Company B acknowledges that the difficulty of prioritizing between different customer values as there is much input from customers. Using the input to build business cases and evaluating these makes it possible to weed out sustainable and profitable product ideas.

Ideally, Company B would want to bring the customers together for continuous reconciliation with the purpose discussing how products can be improved. Today, these meetings focus on the perception of the company from a business partner perspective, and this information constitute the portion of organizationally collected customers values today. As a complement to feedback collected from sales staff, improved structure for capturing customer expectations, listening and implementation of these are acknowledged as an ideal way of working with customer values. A shorter product development cycle would be beneficial. Company B regards current practices to be right but recognizes areas to be subject to continuous improvement efforts.

4.3 COMPANY C - CASE STUDY

4.3.1 COMPANY DESCRIPTION/PRODUCTS

Company C is an international provider of complex wireless communication solutions. Market trends that affect the company is an increased trend of using IP standards, and the ability for smartphones to be used in the healthcare market. Owing the company's presence in the healthcare sector, they are subject to legal requirements. Today, they have subsidiaries in approximately 20 countries and employ over 2000 people worldwide (Company C Annual report, 2011).

4.3.2 INDUSTRY CHARACTERISTIC: CUSTOMERS

Company C has mainly two sales channels: selling systems under their own brand, through subsidiaries or sales partners, and selling to original equipment manufacturers, where the customer includes the product in their systems. The focus of the interview was on products sold under Company C's own brand. The main segment that Company C targets is healthcare. Company C often sells to an entire, or a large part of, a hospital.

The company has a business-to-business relation to their customers, resulting in products being sold to a purchasing manager, and not the user of the product. Consequently, product benefits that attract the buyer may not be the same as those that attract the user.

Historically, Company C has done a high degree of customization for each customer, as they have different needs depending on the industry they operate in, but also on an individual company level. As the company grew, this led to products with an abundance of functions in order to meet every need of every customer in every segment. This made the product more difficult to use. Today, Company C has chosen to focus development mainly on one customer segment, healthcare, and conduct roadmap driven development. Input from customers is still valued, but it also has to be taken into consideration whether it is a majority that wants the feature. The focus is also on tailoring a product to fit customer's needs, as Company C is moving towards selling a service such as "quiet healthcare environment" rather than a complex system. Further customization is still made by Company C's subsidiaries for local markets.

Owing the close to monopoly position on several markets, after-sales are an important way to ensure continued revenue. Returning to the customer to update the system and being present in organizational change becomes a part of the relationship with the customer. Since the system is complex, it is normally necessary to call for Company C's internal technicians for troubleshooting.

Many customers in the healthcare sector buy through public service contracts, a process often managed by a consultant to handle the procurement process between hospitals and companies. The consultant creates a requirement list of specifications that the companies have to fulfil in order to participate in the procurement process. Many companies spend time and resources on lobbying to influence the specifications on the list. This type of purchasing process is bureaucratic and time consuming, preventing the customer from changing systems too often.

4.3.3 INDUSTRY CHARACTERISTIC: LIFECYCLE

A new generation of handheld units is placed on the market every 5 years on average. Between these releases of new generations, there are software updates and re-releases with minor updates.

For most of the fixed physical products, there is not an intense physical wear. However, for the handheld units and nurse call products, the physical wear is extensive. The products need to withstand frequent use. For Company C, it is a unique selling point to be able to repair products for a long time after sales, over 10 years after the product has been sold. The products last for a long time, up to 15-20 years, before they are considered to be old. Owing the long time the products are on the market, effort is put into designing products that withstand current fashion trends.

The average time for developing a new product is two years, when it is a physical product with mechanical parts. During the lifecycle of a product range there are constant updates and re-releases of the same product. Development of a new generation can be triggered by for example a need for major update of mechanical parts, new functionality requirements, and new competition situations on the market.

4.3.4 INTEGRATION OF CUSTOMER VALUES IN PRODUCT DEVELOPMENT

Company C used to collect and utilize customer values in a linear process that can be seen in Figure 17. The product manager, implementing customer values as mediated by the sales force, formulates new product ideas that are brought to the product developers. Due to the length of this communication chain, the validity of the information has been questioned and Company C has now put more focus on the product development functions getting in touch with end users directly.
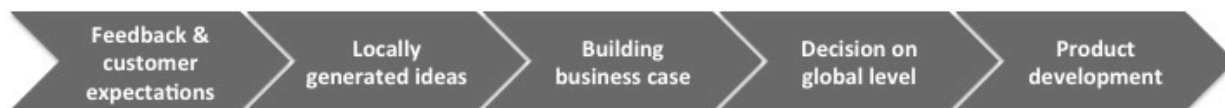
FIGURE 17 THE PRODUCT DEVELOPMENT PROCESS OF COMPANY C.

Since a few years back, Company C has a department called Feature Management, where interaction designers and system engineers work. The goal of the department is to ensure usability of the products. To reach this goal, an important aspect is that the products work together as a system, even though

they may be developed separately, together with external systems, and also that the interaction between user and product works well. In order to fulfil the latter, the department works with collecting customer values that does not reach the company automatically. The department often gets help from the sales force in order to reach the end user, but they do not want to meet the end users together with the sales force in order to ensure that the users do not get influenced. Working in this manner has only been done for just over six years. Figure 18 shows how the Feature Management complements the traditional chain of communication.

FIGURE 18 THE FEATURE MANAGEMENT DEPARTMENT'S CONTRIBUTION TO THE PRODUCT DEVELOPMENT PROCESS.

Company C defines their product development process as user-centred, rather than user-driven. Focus has been to move away from developing the exact function that the customer asks for, such as a green light, towards understanding the underlying reasons for this, for example the want to be able to see from a distance if there has been an alarm. This change of focus makes it possible to develop different solutions to meet the customer need.

There is a difference between how the issue of customer values are regarded depending on if it is an old product that needs improved as compared to a new product being developed. This can be traced back to older products having been developed with a focus on functionality demands, rather than usability, resulting in different problems to address. The scope of possibilities is also narrower when improving an already existing product.

Since two years, Company C has to fulfil legal requirements on validating product usability in tests in order to be able to sell their products as medical equipment. If there are important functions that are not understood by the potential users, changes have to be made to the product before it can be sold.

Company C considers that they have several user groups, such as field engineers and patients, but the main focus in regards of customer values are the so called real end users, the nurses. Five methods for capturing customer values used by the company have been identified.

4.3.5 METHODS FOR CAPTURING CUSTOMER VALUES

Six methods for capturing customer values have been identified:

1. Interviews and Customer surveys

To understand user needs, interviews and surveys are considered to be insufficient. The nurses are not used to talking about technology, and the product is very high-tech. It can also be hard to get truthful answers. A question about response rate to alarms can be hard to answer both because of difficulty to admit that not all alarms are acted on, but also because of alarm fatigue, where a large number of alarms lead to nurses not registering that there is an alarm. It can also be hard to describe every day work, the complexity of a work situation and the level off stress.

2. Ethnographic Studies

In addition to interviews and surveys, Company C conducts user studies. Interaction designers have visited hospitals in several countries where they, wearing nurse uniforms, have closely monitored nurses in their daily work. To get an overall picture Company C finds it essential to experience the situation of use and create understanding of what it is like to be a nurse. This type of field studies is conducted before development of a new product begins.

