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Utilization of Social Media within Product Development

-an exploratory multiple case study of SMEs and their perception on the usability of social media in the product development process

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Abstract

While social media is already widely adopted among firms within commercialization and marketing, it can also prove to be a useful tool in the process of product development in order to interact with customers and open up innovation efforts. Our qualitative multiple case study of SMEs within sustainable innovation aims to outline; if, how and why social media is utilized in their product development processes. Our results show that the use of social media within product development is almost non-existent among our respondents, mainly due to limited resources in combination with a low amount of customers. A low number of customers impede the ability to realize the major gains of using social media; to facilitate convenient communication among a large number of users. Additional significant challenges are perceived to be the difficulty in controlling content, measuring gains and dealing with security issues. There is no consensus among the respondents regarding the perceived future potential for social media within product development; while some are quite hesitant, some companies do anticipate increased potential in the future.

Keywords: *Customer interaction, Customer input, Open innovation, Product development, Stage-gate, Social media, SME, B2B, Sustainable innovation*

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1. Introduction

This chapter aims to introduce the purpose of our thesis and to provide an overview of some of the central theoretical aspects of the studied topic that has led forth to our research question.

An area of study which has received increased emphasis in recent innovation management literature is the one of *open* or *collaborative* innovation models (Chesbrough, 2003, Gassmann, 2006, Kärkkäinen et al., 2010). The concept of open and collaborative innovation stresses the importance of retrieving and making efficient use of knowledge and information acquired from outside the own company, e.g. from actors such as suppliers, other companies, universities and communities; but perhaps foremost from a company's *customers* (Chesbrough, 2003). The potential of customers as an external resource for companies' innovation efforts, and more specifically in the product development (PD) process, has for long been recognized in both theory and practice (Leonard-Barton, 1995; Rothwell, Freeman, & Townsend, 1974; von Hippel, 1988). Customer involvement in product development has for example proven to enhance aspects such as product concept effectiveness and product market fit (Brown & Eisenhardt, 1995).

Hence, successful product development is nowadays often not solely dependent on the internal R&D resources possessed by a company, but are instead to a great extent dependent on both internal and external input and knowledge; i.e. matching internal capabilities with external requirements in order to be able to combine and match the technologies a company owns and is able to incorporate in a product with what the market and the customers actually demand. External input and information may take the form both of experiences and reviews from customers using existing substitutes, their ideas about adaptations for available products as well as changing needs and requirements. The idea of both internal and external components of the PD process is illustrated in the below figure 1, where the innovation process is pictured as several intersecting internal development processes and external customer touchpoints. The process of product innovation may in a broad perspective be seen as all the steps ranging from the first pure idea of an innovation through the development stage and initial market introduction, all the way forth to the initial commercialization and the actual penetration of markets, as highlighted in below figure.

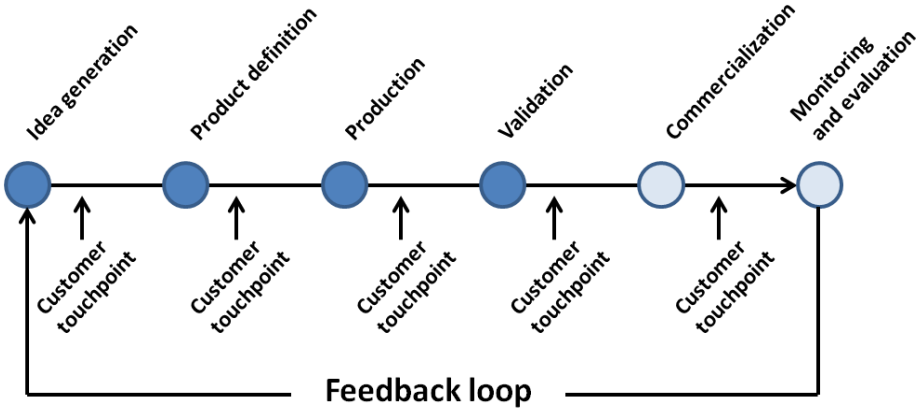

Figure 1 *- Customer Touchpoints throughout the Innovation Process.*

Where the right side of the process presented in the above figure; the commercialization and monitoring and evaluation, has more of a commercialization, marketing and after market focus which in this study is left aside, the left side; ranging from idea generation to validation, focuses on the development phase; transforming from a conceptual idea into an actual product through processes of setting requirements and developing it. It is these development phases that are the focus of our study. Common for the entire process is that throughout all steps and stages, sections of internal processes are intersected by customer touchpoints; sections where companies can and to a greater or lesser extent do interact with their customers through different channels. While interaction with customers as primarily a marketing and relationship building tool is already somewhat acknowledged through various CRM (Customer Relationship Management) systems, interacting on the left hand product development side is not as widespread.

According to Nambisan (2002), there are several reasons why the valuable resource of integrating customers in the PD process so far has had a relatively weak utilization. One of the potentially most limiting factors has been the poor connectivity between customers and producers. Though at this point, developments in IT and new collaborative and social applications have the potential to significantly enhance this connectivity between customers and producers in terms of cost efficiency and the support of new models and mechanisms of product development that involve customers in the innovation process. A rather major transformation of customer-producer relationships has been initiated throughout several industries from the emergence of new information and communications technologies, resulting in substantial implications and possibilities for the PD process (Nambisan, 2002).

This is where *social media* comes into the picture. To ease the transition towards opening up innovation efforts, web tools and applications such as the ones incorporated under the term of social media has played a significant role (Kärkkäinen et al., 2010). A customer touchpoint is created whenever a customer in some way comes into contact with or "touch" a company, and while these prior to the boom in IT advancements were traditionally bound to either human touchpoints (e.g. sales, support and call-centers, or static analog touchpoints (e.g. promotions and advertising); interactive digital touchpoints are now available at hand for companies interacting multi-directionally with customers through various different web tools and through social media. The effect of these web tools can be especially significant for small and medium enterprises (SMEs) since they inherently have limited resources and therefore it may be especially interesting looking at how social media can be utilized by these companies.

Social media applications are numerous and there are various views on how to actually define the concept and what ought to be included in the term. A somewhat general definition of social media is to define it as ‘a group of Internet-based applications that build on the ideological and technological foundations of Web 2.0, and that allow the creation and exchange of User Generated Content’ (Kaplan & Haenlein, 2010). Thus the essence of social media is the multi-directional *interaction* made possible through more or less collaborative web tools where all users may provide *content*. Although there is quite extensive research conducted in the fields of using social media in a business context and on product development and innovation commercialization separately, there is no extensive research conducted within the combined topic of using social media in a company’s PD process. There is even less research in the field if you add the combined aspects of social media in a business-to-business context, and the aspects of interacting with

customers in product development within sustainable innovation (choice of setting and context will be further assessed in chapter 3; *Methodology*).

The above introduction leads us down to the purpose and research question.

1.1 Purpose and Research Question

The purpose of this exploratory research on the topic of utilizing social media in product development is to determine *if*; *how*; and *why* companies choose to engage in this type of activity; what social media applications are used and for what reasons; what are the perceived possibilities and challenges; and do the targeted companies fulfill the requirements and mitigate the challenges stated in theory in terms of what type of internal capabilities required in order for a company to efficiently facilitate customer involvement throughout the PD process.

The purpose and problem description leads to the following research question;

- How and why is social media used in the product development process of SMEs in order to interact with customers?

1.2 Context

This thesis has been performed within the framework of a larger study, which is a collaborative research project between the University of Gothenburg and HAN University in The Netherlands. It sets the general context for the study which have been performed within *sustainable innovation*; a topic which is continuously given more and more attention. Additionally, it will be targeted towards *SME*s. Further presentation and explanation of context and case selection criteria can be found in chapter 3.3.1; *Case Selection*.

1.3 Thesis Disposition

The thesis begins with an *Introduction* which provides background information and a view into the importance of the subject. The purpose and research question is also presented in this chapter.

The *Literature Review* is presented in chapter two. In this chapter, an overview of relevant theories and models are explained and defined. The main topics are Product development processes, Customer interaction in product development, Social media; and how these concepts relate to each other.

The third chapter contains the *Methodology* which describes how the study has been conducted in terms of how empirical data have been gathered and later analyzed together with the theory. Topics described are; what sample selection criterions have been used, which data gathering techniques have been utilized and how the empirics have been analyzed.

In the fourth chapter, the *Results* of the study are presented. The results constitute of the empirical findings and have been gathered through several interviews. They are presented according to the view of a number of companies who has given their opinions on the topic.

The fifth chapter contains the *Analysis* where the theories are connected and discussed in relation to the empirical findings in order to see how well the empirics are corresponding with theory and vice versa. This chapter lays the foundation for the conclusions drawn.

The *Conclusions* are presented in chapter six. We are summarizing the study by presenting the conclusions and thereby answering the research question, as well as providing suggestions for future research.

The thesis ends with the two last chapters of *References* and *Appendices*. Appendices include the interview guideline that has been used in interviews to gather the empirical data.

2. Theoretical Framework

This chapter aims to provide an understanding of the different theories and frameworks which form the theoretical base of the thesis. The chapter gives a comprehensive overview on the topics of innovation, product development process, customer involvement and social media.

In order to understand how social media can be utilized when developing new products, defining a general Product development (PD) process is the first essential step in establishing a theoretical understanding of our area of research. In the different steps of the PD process, involved customers may take different roles and certain internal capabilities are required (e.g. the DART model [Prahalad & Ramaswamy, 2004]) in order to efficiently interact with customers, which is why *customer involvement* is a crucial aspect to understand. In order to be able to study how *social media* can be used to interact with customers in the PD process, social media needs to be thoroughly defined in terms of challenges and possibilities, as well as segmented upon the various different applications available, whose areas of application may vary between the different steps in the process and the with the different roles taken by integrated customers.

2.1 The Product Development Process

In order to be able to analyze and understand the potential for use of social media in product development, one must first understand the PD process. This is a process which starts with the idea and moves on with consecutive steps until the product is launched on the market. After the launch there are additional steps which are not in our scope for this thesis and thus left aside because they are more focused on marketing and after market. All products are moving through some kind of process from idea to launch and there are benefits of having a structured PD process in order to minimize costs and achieve a high level of product successes. There are different PD processes (i.e. Cooper, 1990, Trott, 2005, Song & Montoya-Weiss, 1998) and in this chapter we aim to show our interpretation of the general steps in those processes which are important in our research. These steps are important since there might be different purposes of involving the customers in the PD process depending on in which stage the development currently is in, the different aspects of customer interaction changes along with the stages (Nambisan, 2002). This in turn might change the potential for social media to be used, if the development is in the product definition phase the customers might not have a lot of important information to add to the product but if the development is in the production stage the customer may not be able to add any value to the product at that time.

When combining the models by Cooper (1990), Trott (2005) and Song & Montoya-Weiss (1998), there are some general steps emerging that are interesting for our research. The general steps are presented below, but all steps from all the authors are not included; only the general steps interesting for our research. The steps have been combined and renamed in order to make them easier to follow.

To begin with, all of the models have an early step where the process is initiated; what happens here is that an idea is generated or brought to attention somehow. In relation to this first step, the idea is screened and evaluated to assess if it will result in a product that later might be able to be sold on the market. Scholars (Cooper, 1990, Trott, 2005, Song & Montoya-Weiss, 1998) agree fairly well on the idea generation phase. This step is interesting for this study since the ideas might sprout both from an internal source (e.g. employee) or an external source (e.g. customer).

When the idea is set and somewhat defined on how a potential product may look like, there is another general step acknowledged by scholars (Cooper, 1990, Trott, 2005, Song & Montoya-Weiss, 1998). This second general step is where the product is defined technically and aspects regarding customer expectations, segments and the market are discussed. Views from outside the company is collected and assessed to see how the product may be sold and priced (Cooper, 1990, Trott, 2005, Song & Montoya-Weiss, 1998). Worth to note in this stage is that all of the authors somehow state that their own PD process makes sure to interact with the customers and also listen to them in order to make a good product.

A third general step being described by the assessed scholars (Cooper, 1990, Trott, 2005, Song & Montoya-Weiss, 1998) is the actual development phase. When the idea has reached this far, a product is going to be manufactured. In this step, the value of including customers is limited since the product will not be altered to any larger extent until it is manufactured.

When the product is manufactured, there is a fourth general step which can be seen in Cooper (1990) and Song & Montoya-Weiss (1998). This is the step of validation where the product is being tested in order to see if it meets the technical requirements and also customer demands. To interact with customers in this stage may prove essential in order to reach a sufficiently good product which later will reach the market. Though, if the two first steps were thoroughly executed, there will not be any significant changes needed to be done at this stage.

After these four general steps, there are additional steps; in our model called commercialization and monitoring and evaluation, but they are aimed towards the commercialization of the product; e.g. marketing, product launch and after market, which is not the focus of this research and thus will not be examined further. Another important aspect is that the further into the process the development progresses, the costs increases (Cooper, 1990). This makes each step more risky, and to proceed there is a need to have as much information as possible in order to make the product a success (Cooper & Kleinschmidt, 1987). Vital information regarding the product may come from future customers and through the entire process it is possible to involve the customers to make sure that the product is following demands in the market (Cooper, 1990).

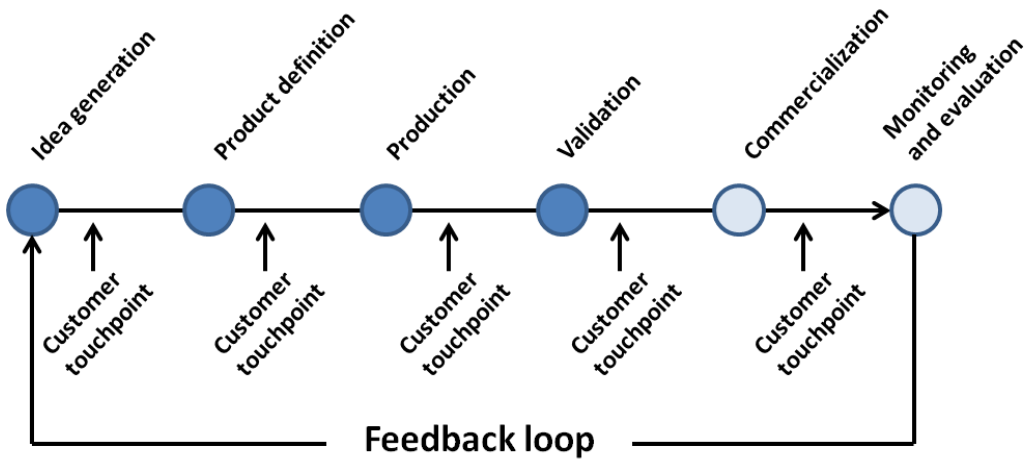

Figure 2 *- Customer Touchpoints throughout the Innovation Process*

The four steps in our general model is idea generation, product definition, production and, validation. In all of these stages, it is possible to interact with customers in order to refine the idea into a successful product. With this noted, we are continuing by explaining more specifically how customers can be involved in the PD process and what different roles customers can actually take throughout the process (Nambisan, 2002).

2.2 Customers in the Product Development Process

Customer involvement may be defined as either direct or indirect, where direct involvement could be seen as just that; two-way communication between a customer and a firm/producer where both actors intentionally generate content and actively take part in the interaction, whereas indirect involvement could rather be seen as simple collection of market intelligence; i.e. to extract customer demands and preferences from publicly available sources. This research is focusing on the type of involvement defined as direct involvement and thus this is what is meant when referring to customer involvement.

Throughout the PD process, there are several potential touchpoints for customer interaction. The roles customers may take when interacting with firms varies, not least due to in which step they are involved, and this has managerial implications for how customer involvement could and should be shaped.

So what are the company looking for when listening to customers? The customer input can be a varied and concern virtually anything within a product. Though, important to remember is that the customer may have many good ideas but the given input should be suggestions and not solutions. The customer demands a set of features but the real experts of how to provide these features technologically is the R&D team (Ulwick, 2002).

2.2.1 Customer Touchpoints

A customer touchpoint is created when a customer in some way interacts with a company, and is defined as; ‘Touchpoints occur every time audiences come into contact with or "touch" your company’ (MCorp

Consulting, 2012). As stated in the introductory chapter; while customer touchpoints prior to the boom in IT advancements were traditionally bound to either human touchpoints (bi-directional) such as sales, support and call-centers, or static analog touchpoints (one way) such as promotions and advertising, interactive digital touchpoints (multi-directional) are now available at hand for companies interacting through various web tools and social media.

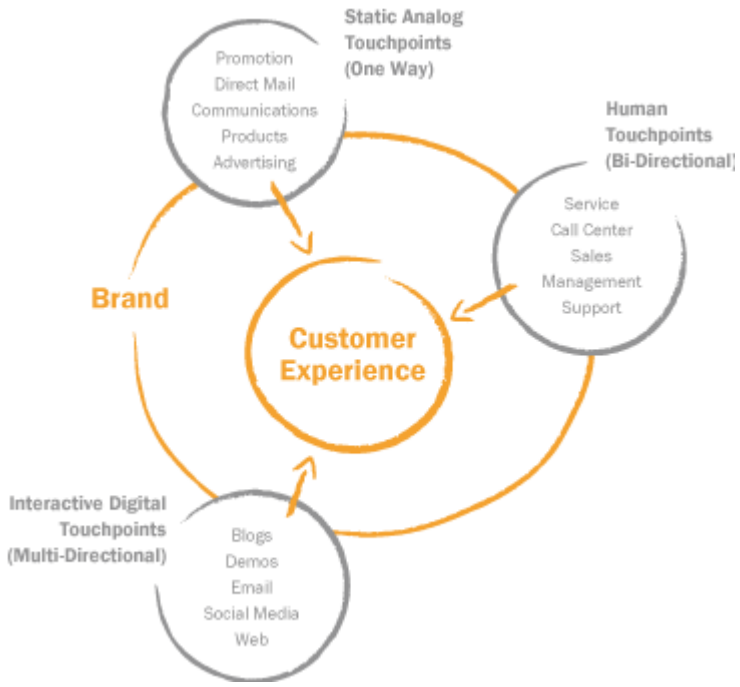

Figure 3 *- Customer Touchpoints Affecting Customer Experience (MCorp Consulting, 2012)*

Different models propose that the interaction with customers is to be done in different ways. In general, it is important to co-create with the customers in order to achieve competitive advantage in the economy of today (Prahalad & Ramaswamy, 2004). In the stage gate model, one of the tasks being emphasized is to be able to communicate with the potential future customers throughout the several different control phases; i.e. the gates can be seen as potential customer touchpoints. Cooper (1990:48) states that market orientation is an important factor to reach success, but is also one of the key aspects that is often missed out on in the PD process. To manage this problem, customer communication and interaction may be implemented in the gates; in order to coordinate and control what the customers want before proceeding to the next stage where the product is further developed (Cooper, 1990). Brown & Eisenhardt (1995) state that the development process will be more successful if the participants are connected to each other and with the outside parties, i.e. the customers, but they do not explicitly point out exactly at what stage or gate customer interaction is most appropriate (Brown & Eisenhardt, 1995).

Integration of customer input throughout the various gates can be facilitated in various ways. One example is through so called gatekeepers; individuals who are taking on extra responsibility of talking to different people, both internally and externally (Brown & Eisenhardt, 1995). Nambisan (2002) states that an integrator should mediate and filter the information between the customers and the company, this is

similar to above mentioned gatekeepers. The integrator should also nurture and facilitate the interaction in order to provide a feasible and positive environment for customer interaction.

2.2.2 Customer Roles

In the different steps of the general PD process and in the potential touchpoints previously described, involved customers may take different roles. In order to be able to study how social media can be used to interact with customers in the PD process, the different applicable customer roles needs to be thoroughly defined.

There are five different roles of the customer identified in the management literature, resource, co-creator, buyer, user and product (Finch, 1999; Gersuny & Rosengren, 1973**;** Kaulio, 1998; Lengnick-Hall, 1996). We are reasoning as Nambisan (2002) and regard the important roles of the customer as the resource, co-creator and user. The customer role is varying depending on where in the PD process the development currently is. Shortly defined the customer as a resource is the stage where a customer may provide ideas for innovation. The customer as a co-creator refers to the customer as a part in the design and development of the product and the customer as a user is referring to when the customer tests a finished product (Nambisan, 2002).

Customer Role	**PD Phase**	**Key Issues/Managerial Challenges**
Customer as Resource	Ideation	Appropriateness of customer as a source of innovation Selection of customer innovator Need for varied customer incentives Infrastructure for capturing customer knowledge Differential role of existing (current) and potential (future) customers
Customer as Co-Creator	Design and development	Involvement in a wide range of design and development tasks Nature of the PD context; industrial/consumer products Tighter coupling with internal PD teams Managing the attendant project uncertainty Enhancing customers' product/technology knowledge
Customer as User	Product testing Product support	Time-bound activity Ensuring customer diversity Ongoing activity Infrastructure to support customer-customer interactions

Figure 4 *- Customer Roles in product development (Nambisan, 2002).*

2.2.2.1 Customer as Resource

As stated, Nambisan (2002) claims that the customers can be used as a resource in the first phase of the development process, in our general process the idea generation stage, mainly in order to reach innovative ideas and knowledge. Earlier the customer has been seen as a resource but played mostly a passive role in a structured evaluation or contribution system. The companies have been pushing the customers in order to make them contribute and this might hamper the creativity and frequency of the customer participation (Nambisan, 2002).

Another claim stated by Nambisan (2002) is that the technology itself may inflict on how the customers can be utilized. For some innovations the customers can help out, this is often for incremental continuous innovation. For more radical innovation the customers may not be a help since they do not know about the product and therefore cannot picture it and what they would prefer. But even where the customers have been a great resource in the development, many companies have not utilized that resource more than in a passive way where not many fruitful ideas develops. Moreover, the customer groups in these cases tend to be unrepresentative in relation to the total customer group. But Nambisan (2002) also states that with new technologies the firm can provide the customers with many opportunities to team up with the firm and join the value creation (Nambisan, 2002).

2.2.2.2 Customer as Co-creator

The second role of customers is as co-creators of new products, for which activities within product design and development are typical areas of participation. Customers have played the role of product co-creators, e.g. by participating in concept testing, consumer idealized design, and component selection (Kambil et al., 1999). The role of the customer as a co-creator is according to the authors most suitable in the stage of the PD process called product definition.

A big part of the theory on customer as co-creator discusses the incentives available and needed for customers to be involved as co-creators and co-producers. Schneider & Bowen (1995) have identified several potential incentives; e.g. increased self esteem stemming from increased participation and control, enhanced discretion and possibilities to affect choices concerning product, and thus greater opportunities to influence on product customization. Customers acting as co-creators of products have the ability to influence on various product design and development activities, e.g. validation of product architectural choices, design and prioritization of product features, specification of product interface requirements, and establishment of development process priorities and metrics (Schneider & Bowen, 1995).

But in addition to the above listed potential benefits and opportunities stemming from customer co-creation, there are also several management challenges in order to facilitate this type of customer involvement. Firstly, customer interaction in design and development may increase the level of project uncertainty when involving additional actors in the process, and thus implementation of new mechanisms such as monitoring and controlling development quality and efficiency may be needed (Lengick-Hall, 1996). Secondly, customers may not feel as tied to the role as co-creators and thus may disrupt their involvement and thereby also disrupting the whole PD process. Thirdly, in order for the customer to efficiently be able to act as co-creator, they need enhanced knowledge of product and inherent technologies which in turn may require severe investments in increasing customer awareness and

knowledge in these areas. Additionally, producer-customer interaction requires high level of integration due to the nature of the processes and tasks to be undertaken which are usually more frequent and intense during co-creation than when involving customers as resource. Mechanisms needed to facilitate this integration are often costly and technology intensive (Sawhney & Prandelli, 2000).

2.2.2.3 Customer as User

When the product is ready to be used and tested, customers can play an additional role; the role as a user. This role means that the customer is testing the product but also providing product support. The role as a tester is not new and is quite commonly used for new products, most commonly known today is the tests of beta products in software. This use provides valuable insights in how the product will be perceived on the market, possible flaws and new areas of usage which in turn is preparing the companies for the product launch and thereby saving money for them (Nambisan, 2002). The use of the customer as a user is most suitable to use in the product development stage validation where the products are being tested and validated before reaching the market.

The role of the customer as a user has two challenges. The first is the high costs inherent of letting the customers testing the products in a controlled environment with all the required facilities. The second is mentioned in the section of the customer as a resource; that is the difficulties in reaching a representative sample of the customers in order to reach a holistic picture of the market (Dolan & Mathews, 1993).

2.2.3 How to Interact with Customers

As explained above, customers may take on various different roles in product development and its support activities. Though, in order to successfully interact with one's customers and to be able to apply and implement those potential customer roles, new bonds of interdependencies and the establishment of increasingly complex social networks that cross traditional organizational boundaries are required (Sawhney & Prandelli, 2000). Nambisan (2002) has stated some important aspects on how to implement the customer roles in the PD process, in which increased transparency has a rather prominent role, which in turn relates strongly to the theory of Prahalad & Ramaswamy (2004) who deals with the internal capabilities required for customer involvement.

In order to be able to successfully utilize customers and their different roles in the PD process, there are certain challenging components to take into account. There is a need to understand how to best manage the relationships and what impact they might have (Goodman, Fichman, Lerch, & Snyder, 1995). Moreover, firms need to understand the roles which customers may take and their differences, in terms of how to best utilize them and create value. Customers will contribute with their time and interaction in order for companies to gain valuable input. There are various challenges for both the company and its customers, as well as potential incentives and benefits for both parties when engaging in customer interaction.

2.2.4 Challenges

Even though there are several incentives for customers to participate in product development, as stated above, getting these proper incentives in place is a challenge in itself for the company who tries to facilitate these open innovation efforts (Nambisan, 2002). Glessner (2012) state that open innovation concepts are not always easily applied, especially not for B2B companies and in general, B2B firms often do not want to go fully public with their technical challenges. Moreover they are often hesitant towards openly sharing sensitive information critical to a solution. In addition, many of the challenges faced by this type of firms require very specific training and experience just to understand and be able to frame the specific situation. Glessner (2012) underline that even prominent and forward-thinking companies experience difficulties to apply open innovation when the above mentioned concerns are being faced in their PD process.

There is also a specific challenge regarding effectiveness versus input in the PD process. The firms using collaborative web tools; e.g. social media applications, will have to structure the product development environment so that there is a balance between the customer contributions and the effectiveness of the PD process. When having too much input from customers, the effectiveness may be suffering and the process will take too long time; phases like design and conceptualization may be affected (Nambisan, 2002). Nambisan's (2002) aspect on deteriorated effectiveness is interesting when compared with Glessner (2012) and Kärkkäinen (2010) who both claim open innovation efforts and interacting with customers in product development to result in faster and more successful PD processes. Nambisan (2002) also claim that collaborating and interacting with customers in the PD process will result in having a new type of process where customer input, regardless of amount of input, is integrated throughout the different stages. This will result in continuous new external input that might change the course of the development path numerous times throughout the process. This needs to be efficiently managed, and if not done properly, risks slowing down the PD process and also bringing additional costs.

An additional challenge is to be able to evaluate the different customer suggestions properly when customer input is massive (Nambisan, 2002). In addition, there is a significant risk that there is a small group of customers who stands for a majority a majority of the posted input and feedback, which is not representative for the larger population of customers. If a firm strongly takes account for these potentially unrepresentative suggestions, there is a risk of developing the product towards the wrong direction (Nambisan, 2002).

Important factors in order to have effective and good collaboration between customers and the company are trust and openness. To ease these factors the important feature transparency is vital. With transparency the company is having intense communication and especially exchange of information, which makes the expectations and information flows explicit and outspoken (Dougherty, 1992; Jassawalla & Sashittal, 1998). This means that everything needs to be transparent. The company needs to provide the customers with an insight in the processes but also telling the customer about their roles and what is expected in the particular settings. The customer also needs to know how, when and by whom the provided information will be processed. If the transparency fails and there are doubts about expectations there might be undesirable outcomes which could be detrimental for the PD process, e.g. customers might be dissatisfied and provide less useful information (Nambisan, 2002).

The transparency and willingness to be outspoken about the new products may be dangerous since it can give the competitors a warning and let them in on the new product being developed. The transparency is a matter that needs to be taken of great importance and thus how and which customers the company should interact with needs to be carefully assessed (Nambisan, 2002).

Above stated challenges described by Nambisan (2002) are summarized in below table.

Challenges Related to Customer Interaction in Product Development
Balancing amount of customer input with effectiveness
Customer interaction in PD processes risk slowing down process and increase costs
Proper evaluation of customer suggestions
Suggestions from customer minority might lead development in wrong direction
Proper management of trust and openness in order to match customer expectations
Risk of unwanted leakage of secret information, which competitors may get hold of
Creating incentives for customer participation

Figure 5 *- Challenges related to customer interaction in product development (Nambisan, 2002).*

2.2.5 Benefits and Incentives

The customers will contribute to the PD process in varying ways depending on both the roles they take and the benefits they are likely to receive. It is thus important from a corporate perspective to understand the incentives for customers, as they are a challenge to be managed for the company.

When educating the customer about the product, both the customer and the company will gain. The company will receive input needed to perfect the product and the customer will receive increased knowledge. This increased knowledge gives the customer a better understanding of how the product works and they will thereby be able to use it more efficiently and receive greater satisfaction from it when understanding the full potential and the possible complementaries. Other benefits for the customer are that their contributions are likely to receive high visibility and thus have a relatively high possibility of having their suggestions implemented. The customers are also likely to receive new products and upgrades in advance relative to the rest of the market and thereby the experience of the product will be more exclusive (Nambisan, 2002).

In terms of incentives and benefits for a company to engage in open innovation and more specifically to include their customers, Glessner (2012) and Kärkkäinen et al. (2010) state that the potential benefits are substantial if done correctly, B2B companies included and particularly in the resource-constrained R&D environments of today. Glessner (2012) and Kärkkäinen (2010) list the following dimensions of value to consider;

Discovering Customer Demands and Increasing Customer Orientation

In the research of Kärkkäinen et al. (2010), discovering customer demands and being able to increase customer orientation is put forward as one of the most prominent values of engaging in open innovation. Discovering knowledge and input from outside the company borders is at the core of open innovation and may contribute to a persistent focus on customer orientation and aligning development activities accordingly.

Faster, More Successful Technology Development

While invention means discovering something truly new to the world, innovation allows you to tweak and leverage from a solution that already exists; addressing that solution in a new way to another challenge, typically in another context. If an existing solution from another industry exists and might work in another context, open innovation through customer interaction can help in finding these answers and adapting them rather than creating new answers. Open innovation will speed organizational learning and technology development initiatives will have the potential of achieving a higher probability of success (Glessner, 2012). Also Kärkkäinen et al. (2010) emphasize the shortening of product development time, and consequently cost savings, as one of the major benefits of using social media.

Increased Probability of Breakthrough Ideas

While companies possess valuable internal R&D resources in terms of smart and talented people, there are a significant amount of smart and talented people outside company borders as well, not least a company's customers who indeed know the particular products targeted. External resources can bring new approaches or solutions to problems, or contribute with skills which the current internal R&D team lacks. Open innovation can increase the probability of breakthrough products by expanding the talent pool and inspiring existing internal teams to systematically re-define challenges in a thoughtful manner (Glessner, 2012).

Improved Team Productivity

Kärkkäinen et al. (2010) argue that open innovation can develop and nurture the innovation activities of a company in general, while Glessner (2012) emphasize the effects on productivity. Glessner claim that innovation productivity is boosted in two ways; first by keeping top technical talents motivated and second by engaging top talents from outside a firm. Opportunity to work with smart people from outside the own organization is an efficient incentive for internal researchers and engineers, and in the dynamic workplace of today, it is seen as highly critical to keep employees truly engaged on innovation initiatives.