3. Formal feedback

After the product has entered the market, there are mainly two ways of understanding customer values. One is through formal feedback in the form of change requests. This information comes through the sales and quality channels and is often centred on functions that are either missing or not working properly. However, the company is aware that not all problems encountered by the users will result in them filing an official change request. To pick up on these types of problems and also ensure that softer values are taken into account, usability tests are used.

4. Focus groups

Another method used for understanding customer values is to invite end users, usually nurses, to the company to validate products that are ready for market entry. The goal is to have between 5 and 30 people participating in the study, but even getting 5 nurses to participate can be hard. One of the difficulties in getting nurses to participate in the study is that they need to take time off from their work to participate in the study. One way of solving this has been to find people with the help of the sales force, other colleagues and social media to invite nurses to participate outside of their work hours. This has shown to give more people to sign up.

5. Customer co-creation

The focus group setting can also be used for idea generation around an early product concept. The input from the end users can then result in big changes in the concept.

6. Procurement demands

Further issues that have to be taken into account have its foundation in the procurement process of public service contracts. As described above, this includes a list of requirements that the system has to fulfil to be considered for purchase. This is a formal requirement, which may or may not be connected to actual needs of the user. In addition, compatibility of functions and high quality products are of great practical importance.
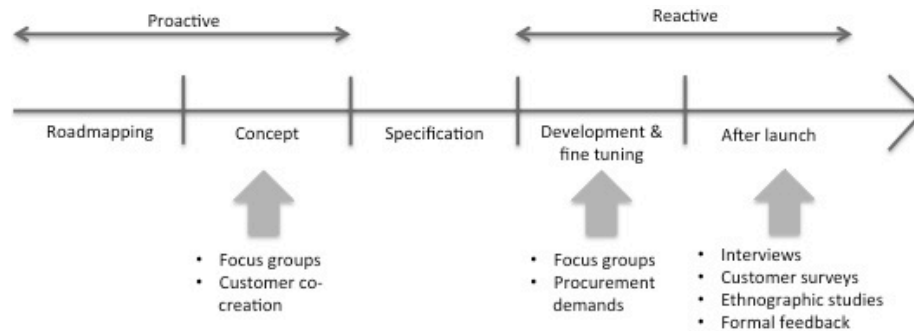
FIGURE 19 PROACTIVE AND REACTIVE INPUTS TO THE PRODUCT DEVELOPMENT PROCESS OF COMPANY C.

When Company C uses focus groups for customer co-creation, the method can be seen as proactive. The discussion is centred on concepts rather than products, and the input can have big impact on the development process. The rest of the methods are of a reactive nature, focusing on products already on the market or that are in the final stages of development.

4.3.6 CUSTOMER VALUES AND THE COMPANY

Usability becomes increasingly important for customers, which in turn leads to an increased importance of understanding the customer. In consumer electronics, consumers are not satisfied with technical functionality, but demand products and services that are easy to use. The B2B setting combined with a rigid purchasing process will likely make this development slower. However, Company C produces premium products, and to remain that way they need to have a focus on not only quality, but also usability. As the company moves in this direction, usability will become an increasingly big part of the company's competitive edge.

Company C claims that the most important factors influencing the choice of methods is the relation to the customer and the way the purchases are made, with a purchasing manager taking the decision but a nurse being the actual user. Another factor is the legal requirements for usability for manufacturing medical equipment. Further, it can be derived from Company C being comparatively new in focusing on customer values. The company does not have a set strategy for how to work with capturing and implementing customer values, other than acknowledging that it is important. Instead, the processes are shaped by the competency of the people working at the department, their background and education.

Ideally, Customer C would want to be out in reality to understand where their systems are being used, even more than they do today. They would also benefit from working more freely in the initial concept phase of product development and to check ideas, concepts and prototypes on users earlier. Doing this would enable a more flexible way of adapting to customer requirements quicker, as opposed to finalizing a product and then testing it on the user. Company C's past, as a technology driven company with focus on other types of values, is likely the reason for them not being there today.

4.4 COMPANY D - CASE STUDY

4.4.1 COMPANY DESCRIPTION/PRODUCTS

Company D is an international telecommunication actor providing operators with network solutions and integration of these with other operational systems and ERP. As the assessed department of the company is developing solutions for the media area, market trends relating to utility patterns of mobile technology as well as increased level of media offerings are key affecting trends. Owing the company's presence in the telecom industry, they are operating in an environment where standardization of core technology is essential. The company has subsidiaries in most countries in the world and has over 100 000 employees, whereof 1700 work at the assessed department.

4.4.2 INDUSTRY CHARACTERISTIC: CUSTOMERS

The primary customer types for Company D are service providers, such as telecom operators, but also other media providers such as cable and satellite operators. The products sold often constitute the backbone of the systems, middleware, functioning as a communicating node enabling operators to target and charge their subscribers with media content. The customers are large of size and segmented depending on their market position; tier 1 refers to the market dominator, tier 2 additional large actors and tier 3 contain other, smaller, operators. Tier 3 is initially targeted when launching new technology on the market and after proof of concept has been obtained, tier 1 is targeted.

Company D has a business-to-business relation with their customers. The assessed department has little interaction with the end users in their sales process. Nevertheless, the company still needs to take two types of customer values into consideration, both the value of the direct paying customer, the solution provider, as well as the end users who are directly affected by the system. The company has long-term relationships with many of its customers and its global organization ensures local presence through subsidiaries. The sales are continuous and as a provider of the base technology, the challenge is to sell additional solutions. Little customization for customer segments is made on strategic product development level. Instead, the core product is modified to match market needs on a local level.

Customers are more likely to change solution provider when switching to next generation technology, as opposed to when being presented with upgrades and new features. Telecom standards make exclusion of competitors by reduced compatibility difficult. Also, compatibility with competing solutions is often a customer demand. The media middleware provided by the company works as nodes for the operator's entire system. While this solution constitutes the foundation of all other add-ons, complementary products can be purchased from competitors and/or partners. The media middleware requires implementation and there is a learning threshold for maintenance staff and sometimes also end users.

4.4.3 INDUSTRY CHARACTERISTIC: LIFECYCLE

Twice a year major functional enhancements, such as upgrades of software systems, are released. Larger upgrades, including hardware changes or software platform changes such as application server changes, occur every 2 years or more seldom. New technology generations, introduced to the market as brand new products, are released every 5th -10th year. In the introduction phase of these new products Company D is exposed to greater competition as the core product is about to be changed.

Middleware is not subject to physical wear. However, there is a limit to how long you can upgrade dated technology. One example is Company D's solution for video back-office where the platform is 10 years old, in version 7.0.

The development time for new products is long at Company D, owing to the company's great size. However, the products that are released are globally compatible and thus greatly scalable. The timespan from product idea to released product varies where infrastructure technology subjected to standardization takes up to 5 years to market introduction due to lobbying work with standardization organs. Products targeting isolated problems are developed faster, down to one year.

4.4.4 INTEGRATION OF CUSTOMER VALUES IN PRODUCT DEVELOPMENT

In order to decide what technology development that should be undertaken, Company D has a business opportunity process. In order to determine the feasibility of the project, the product manager makes an opportunity analysis based on business case, required functionality, market outlook and tollgates that need to be passed. Engineers estimate resource requirements and technical feasibility. The marketing and the business development department are also involved in specifying requirements for new products. This process is illustrated in Figure 20.

FIGURE 20 THE PRODUCT DEVELOPMENT PROCESS OF COMPANY D.