Expanded Revenue Opportunities

Kärkkäinen et al. (2010) state that engaging in open innovation may develop the organization in general. Additional revenue opportunities for intellectual property and technology developed within a firm are provided by open innovation models, where internal R&D investments may transform into additional revenue streams through licensing, selling, establishing joint ventures, or spin-offs. The ability to act on these possibilities is significantly enhanced as external perspectives and ideas from relationships and partners are provided through open innovation (Glessner, 2012).

Incentives for Customers	Incentives for Companies
Increased knowledge, which will lead to; **- Ability to use product more efficiently** (Nambisan, 2002)	**Discovering customer demands and increasing customer orientation** (Kärkkäinen et al., 2010)
- Understanding full potential and complementaries (Nambisan, 2002)	**Faster, more successful technology development (Glessner, 2012, and** (Kärkkäinen et al., 2010)
High possibility to have their suggestions implemented (Nambisan, 2002)	**Increased probability of breakthrough ideas** (Glessner, 2012)
Increased likelihood to receive new products and upgrades in advance relative to rest of market (Nambisan, 2002)	**Improved team productivity** (Glessner, 2012)
	Expanded revenue opportunities (Glessner, 2012, and (Kärkkäinen et al., 2010)

Figure 6 *- Incentives/benefits of customer interaction in product development.*

2.2.6 Internal Requirements Needed - The DART Model

Building further on the reasoning made by different scholars above; there are certain internal organizational requirements needed in order to successfully interact with one's customers. Prahalad & Ramaswamy (2004) have come up with a framework for addressing this issue; the DART model, which is used to explain some of the main features needed when engaging in co-creation with customers. DART stands for; Dialogue, Access, Risk assessment and Transparency. These attributes link directly to the internal challenges of organizations rather than social media in particular (Prahalad & Ramaswamy, 2004).

The attributes in the DART model addresses different issues. The Dialogue refers to the willingness to interact; both from the company and the customers' side; and this is where the communication occurs. Access refers to how much information the customers ought to receive in the PD process. Risk assessment refers to the risk posed on to the customer. If the customer creates should it also carry some risk? Transparency refers to how transparent the company should be; e.g. should the customer be able to see all the financial data or the margins the company has on its products (Prahalad & Ramaswamy, 2004)?

Combining Access with Transparency gives the customers the possibility to make more informed choices (Prahalad & Ramaswamy, 2004) and is a key feature in order to let the customers into the product development-process. The customers can then use a tool to see the information the company provides, and a customer touchpoint is created. The combination Access and Dialogue is another important connection to make. This combination provides the ability to create communities and ways to interact with the customers (Prahalad & Ramaswamy, 2004).

2.3 Social Media

Previous presented theory explains the PD process and we have come to learn the importance of integrating customers and some of the attributes needed in order to do so, but also the different roles customers may take. The next step is to define social media in order to see what different applications there are and how they can be utilized in relation to both the different steps of the PD process and the different roles customers may take in the very same process.

2.3.1 General Definition

The idea behind social media is not groundbreaking, though there seem to be a handful various views as to what social media really is and what should be included in the term (Kietzman, 2011, Kaplan & Haenlein, 2010, Boyd & Ellison, 2007, Dijk 1999). Kaplan and Haenlein (2010) have made a thorough literature review and a systematic categorization on social media and we will mainly use their structured definition of what social media is and what it is not. Kaplan and Haenlein (2010:61) state that *"social media is a group of Internet-based applications that build on the ideological and technological foundations of* ***Web 2.0****, and that allow the creation and exchange of* ***User Generated Content****".*

2.3.1.1 Web 2.0 & User Generated Content

According to Kaplan & Haenlein (2010), Web 2.0 is a term presented for the first time in 2004, used to describe how software developers and end-users originally began to utilize the possibilities of the web. Web 2.0 is to be seen as the platform that now facilitates content and applications which, rather than created and introduced by separate individuals, are now continuously modified in a collaborative way by all participants. If the idea of content publishing, e.g. personal web sites etc., belong to the concept of Web 1.0, applications such as blogs, wikis and collaborative projects are included under the theoretical aspects of Web 2.0. The shift from Web 1.0 to 2.0 does not address any particular technological revolutions to be based upon, but is rather bound to its conceptual ideas of collaboration, though there are several basic functionalities which are more or less related to the platform, such as Adobe Flash (method for adding animation and interactivity to web pages), RSS feeds (feed formats used to publish frequently updated content) and Java Script (allowing update of content without interfering with display and behavior of whole page). In accordance with Kaplan & Haenlein (2010), we consider Web 2.0 as the *platform* for the evolution of social media.

If Web 2.0 is to be seen as the ideological and technological foundation of social media, User Generated Content (UGC) is by Kaplan and Haenlein (2010) described as *"the sum of all ways in which people make use of social media"*. The term received broad popularity in 2005 and generally acts as a term used to address all the different forms of media content that are created and thus made publicly available by all end-users.

2.3.2 Social Media Applications

Within the general definition of social media, there are several different types of applications and concepts included under this umbrella term. But categorizing social media applications is difficult, not least due to the fact that new ones and new updated versions of existing ones with new features are

continuously being introduced. Kaplan & Haenlein (2010) provides a systematic way of categorizing currently available social media applications.

Type	Example	Description	Benefits
Collaborative Projects	Wikis, Social Bookmarking Applications	Joint and simultaneous creation of content by several end-users.	Collaborative efforts increase potential success rates, Increased importance and legitimacy for customers.
Blogs & Microblogs	Blogger, Wordpress, Twitter	Date-stamped postings, usually text-based and often targeting specific topic.	Fairly easily managed, convenient way of communicating and keeping users updated.
Content Communities	YouTube, Flickr, SlideShare	Content sharing (media) between users (e.g. photos, videos, etc.).	Usually extensive amount of users and content; efficient contact channels.
Social Networking Sites	Facebook, MySpace, LinkedIn	Enable users to connect with each other by sharing personal profiles and messaging services, sites often having different themes.	Usually extensive amount of users and content; efficient contact channels, efficient for marketing.
Virtual Social or Game Worlds	Second Life, World of Warcraft	Platforms letting users interact through personalized avatars in virtual environments.	High social interaction.

Figure 7 *- Different social media applications (Kaplan & Haenlein, 2010).*

2.3.2.1 Collaborative projects

The somewhat diffuse concept titled as collaborative projects is defined as applications that enable the joint and simultaneous creation of content by several end-users. Wikis are one type of collaborative project; a website allowing all users to add, change or remove content (generally text-based), while social bookmarking applications are another, shaped through group-based collection and rating of e.g. Internet links or media content, etc. (Kaplan & Haenlein, 2010).

As conceptual idea, collaborative projects are perhaps the type of application that most extensively characterizes UGC. Similar to the efficient market hypothesis (Fama, 1970), the main underlying idea of collaborative projects is that the collaborative effort of several actors has the potential to result in an outcome superior to what any single individual could have obtained singly. An important acknowledgement from a corporate perspective towards collaborative projects such as wikis are that the importance of this type of applications for customers is growing; i.e. more and more users utilize wikis, even as their primary source of information, and more and more users find them legitimate (Kaplan & Haenlein, 2010).

Collaborative projects do not only apply as a function towards external parties such as customers, they may also provide internal possibilities for firms, e.g. as internal wikis used to update employees on status of different projects and to for example trade ideas internally. While Nokia is a typical example of a firm which actually utilizes this type of wiki, Adobe Systems have an employee-generated collection and rating of company-related websites and conversations (Kaplan & Haenlein, 2010).

2.3.2.2 Blogs & Microblogs

Blogs are one of the earliest forms of social media; a website of date-stamped postings, either shaped as a personal diary of the author or filled with content on a specific topic. Text-based blogs are still by far the most common. A microblog, e.g. Twitter, has the same characteristics as a traditional blog but differs in that its content is typically smaller in size and is thus suited for exchange of small elements of content such as short sentences, images, or video links. A blog may be seen as the social media equivalent of a traditional personal website, but what distinguishes it from not being just that is the comment function which enables the users, i.e. readers, to interact both with each other and with the person or company who is managing the blog. The elements of interaction and feedback are critical for all types social media, blogs included. This became brutally evident for aerospace and defense company Boeing when they decided to launch their first corporate blog. The blog was designed in a manner where users were not able to comment on the content of the blog, and thus many readers perceived the Boeing blog as a scam; not more than disguised corporate advertising (Kaplan & Haenlein, 2010).

As is the case with collaborative projects, there are certain risks involved with blogs. According to Kaplan & Haenlein (2010), these risks are primarily related to the fact that blogs provide online space where both customers but also employees, if encouraged to participate in such activity, may complain or write negatively about the company if they for any reason feel disappointed with the firm; negative comments and opinions that will be visible for all other users and/or staff and which in that way may harm the reputation of the firm to a larger extent than if there were no blog available.

2.3.2.3 Content Communities

As the name implies, content communities have the main objective of enabling content sharing (media) between its users. Different content communities exist for different reason and with different focus on type of media. The most famous ones are perhaps YouTube (videos), Flickr (photos), and Slideshare (Powerpoint presentations). Putting content communities in a corporate perspective, they might impose a threat in acting as platforms where copyright-protected material might potentially be distributed. Even though the posting of copyright material is deemed illegal on most sites, this ban can be difficult to uphold if the volume of UGC is massive. But this aspect of massive amount of content and foremost amount of users is also what makes content communities attractive when acting as efficient contact channels and touchpoints for many companies (Kaplan & Haenlein, 2010).

2.3.2.4 Social Networking Sites

Social Networking sites are communities that enable its users to connect with each other by sharing personal profiles and email/instant messaging services. Social networking sites may have different themes

and information provided in personal profiles may also differ. Besides MySpace and LinkedIn, Facebook is a typical example of a social networking site, the biggest one of its kind, and presumably the single application that most people associate with the term social media. Many companies are already using social networking sites for several reasons such as to increase brand recognition and for marketing research in the setting of netnography, but are as stated more common in the marketing and commercialization processes rather than in the product development phase (Kaplan & Haenlein, 2010).

2.3.2.5 Virtual Social and Game Worlds

Virtual worlds; either purely social (e.g. Second Life) or game worlds (e.g. World of Warcraft), are platforms where users may interact through personalized avatars in virtually built three dimensional environments (Kaplan & Haenlein, 2010).

2.3.3 Potential Challenges of Social Media

In addition to the challenges related to open innovation already stated above by Kaplan & Haenlein (2010), Kärkkäinen et al. (2010) describe several aspects that constitutes challenges of using social media within the PD process. Below listed are various challenges which companies that choose to utilize social media in their product development need to deal with.

Difficult to control content. Social media efforts can result in both incorrect and negative content, which may take time before noticing and simply erasing it will not be tolerated by most customer users (Kaplan & Haenlein, 2010).

May result in generation of negative content, publicly available to all. Users may agitate each other into writing negatively about the firm and people may realize and cling on to negative aspects of a firm which they would perhaps not have thought of on their own (Kaplan & Haenlein, 2010).

Requires frequent activity. Simply creating an account is not sufficient, social media efforts requires activity in order to achieve credibility (Kaplan & Haenlein, 2010).

Lack of case evidence and an understanding of the possibilities of social media in innovation. It is difficult to implement something that a majority may not be able to visualize or understand the possibilities and benefits from. It is difficult to find applicable case evidence due to current weak utilization of social media in innovation efforts, or at least insufficient written coverage of such in theory (Kärkkäinen et al. 2010).

Difficulties in adopting new mental models and practices. Resistance to change is often substantial in most organizations, not least in combination with additionally mentioned facts such as lack of case evidence and understanding of both possibilities and gains (Kärkkäinen et al. 2010).

Security issues, e.g. with leakage of intellectual property rights (Kärkkäinen et al. 2010).

Inadequate time resources. Interacting through social media requires a high level of engagement and commitment in order to do well, one of the cornerstones of the social part of social media is to actually actively take part, and this requires substantial time resources (Kärkkäinen et al. 2010).

Inadequate personnel resources. In addition to the fact that interacting through social media requires the commitment of substantial time resources and thus also personnel resources, the personnel who takes part also ought to be well educated in how to do so and this competence may prove difficult to find (Kärkkäinen et al. 2010).

Inadequate financial resources. The fact that this activity requires both time and personnel resources, in combination with potential costs related to obtain the appropriate social media applications and the education of personnel on how to use them, may constitute a too massive pressure on financial resources needed for certain firms (Kärkkäinen et al. 2010).

Difficulties in applying current innovation process. The current innovation, i.e. the PD process is structured and optimized before the component of interacting through social media was added, and this activity may thus not fit into the current PD process of a company (Kärkkäinen et al. 2010).

Difficulties in integrating to existing information systems. As is the case with the current innovation process, inherent information and enterprise systems are optimized according to a current structure and may prove to be too rigid to add additional components such as social media (Kärkkäinen et al. 2010).

Difficulties in assessing financial value, i.e. difficulties to quantitatively measure the financial outcomes able to gain from using social media in innovation efforts (Kärkkäinen et al. 2010).

Social Media Challenges
Control of content (Kaplan & Haenlein, 2010)
Generation of negative content (Kaplan & Haenlein, 2010)
Requires frequent activity (Kaplan & Haenlein, 2010)
Lack of case evidence and understanding possibilities (Kärkkäinen et al., 2010)
Adopting new mental models and practices (Kärkkäinen et al., 2010)
Security Issues (Kärkkäinen et al., 2010)
Inadequate time resources (Kärkkäinen et al., 2010)
Inadequate personnel resources (Kärkkäinen et al., 2010)
Inadequate financial resources (Kärkkäinen et al., 2010)
Applying to current innovation process (Kärkkäinen et al., 2010)
Integrating to existing information systems (Kärkkäinen et al., 2010)
Measuring financial value (Kärkkäinen et al., 2010)

Figure 8 *- Challenges related to using social media.*

2.3.4 Potential Benefits of Social Media

As stated above; besides the general benefits of open innovation and integrating customers in a firm's PD process, there are several benefits of using social media applications to facilitate this interaction (Kaplan & Haenlein, 2010). See summarizing table below.

Benefits of Using Social Media
Social media applications are achieving increased importance and legitimacy from customers
Fairly easily managed if one is familiar with these types of applications
Convenient way of communicating and keeping users updated
Collaborative efforts increase potential success rates
Several applications are already established platforms, i.e. usually have extensive amount of users and content; efficient contact channels
High social interaction, relationship-building

Figure 9 *- Benefits of using social media (Kaplan & Haenlein, 2010).*

2.3.5 How to Use Social Media in a Business Context

Kaplan & Haenlein (2010) provides insight on certain aspects companies should take into consideration when choosing to engage with customers through social media.

- **Choose carefully**. There are a great number of social media applications available and the amount is only growing. In order to be able to keep up with the core business, most companies do not have the resources to participate and be active in all. Thus, choosing the right medium for any given purpose is crucial and largely depends on the target group to be reached since different social media applications usually attracts certain groups of people and hence companies should choose to participate in mediums where their target customers are present (Kaplan & Haenlein, 2010).

- **Pick an application or make one's own.** Make or buy decision; in some cases, it might be most suitable and beneficial to join an existing social media application and reap the benefits from its existing user base and popularity, while a firm on the other hand may be in a situation where none of the existing choices of applications are suitable and thus needs to create their own (Kaplan & Haenlein, 2010).

- **Ensure activity alignment.** When companies choose to engage in various social media applications, e.g. in order to attain the largest possible reach, it is crucial to ensure that different social media activities are all aligned with each other. Using different channels in order to reach different customers may prove to be a successful strategy, but the firm should in this case remember that one goal of communication is to

reduce ambiguity and uncertainty. Contradicting messages across different channels may result in confusion for the customers (Kaplan & Haenlein, 2010).

- Access for all. Once a company has decided to use social media applications, Kaplan & Haenlein (2010) argue that all employees ought to be able to actually access them. It might sound elementary, but should be put in the light of the fact that companies commonly block or explicitly forbid social media applications in fear of that staff might spend too much time networking instead of working. This fear is relevant even after the introduction of corporate use of social media, but Kaplan & Haenlein suggest a possible approach to deal with this issue; namely to define certain groups of employees whose primary objective is the management of corporate social media while all other staff members are treated as occasional participants.

- Nominate Gatekeepers/integrators. In addition to the above listed actions stated by Kaplan & Haenlein, one could relate the concept of gatekeepers (Brown & Eisenhardt, 1995) and integrators (Nambisan, 2002). In order to efficiently mediate and filter the information and input between the customers and the company facilitated through various social media applications, certain individuals should be nominated who take on extra responsibility of managing this particular communication. The gatekeeper/integrator should also nurture and facilitate the interaction in order to provide a feasible and positive environment for customer interaction.

2.4 Summary of Theory

We have learnt from theory that there are several benefits of having a formalized *PD process*, not least in order to be able to identify what roles customers may take when interacting with a company throughout the different stages in the PD process. The four steps up until commercialization in our general model is; (1) Idea generation, (2) Product definition, (3) Production, and (4) Validation (Cooper, 1990, Trott, 2005, Song & Montoya-Weiss, 1998). In all of these stages, it is possible to interact with customers in order to refine an idea into a successful product. Though, there are certain internal organizational requirements needed in order for a company to successfully interact with its customers, e.g. the building blocks of the *DART model*; Dialogue, Access, Risk assessment and Transparency (Prahalad & Ramaswamy, 2004).

Social media seems to be a viable tool to facilitate customer interaction, not only for commercialization and marketing purposes. The definition of social media is expressed as a group of Internet-based applications that build on the ideological and technological foundations of Web 2.0 which allow the creation and exchange of User Generated Content (Kaplan and Haenlein, 2010). Social media provides various platforms and applications, such as: Collaborative projects (e.g. Wikis), Blogs and Microblogs (e.g. Blogger, Twitter), Content communities (e.g. YouTube, Flickr), Social networking sites (e.g. Facebook, LinkedIn), and Virtual Worlds (e.g. Second Life).

Below table summarizes the benefits and challenges of customer interaction in product development in general, and with social media in particular (Nambisan, 2002, Glessner, 2012, Kärkkäinen et al., 2010, Kaplan & Haenlein, 2010).

Customer Interaction in PD		**Social Media**	
Challenges	**Benefits**	**Challenges**	**Benefits**
- Balancing input with effectiveness	- Discovering customer demands and increasing customer orientation	- Control of content & Generation of negative content	- Increased importance and legitimacy
- Customer interaction risk slowing down PD process and increase costs	- Faster, more successful technology development	- Requires frequent activity	- Convenient management of applications
- Evaluation of customer suggestions	- Increased probability of breakthrough ideas	- Lack of case evidence and understanding possibilities	- Efficient and convenient communication
- Customer minority stands for majority of activity	- Improved team productivity	- Adopting new mental models and practices	- Collaborative efforts increase potential success rates
- Management of trust and openness	- Expanded revenue opportunities	- Security Issues	- Established platforms; reaching many users
- Leakage of secret information		- Inadequate time, personnel & financial resources	- High social interaction
- Creating incentives for customer participation		- Applying to existing innovation process & information systems	
		- Measuring financial value	

Figure 10 *- Challenges and benefits related to customer interaction in product development and social media.*

As theory implies, social media seems to provide both significant challenges to overcome, and substantial benefits if executed right. Through empirical data gathering, we aim to contrast with theory and provide an understanding of how SMEs within sustainable innovation are currently operating in order to interact with customers in their PD processes; using social media or not, and how they perceive the potential and usability; i.e. in terms of challenges and benefits, of using social media as the application to facilitate this customer interaction in product development.

3. Research Methodology

This chapter aims to provide an understanding of how the research will be conducted and why the tools chosen are the most appropriate ones for this kind of study. Moreover, the chapter describes the process for how the empirics have been gathered and analyzed.

3.1 Research Strategy

For this thesis a qualitative strategy is chosen. With a qualitative strategy the data gathering is not locked into predetermined categories in which the answers have to be labeled as with a quantitative study. Thus, this study is open for data that is not expected and predetermined. By having a qualitative strategy the researchers have to interpret the responses in order to reach a holistic picture. Moreover, the research conducted will be inductive, meaning that research aim to provide understanding of the subject and perhaps a theory (Bryman and Bell, 2011).

The possible drawbacks for the thesis when choosing a qualitative study is that the results need to be interpreted and thereby there is a risk of biases from the researchers. In addition to biases it is hard to generalize the results of qualitative studies on a bigger population meaning that the results should be viewed in the context of the research (Bryman and Bell, 2011).

3.2 Research Design

The chosen research design is a multiple case study design meaning that when doing the data collection there will be a number of cases studied. In the analysis the cases will be compared and contrasted to each other to see differences and similarities. The multiple case study design is chosen since it entails the most suitable way of working for this thesis. To get a broad picture and see why and how social media is used there is a need to meet more than one organization and receive different inputs from different cases. This design is also appropriate since the thesis aims to describe a new combination of topics; therefore some breadth is needed in the cases studied (Bryman and Bell, 2011).

3.3 Research Method

The data gathering for this thesis is done through both primary and secondary empirics. The primary empirics have been gathered by using semi-structured interviews. The semi-structured interview form suits this thesis best as it is a flexible form of interview where the researchers determines specific questions in advance but still leave room for the respondents to fill in with new comments and topics. By having this type of interview, the thesis will be able to cover the researched area in a broader way; opening up for the unexpected responses to provide a more complete picture of the topic (Bryman and Bell, 2011). The overlying structure of the interviews is provided in the interview guideline in Appendix 1. Below table displays an overview of the interviews and their settings.

Company	Location	Respondent Position	Date	Type	Language
Company A	Stockholm	CEO (Founder) & CIO	2012-03-29	Face-to-Face	English
Company B	Gothenburg	Deputy CEO/Operations Manager	2012-04-02	Face-to-Face	Swedish
Company C	Gothenburg	CEO (Founder) & Key Account Manager	2012-04-03	Face-to-Face	Swedish
Company D	Gothenburg	CEO (Founder)	2012-04-12	Email	Swedish
Company E	Gothenburg	CTO	2012-04-12	Face-to-Face	Swedish
Company F	Gothenburg	R&D Manager	2012-04-23	Face-to-Face	Swedish
Company G	Gothenburg/Florida	CEO (Founder)	2012-04-23	Skype	Swedish
Company H	Gothenburg	R&D Manager	2012-04-24	Face-to-Face	Swedish

Figure 11 *– Overview of the conducted interviews and their settings.*

The interviews were conducted in Sweden during a number of weeks. The interviews took place at the office of the respondents in all cases except two; we had one interview over Skype since it was not possible to meet that person physically (Company G), and one interview was cancelled, but later answered via email instead (Company D). All interviews but one was conducted in Swedish in order to decrease language barriers. The interview with Company A was conducted in English due to the participation of the CIO who did not speak Swedish.

Secondary empirics are concerned with books, articles, documents, web pages etc. This is information someone else has written and for this thesis a literature review will be conducted where most of the secondary empirics will be gathered (Bryman and Bell, 2011). Some parts of the secondary empirics will be gathered as the research progresses and new information is found, e.g. on company websites or when the researchers are provided with documents. One example of secondary empirics used is that we before each company browsed the web for their presence on social media and also did the same afterwards to control details provided in the interview.

3.3.1 Case Selection

The interviewed companies in our study were chosen by some specific criterions. These criterions were set in accordance with the larger research project which this thesis is a part of. By having these specific criterions, the thesis becomes more focused and targets a specific group of companies, making it more likely to answer the research question in a satisfying way. We were provided contact with some of the companies through the larger research project, while some of the companies were contacted on our initiative. All of them were meeting the criterion below.

The first criteria was that the companies approached had to be doing some kind of sustainable innovation. The concept of sustainable innovation derives from the general concept of sustainability; the idea that

systems—including natural and human ones—need to be regenerative and balanced in order to last (MIT Sloan Management Review, 2011). Sustainable innovation thus means innovating towards the goal of developing more sustainable products and services. Sustainable innovation is driven by several factors, e.g. external ones such as regulations, green score cards and other sustainability metrics, media and nongovernmental organizations, climate change science, resource scarcity and consumer demand. There are several reports and studies (Ernst & Young, 2008, PwC, 2010, Kiron et al., 2011) which indicate that consumer interest in sustainable products has gained strength in recent years and those consumers have higher expectations today on companies to deliver sustainable products. There are also indicators pointing at firms engaging in sustainable innovation have to focus more extensively on a broader community involvement in their new business development processes, because the success of their new sustainable products and businesses is largely dependent on the willingness of the customers to embrace new technologies which demand changes in their own behavior related to their consciousness of sustainability issues (Beckett & Berendsen, 2010). In addition to this theory of increased customer involvement, it is also stated that the focus of customer demands in terms of sustainable products are not to provide new features, but to provide the same functionality as in existing products, but in a more sustainable way; e.g. less resources needed, being renewable, etc. (Ernst & Young, 2008).

The second criterion was that the interviewed companies had to be small and medium sized enterprises (SMEs). A SME is a company which has fewer than 250 employees and a turnover less than € 50 million (European commission, 2003). The underlying difference from larger companies is the lack of resources such as limited finances and lack of knowledge within certain areas (Gilmore et al. 2001, Carson, 1990).

3.4 Data analysis

The primary source of our data collection was the interviews; they were recorded and transcribed shortly after the interview session. The interviews were based on certain categories, see Appendix 1, and thus they were also analyzed through these categories. The categories themselves came from the theoretical framework displayed in chapter 2. When all the interviews were transcribed the respondent's answers in the different categories were compared in order to find similarities and differences, this was done through a matrix where the data were compared and assessed. The method of using categories to analyze the empirical data is described in Eisenhardt (1989). When the interviews were compared with each other, the different similarities and differences were compared with theory. The most extensive empirics, the benefits and challenges of social media, were put into a matrix with the empirics from the interviews on one side and theories on the other side as suggested by Yin (2003). This was done to make sure that the theory and empirics were thoroughly analyzed and nothing was missed out.

3.5 Research Quality

When doing a study there are many factors to take into consideration and we have considered all possible factors we could think of and acted accordingly. One major factor is the language the interviews are performed in. In all but one interview the language was Swedish which is our and the respondent's native language. This is important to consider in order to avoid misunderstandings. In one of the interviews the language was in English since the respondent had a CIO who was a non Swedish speaker. This can lead to

minor misunderstandings from both sides but we regard that interview to have high quality despite possible minor misunderstandings.

A major factor affecting the results was that as the interviews progressed, the more information we received, the better we were at interviewing smoothly and giving more and better examples. This means that the respondents in the end in some cases received more examples and a more fine tuned interview technique. This factor is affecting our results in general, less regarding the PD process but more considering benefits and challenges of customer interaction and social media.

The respondent of Company D was only available through email and thus there was no face-to-face interview performed. This have a large impact on the quality of the interview since there are limited ways of asking follow up questions and use the various gains the semi-structured interview technique provides. Although this was no optimal way of conducting the interview we still regard the results from Company D as useful in a general matter.

All the respondents have a rather high and qualified position within the company; e.g. as CEO or R&D Manager/CTO, which ensures their comprehensive insight and understanding of their PD processes and the discussed topics. This assures that we have received the best possible answers to our questions at respective company.

3.5.1 Validity

The validity is explaining if the methodology used is actually measuring what it claims to measure. Simply put, are we measuring what we are claiming to be measuring (Bryman and Bell, 2011)? This is important, since the validity states if the study as such, with results and conclusions, can be generalized and applied in other cases (Bryman and Bell, 2011). As this study is a qualitative study it may be hard to generalize it because of the small sample. Though, we consider the study to have high validity based mainly on two factors; (1) the study has a clear research question and in the end clear answers, (2) the respondents are all persons with good insight into the companies PD process and use of social media.

3.5.2 Reliability

The reliability measures if the study can be replicated by another researcher. For qualitative research is this problematic due to the fact that the settings practically cannot be exactly replicated (Bryman and Bell, 2011) and the setting for each case is unique. This study is based on a qualitative multiple case study and thus there are many variables affecting the outcome and they are likely to be impossible to replicate practically. This means that there will be differences regardless of how a new study is conducted. Though, this study has a structure presented with keywords for the literature review and an interview guideline together with a framework for analysis, all of it providing a fair reliability and considering the context we believe another researcher would receive similar results if replicating our study.

4. Results

In this chapter the gathered empirics are displayed. The chapter starts off with an overview of the interviewed companies and then moves on to a show the results by themes in order for the viewer to get a comprehensive overview of the material.

4.1 Presentation of Case Studies

Below follows a presentation of the interviewed companies. It starts off by providing background information concerning relevant metrics such as number of employees, size and characteristics of customer base, type of industry, their PD processes, etc. After the general presentation there is information regarding the company's current utilization of social media, both externally and internally, and both in general/for other purposes and more specifically in the process of product development. Some companies initially replied negatively on whether they used social media or not, but after having been asked with more specific questions and given examples, it turned out that some of them actually did use social media, though most of them to a rather minor extent and not in a way of actively interacting with customers. After the parts of current use of social media; a big part of the conducted interviews focused on the discussion of how the respondents perceive the future potential for an increased use of social media. The interviewed companies provide different views on this matter, and list both potential benefits from an increased use and significant challenges.

4.1.1 Company A

Background Information

Company A was established in early 2009, and they develop an innovative technology for solar panels. They have four intended business areas; Power plants, Automotive, Facade/Construction and Consumer Electronics, but are currently in a phase of finding and partnering up with investors as well as getting all patents in place, and hence large scale manufacturing is not yet initiated. Thus Company A do not yet have any commercialized products within any of their four business areas, but intend to initially focus on consumer electronics; and more specifically will start by developing components for chargers (e.g. for mobile phones, computers, tablets, etc.). They are currently 10 employees, and are initially intending to operate within B2B and aiming towards becoming an OEM (Original Equipment Manufacturer) for one of the larger manufacturers within consumer electronics, but do not disregard the potential of moving into B2C in the future.

The PD Process

As mentioned above, Company A is as of now in the process of seeking funds and investors to partner up with, before they are able to approach customers and business partners to sell/license their technology to (i.e. become an OEM). The respondent says this is because they possess the technology, and not the competence of how to design a final consumer product, at least not as of now.

The respondent could not give a formal, detailed and segmented overview of their PD process. The respondent claimed that this type of formal framework or structure of a PD process was not applicable to describe their process of developing their product. The respondent claimed that that is seldom the case in an entrepreneurial startup of commercializing an innovation.

Customer Interaction & Current Utilization of Social Media

As of now, Company A do only use social media to a minor extent. They initially partly used social media for finding information and trends about the industry their approaching, e.g. what customers want. The respondent says that they for example follow cleantech blogs (e.g. '*EcoFriend*'), among other sources. The respondent also claims to be a member of several cleantech groups on LinkedIn and from there extracts information about for example trends. Apart from that, Company A does not use social media in their PD process.

Company A do not use social media mainly due to two reasons; firstly because they in this initial stage only focus on collaborating with one customer/partner and thus they do not see the need for using social media. One of the major benefits or opportunities of social media and enhanced information technology in general is to facilitate the communication between a large number of users, hence the limited number of actors in a one on one partnership does not require this one of the major opportunities of social media, a phone call and a physical meeting is more plausible says the respondent of Company A.

The second reason is the security issue. Communicating through social media makes it more difficult to maintain company specific knowledge and secrets about their technology that are not yet patented, which is highly unwanted.