There are two types of customer values that Company D assesses: operator values and end user values. An example of the former can be replacing four systems with one to decrease maintenance costs and complexity. Faster connection speed or mobile access to video libraries is an example of the latter. All values are thus not noticed by the end user.

Clearly describing customer values and functionality is essential in order for sales management to discuss new products with customers. Every product owner is responsible for clearly defining operator values and end consumer values for each product.

4.4.5 METHODS FOR CAPTURING CUSTOMER VALUES

Seven methods for capturing customer values have been identified:

1. Consumer labs

As Company D's customers expect the company to be knowledgeable of market trends, a department specialized in studies on end-consumers is used to understand user habits and expectations. Questions asked are relating to usage pattern such as where the users collect information and their expectations of media availability.

2. User groups

On a strategic level, product development management has periodical meetings with strategically important customers. User group methodology is also an opportunity for Company D to interact with operators. During a two-day event, operators from different countries listen to Company D's prospects for the future, but also discuss with one-another. Since the operators do not compete in the same regions, they share ideas and complaints.

3. Market requirement definitions

An important way of capturing customer values is an online tool where local divisions are able to place market requirement definitions. Some are assessed using the business opportunity approach described earlier, some are included in the technology roadmap and some are encouraged to be solved locally. This tool is also used as a communication tool to the divisions regarding the content of upcoming releases. As a variation of this, information collected on fairs and congresses through informal meetings with analytics, journalists and politicians is registered and tended to internally or communicated to local divisions.

4. Procurement requirements

As a part of the tendering process, operators send out lists of feature requirements they demand in from their suppliers. In these processes, it is important to be involved at an early stage in order to capture development opportunities and be able to sell company specific offerings.

5. External sources

Market reports and trend analyses are acquired from external analysis firms as well as from in-house analysts. Company D also hires these firms to perform targeted analyses and promotional reports in favour for the company's market position. Also, the company has initiated a collaboration with an American university specialized in user-friendliness for end users.

6. Prototype Testing

When the functions of a product are fully developed but before a product is globally launched the product is tested at 1-3 customers, depending of the size of the system. The goal is optimization and certification of quality rather than redesign. During this period of time, the product development unit supports the local division. Once approved, the product becomes generally available.

7. Application-programming interface

The product constitutes of a centrally managed core product, with an application-programming interface (API), a specification intended to for software components to communicate with each other. This enables local divisions, customers and third parties hired by customers to conduct customization. The core product is kept closed to facilitate new releases and updates. Modified source code and add-ons can be shared on an internal webpage, but it is made clear that Company D resigns responsibility of support. This method enables geographically dispersed subsidiaries to share customer needs and configurations suited to match these.
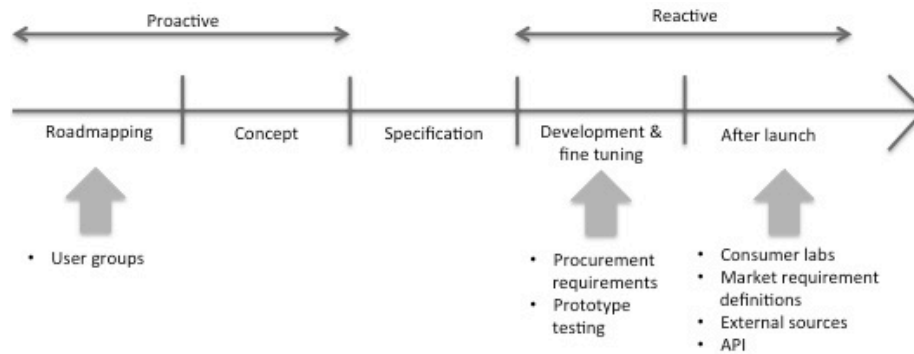
FIGURE 21 PROACTIVE AND REACTIVE INPUTS TO THE PRODUCT DEVELOPMENT PROCESS OF COMPANY D.

Company D uses user groups for input already in the roadmapping stage of the product development process, making it a proactive method. The rest of the methods used are reactive in nature as they focus on product that are already on the market and how they can be further developed.

4.4.6 CUSTOMER VALUES AND THE COMPANY

In order to preserve a competitive edge, a good mix between market pull and technology push is important. Only responding to the expressed needs of customers is insufficient. As a market leader, Company D is also expected to be innovative, introducing novel functionalities and ideas.

The reason for Company D's way of working with customer values can be derived to the company size and the organizational structure. The company places great responsibility on local divisions to manage customers as well as customizations. Moving forward, it is important to balance between understanding customers and understanding the technology. More time should ideally be spent in the environment of the customer.

5 ANALYSIS

This chapter consists of an analysis of the findings of the theoretical framework and the results of the qualitative case studies. First, the interviewed companies within the same industry, telecom and power tools, are compared against each other to find correlating and diverging industry factors. As a second step, the two industries are compared against each other. The chapter ends with a comparison between the findings of the empirical study and the theoretical framework.

5.1 POWER TOOL INDUSTRY

5.1.1 INDUSTRY CHARACTERISTICS - SIMILARITIES AND DIFFERENCES

Customers

Even though Company A and B produces similar products, the customer perspectives and supply channel strategy is diverse. Company A has two target segments, rentals and heavy users. The rentals purchase large amounts of power tools and let them out to private as well as professional users. The products are sold both using personal selling but also through retailers. Company B do only target professional users and performs all sales using in-house sales staff, making high number of on-site visits. Company B also rents out their tools on a long-term basis to their customers. In conclusion, Company B performs all sales to end users themselves while Company A uses intermediaries.

Both companies highlight the importance of knowing their customers, conducting personal selling by highlighting benefits and providing solutions that would be suitable for each specific customer. Both companies aim to commit customers their consumables such as drills and cutting blades as these are important revenue streams. Company A are open to customizing products to suit the needs of customers with high bargaining power. Exterior colour alterations as well as height modifications are examples of customizations done in the past. Company B do rarely do any customizations at all.

Some products need the user to be certified and both companies provide product specific training. As a barrier to change of supplier, Company B highlights the importance of their brand. In some product ranges, the brand is stated to be a significant competitive advantage. Company A has recently initiated trademark initiative by using uniform colouration and product design. Also, Company A has initiated system thinking in their product development, as an attempt to affect buyer lock-in.

Lifecycle

The product lifecycles of the two companies are similar. Having been in business for many decades, Company B has longer experience from releasing new technology compared to Company A, which was founded less than a decade ago. New model release every 5th year and release of updated facelifts every 3rd year is a common denominator. Company B recognizes the reason for product replacement by customers being new, improved tools available on the market rather than worn out machines.

As drivers for new technology, Company A lists cheaper manufacturing methods, material improvements, changes in legislation and user-friendliness. Long development cycles, varying between a couple years to a decade, is related to thorough testing of new products. Company B is brand cautious and regards careful product testing as an important way to not risk customer trust.

5.1.2 INTEGRATION OF CUSTOMER VALUES IN PRODUCT DEVELOPMENT

Both Company A and B utilize the concept of business cases when assessing and prioritizing which customer values that will drive product development efforts. The product managers are responsible for describing underlying business idea and financial feasibility. Both companies also describe their product development process as subject to push from the development department. Both Company A and B lean towards product push, i.e. product development based on internal product ideas. Company B explains this referring to being market leaders. Being forefront and innovative is essential to maintain this brand recognition and market position.

5.1.3 METHODS FOR CAPTURING CUSTOMER VALUES

Ethnographic studies and on-site visits

Both company, A, B and C highlight the importance of on-site customer visits and consider this practice to be a core method in capturing customer values. However, there is a significant difference on the rationale of these visits. While Company A conducts ethnographic studies, assigning a product development team to travel globally and observe end users working with the power tools, Company B combine on site visits with sales meetings. As Company B is vertically integrated and has ownership from product development to sales and product maintenance with own workshops, the company is in contact with the end users in their sales process. The sales process is focused on on-site visits. Company A conduct local personal sales but globally, all sales are made through retailers.

Focus groups

Company A have experience in using focus groups to capture product related customer values. In contrast, Company B does not invite customers to discuss products or utility patterns but rather for sales demonstration of products. Company A's earlier experience with product related focus groups resulted in mediocre results and no modifications were made on the assessed product. However, the focus groups were discussing a product that had been on the market for a couple of years. When presented with a finished solution outside of the context in which the product is used, is likely to result in reactive feedback rather than proactive, targeting latent needs.

Product feedback

Company B gets direct input of product faults as they have their own workshops for repairs and product maintenance. This practice both ensures profound technical understanding of quality and functionality but will only provide a retro perspective on the utility situation. While not conducting maintenance in-house, Company A has chosen another approach to ensure feedback on product functionality and quality feedback. Product developers have been in charge of answering customer service calls related to new products. This results in both good customer service and also an opportunity to understand problems in relation to when a product is used leading to better understanding of product related problems.

Customer surveys

Company A have made several attempts to derive useful information from customer surveys using external competencies such as market analysis companies. However, the return has been lower than expected owing difficulty of phrasing questions and secrecy on behalf of retailers and rental companies. Company B performs semi-annual customer satisfaction surveys focused on the company as a business partner rather than products.

Prototype testing

Both companies use customers to test their products before releasing them to the market. For Company A, this process is intended for smaller modifications as choice of material choices and manufacturing facility already have been made. Company B, on the other hand, have placed the trials in an earlier product development phase, enabling changes on a larger scale. Both companies collect information from these trials using questionnaires complemented with interviews. The customers of Company B strongly connect the brand with high quality products. As this is a source of competitive advantage, Company B is careful with prototype testing, making sure changes that are needed will be made to maintain brand value.

Customer driven product development

Company A uses customers, considered as specialists, in their product development processes. If required competence does not exist in-house, the responsible product specialist is able to use their contact network to recruit the competence needed. Today, one customer with special knowledge within a certain field is involved with product development of a product.

5.1.4 CUSTOMER VALUES AND THE COMPANY

Both companies describe customer values as being core to their business. Company A describes their approach as *business driven* innovation, where 50 % of innovative efforts are derived from internal product development and 50 % from customer feedback. Company A has traditionally viewed product excellence to be their source of competitive advantage, but obtaining deep customer understanding has become more in focus. Company B describes themselves as market leaders, and in order to maintain that position, technology push from the product development is key. Company A has higher dependency on product performance than brand while Company B regards their brand to be a key asset.

While Company A sees their methodologies and processes as coincidence, Company B's are more profoundly integrated in their business model – as a natural consequence of sales efforts. Also, Company B is satisfied with their current practices but see continuous improvements to be implemented.

	COMPANY A	COMPANY B
CUSTOMERS		
Customer segments	Rental and heavy user	Heavy user
Customization	Yes, for large customers	No, very seldom
Barriers for changing	Trademark initiatives Training needed	Brand Certification needed
LIFE CYCLE		
New releases	New model release every 5th year and release of updated facelifts every 3rd year	New model release every 5th year and release of updated facelifts every 3rd year
Drivers of new technology	Cheaper manufacturing methods, material improvements, legislation changes, user-friendliness	Ergonomics, product development, technology push
METHODS		
Business cases	Used	Used
Ethnographic studies and on-site customer visits	Used, also done solely for capturing customer values	Used, part of sales process
Focus groups	Used	No, only demonstrates products
Product feedback	Customer service calls	Own workshops
Customer surveys	Using external companies, limited success	Semi-annual customer satisfaction surveys
Prototype testing	Yes, for smaller modifications	Yes, can lead to large changes
Customer driven product development	Yes, using experts in some cases	No
CUSTOMER VALUES AND THE COMPANY		
Reason for using methods	Coincidence	Part of business model
View on customer values	Products as key assets Business driven innovation	Brand as key asset Need technology push to stay leaders

TABLE 1 COMPARISON OF COMPANIES WITHIN THE POWER TOOL INDUSTRY

5.2 TELECOM INDUSTRY

5.2.1 INDUSTRY CHARACTERISTICS - SIMILARITIES AND DIFFERENCES

Customers

Company D never sells directly to end users, but always to other businesses that integrates the system in an offer targeting end users. Company C targets the organization where the system will be used but as sales generally are made through tendering, decision maker regarding purchase is not the user of the product. Thus, both companies have more than one group's customer values to take into consideration, the one of the purchaser and the one of the end user.

Company C has moved from customizing for customers in a wide variety of industries, to mainly focus on customization for healthcare. Since the system will have to integrate with whatever other systems the customer has in place, some grade of individual integration for each customer might still be needed. In contrast, Company D does little customer based customization rather market based, where market customizations are dealt with on a local level rather than central modifications on the core product. Several products related to infrastructure in Company D's portfolio is subject to standardization, and required to be compatible with competitors' solutions.

Company C sells to newly built hospitals, or hospitals about to replace entire systems. Company D sells their system when the customer switches to next generation technology. Both companies are vital for support and up-keep of sold systems. While Company D takes on the formal responsibility for their systems, Company C highlights system complexity as the main reason for taking on the support function. Company C has greater physical wear on parts of their system than Company D, resulting in repair needs and being able to repair the products for a long time is used as a selling point.

Lifecycle

The companies are similar in their development of new technology. Completely new technologies are put on the market every 5th year, or more seldom, whereas software updates are released continuously. The development time can be longer for Company D, and this long time is explained with the size of the company and the need for standardization work in some cases.

5.2.2 INTEGRATION OF CUSTOMER VALUES IN PRODUCT DEVELOPMENT

Company C considers integration of customer values as crucial in their product development process and are also subject to legal requirements of performing user tests before launching new products. To overcome the problem with a long information chain between end user and product development Company C initiated a feature management department where interaction designers work in collaboration with system engineers working closely to create a system that is user-friendly. Focus is not to replicate exact functions asked for by the customers but to understand the underlying need, this enables the possibility to develop solutions based on the expertise of the system engineers while meeting the needs of the customers.

In comparison, Company D assesses captured customer values using a business opportunity process. A product manager makes a business case based on market outlook and required functionality. Engineers, marketing and business development is involved in the assessment. The difference in integrating customer values in the product development process is likely to be related to variation in the need of product user-friendliness. Company C's products will be used by the end user while Company D's products will provide the foundation for it's purchaser's product which consequently will be used by end users. Understanding overlying trends in utility patterns is thus equally important as ensuring usability.

5.2.3 Methods for capturing customer values

Ethnographic studies

Methods unique for Company C are studies to see how end users use the system. Company D on the other hand practices prototype testing, where a system is implemented in a tier 3 company, evaluated and modified before possibility for customers to do changes through an application programming interface, using external sources for information and having access to a specialized department focusing on understanding the end user.