Challenges and Benefits of Social Media Usage

All in all, for Company A, using social media in their PD process at this stage would in their point of view constitute high security risks of their intellectual property while not giving any substantial gains. These are the major reasons why social media is not used. Though they are already having RSS feeds on their homepage with press releases and company news, but these are not focused on distributing technology development news or in any way to benefit product development. Moreover, the respondent claims that if he wants to get in contact with potential customers or to establish business relationships a physical meeting where he buys the customer a beer or two is the best way for the moment. By doing so, the respondent can receive ideas from the customer.

Company A is actually already developing the foundation of a wiki for their company, technology and upcoming products, but it will not be released until technology is fully patented and first products are developed. The respondent mentions the fact that once the wiki is online it will be in the hands of all users as "quite scary", and the respondent is quite aware that it may generate both negative and positive critique and feedback.

The respondent sees potential in using social media for product development in the future when the technology is fully patented and first products are in place. At that point, specifications of their products will be available to distribute and it will then be possible to use social media for idea generation and targeting potential customers for generating ideas of possible use of the company's technology in new product areas.

4.1.2 Company B

Background Information

Company B is operating in the construction industry with an innovative technology of how to renovate/remake pipes and whole pipe systems. Company B is developing, manufacturing and licensing a product used to execute this type of service, targeting partner companies within facility management, and is thus to be considered as a B2B company. They are 7 people working with the company, but only 3 who are actually employed at the firm. They are at this point only active on the Swedish and Finnish market, but are currently evaluating the possibilities of expanding to other European markets within the next few years.

The PD Process

Respondent says that new type of products, i.e. services, are continuously developed and areas of potential usage are being expanded. Company B's PD process is not fully formalized, but the respondent identifies three main steps; idea generation, prototype/installation execution development and testing, and the final design phase executed in conjunction with suppliers.

Customer Interaction & Current Utilization of Social Media

Company B underline the importance of good customer relationships and to get customer input in product development in order to be able to deliver products that match customer demands, but state that they do not use social media for that matter at all. The nearest they come communicating with customers digitally is their newsletter, which really is not social media since it is a one-way communication. The respondent perceives the industry and its characteristics as one major reason as to why they do not use social media and why it is not suitable for them to do so. The respondent claims that the construction industry is highly conservative; some customers are said even to be hesitant towards communicating via email. As a consequence of this, Company B does not believe that efforts within the usage of social media would result in any extensive contributions or substantial input from their customers. The respondent highlight the concern of currently not having sufficient incentives in order to get their customers to interact via social media, or extensively in their product development at all for that matter, especially since they are within B2B and the respondent claims that it is difficult to urge a buying company to interact in a selling company's PD process. The respondent believes that customer interaction and social media efforts, if initiated today, would most likely not receive any higher level of participation. The respondent instead underlines the weight of close personal contact, which he believes would be substantially reduced if interaction with customers where partly transferred to applications of social media. A similar quote to what was stated from Company A regarding physical meetings was also expressed by the respondent from Company B; *"You cannot drink beer via social media"*.

Challenges and Benefits of Social Media Usage

For Company B, the respondent do not really see any significant potential in the usage of social media in the near future, as characteristics of a conservative industry may be difficult to change over a night, but also due to minor size of company and the fact that they are working towards a limited number of customers and partner firms. To be able to realize the full potential of integrating customers through a social media application, the respondent believes that the customer base needs to be expanded.

Minor size in terms of limited personnel resources are also listed by the respondent as an important factor. The respondent claims that they already are having a hard time to keep up with crucial tasks to operate the firm, for example education of license takers on how to use their products and techniques. We then asked how the respondent perceived the potential of for example a Wiki and how that type of application might function as a solution where a company's customers (i.e. license takers), may help each other and jointly contribute to educate each other in collaboration with Company B. The respondent did not see any significant potential in this type of social media application either, and again the respondent referred to the conservative characteristics of the industry and that efforts within the usage of social media would at current stage not result in any extensive contributions or substantial input from their customers.

When questioned about how the respondent perceives potential risks inherent in the usage of social media; such as security and leakage of intellectual property issues and minor control of user generated content, either good or bad, the respondent do not perceive these two mentioned aspects as major risks or barriers as to why they have chosen not to use social media in their PD process, or at all. Instead, the respondent brings up the minor size of the company and hence their limited personnel and time resources as a contributing factor as to why they are not using social media.

4.1.3 Company C

Background Information

Company C is a B2B company operating within the industrial glass facade industry, and is actually two separate firms; one firm who holds, develops and licenses the patented technology behind the products, and one contracting firm who license the products and delivers/constructs to the customers within the construction industry. The former firm is to be seen as the main target for our study, and is the one referred to as Company C. The products and technology are to be considered as a sustainable innovation due to providing exceptional isolation and minor heat or cold penetration; factors which makes glass facades contributing to less energy consumption. Company C was founded in 2005 and has 3 employees (while the licensing firm has several more). They are active mainly on the Swedish market (and to some extent in Norway), but are looking to expand to other European markets as well as the US through licensing their technology and products to other construction firms.

The PD Process

As the small company they are, the PD process is not as formalized, at least not explicitly stated, as may be the case in larger firms or in academic theory. The respondent says that products and technologies are being continuously further developed, but rather as a consequence of adapting existing products to customer needs specific for single assignments than through internal R&D. Customers are thus foremost integrated into product development for feedback and evaluation of prototypes and drawings of new adapted products, though still underlined as a vital external resource.

Customer Interaction & Current Utilization of Social Media

The respondent from Company C answers no on the question on whether the company uses social media in any way, but then recall that they are actually members on LinkedIn. The community was joined with the objective to expand the potential customer network and to increase the knowledge and recognition

about the company, but activity has been limited. Thus Company C clearly does not use social media in their PD process, neither to attain market intelligence nor to actively integrate customers.

When asked for the main reasons as to why social media is not being used, the respondent lists the minor personnel resources as the main reason. Company C and their management prioritize other tasks that are deemed more crucial to operate the business. Secondly, the respondent underlines security issues as another aspect; explaining that despite the fact that they have patents for their technologies, copying is fairly easy; not least by companies operating in other countries and markets which are harder for Company C to control at this point when they are primarily operating on the Swedish market. The respondent believes that their industry (the construction industry) is perhaps more subject to copying than many other industries.

Challenges and Benefits of Social Media Usage

Company C is hesitant also to future potential of increased usage of social media. Though, the respondent sees some areas where applications may have potential, but is underlining the condition of in that case being able to choose applications which can be adapted to be used in their specific relations with their relatively limited number of customers. Using social media to 'reach the masses' for input, will probably not be the aim in any near future.

The respondent elaborates on the thought of increasing activity on LinkedIn and communicating with customers through that application, but rather in a network expanding effort than to be integrated in product development. What the respondent do see potential in for future integration of customers in product development is collaborative applications, e.g. for sharing of CAD drawings and specifications where customers can provide feedback and requirements for adaptations and development of products through these applications. Though as of now, the customer base is not as big or dispersed and personal contact and relationship building is currently valued higher than the potential convenience of using social media applications.

The respondent is also highly aware of and underlines the need of being truly active when engaging in the use of social media to interact with customers, an aspect also brought up in theory. Moreover, the respondent is aware that a social media application, e.g. a blog, forum or community, is something you simply set up, it needs continuous activity and follow-up, which is why respondent yet again reverts to referring to the currently insufficient personnel resources as a major barrier towards using social media.

4.1.4 Company D

Background Information

Company D is a small company with only 2 employees. They are currently developing a product that will produce electricity out of waves. The person we have spoken with is a developer of the technology and also CEO of the company. As of now they don't have any customers but in the future their customers will be rather few power production companies. The product is not out on the market yet but is being tested in smaller scale.

Customer Interaction & Current Utilization of Social Media
Company D is not currently using social media in the product development; they are using a web page and Youtube in order to display the company for potential investors. As of now the company cannot see any benefits from using social media since the product is in such an early stage of development and very technology intensive.

Challenges and Benefits of Social Media Usage
For the future potential of using social media Company D cannot see any technical benefits, meaning that they don't think they will gain from communicating with customers through social media. There are though benefits of reaching a larger group of people with social media but that is for marketing purposes.

The respondent sees no risks with using social media in the PD process. The reason of seeing no risks is because the respondent cannot see how they can use social media in product development at all.

4.1.5 Company E

Background Information
Company E is primarily a B2B company selling software and equipment for monitoring energy usage in buildings; apartment complexes and office spaces, thus they are to be considered as within the construction industry. They are mainly selling to real estate companies, who install their products and software in buildings, but also to energy companies who in turn are selling their products to other customers. The company has around 35 employees, out of which approximately 20 employees are functioning within product development. They are constantly developing new products and also refining current products on the market.

The PD Process
Since the company is relatively small they do not have a structured formalized PD process. Though, the respondent gave an example of where it all starts with an idea, it moves on to a "product council" where it is screened in relation to strategy, finance, etc. Later it moves on in the process but the steps themselves are unclear.

Customer Interaction & Current Utilization of Social Media
Company E is currently using a wiki page internally for product development and FAQ, etc. This page is not public and contains some material that is secret. Other than that they are not at present time using social media in the product development but slightly for marketing purposes such as LinkedIn and Twitter (and Facebook according to them, but there is no Facebook page to be found).

Social media is not prioritized but currently the company is trying to get feedback in general from customers for which they have an IT-system. When the customer has an idea about something he/she can visit the company's web page where there is a form (can also use email) to fill out and later sending it to the company. The suggestion receives a number and is thereby registered formally. The thought is then that the customer should get feedback on the suggestion, but this is not always the case since there is a vast amount of suggestions where many suggestions are the same. As an example, the respondent had 980 suggestions for a product he was responsible for. To sort through all of them and categorize is a very time

consuming job, moreover he claimed that ⅔ of the suggestions were actually the same as some other suggestion. So it is a lot of double work. This system is not only used for product development, it is also used in general for suggestions.

Another way of interacting with customers has been through other firms, contractors. One example is a contractor specializing user friendly layouts for customers. The latest product has a touch screen and the contractor then went out interviewing potential customers on how they wanted the layout to look and perform. In this way Company E has interacted with the customers in the product development in some way but through another connection.

Challenges and Benefits of Social Media Usage

Company E repetitively underlines the importance of involving customers in the PD process in order to be able to provide the end customers with truly user friendly products. Even though company E is not selling to the end customer they still think it's important to involve them so that the product is successful. When the respondent was presented with an example of how social media can be used in product development, the respondent was able to elaborate on potential for social media:

- Since the company is selling software it is possible to test the user friendliness over the web. This could be done through social media and save a lot of time. Social media could prove to be very time and cost efficient in this sense.
- Social media could be a solution where people can leave suggestions and other people can like or dislike the suggestion (this means that other people can vote if they think the idea is good or bad). This provides a solution to problems that some users are writing too much and spamming the current suggestion box hiding the good suggestions. With one vote per person and suggestion the top suggestions will penetrate the flood of suggestions and float to the surface.
- With social media there is a potential to choose which persons that can see and comment what things. An example could be a closed forum where only invited persons are allowed, this will probably result in a more structured approach where people think more before they write.
- There is a potential to open up a wiki page where invited persons can go in and document issues and provide suggestions on how to resolve problems with the product. This could be a living FAQ that can be altered and improved as time goes by.

Even though the respondent saw potential for using social media in product development in the future he was hesitant towards whether it would occur in the near future or later. In addition to the above mentioned benefits, the respondent also argued around potential disadvantages and challenges related to social media. The respondent addressed the following concerns;

- When using social media it is not easy to control what will happen on the internet. There is a fear of losing control over the information and the forum.
- A fear related to the one above; people may agitate each other into boosting the amount of complaints and negative postings. A real example of this is inhabitants in an area who could complain on an open forum online. Often times when one person complained, many others followed and started complaining on the same thing; a sort of a 'band wagon effect'.
- The vast amount of information that is collected may be overwhelming and thereby making it very difficult to find the good suggestions among all the 'noise'.

- The risk of not having enough traffic of content or users; a concern of how to give people sufficient and the appropriate incentives to use social media for the intended aim of developing the company's products.
- The risk of not having time to update the social media and thereby losing credibility and the trust of the users; e.g. suggestions made by users need to get feedback or else users will perceive it pointless to interact and provide content.
- The risk of developing the wrong products due to people who are yelling the loudest and the most to a larger extent get their sayings highlighted, while they might not be representative for the customer group as a whole.
- Related to the above; the risk of not reaching groups that are representative of all the customers. The selection might be biased and this is hard to control in an open forum.
- Hyped expectations; An open forum with the aim of collecting ideas and feedback may give customers the wrong expectations if they believe that all content that is posted is actually going to be implemented in future products and services. Customers need to be aware of the conditions.
- In order to get good feedback the product needs to be revealed and this might lead to undesired leakage of secret material and information on the internet, which the competitors might get a hold of.

The respondent elaborated on two possible solutions for social media in order to mitigate some of the risks; to have one fully open application where everyone would have access and the ability to comment and rate ideas, and to have one closed application only available for people with an invitation.

4.1.6 Company F

Background Information

Company F was founded in 2008 and acts within the energy industry. They develop and manufacture a certain type of engine, of which they have different models. They are currently 40 employees, whereof 7 work within product development. Their customers are mainly large energy companies or retailers (hence B2B), and they have approximately 50 customers in total.

The PD Process

Despite their relatively minor size, Company F actually has a formalized structure of their PD process called CGP; *Company Name* Gated Process, which includes the stages of idea, pre-study, preliminary design, detailed design, and industrialization (with gates/checkpoints in between each stage).

Customer Interaction & Current Utilization of Social Media

Company F claim to conduct a whole lot of business intelligence where they follow several clean tech blogs and search the web for related content, but they do not engage in any other social media applications with the aim of actively interacting with customers, not for internal use either. The respondent claims that market analysis (including customer interaction) is not and should not be a part of product development. Market analysis and customer feedback is restricted to the market/sales department, and they contribute to the initial directives given to the product development department for each development project, but market/customer input is otherwise not incorporated in the their PD process. It is thus clear that Company F do not see the gates which intersect the different steps in their PD process as

possible customer touchpoints. The respondent is very hesitant towards the concept of letting the initial development project directives be affected or altered, customer input included. The respondent calls that kind of project (that is being altered along the way) for "mission creep" and claims that the only effects that may give rise to is; a) a lengthier, and b) more expensive project. In addition to this in general hesitant stance, the respondent put forward their low number of customers as one of the major reasons why there are no major gains for them to use social media; the market department is able to facilitate customer feedback through traditional means of communication such as phone, email and physical meetings.

Challenges and Benefits of Social Media Usage

The respondent of Company F do not want to fully rule out the potential for future use of social media in product development, but is very hesitant towards it and do not think that they will use it externally in any near future. As the respondent do not believe that the number of customers which they are working with will increase heavily in the near future, neither will the potential value of using social media increase. The respondent believes that there is more value in it for companies targeted towards end-customers as they have a larger amount of customers. The only application the respondent see use for potentially integrating social media externally with customers is for monitoring performance of their products in use at customers, and perhaps integrate automatically transmitted performance metrics with customer initiated feedback, but the respondent do not really see this as using social media. Internally though, the respondent see value in using a wiki. If an internal wiki prove to work smoothly, they may try it externally with customers, but the respondent of Company F is still quite hesitant towards an external wiki and believes a sort of developer blog is more likely. As the respondent has argued quite negatively towards continuously integrating market and customer preferences in product development at all, it is by no means any surprise that the respondent is very hesitant towards using social media either.

The rather low amount of customers of Company F, and thus a perception of limited gains of using social media, is perhaps not to be seen as a challenge, but is definitely a significant reason why they do not currently use and why they do not see any major future potential for an increased use of social media.

Company F list several challenges towards using social media:

- Limited resources, not least in terms of personnel. Social media is not a priority.
- In some of Company F's markets, using social media is not even allowed.
- Industry characteristics; the respondent claims that many people employed in the industry and among their customers are of age and hesitant towards using web applications and that this may constitute a substantial barrier and hamper the potential gains of using social media.
- Not being able to control the content of e.g. a wiki, and the risk of customers writing negatively about the company.
- Certain security issues and the risk of unwanted leakage of secret company specific information regarding technology.

4.1.7 Company G

Background Information

Company G is a small company developing a product that will extract power out of waves. They are developing the buoy which floats on the surface. Currently there are 12 people developing the product both in Sweden and in the USA. They are a young company and have only developed prototypes of the product this far. Thus the company does not have a specified PD process in which they use.

Customer Interaction & Current Utilization of Social Media

Currently Company G is using a web page and a Facebook page for marketing purposes. Moreover they are following LinkedIn groups about renewable energy. They are also using SharePoint internally which is a tool that is not completely clear regarding its status as social media or not. Company G is not using any social media since they cannot see any benefits arising from it. The product being developed is not a consumer product and it consists of advanced technology making it less adaptable for change coming from customer inputs.

Challenges and Benefits of Social Media Usage

When the respondent of Company G explained his views regarding potential and challenges of social media he used examples from a group they are currently collaborating with on Chalmers but also general examples.

Future Potential:

- The respondent believes that social media has a potential for the future since it is an easy way of communicating with many people at the same time.
- There are possibilities to find persons with expert knowledge within a certain field when using social media.
- There are possibilities to use closed forums on social media which might prevent some challenges regarding for example risks of information leakages.
- The respondent said that social media applications are time effective and therefore suitable for SME's. It is not the size of the SME that is the limiting factor; it is more likely to be the product and the number of customers that is limiting if social media is viable way of communication. Therefore the respondent sees a potential for SME's to use social media just because they have limited resources. Especially in the future when younger generations enter the companies, they are much more used to social media and also faster around the different applications.

Challenges of using social media:

- Social media is probably more suitable for companies who are selling to end customers directly, B2C, and therefore it is a challenge for companies similar to company G to utilize it in a greater extent.
- Another current challenge perceived by the respondent is the age difference correlated with computer usage. The younger generations has an easier way of utilizing social media and for the older generation it is harder since they are not as used to computers as the younger generation. The respondent means that this might be an inhibiting factor for social media usage.

- Regarding security there might be difficulties, the respondent doesn't want to let sensitive information end up on the internet. He would prefer using closed forums of different sorts in order to limit the risk of information leakages.

4.1.8 Company H

Background Information

Company H is around 10 years old and was started in order to finance additional research on a substance which significantly increases the performance of anti-fouling paint (paint for the bottom of boats). Currently the company is moving towards a commercialization of the substance but the process of getting the necessary approvals from authorities has so far been going on for several years and is still not completed. Though different markets have different rules and it is possible that the substance might be approved in Asia within one year. To keep the patents on the substance is not that important since the regulations on the pesticides market within EU is longer lasting than patents, making them stronger.

The company can sell the product to both privately owned boats and to commercial ships but they have chose to license the substance to another company which in turn will sell to the private market while themselves are selling to the commercial market. This means that they are a B2B company with a few large customers.

The PD Process

Company H has currently 4 employees which are all working with product development in some sense but since the company is very small the tasks are very varied for all the employees. The same reason about the small company applies to the PD process which is not formalized in any way. The respondent explained that there are so many tasks that need to be done that it is not possible to have a formalized process for product development. Although no formal PD process the customers are involved in the product development to a minor extent when it comes to working environment issues concerning packaging and transport of the substance. This customer involvement is done through meetings or seldom via telephone, i.e. approximately twice per year.

Customer Interaction & Current Utilization of Social Media

Company H is not using social media at present time. They have a web page that is updated in order to have a presence on the internet. They are also using a form of business intelligence where a supplier has given them a tool which searches and provides the company with everything new on the internet with specific keywords in them. The keywords may be everything from the company name or the name of the substance etc. Company H states that they are not using social media due to their relatively small size in combination with few customers. In addition to these reasons the company cannot see that they would alter their product in any way since it is an extremely specialized chemical.

Challenges and Benefits of Social Media Usage

Company H can see a potential of using social media if they would have many more customers, i.e. if they are themselves targeting the private market that is changing focus to B2C instead of B2B. But since they are currently focusing on B2B with a few large customers they cannot see any usage of social media in product development. An additional factor for not using social media in general or even web based tools is that people like to meet in person, to sit down and have a physical meeting.

4.2 Summary of Results

	Industry	No. of Employees	No. of Customers	B2B/B2C	Involving Customers in PD	Using Social Media in PD	Application	Using Social Media for Marketing	Application	Future Potential
A	Consumer Electronics, Construction, Automotive	10	2-3 for each segment	B2B	No	Minor extent (mainly market intelligence)	Linkedin, Youtube, Blogs, Wikis	Will do when patents are secured	Wikipage	Yes, primarily idea generation
B	Construction	7	3	B2B	Yes	No	-	Yes	Youtube	Minor
C	Construction	3	Few	B2B	Yes	No	-	No	-	Minor
D	Wave Energy	4	No commercial products	B2B	No	No	-	No	-	No
E	Construction /Energy Monitoring Software	35	Approx. 300	Mainly B2B	Yes	Minor extent (mainly market intelligence)	Linkedin, Feedback tool	Yes	Twitter Facebook	Yes, both for ideas and testing
F	Solar Energy/Engine	40	Approx. 50	B2B	No	No	-	Minor extent	Youtube	Minor, primarily internal use
G	Wave Energy	12	No commercial products	B2B	No	No	-	Yes	Facebook	Yes
H	Anti-Fouling	4	Approx. 5	B2B	No	No	-	No	-	No

Figure 12 *- Summary of results.*

5. Analysis

This chapter contains our analysis of the gathered empirical data in terms of current utilization of social media, perceived barriers and challenges, and future potential and benefits - contrasted with the previously presented theoretical frameworks.

When analyzing the collected empirical findings, one must bear in mind the context and setting in which the interviewed companies are figuring in. The industries in which some of them operate in, the companies' often modest age, the fact that they are all within B2B, and particularly their size and resources; are factors which need to be taken into account when assessing the gathered data. Thus a large part of our analysis and conclusions drawn are specific to the setting and to these actual cases, while some conclusions are applicable to the potential for social media usage in product development in general.

As the empirical result displays, the fact that most of the companies are not using social media to any larger extent, the analysis will to a large extent focus on the challenges related to using social media since this is what has been most extensively discussed by the respondents. It would have been surprising if the respondents claimed they did not use social media; but in fact listed more benefits than challenges related to social media usage.

5.1 The PD process and the Current Utilization of Social Media

Among the eight case studies we have conducted, there are only two companies (Company E & F), who are using a somewhat structured PD process. The respondent at Company B could mention a few general steps but their process was not formalized. Understanding the different steps in the PD process is vital in order to understand how and when customers can contribute, because customers may take different roles depending on the different stages in a PD process (Nambisan, 2002); explicitly formalized or not. Despite the different advantages of having a structured PD process, the result itself; that few companies have a structured process, is not surprising considering that our respondents are SMEs with limited resources and a limited customer base. According to our respondents, the size of SMEs and their limited resources make these companies disinclined towards structuring their PD processes. Some of the respondents said that as a result of their limited resources, they are focusing on doing what has to be done at the moment, and to work with a structured PD process is not feasible, it takes too much time and limited resources implies acting beyond rigid structures.

Company E has a process with similarities to the general PD process presented in theory. In their PD process, it is possible to interact with customers, which is also done via a suggestion box that is frequently used by customers. The suggestion box is used within almost all the steps of the PD process. According to the respondent at Company E, the view of the customer is taken into account throughout the development and also after the commercialization phase of a product. Company F also has a well structured process. The processes described by these two companies are similar to the general PD process described in chapter 2. Company F has a process which is strictly formalized and according to the respondent at Company F, it is not appropriate to include the customer in the process. There is one exception according

to the respondent at Company F; if the customers are to be integrated, it should be in the very beginning stage where market input is one of the factors that influence the specifications and initial path of a project.

> *"Market analysis is, and should not, be a part of product development logic"*
>
> (Respondent, Company F)

Since all the interviewed companies, except company F, somehow have contact with their customers during the PD process, even though a majority of them do not actively integrate their customers in the actual phases of the process. Thus, they do have customer touchpoints in various ways, i.e. workshops, educations, informal meetings, etc. As of now, these touchpoints are to a major extent established through either personal meetings or via phone and email. When discussing which roles the customers can take in the PD process, the respondents mentioned the opportunity of using the customers as a resource for idea input and also as testers of products. Throughout the PD process, the customer roles will change (Nambisan, 2002) and this is not something the interviewed companies are extensively considering. What roles customers take rather seems to come natural; i.e. when ideas are generated, customers can act as a resource and when the product is manufactured, customers can act as testers.

When looking at the current utilization of social media as a tool in the PD process, we can conclude that it is to be considered as almost non-existent. Most companies do not use social media at all, neither for marketing purposes. We have seen a few examples where companies follow blogs and/or are member of certain groups on LinkedIn focused towards their area of green tech/sustainable innovation, but this is mainly carried out in order to get updates on market trends and the latest buzz rather than actively interacting with customers. Some companies are also using LinkedIn to extend their network among customers and potential customers, but it is thus rather used as just a networking tool than an active application in the PD process. In addition, we can see a connection between the fact that the respondents are SMEs with limited resources and the fact that they generally have a rather low amount of customers. The respondents claim that they have to prioritize strictly and therefore are not having the resources to use social media in product development since there are other tasks considered more important that need to be done. Though, there are companies that involve customers in the PD process, but it is often not well structured in accordance to specific outspoken stages of the PD process. Another major argument for not using social media is the low amount of customers; with whom communication instead can be facilitated through more relationship building means such as by phone and physical meetings. All companies but one have less than 12 customers, which leads to not being able to realize one of the major benefits of social media; convenient and efficient communication with a large amount of people. This challenge toward using social media will be discussed further below.

In theory, it is stated that the potential for integrating customers and the roles customers can take may vary and are dependent on where; i.e. what stage, in the PD process a project currently is (Nambisan, 2002). When analyzing the empirical results, we are unable to confirm or definitely conclude on where potential for customer interaction is greatest, since most of the interviewed companies do not have a formalized PD process. Though, from the discussions with the respondents, it seems like the general view is that the greatest potential of customer interaction in product development is for generating ideas and confirming specifications in the initial stages. This interaction is, as already stated multiple times, in general facilitated through traditional means such as phone, email and physical meetings.

As the companies do not use social media to any greater extent, we will below explain the different expressed reasons as to why the utilization is this low; first with challenges of customer interaction, and later more specifically; challenges of using social media. Further down, we are contrasting with potential benefits of using social media; both from theory and empirics.

5.2 Challenges Related to Customer Interaction in Product Development

Challenges of customer interaction and social media are not mutually exclusive, but we have tried to separate them as they are explained differently in theory and there seem to be somewhat different attitudes among the respondents towards customer interaction as concept and social media as the tool (which will be examined further in chapter 5.3). Below table 5.1 displays the challenges found in theory related to customer interaction, and which of the interviewed companies who confirm these challenges.

Challenges Related to Interacting with Customers in Product Development	**Described in Theory**	**Confirmed Empirically**
5.2.1 Balancing input with effectiveness (Nambisan, 2002)	Massive amount of customer input might decrease efficiency.	Company E, F
5.2.2 Integration of customers in PD Risks Slowing Down Process and Increase Costs (Nambisan, 2002)	Customer interaction efforts need to be integrated with existing practices in order to handle continuous external feedback.	Company F
5.2.3 Evaluation of customer suggestions (Nambisan, 2002)	Need proper evaluation structures to highlight the right ideas and feedback.	Company E
5.2.4 Customer minority stands for majority of activity (Nambisan, 2002)	Not reaching the right people and suggestions from minority might lead development in wrong direction.	Company E
5.2.5 Management of trust and openness (Nambisan, 2002, and Prahalad & Ramaswamy, 2004)	Needs to be managed in order to create mutual trust and match company/customer expectations.	Company A, E
5.2.6 Leakage of secret information (Nambisan, 2002, and Glessner, 2012)	Competitors may get hold of company secret information.	Company A, C, E, F, G
5.2.7 Creating incentives for customer participation (Nambisan, 2002)	Fear of low customer participation; need to have the right incentives in place.	Company B, E

***Figure 13** - Comparison between challenges related to customer interaction in product development stated in theory and confirmed empirically.*

5.2.1 Balancing Input with Effectiveness

When using social media, the definition itself implies that there are many people that have the opportunity to provide information and contribute with content. In some cases, this opportunity has proven to be a

daunting task for the companies to manage since there are vast amounts of information being posted. Company E has a suggestion box system, which is not to be categorized as social media, but the implications of balancing the amount of input with effectiveness are similar to the ones stated in theory (Nambisan, 2002). In this system there are many suggestions being posted and to sort out the 'good' suggestions is claimed to be very difficult. The amount of information is so vast that it takes a lot of time to get an overview and to perform the selection of which ones to investigate further and which to discard. The respondent of Company E claim that the solution could be a forum where people can leave suggestions and other people can like or dislike the suggestion (this means that other people can vote if they think the idea is good or bad). This type of voting system will help to penetrate the flood of suggestions and highlight the sharpest ones. The suggestion is very similar to the 'My Starbucks Idea' community; Starbucks' social media initiative for customer co-creation.

5.2.2 Integration of Customers in PD Risks Slowing Down Process and Increase Costs

By interacting with customers, there is a risk that the PD process is slowed down and thereby the costs might increase. Irrespective of the amount of customer input; when having customer input throughout the process at multiple touchpoints, there is a risk that the process will change direction several times. This was the main argument from the respondent at Company F as to why they did not include customers in their process (which they call "mission creep"). Company F claims that when involving the customer in the product development, the process will progress in a very low pace and cost significantly more. This is somewhat related to what Nambisan (2002) states when saying that the process will be altered when involving the customers and it is likely that it will be performed slower. Though, Glessner (2012) and Kärkkäinen et al. (2010) state that the PD process can be performed in a faster pace if customers are involved, thus these theories disagree on this point. Both Company E and F are concerned about the risk of slowing down the P D process, although Company E believes that there are ways to manage the problem, e.g. through social media. Why Company E believes the challenge to be manageable is related to their product which is a software and thus easy to test over the web.

5.2.3 Evaluation of Customer Suggestions

When the suggestions from customers have reached the firm it is important to have structures making it easy to process and evaluate the information. This is important because of two factors. Firstly, the company needs to evaluate the suggestions in an efficient way to be sure that they are separating what is useful from what is not. Secondly, according to Nambisan (2002), customers need to know how the information is being processed in order for them to feel that they are being evaluated seriously and thus will contribute again in the future. Otherwise the trust for the process from the customer side may be ruined and all the work with implementing customers in the PD process was for nothing. This challenge was stated by Company E but by no others. The respondent at Company E claimed, as the theory stated, that the customers want to know how the information is processed. The fact that the other companies did not state this challenge is not surprising since most do not use customer interaction actively and to any larger extent in their PD processes, and thus they have not yet really faced the challenge.

5.2.4 Customer Minority Stands for Majority of Activity

Regardless of how many customers the firm is interacting with, there are inevitably some people that are more active and provide a majority of the input and suggestions. The difficulty with this group is that they may not be representative for the entire population of customers and thus they may lead the PD process in the wrong direction (Nambisan, 2002). Company E expressed this as an issue that needs to be taken into consideration. There is no easy solution as to how a company can be sure of that they have a representative customer group from which they receive suggestions, but by having a large group of customers and taking into account of all the suggestions, this challenge can be somewhat averted. Moreover, a company may list the best suggestions and arrange votings among them in order to verify that a large amount of the total customer group supports them. Even if the majority of the companies we interviewed did not express this challenge, it is still important for them to be aware of the fact that just because they get suggestions from some participants, this may not be representative for the larger population.