Formal feedback

The formal feedback process of Company C, customers sending change requests describing problems, is to be compared with the market requirement definitions that Company D achieves from local divisions. In both cases, the feedback is of reactive nature and will provide input for updates and incremental product innovation. As end users not are naturally met in the sales process, the rationale for this practice can be derived to lack of continuous end user interaction.

Focus groups

Both companies gather users in discussion groups. Company C invites end users for input on early concepts as well as products ready for market launch. For Company C, this is a legal requirement but also a way to interact with end users. Company D focus on strategically important customers by inviting them for long discussions regarding general market trends. This practice enables Company D to both understand market trends and make sure the trends are diffused globally, within the industry.

Procurement requirements

Since Company C has hospitals as a target segment; sales are done through public procurement. As a part of the procurement process, the company will be handed a document defining the parameters needed. In similar manner, customers to Company D will receive a list of feature requirements to initiate the tendering process. In both cases, it is important to influence the requirements listed and be able to prepare accordingly. The underlying reason for this practice can be explained the high level of investments needed when purchasing an entire system. As one sale will have significant financial impact, it is of essence to offer a product meeting requirements set, or even influence the tendering process to be adjusted to suit the company product for sale. There is long time spans between when customers change their systems thus, the tendering process becomes increasingly important.

Customer driven product development

Company C uses end user input during early concept stages where the presented product might be subject to complete revision. Also, by assessing expressed customer values and analysing them to discover latent needs provide a foundation of ideas leading to high value-in-use products. Company D involves customers late in the product development process, where only some configurations can be made.

5.2.4 CUSTOMER VALUES AND THE COMPANY

Company C highlights increased importance of usability and how this consequently leads to increased focus on customer values. Although not explicitly discussed, this should apply for Company D's users and end users as well. Both companies point out that they would benefit from spending more time in the environment of the customer.

Company D states that the reason for them working with customer values in the way they do is size and organizational structure. Company C instead regards the relation to the customers, the way purchases are made and legal requirements as reasons. It should be noted that Company C only has worked with this issues for a few years and have yet to build up a set structure for actively capturing customer values. Company D on the other hand have a more worked-through structure, with an entire department set aside for focusing on end users and processes that are well rooted.

	COMPANY C	**COMPANY D**
CUSTOMERS		
Customer segments	Organization where product will be used	Customers integrate into own systems
Customization	Has done extensive customization, moving towards roadmap driven	On market level
Acquisition of new customers	New hospitals, or complete system change	Generation change
Customer relation	Support and up-keep due to complexity, physical wear	Formal responsibility for systems
LIFE CYCLE		
New releases	New model release every 5th year, software continuously	New model release every 5th year, software continuously
Development time		Longer, due to size of company and standardization requirements
METHODS		
Ethnographic studies	Yes	No
Formal feedback	No	Yes
Formal feedback on existing products	Yes, change requests	Yes, from local divisions
Focus groups	Yes, input on early concepts and developed products	Yes, discuss general market trends
Formal customer values	Yes, public procurement	Yes, feature requirements
CUSTOMER VALUES AND THE COMPANY		
Reason for using methods	Relation to customers, purchasing process, legal requirements	Size and organizational structure
View on customer values	Increased importance of usability	

TABLE 2 COMPARISON OF COMPANIES WITHIN THE TELECOM INDUSTRY.

5.3 INTER-INDUSTRY COMPARISON

5.3.1 SIMILARITIES AND DIFFERENCES BETWEEN THE INDUSTRIES

Customers

An initial difference between the two industries is how they interact with the end user of their products. In the power tool industry the companies regularly meet with the end users of their products. Conversely, in the telecom industry, this interaction is not a natural part of the business model as the product sold is a system, e.g. Company D's system only used by the end user via add-ons added by the operator. There is little correlation between the level of customer based customization and industry. This can be related to chosen business model rather than industry requirements. Also, the telecom companies achieve customer requirements prior to the sale and have the opportunity to twist their product development to suit the requirements of the tendering lists.

The power tool industry mentions importance of brand; the telecom companies do not discuss this perspective at all. It can be suspected that as the telecom companies are solemnly focused on business-to-business relation a clearly defined brand does not provide the same type of competitive edge as for the power-tool companies selling directly to end users.

Lifecycle

The product development time is similar between the industries. Both in terms of time between major updates but also in that minor software updates are released in the meantime.

In the telecom industry, new customers are targeted through selling an entire system, for example Company C selling a system to a hospital or Company D selling a system when a customer switches to next generation technology. After the system has been sold, updates and service can be sold as well. This does not apply to the companies in the power tool industry, where the customers often use products from several manufacturers. However, both industries highlight the importance of selling add-ons as a complementary revenue stream. The power tool industry makes continuous sales but the telecom industry is subject to longer lifecycles between system changes increasing the importance of each sale.

The telecom industry releases updates on existing systems based on product development department input as well as feedback on functionality from customers. In contrast, the power tool industry releases updated versions of their products about every third year.

5.3.2 INTEGRATION OF CUSTOMER VALUES IN PRODUCT DEVELOPMENT

The power tool companies and Company D utilize the concept of creating business cases to motivate implementation of customer values in a new product. Company C on the other hand, has a slightly different process as the product development department itself is responsible for capturing customer values, assess underlying needs and design product functions corresponding to these.

5.3.3 METHODS FOR CAPTURING CUSTOMER VALUES

Product feedback and formal feedback

The formal feedback processes utilized by the telecom companies can be compared to the workshops and service call solutions practiced by the companies in the power tool industry. Both mainly give rise to feedback of reactive nature.

Ethnographic studies and on-site visits

The on-site customer visits that power tool companies conduct is a good source of customer values and a way of observing the user. There are differences in how the companies structure these visits, but the access to the end user makes it possible. In contrast, the telecom industry has little contact with end users and all information is collected through processes with an explicitly stated target of capturing customer values.

Procurement requirements

The telecom industry is subject to formalized customer values in the form of demands as a part of tendering processes. This can be derived to big investments required and low amount of customer specific customization. As these characteristics diverge from the power tool industry, this does not apply.

Prototype testing

Due to the nature of the products that the power tool companies manufacture, they can let customers test their product before the product is put on the market. This is harder to do with an entire telecom system. However, a parallel can be drawn to how Company D at first targets smaller tier 3 companies with new solutions, as a way of proving the concept before being able to sell to larger companies.

A major driver, affecting to what extent prototypes will need to be tested by customers is the possibility to continuously modify the product after sales or if all modifications is needed before the product is released. Telecom companies continuously release updates and upgrades on their system and since the systems to large extent are digital, transportation to customer are easy. Power tools releases an updated version of their product every third year and since the products are physical, updating already sold products would be a resource intensive process. Consequently, the products undergo thorough testing before being released to the market.

5.3.4 CUSTOMER VALUES AND THE COMPANY

Several companies mention that they would want to work more with customer values, but that they have a difficulty finding time for it. Especially companies in the telecom industry talk about spending more time in the environment of the customer, also the power tool companies highlight this issue.

While there is little industry specific variation in the valuation of customer value importance, variations based on market position can be derived. Company B and Company D, highlight technology push as a key strategy to maintain a position as market leader.

	POWER TOOLS	**TELECOM**
CUSTOMERS		
Customer relation	Regularly meet with end-user	Integration with end-user not part of business model
Customization	No correlation	No correlation
Acquisition of new customers	Customers use products from several manufacturers	First sales is entire system
Importance of brand	Mentioned	Not mentioned
LIFE CYCLE		
Development time	Similar	Similar
Frequency of update	Every third year	Multiple times a year
METHODS		
Product feedback and formal feedback	Workshops and service call solutions	Formal feedback process
Ethnographic studies and on-site visits	Yes	Yes, by one of the companies
Procurement requirements	Not as applicable	Applicable
Prototype testing	Yes	No
CUSTOMER VALUES AND THE COMPANY		
Ideal way of working	Spending more time with the customer	Spending more time with the customer

TABLE 3 INTER-INDUSTRY COMPARISON

5.4 COMPARING THEORETICAL FRAMEWORK AND EMPIRICAL STUDY

5.4.1 DEFINITION OF THE CONCEPT OF CUSTOMER VALUES AND RELATED CONCEPTS

Definitions of the concept customer values and how they are regarded were not something that was discussed during the interview. However, the service-dominant logic perspective was recognized in the interview with Company C. The company is moving towards selling a service rather than a product and wants to understand the customer's needs rather than focusing on specific features. This is close to Witell's (2011) definition of the concept. However, none of the companies directly talk about the use situation as the part where value is created, as Woodruff (1997) suggests.

Company B addresses the question of difficulty of prioritizing and sorting the stream of customer values the company is subject to. It is evident that some type of prioritization system is needed. Khalifa's (2004) concepts, the value components model or Kano's model dividing customer values into dissatisfiers, satisfiers and delighters seems to be applied. Being able to categorize and understand what type of customer values that are captured enables the possibility to take an active standpoint in the choice of methods to use. For example, failing to capture latent needs, constituting the foundation for delighters, when capturing customer needs is likely to result in failure of capturing ideas good enough for competitive advantage or disruptive innovation. When not satisfied with the result achieved in a customer survey or a focus group, it is likely that companies are reluctant to offer customer a more integrated role in the product development process. Using customer values in the product development process are not intended to be a substitute for competent product developers but rather a complementary tool to direct development efforts. Company C practices this by investigating customer needs to understand latent needs which the product development department targets.

One reason for the lack of practice in this field might reside in the chosen organizational responsibility for capturing customer values. At Company C, design engineers educated in user interaction are capturing customer values, probing in the answers provided by the respondents using laddering techniques to understand latent needs. Company B captures most customer values in sales meetings, where the sales staff listens to the expressed needs of the customer and reports back to product management. This results in less opportunity to use methods with a higher level of sophistication to understand latent needs.

5.4.2 TECHNOLOGY-BASED COMPANIES AND CUSTOMER VALUES

Both industries studied are characterized by being technology based, which brings relevance to the discussion made by Kristensson et al. (2008). The lack of face-to-face interaction and fewer opportunities to observe the customers are both things that Company C tries to overcome with their user observation studies. For Company A, B and C the user of the product has limited technological knowledge, something that Kristensson et al. also brings up as a difficulty and a reason for focusing on latent needs (2008). Company C is the only company that makes a point of looking deeper than at requested features. However, the companies want to watch the users using the product, which gives information that the customers cannot express.

5.4.3 CUSTOMER SURVEYS

Company A uses customer surveys in two ways, to collect feedback after a customer has tested a new product prototype and using a third party to collect general customer values. Both strategies have encountered problems such as low quality of answers and difficulty in formulating questions providing desired outcome. The theory mentions question formulation as a key component for method success. Also, analysing the answers is time consuming and required knowledge regarding the respondents. No company uses surveys to get input on how a given idea should be developed and refined, the way that McQuarrie & McIntyre (1986) suggests that it should be used.

5.4.4 FOCUS GROUPS

According to theory, focus groups are good to use when there is an existing concept that needs to be developed and refined, especially for a complex product that is expensive (McQuarrie & McIntyre, 1986). This fits into one of the ways in which Company C utilizes focus groups, by introducing concepts. The focus groups as used by Company D are more focused on communication, and also on a more comprehensive understanding of trends. This resonates more with what Lagrosen (2001) sees as benefits, having focus groups as a practical source of knowledge.

Company A does not use focus groups frequently, but they pointed out that when they did it with the purpose of product improvement they were not able to derive much conclusion. This resonates with the disadvantages brought up by Kristensson et al (2008), who claim that focus groups can result in rather meaningless ideas. Another disadvantage brought up is that it will be hard to validate or analyse the result statistically (McQuarrie & McIntyre 1986), but this was not mentioned as a goal with conducting the research for any of the companies. Furthermore, Company D has a proactive approach in their use of focus groups by enabling strategically important customers to share market trends and problems encountered. This strategy can enable companies to base their input on one platform, well known for Company D. By ensuring that their customers target similar trends and issues and being aware of these, the company are able to modify their technology roadmap accordingly.

5.4.5 INDIVIDUAL INTERVIEWS AND STORYTELLING

In theory, individual interviews are seen as a good source of ideas (GroupQuality, 2011), but the companies interviewed only mentioned using it in relation to prototype testing. Visiting the end user frequently and talking to them, as Company B does, can be seen as an unstructured type of individual interview. When Company D visits users, they conduct in depth interviews with them. Company C points out that interviews, as well as surveys, are insufficient as the users are not used to talking about technology and certain core issues can be sensitive to discuss. This is not mentioned as a problem in the interview theory, but is mentioned as a disadvantage of storytelling (Koll et al, 2010). As Company C asks about user experiences, this can be seen as a type of storytelling. Storytelling is well suited for experiential brands of products, where the respondents interact frequently and for longer periods of time with the product. This fits with the product of Company C, as they specify that their products to be made for heavy use.

Company A uses storytelling when presenting the results of their ethnological studies. Naming different user segments to provide the product development department with a clear image of the user needs of a certain market or segment aims to deepen understanding of customer needs and values.

5.4.6 LADDERING

Laddering theory talks about capturing underlying personal motivations to expressed needs (Reynolds & Gutman, 1988). Company C does not go to an emotional level when interviewing their end users, but aims to get past expressed needs for a feature to understand underlying needs. This complies with the use of the follow-up question "why?" that Reynolds & Guteman (1988) brings up. The disadvantages discussed by Hawley (2009), continuous questioning being tedious for the participant, might be avoided since Company C does not create the extensive maps otherwise being the goal of laddering studies.

5.4.7 ETHNOGRAPHIC STUDIES AND PARTICIPANT OBSERVATION

Both Company A and C conduct user studies to be able to see how their product is used. Flint (2002) points out that the customer is not always able to express what they want. This can be connected to Company C mentioning that their end users are not used to talking about technology. Although Company B visits the customers regularly; they do not mention that they observe the users while they are using the product or conduct visits with the purpose of capturing customer values. The method is stated by Miriampolski (2006) to be particularly suited to understand user practice in different cultural settings, making it suitable as a method for assessing different geographical markets, in line with Company A's practice of ethnographic studies. This method is stated to be uncommon in new product development. Also, it overcomes the limitations of surveys, interviews, and focus groups in the regard that it is enables assessment of an actual usage situation rather than a narrated.

5.4.8 PRODUCT ANALYSIS

Even if none of the companies mentions product analysis explicitly, it is likely that the method is used, although companies might not see it as part of capturing customer values, but as a way of keeping track of competition. In one way, the procurement requirements used in telecom cover the outcome of this method, as the requirement lists are compilations of functions known by the customer to be available.