5.2.5 Management of Trust and Openness

Whenever customers are participating in the PD process in any way, a company needs to establish and nurture mutual trust and openness with their customers; and to clearly communicate conditions of interaction in order for all actors involved to have the same expectations (Prahalad & Ramaswamy, 2004). Despite the possibility of all customers having the ability to provide input, it is far from certain that all posted suggestions will be implemented (Nambisan, 2002). The respondent of Company E highlighted this matter; when customers are not given feedback on their suggestions, they may get disappointed or feel as they are not listened to. Communication is once again an important factor and in this case it is vital that all the participants know what the rules and expectations of customer interaction process are. If the rules are not set and there is a divergence between what the customer gives and receives, the trust towards the company will deteriorate.

"Some customers believe that they will get all their suggestions implemented. Although in reality, many of the customers know nothing about the technology behind the product!"

(Respondent, Company E)

5.2.6 Leakage of Secret Information

The single most anticipated challenge of customer interaction among the interviewed companies is the potential leakage of secret information; both intellectual property and more informal strategies on further intended development paths. Company A underlined the ambition to fly under the radar as long as possible, and a majority of the interviewed companies take a rather hesitant stance towards sharing too much information related to product development. Copying is relatively easy according to the respondents; even if there are patents, there are different ways to a more or lesser extent copy ideas. This concern is highly related to the theories of Prahalad & Ramaswamy (2004) and their DART-model; where Access and Transparency are central building blocks in order to be able to co-create with customers. In order to communicate with the customers they must be given Access to information and a platform to facilitate dialogue (more specific concerns regarding social media platforms are assessed further below

under chapter 5.3). The tricky parts relates to the Risks and Transparency. In order for companies to be credible and reap the rewards of co-creation it is important to let the customers receive information and be aware of the risks of revealing this information. Though, this is not easy for the company and according to Prahalad & Ramaswamy (2004) some companies uses a policy that if they are in doubt they should disclose the information. Also Nambisan (2002) discusses the risk of having too much transparency and thereby risking losing information through customer interaction.

5.2.7 Creating Incentives for Customer Participation

A crucial aspect of using social media within product development is that the customers need to have incentives to provide information to the company. Company B and E was the only companies mentioning incentives as an aspect to consider when implementing customer interaction and social media usage. Relating the question of incentives to the aspect of B2B; Company B claims that it is difficult to urge a buying company to interact in a selling company's PD process. As we see it, the question then becomes whether a company is able to interact with the end consumer instead, as even a B2B company selling to other companies cannot fully neglect the demands of the end consumers. But to what extent does the end consumer care about a firm that might be several steps upstream in the value chain? This can be exemplified by a company which is making products that are to be comprised as components in other products. How much do end consumers care about a specific component? Can customers be given sufficient incentives in order for them to provide input on one of many components in an end product which comprise a vast amount of parts?

In theory, Nambisan (2002) states several incentives for customers to participate including increased knowledge, access to products earlier than the rest of the market, etc., which also ought to be applicable for companies buying from other companies, as is the case within B2B. We can conclude that creating the right incentives for customer participation is perceived as a challenge by two of the interviewed companies (B and E), though as we have not interviewed any of the respondents' customers, we cannot conclude on whether this issue is something that is perceived and thus concerned as a barrier also from their point of view.

5.3 Challenges Related to Social Media

Our case studies show that the interviewed companies do not use social media to any larger extent at all, neither in commercialization purposes nor in product development. Below listed are the main challenges related to social media, gathered both from theory and empirics. The challenges are numbered according to the headings in order to make it easy to find them in the following text.

Social Media Challenges	Described in Theory/Empirically	Confirmed Empirically
5.3.1 Control of content (Kaplan & Haenlein, 2010)	Can result in both incorrect and negative content, which cannot simply be erased.	Company A, E, F
5.3.1 Generation of negative content (Kaplan & Haenlein, 2010)	Users may agitate each other into writing negatively.	Company A, E, F
5.3.2 Requires frequent activity (Kaplan & Haenlein, 2010)	Requires activity in order to achieve credibility.	Company B, E, F
5.3.3 Lack of case evidence and understanding possibilities (Kärkkäinen et al., 2010)	Difficult to find applicable case evidence due to current weak utilization.	Company E
5.3.3 Adopting new mental models and practices (Kärkkäinen et al., 2010)	Resistance to change is often substantial in most organizations.	- (Not explicitly expressed, but assumed in several cases)
5.3.4 Security Issues (Kärkkäinen et al., 2010)	Leakage of secret company information and intellectual property rights.	Company A, C, E, F, G
5.3.5 Inadequate time resources (Kärkkäinen et al., 2010)	Requires a high level of engagement and commitment.	Company B, C, E, F, H
5.3.5 Inadequate personnel resources (Kärkkäinen et al., 2010)	Requires commitment of educated personnel resources.	Company B, C, E, F, H
5.3.5 Inadequate financial resources (Kärkkäinen et al., 2010)	Requires time and personnel resources, education and potentially paying for applications.	- (Not explicitly expressed, but related to inadequate time and personnel resources)
5.3.6 Apply to current innovation process (Kärkkäinen et al., 2010)	Current PD process is structured and optimized before adding social media, may not fit.	-
5.3.6 Integrate into existing information systems (Kärkkäinen et al., 2010)	Information and enterprise systems are optimized before adding social media, may not fit.	-
5.3.7 Measuring financial value (Kärkkäinen et al., 2010)	Difficulties to quantitatively measure the financial outcomes.	- (Not explicitly expressed in terms of assessing financial gains, but as realizing gains in general. See below)
5.3.8 Realizing gains, due to low amount of customers (not stated in theory)	See no significant gains of using social media due to too few customers; physical meetings are manageable.	Company A, B, C, F, G, H
5.3.9 Power of physical meetings (not stated in theory)	Social media is less relationship-building than phone calls and physical meetings.	Company A, B, H

Figure 14 *- Comparison between challenges related to social media stated in theory and confirmed empirically.*

5.3.1 Control of Content & Generation of Negative Content

For Company E who was the one who saw largest potential in using social media, lack of control was perceived as one of the most challenging factors. Lack of control was put in two dimensions; both in terms of controlling and evaluating the mass of content; being able to distinguish the really good ideas from all the noise, but also lack of control in terms of the potential outburst of negative critique and people agitating each other. Also Company A and F stated that lack of control is a challenge for using social media.

> *"We don't want people to agitate each other into massive whining"*
>
> (Respondent, Company E)

This shows the fear that may exist among companies of letting go of a certain extent of control and provide a more or less publicly visible application where positive but also negative critique may be posted and where users may agitate each other. This concern is highly related to the aspects of the DART-model (Prahalad & Ramaswamy, 2004) and to what level a company can and wants to integrate its customers in terms of access and transparency.

Another risk stated by Kaplan & Haenlein (2010) is the fact that customers may see negative comments about a company on social media platforms, which they might not would have thought of individually, and consequently following up on that critique. This challenge was discussed by company E, where the respondent claims to have witnessed a bandwagon effect of customer claims. It is hard to manage this problem if a company simultaneously wants their customers to interact. This is not specifically related to social media, but it is most visible on social media forums where comments can be accessed and viewed for a long time. The most effective cure according to theory is to meet negative comments and allegations in an early stage and thereby provide a solution to possible problems or comments (Kaplan & Haenlein, 2010). The company cannot simply delete the comment because the effects of this action may be accusations of censorship. If something negative is written, it is not just for the company to delete. If this is done the customers may be angry and complain about censorship. This is confirmed by Company A, E and F who all were afraid of losing control over the content and also in theory by Kaplan & Haenlein (2010).

5.3.2 Requires Frequent Activity

In order to be credible as a user on social media, frequent activity is mandatory. According to Company B, E and F, there is a need to show that the company is working actively and it is vital to update the different channels. This is in line with what Kaplan & Haenlein (2010) states about social media usage; customers will see through the facade if a company does not update their social media channels frequently. In order to have frequent updates, a company thus needs to allocate resources to this purpose, which might prove difficult for SMEs since they generally have limited resources (further discussed below). While it is indeed truly important to be active, quantity needs to be matched with quality and it is important to post qualitative messages in order to reach trust (Kaplan & Haenlein, 2010).

5.3.3 Lack of Case Evidence & Adopting New Mental Models and Practices

When initiating something new and unfamiliar, the easiest way is to look at someone else who has already done it and analyze their practice. This is applicable also to social media usage within product development, where the lack of case evidence is a challenge according to Kärkkäinen et al. (2010). Company E expressed such a concern and underlined the desire to have good case examples of best practices regarding social media usage in product development.

When Company E highlighted the need to have the appropriate mechanisms in place in order for a social media application to function properly; e.g. being able to extract the good and constructive feedback from all the noise, we explained a case example. The case example described a company who has established an idea generation community that has an internal rating system among its users which in a sort of self-controlling way highlights the most popular ideas. The respondent expressed a sincere interest in these types of mechanisms and consequently saw substantially higher potential in using this type of social media application. This explicitly shows how the lack of case evidence seem to be a significant barrier towards how many companies perceive the potential for using social media in their product development.

5.3.4 Security Issues

The challenge of security issues related to social media is highly related to the customer interaction challenge of leakage of secret information, but security issues related to social media are more concerned with the fact that information, company intelligence and discussions with customers are inevitably codified (needed in order to be able to share it), and made available via a social media platform on the web. This challenge is confirmed and highlighted by the same five companies (Company A, C, E, F and G) as also expressed the concern for the risk of leakage of secret information related to the concept of customer interaction in general (even though the demarcation is somewhat fuzzy between these two challenges).

"We try to fly below the radar for as long as possible, because when we go public; we will have some revolutionary patents that will really change the market."

(Respondent, Company A)

Despite being informed with the possibilities of having a closed social media platform for certain invited customers, there seem to be a fear among these companies to publish via social media the specific type of information needed to be able to take part in product development. This concern might be augmented by the level of knowledge the interviewed companies possess about the possibilities of social media, which seem somewhat limited. The respondent's fear of leakage of codified information is in line with Nambisan's (2002) discussion regarding how much transparency a company should provide for customers. There is always a risk that competitors can gain knowledge when information is codified and made accessible online.

For some of the interviewed companies, all patents were at this point not in place, and hence the desire not to risk to spread information on their current product development is strong. In terms of security issues, conclusions on the usage of social media in the PD process can be drawn both on a general level and more specifically to SMEs. Although increased emphasis on customer interaction; the general nature

of the PD process as such is often highly company specific and comprise content not desirable to communicate too openly. This is a concern, especially if the actual products are very technology intensive; leakage of information on intellectual property is never desirable. Why this is an even bigger concern for SMEs, explicitly expressed by e.g. Company A, is yet again their minor size and lack of resources, which in turn results in limited possibilities to defend intellectual property and the copying of it towards bigger corporations backed up by massive resources. Although information leakage is never desirable, it is sometimes necessary to open up the company in order to establish and nurture the required trust between a company and its customers, as discussed by Prahalad & Ramaswamy (2004). Customers need to be given access and the company must be transparent in order to establish trust. This will inevitably involve certain risks and social media augments this risk since content needs to be codified and is thus more easily spread.

5.3.5 Inadequate Time, Personnel and Financial Resources

The current low utilization of social media seems to be mainly ascribable to the minor size of the interviewed companies and their limited resources, where lack of personnel resources and consequently lack of time resources are claimed to be the major barriers. Many of the companies (B, C, E, F, H) have acknowledged this challenge as a major inhibitor. These two barriers have their foundation in the lack of financial resources that many firms have, especially SMEs. For a company with less than 10 employees, which is the case for several of the interviewed companies, this seems to be a quite understandable reasoning. Stated in theory and discussed above, one of the premises from a corporate perspective of using social media is to be active, otherwise the effort can turn counterproductive if customers realize that a company's existence in social media applications is limited to solely have been created and not continuously managed. Viewed in the light of this fact, interacting through social media surely requires quite substantial time resources spent; a fact that some of the interviewed companies show awareness of and which is thus referred to as a major reason to why social media is currently not actively used.

In contrast to both theoretical (Kärkkäinen et al., 2010) and empirical (Company B, C, E, F, H) statements pointing at social media as highly resource consuming, Nambisan (2002) states in his theory that customers can be utilized as a resource in the PD process. One might believe that for an SME with limited resources, being able to utilize external resources ought to be of high interest. The reason for this not being extensively emphasized by our respondents might be that limited resources imply different ways of prioritization as actions in SMEs have more of firefighting characteristics than in bigger and more formalized organization structures. Even though social media might have the potential of being a quite efficient tool in order to interact with customers throughout the PD process, setting up a new way of working implies a start-up phase where a lot of resources is required, and this resource cache might not be available or deemed possible to spare in an SME.

5.3.6 Applying to Current Innovation Process & Integrate into Existing Information Systems

As described by Kärkkäinen et al. (2010), these challenges imply that the structures of both PD/innovation processes and information systems are set when implementing these systems and in many

cases, these structures are quite rigid. Hence, it may be hard to implement new applications, e.g. social media, in already existing processes and systems; the process and system can simply not handle the adding of these applications into existing infrastructure. Though, since almost none of our companies worked according to structured PD processes, and one (Company F) of these two firms who had (Company E and F) a structured PD process did not desire interaction with customers throughout the process, this challenge is not verified or discussed empirically to any larger extent. Moreover, the non-verification of these challenges may be due to the fact that they are dealing with implementing and applying social media, and hence a firm would perhaps not reflect over these issues before actually having tried to implement social media in these processes mentioned.

5.3.7 Measuring Financial Value

As in all business, it is important to measure the financial value of all different tasks being executed. This challenge is stated by Kärkkäinen et al. (2010) but was not explicitly mentioned by the respondents. Even though not explicitly expressed, we think it was implicitly comprised in the statements of some of the respondents when they could not assess or measure the value out of using social media. We deem this challenge to be rather significant; if a company cannot identify the value (particularly financial value) from using social media, then what would their incentives to use it be? Naturally, there might be other values (see below, 5.3.8) that are to be gained, but we believe that it is utterly important from a corporate perspective to be able to measure the monetary outcomes of an activity.

5.3.8 Realizing Gains, Due to Low Amount of Customers

While the above challenge 5.3.7 describes the difficulty in measuring gains and financial values that may exist but might be difficult to quantitatively measure, this challenge implies that potential gains may not exist in all cases. Due to certain factors, e.g. company size and size of customer base, might result in difficulties to realize certain gains described in theory, despite the fact that one might be able to conceptually identify and understand them. The minor customer base in terms of quantity seem to be a component which leads the interviewed companies into reasoning that the potential of using social media is limited for them, since one of the major advantages of social media is to facilitate the collaboration and exchange of content between a large number of users. As previously stated, all companies but one has less than 12 customers. For a company with only a few customers, interaction by phone and physical meetings are manageable and results in higher personal interaction and relationship-building; factors which several of the interviewed companies state as highly important and fear to lose if instead using social media. Then the same results of customer interaction could be achieved with old tools instead of learning how to use the new tool social media.

"For us, it is more personal approach instead of using social media. I think social media is better for reaching masses. It is better for us to achieve personal contact"

(Respondent, Company A)

Without being able to statistically conclude on the matter, true for our case studies are that there seem to be a rather strong correlation between a company's number of customers and their perception of potential for using social media in product development. With customers is meant the customers that the company

can get in contact with, even if they are B2B they sometimes have access to the end customer which can be many more than the actual B2B customers. So if a company can interact with the end customers the number of customers rises significantly.

5.3.9 Power of Physical Meetings

Company A, B and H emphasized that physical meetings is very important in their businesses. They argued that it is a consequence of the simple reason that people like to meet and talk to each other under relaxed forms. Company A and B explicitly mentioned the importance of being able to drink beer and socialize with business partners in order to establish and nurture good and long-lasting relationships. Also Company H confirmed this opinion.