5.4.9 PROACTIVE METHODS AND CUSTOMER CO-CREATION

Company A mainly has customers as active contributors in new product development when they lack knowledge themselves. Kristensson et al. (2008) discusses the similar concept of customization. It is pointed out that the role of the customer is reactive in customization, resulting in product changes when the company asks the customer questions. However, in the case of Company A, it seems as if customization is done because of customers having direct demands on colour etc. The API made available to customers by Company D also allows for a certain level of customization. However, the level of customization is limited to add-ons and configurations.

Differentiating from the reactive nature of customization, customer co-creation allows customers to take active part in the product development process from the beginning. Company A currently uses customers possessing product specific expertise in one specific of the product development, theoretically referred to as the lead user method. However, this seems to not be an established practice.

5.4.10 METHODS NOT USED BY COMPANIES

Of the methods mentioned in the theory chapter, there was little reference to proactive methods being used. Reasons for not implementing proactive methods such as the lead-user method can be, as earlier mentioned, insufficient quality of previous efforts to capture customer values. Furthermore, the suitability of lead user method does not seem to be industry specific, but rather dependent on what customers that are targeted. Company C offers technically complex products to customers who know little about technology and this is likely to affect the character of the customer values they receive. Company D on the other hand, sells their systems to operators who possess technical knowledge. Using the lead user method using operators as lead users will provide customer values with higher level of practical implementation possibilities. Other reasons could be that the companies want to ensure secrecy of product development.

	COMPANY A	COMPANY B	COMPANY C	COMPANY D
Definition of concept			Service-dominant logic	
Characterization of customer values	Customer has limited technical knowledge	Customer has limited technical knowledge	Customer has limited technical knowledge	Technology knowledgeable customer
REACTIVE METHODS				
Customer surveys	Yes			
Focus groups	Yes, product improvement		Yes, introduce concept	Yes, communication
Individual interviews & storytelling	Storytelling to present results	Yes, by talking to users	Yes, with storytelling	Yes, in-depth interviews
Laddering			Yes	
Ethnographic studies and participant observation	Yes, global studies conducted.	Visit customers, not explicitly for observation	Yes, participant observation on site.	
Product analysis				
PROACTIVE METHODS				
Customization	For direct demands			API abilities
Co-creation	When lacking knowledge			

TABLE 4 COMPARING THEORETICAL FRAMEWORKS USED BY THE INTERVIEWED COMPANIES

6   DISCUSSION

In the discussion, the findings of the analysis are discussed with the goal to find a basis for answering the research question. The structure is based on the three sub-questions formulated in section 1.3.

6.1   METHODS USED IN SURVEYED COMPANIES

As could be seen in Figure 13, Figure 15, Figure 17 and Figure 20 in chapter 4, all interviewed companies are mainly focused on using reactive methods for capturing customer values. No proactive methods as described by theory were found; however, some of the methods used have proactive features and can be used in a proactive manner. Examples of this is how user groups, a traditionally reactive method, is used by Company C for customer co-creation and by Company D for roadmapping. Most reactive methods are well proven and traditionally used; proactive methods and customer co-creation are novel methods. One explanation for less use of these methods could be just this; the methods have yet not diffused to organisations and are still considered to be unproven.

According to theory, focus groups are most beneficial for products that are complex, demand involvement of the buyer, and are resource intensive. This correlates with the products sold by all interviewed companies. The experienced success with using focus groups has been varied. Company A did not manage to capture any particular benefits. However, they used an existing product as the topic of discussion, something theory does not argue for. The way Company C works is more correlated with focus group theory, and they experience greater benefit from the method, using it centrally in their product development.

Flint (2002) states that ethnographic observation is uncommon in new product development. This contrasts with the findings of the empirical study where many of the companies use ethnographic studies as a method to obtain a deep understanding of customer values. This is the most important and valued method used by Company A and is suitable to assess global markets, as described in theory. These studies result in user based segmentation. The theory mentions that segmentation makes it easier for the product development staff to visualise, something that Company A has experienced.

Customer service feedback is not mentioned in theory, neither is prototype testing. This would be classified as reactive methods but is also a good way to create better understanding of the customer and ensure quality levels of existing products. These methods are not likely to result in novel ideas leading to development of innovative delighters but will provide insights good enough to keep even pace with most competitors.

There are a few methods described in the theory chapter that is not used by any of the companies interviewed. Most of the methods described and used are characterized as reactive methods and few proactive methods are used. Two methods the companies could benefit from implementing are product analysis and the lead-user method. As previously mentioned in the analysis, it is not unlikely that product analysis is used as a way of keeping track of competition. However, by tracking trends with an understanding that this process also gives a way of seeing what customers value on the market, another dimension of customer values can be captured. The lead-user method should be especially suitable to

implement for telecom companies selling their product to an operator, as these are technology competent and understands end user values. This can provide holistic perspectives and additional insights in to the product development.

6.2 INFLUENCE OF STUDIED INDUSTRY CHARACTERISTICS

Customer

The nature of sales conducted by power tool companies lead to ample possibilities for interaction with product end users. A natural part of the sales process is to visit the end user and observe how the products is use in operation and through this obtain direct feedback on functionality and unexpressed user needs. The stream of customer values reaching the company does thus need to further processing but can be implemented directly.

Telecom companies do not have natural end user interaction integrated in their business model. Instead actions are needed to ensure understanding of customer behaviour and values. This is manifested in the department of Company D that works exclusively with customer values of the end user and in how Company C works with putting the developers closer to the end users, for example by conducting user studies.

The companies in the telecom industry are more dependent on when the customer decides to change their entire communication system. When the customer decides that it is time and sends out official requests, in the form of public procurement or feature requirements, the company needs to have a product ready that will meet these needs. This should call for a bigger need to understand not only explicit but also implicit customer needs.

Continuing the discussion in the previous section regarding lead-user methods, part of the definition of a lead-user is that they should be people with high degree of technology readiness. This contrasts with the theory on users of technology-based services having limited technical knowledge. Companies in both industries bring up the low technological level of knowledge in their end users, which could be a reason for them not choosing this path.

Lifecycle

In both industries studied, the products have long lifecycles owing the need for technology development. This gives much time to implement customer values during the different stages of product development; however, it seems as if customer values are mostly brought in as a source of starting product development and then later when the product is almost finished. There are some diversions in that Company A discusses product concepts with customers in focus groups and that Company B lets customers test their new products earlier, enabling larger changes based on their input. The companies could benefit from learning from each other in this aspect.

6.3 REASONS FOR CHOISE OF METHODS IN SURVEYED COMPANIES

Analysing the empirical study, other factors that could influence the choice of methodology appear. The business model of the company includes the part they take in the value chain and the possibilities the company have to naturally meet with the customer, influencing the possibility of getting product

feedback and conducting on-site visits. Further, the business model of Company D is what allows them to collect local market requirements through local divisions. Moreover, a different business model can change the need to have a structured process for capturing customer values. The further away the company is from the end-user, the greater the need is to have such a process.

Further factors that can be derived are for how long the companies have been working with customer values in a structured way. Company C has a new department and are quite free in the use of methods and processes, drawing inspiration from methods learned in school. Company A claim that much of their choice of method is coincidence. This might mean that they test methods that they have heard about, and that do not seem to hard to implement. As discussed earlier, proactive methods are not widely used or tested, and might therefore not come to mind when discussing potential strategies for capturing customer values.

Another factor that can influence is the importance of the company brand. Within the power tool industry the importance varied between the companies, but the trend points towards increased importance. In the case of Company A, they work at strengthening their brand by being consistent in choice of design and colour of their products. However, they still do customization on these parts for large customers, which limit the possibility to build a brand. Company B regard their brand as highly important and never do any customization. This might be a way that Company A will develop if their goal is to ensure stronger brand recognition.

Several of the companies brought up the relationship between being regarded as market leaders and having an element of technology push and innovation with origin within the company. Owing this, the companies may be afraid of listening too much on customer values with a reactive nature, not wanting to risk this leading to incremental innovation.

Company B mentions that customers' expectations and feedback are regarded as the greatest assets in product development. However, these provide explicit customer values. Without an additional effort to find implicit values, this type of customer value focus will mainly lead to incremental improvements.

Something that was not discussed in the interviews was the definition of customer values. This would have been interesting to discuss and might have given another view on how they regard customer values.

7 CONCLUSIONS

In this chapter, an answer to the overlaying research question as stated in section 1.3 is derived from the analysis and discussion. Stated hypothesises are verified or falsified. Practiced methods are presented in combination with identified main drivers and causes.

The methods described by theory and used in companies today are customer surveys, focus groups, storytelling, laddering, ethnographic studies, product analysis, and customer co-creation. Further, the companies also used direct input on existing products and prototype testing. Most of these methods are of reactive nature; purely proactive methods are rarely used.

Factors that have been found to affect the choice of method for capturing and integrating customer values include consumer characteristics and choice of business model. The hypothesized influence of lifecycle could not be verified. However, the lifecycle regarding product release and product development were similar for all interviewed companies and thus, no conclusions could be made between the two assessed industries. A company's business model affects the level of end-user contact. The importance of having established methods for capturing customer values increases with the distance between the company and the end users. As business model was not a factor that was hypothesised to have an impact, the empirical study did not go very deeply into this factor.

The hypothesis stated in the beginning is thus verified. Methods and processes for capturing and integrating customer values are dependant on factors. However, the factors are not necessarily industry specific, but can instead be company specific. Whereas customer characteristic can be similar for companies operating in the same industry, the individual company's choice of business model will affect their relationship with the customer and thereby how they chose to capture customer values.

Two of the interviewed companies are considered to be market leaders within their industry and motivate their high degree of product development technology push with the need to be innovative. This view indicate that capturing customer values using reactive methods is not enough to discover the latent needs which would provide a good foundation to build innovative features on in collaboration with the customer. Utilizing new proactive methods, where the end user is involved in the product development process would make customer values truly beneficial, not just producing faster horses.

7.1 SUGGESTIONS FOR FUTURE RESEARCH

As this study focuses on the industry characteristics product lifecycle and customer characteristics, the effect of the business model has not been evaluated in the same depth. Further studies are needed to investigate the importance of business model in relation to capturing and integrating customer values in the product development process. Furthermore, a study with greater selection of companies, both in numbers as well as diversity would provide an improved overview of how methods for capturing customer values varies and in what industries they can be seen as particularly important.

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INTERVIEWS

Company A, *R&D Manager*. Face-to-face interview. 2012-04-26.

Company B, *Marketing Manager* Swedish division. Telephone interview. 2012-05-07.

Company C, *Product Developer*. Face-to-face interview 2012-04-30.

Company D, *Product Manager*. Telephone interview. 2012-05-09.

APPENDIX A – INTERVIEW TEMPLATE

Purpose: Gain insight on how the assessed company values and practically utilizes customer values in their product development process and also underlying reasons to choice of methodology. In addition, investigation on how the product lifecycle and customer characteristics influence the choice of work methodology shall be assessed. The interview aims to provide an understanding of the methodology, company focus and values rather than provide a detailed process description.

Preparation: Read up on company to achieve a profound understanding for products, industry and company profile. Prepare a suggestion for product to use as example to clarify answers. Formulate questions that are easy to understand, without advanced terminology from the theoretical chapter.

Send confirmation email containing:

- Interview purpose and scope
- Subject areas of relevance
- Questions at issue
- Time and location for interview

Tools: Clarification of what type of answers we are looking for and to use as food for discussion if necessary.

- List with methodologies to capture and integrate customer values methodology
- List of aspects on product lifecycle and customer characteristics
- Potentially a figure of a standard product development process to illustrate if different methods are used in different stages.

Methodology: The interview will be recorded and transcribed. To ensure all questions are answered in a satisfying manner, responsibility of the questions will be divided. Notes are taken during the interview to facilitate references to earlier examples and details.

In order to maintain focus on company experience rather than explanations of words or expressions, questions and explanations shall be made without advanced terminology. To probe for more detail and information, the question shall be rephrased and asked again. After each discussed area, the answers shall be summaries and rephrased to ensure comprehension, reduce the risk of misunderstanding and make sure the answer to the question covers all aspects looked for.

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INTERVIEW STRUCTURE

INTRODUCTION

Short introduction of who we are, the thesis topic and procedure after conducted interview.

Ask for company description to sequentially target customer values.

INDUSTRY CHARACTERISTIC: CUSTOMERS

- How many customers do you have?
- How does the customer purchase products?
    o End user?
    o System integration?
- How much customization is made?
- Relation status with customers?
    o Continuous interaction?
    o One time purchase?
    o Customers are dependent on the company?
- Obstacles for customers to switch product?
    o Large investment?
    o Compatibility issues?
    o Learning threshold?
    o Lack of substitution

INDUSTRY CHARACTERISTIC: LIFECYCLE

Based on a standard product or standard product development process

- How often is new products or technology introduced on the market?
- What does the lifecycle of your products look like?
    o How often does the technology need replacement due to physical wear?
    o How long can a product be sold before it is considered to be old on the market?
    o How long time does it take to develop product, from idea to finished product?
- In your technology development, how much new technology is launched compared to improvement on existing solutions?
- Regarding aftersales, is it possible to sell add-ons, upgrades etc.?

PROCESSES TO UNDERSTAND CUSTOMERS VALUES

- Describe the role of the product developer
    o Who is responsible for issues regarding customer values?
    o Who is responsible for capturing and integrating these?
    o How is decisions made regarding the product development? What type of input is used and how is the input valued?
- What type of customer values are you looking for?
    o Explicit or implicit?
- How are you capturing customer values?
    o Is there a organization built around customer values and its use?

- o What roles are important in relation to these issues?
- o Who or which department is responsible?
- o How is the area you are assessing customer values for defined?
- What methods are used to understand customer values?
  - o Focus groups, customer co-creation etc.?
  - o Other sources for information? Purchase market reports, outsource etc.?
- Are customers interactively involved in your product development process?
  - o Why/why not?
  - o In what stage of process, proactive vs. reactive?
  - o What benefits can you derive from this practice?
  - o Pros and cons with customer interaction in product development?
- Is there a difference….
  - o Between how you use customer values in product development of a new product compared to product improvement?
  - o When the product is out on the market, how do you capture the thoughts of your customers?
- When product X was developed, what did the development process look like?

CUSTOMER VALUES AND THE COMPANY

- What type of connection can you see between how you work with customer values and your competitive edge?
- What do you think is the reason to your chosen customer values practice?
  - o Connect to industry characteristics
    - ▪ Lifecycle
    - ▪ Customer
  - o Ideally, how should you be working with customer values?
  - o Why do you think you are not working like this today?