"I use the old fashioned way; I pick up the phone and have a meeting. I give them some beers and then they talk"

(Respondent, Company A)

"You cannot drink beer via social media"

(Respondent, Company B)

Social media can of obvious reasons not provide a physical meeting in the sense that people can sit down together to talking and/or drink. When using social media, there is a certain perceived distance between the parties involved, not only geographical. This challenge is a natural cause of the possibilities of social media where the technology provides a tool to interact and communicate conveniently across far distances via a web platform. Perhaps, one way of communicating must not rule out the other and hopefully it is possible for companies to overcome the perceived distance by combining physical meetings with the contacts most important for their businesses, combined with social media usage to increase interaction with these contacts even further, but also in order to reach the contacts which they would normally not meet physically either.

5.4 Benefits Related to Customer Interaction in PD

Our empirically gathered data show low confirmation of the existing literature described benefits related to customer interaction. Below listed are the main benefits related to customer interaction, gathered both from theory and empirics.

Benefits of Customer Interaction in PD	Described in Theory	Confirmed by Companies
5.4.1 Discovering customer demands (Kärkkäinen et al. 2010)	Increased customer input and customer orientation.	Company A, B, C, E
5.4.2 Faster, more successful technology development (Kärkkäinen et al. 2010, and Glessner, 2012)	Leverage from solutions from other industries and speeding organizational learning.	Company E (product testing)
5.4.3 Increased probability of breakthrough ideas (Glessner, 2012)	Expanding talent pool with external resources.	Company A, E
5.4.4 Improved team productivity (Kärkkäinen et al. 2010, and Glessner, 2012)	Nurture innovation activities and motivating technical talents through external input.	-
5.4.5 Expanded revenue opportunities (Kärkkäinen et al. 2010, and Glessner, 2012)	External relationships may transform into additional revenue streams (e.g. licensing, joint ventures, spin-offs).	-

***Figure 15** - Comparison between benefits related to customer interaction in product development stated in theory and confirmed empirically.*

As can be seen in the above table, there is a rather low confirmation of the in literature stated benefits related to customer interaction. Low level of empirical confirmation when compared with theory might be a result of the fact that literature takes all aspects and possibilities of customer interaction (i.e. reaching out to various external actors; e.g. customers, suppliers, experts, competitors, etc.) into consideration, while our research focus on customer interaction. Thus the potential and benefits perceived by the interviewed companies might be smaller compared to how this area is described in existing literature.

5.4.1 Discovering Customer Demands

Customer interaction may enable companies to discover new customer demands simply by communicating with their customers. Although it might be very beneficial for companies to do this; only Company A and E explicitly expressed this as a benefit for their company. The other companies may see this potential as too obvious and were therefore not mentioning it. Another factor might be that the companies interviewed develop products so specialized and technically complex that they are not suitable for customer suggestions. This hypothesis may correlate with the low usage of social media, which is prevalent.

5.4.2 Faster, More Successful Technology Development

In contrast to the theories of Nambisan (2002), Kärkkäinen et al. (2010) and Glessner (2012) claim that customer interaction gives the benefit of being able to speed up the PD process and simultaneously being more accurate. This could naturally be highly beneficial for companies, but in our study, only Company E confirmed this perceived benefit. The respondent of Company E claimed that since they are somewhat close to the end customers, they are able to get access to them and are thus able to have more efficient trials of their product; in turn speeding up their PD process. Since none of the other respondent mentioned this benefit, it seems like they are not aware of what is to be gained or that they have products with which it is not extensively applicable for customer interaction aiming at increasing the speed of the PD process.

5.4.3 Increased Probability of Breakthrough Ideas

Even if a company's internal R&D department may be talented and efficient in terms of coming up with ideas, there are people outside the company who also generate smart ideas and valuable input. By opening up the innovation process, a company may bring in external resources that might increase the number of breakthrough ideas (Glessner, 2012). Company A and E confirmed this benefit and they claimed that customers may provide valuable insights to their PD processes. Once again, the companies interviewed in this study are aimed towards industries where it requires significant knowledge to understand the product and this may be the reason to why few of the companies mentioned this benefit. Company A and E has products that is more aimed to the broader mass of customers and thus it is logical that these two firms also mentioned this benefit.

5.4.4 Improved Team Productivity

Theory claims that customer interaction can develop and nurture the innovation activities of a company (Kärkkäinen et al. 2010); to motivate internal top talents and increase their productivity (Glessner, 2012). This is supposed to be a result of customer interaction, but our empirical results did not support this statement in any way. Rather the contrary; the respondent of Company F claimed that the productivity would be decreased if customers was let into the PD process. The respondent of Company F expressed that there would be a clash between R&D staff and customers if working directly together in product development as the market knowledge to be retrieved from customers is far from developer logic; hence the sales and marketing department ought to be the ones to deal with customers and then translate and distribute applicable knowledge to the other concerned departments.

5.4.5 Expanded Revenue Opportunities

Kärkkäinen et al. (2010) state that engaging in open innovation and interacting with customers in product development may develop the organization in general, while Glessner (2012) emphasize the enhanced ability to act on new possible revenue opportunities for intellectual property and technology developed within a firm as external perspectives and ideas from relationships and partners are provided; e.g. through licensing, selling, establishing joint ventures, spin-offs, etc. Though, none of our respondents touched upon this benefit. This result may be related to the fact that many of the interviewed companies were of

quite modest age and still struggling with getting the initial revenue streams going and a proper business model in place, and thus seeking additional revenue streams and businesses may not be top priority.

5.5 Benefits Related to Social Media

The respondents of the interviewed companies do not give a homogeneous answer in terms of their perception of the future potential and benefits for the use of social media within their product development. As stated, the current use of social media is only minor, and some of the respondents are hesitant also towards future potential of beginning to integrate or increase the use of social media.

Benefits of Social Media	**Described in Theory**	**Confirmed by Companies**
5.5.1 Increased importance and legitimacy (Kaplan & Haenlein, 2010)	Social media applications are achieving increased importance and legitimacy from customers.	-
5.5.2 Convenient management of applications (Kaplan & Haenlein, 2010)	Fairly easily managed if one is familiar with these type of applications	-
5.5.3 Efficient and convenient communication (Kaplan & Haenlein, 2010)	Efficient and convenient way of communicating and keeping users updated.	Company E, G
5.5.4 Collaborative efforts increase potential success rates (Kaplan & Haenlein, 2010)	The collaborative effort of several actors has greater potential to result in outcomes superior to what single individuals could have obtained.	*(Company A, E)*
5.5.5 Established platforms; reaching many users (Kaplan & Haenlein, 2010)	Several applications are already established platforms, i.e. usually have extensive amount of users that can be reached.	Company A, E, G
5.5.6 High social interaction (Kaplan & Haenlein, 2010)	High social interaction; relationship-building due to extensive and consequent communication.	-
5.5.7 Reaching only the right people *(Not stated in theory)*	Using segmented forums/applications facilitate convenient communication with for different purposes targeted customer groups.	Company E, G
5.5.8 Convenient product testing *(Not stated in theory)*	For products applicable to test over the web (e.g. software).	Company E

***Figure 16** - Comparison between benefits related to social media stated in theory and confirmed empirically.*

5.5.1 Increased Importance and Legitimacy

Social media is receiving more and more acknowledgement from customers in terms of legitimacy of content and as a viable tool for communication (Kaplan & Haenlein, 2010). This aspect is important when put in contrast with the issue of trust; customers must trust the tools used for communication and that their input is being processed in a proper way. Not too many years ago, social media was not seen as an applicable tool to be used for corporate communication and perhaps it is not perceived to be viable today either, as this benefit has not been confirmed by any of the respondents. Rather the opposite, several respondents have claimed that many of their customers are hesitant to all things new and unfamiliar that comes with the internet and IT advancements. In some industries, even email is claimed to be somewhat undesired by some customers as mean of communication.

5.5.2 Convenient Management of Applications

The infrastructure of social media is often constructed in order to be fairly easily managed and easily understood by the big mass (Kaplan & Haenlein, 2010). Thus, in comparison with the often complex infrastructure of enterprise or CRM systems, social media applications can be fairly easily managed and most people, including staff, are already familiar with social media and hence a company might not have to educate their employees to any larger extent. Though, this benefit is neither discussed, nor confirmed by the respondents.

5.5.3 Efficient and Convenient Communication

The efficiency of using social media, when compared to other tools used for similar purposes and to collaborate with an equal amount of users/customers, is argued to be high since it provides a convenient tool for simultaneous communication with a large amount of people (Kaplan & Haenlein, 2010). This is confirmed by Company E and G. We are somewhat surprised that additional companies did not confirm this benefit. Our personal reflection is that this ought to be one of the greatest benefits of using social media as the tool for facilitating interaction with many customers. Though, as discussed earlier, the benefit might not be applicable to the interviewed companies since the majority of them do not have the need or desire to communicate with a vast amount of customers - their customer bases do not constitute any vast amount.

5.5.4 Collaborative Efforts Increase Potential Success Rates

Although being presented by Kaplan & Haenlein (2010) as a benefit of using social media, the idea of collaborative efforts increasing the potential of social media seem more connected to the concept of customer interaction in general than social media as a specific platform. The idea is simple; a platform facilitating collaboration between many people increase the possibility to come up with fruitful ideas or solving problems compared to what any user could have achieved individually. Company A and E could be seen as partly confirming this benefit. They are both emphasizing the importance of and perceive a certain potential and value in terms of retrieving ideas from external sources such as customers, although they do not speak about collaborative efforts as actively co-creating with customers continuously throughout the PD process. Thus we cannot really confirm this benefit, neither fully discard it.

5.5.5 Established Platforms; Reaching Many Users

A large advantage of using social media is to reach large amounts of people, e.g. customers, outside the firm, through platforms that are already established and widely adopted by the masses (Kaplan & Haenlein, 2010). This is also confirmed by Company A, E and G but currently, social media is used mainly as a marketing tool and not for product development. The benefit consists of having platforms ready to be used with a large customer base without having to build the platforms themselves. In this study, the companies interviewed are within B2B; i.e. selling to other companies, and in some cases do not seem very interested in the end consumer, thus this benefit is not applicable to all respondents. But for the companies who has a broader customer base and are positioned closer in the value chain to the vast end consumer group, the established platforms may prove to be usable and highly efficient. Company E agree with this statement and thus confirm this benefit. The fact that Company E is the firm with the largest amount of customers and who are closest to the end consumers further strengthen the conclusion of a rather strong correlation between the perceived potential of social media and the amount of customers, i.e. users aimed at reaching.

5.5.6 High Social Interaction

According to theory, social media platforms can be forums where high social interaction is enabled (Kaplan & Haenlein, 2010). Though, this is stated in relation to other means of communication via the web, e.g. email, and thus it is true in that context. Our empirics is pointing in another direction, namely that social media cannot provide the social interaction needed when doing business. Company A, B and H claimed that it is important to meet the customers, sit down and grow relationships together. These companies claim that this is not possible through social media, which instead provides a certain perceived distance between the parties, compared to communication by phone and physical meetings.

Once again, the type of companies in our selection is affecting the results since companies within B2B have fewer customers than ones operating in B2C, and thus the relationship and communication with customers is often both deeper and more frequent. What Kaplan & Haenlein (2010) states about social interaction through social media may be true for B2C companies for whom it is not possible to have a close relationship with each customer. Thus, for B2C companies we believe that the potential benefit for using social media is larger since it provides ready-made platforms with already massive user numbers where customer interaction can take place at low resource utilization compared to what the case would have been if one was aiming at having physical meetings with all these users, i.e. current and potential customers.

5.5.7 Reaching Only the Right People

The common perception of social media is that everything needs to be completely open for everyone to see and as a consequence many of the above challenges, i.e. security issues and vast amounts of information, is a fear and perceived challenge highlighted by the interviewed companies. Though, in our interview with Company E, the respondent discussed a way of segmenting the social media applications, and we deem it sufficiently interesting to be treated separately as we have not found this benefit explicitly covered in literature. The segmenting of social media platforms elaborated on by Company E could be

done by establishing different forums for different customer groups or other external resources depending on which people the company would want to reach. As an example, if one wants to reach experts in a specific field (Company G also mentioned this benefit related to reaching experts) or first line users within a particular area, it could prove beneficial to have a closed forum where only these specifically invited persons would have access. A possible result is that the discussions may be more serious and aimed towards certain topics. In relation to the closed forum, another forum could exist that is fully open, allowing everyone to comment and provide input. Benefits of using these segmented forums are vast; a company could reach the right people straight away, without having to sift through vast amounts of information and they would not need to worry to the same extent about previously mentioned security issues.

5.5.8 Convenient Product Testing

If a company has a suitable product (i.e. software) that needs to be tested there is a possibility to use social media as a tool to provide the platform between a company and its customers. The customers may then use the product on a validation stage, where it needs to be evaluated before it reaches the market. A solution like this may prove to be efficient for a company, saving resources and providing fast feedback on products. Company E expressed this as a possible solution viable for them to use in the future as they, among other products, develop software that would be suitable to be tested over the web.

When letting the customer test a software over the web it, is important to remember the DART-model (Prahalad & Ramaswamy, 2004) where it is stated that there needs to be a balance between the access and transparency given to customers in relation to the risks that may be present. Once again, the perspective of security issues is prevalent and there is a risk that competitors may get access to platforms and thereby access to test a product and then steal ideas. Though, this could be averted by using segmented forums/communities. In that way, only manually invited customers known by the company will be granted access to test products and the risk of security leakage can thus be minimized.

6. Conclusion

This chapter aims to answer the research question we initially set off with by summarizing the conclusions we have been able to draw from this research. The chapter also includes the conclusions drawn from discussing the implications of our context and case selection criteria, as well as suggestions for future research to build upon and complement our conclusions from this particular study.

The research question we set off to answer was;

- How and why is social media used in the product development process of SMEs in order to interact with customers?

In terms of *how* social media is used in the PD process of SMEs in order to interact with customers, we can conclude that it is practically not used at all. Social media is only used within product development to a minor extent by two of the interviewed companies; not to actively interact with customers but to retrieve market intelligence by following certain blogs and group discussions, e.g. on LinkedIn. Despite nowadays being quite acknowledged as a marketing and commercialization tool, social media is not extensively used by the interviewed companies for this purpose either (four out of the eight respondents; whereof one only to a minor extent). We can thus conclude that social media is not considered high priority among our case studies.

The *why* question has also been answered; in this case the question of why social media is *not* being used as a tool to interact with customers throughout the PD process. Several reasons have been mentioned and deemed important challenges, whereof some are general for interacting with customers in product development and some are specific towards social media as the tool for facilitating this interaction and communication. The three primary reasons listed for not using social media are; (1) security issues; the fear of leaking secret information, (2) the lack of resources (time, personnel), and (3) the difficulty to assess and realize the potential gains.

Difficult to Disregard Security Issues Due to Nature of Product Development

Despite an increased emphasis on open innovation and customer interaction, aspects such as security issues and the concerns of leakage of intellectual property and secret company information are somewhat difficult to disregard, particularly when arguing for the use of social media in product development where content is codified and spread via an online platform. Security issues is an aspect that due to the nature of product development; to develop something better and/or different than what competitors offer, naturally most often comprise information which company would not want to disclose openly. Security issues are thus certainly a significant barrier towards the concept of integrating external actors in product development in general, and the use of social media applications in particular, which has been both underlined in theory as well as now confirmed by empirics. Some of the interviewed companies claimed security aspects as vital especially since they as SMEs sometimes have new technologies not yet patented. Even if they would have had patents, they would not want to risk other companies copying their product, and would in addition also have fewer resources to handle disputes over patents in the case of going to court.

Lack of Resources and Effects on PD Processes

A challenge that proved to be supported by many of the companies was the lack of resources, which is often the case for SMEs. By not having the equivalent large amount of resources as larger corporations, SMEs are simply forced to prioritize other tasks that need to be performed. Actions and processes in SMEs might have more similarities with extinguishing fires where most needed at the moment, rather than the formalized measures that are more common in larger firms. From the answers we have received from our respondents, we can conclude that social media is not a top priority when there is a shortage of resources.

Particularly interesting due to no consensus either in theory or among respondents is the effects that integrating customers in PD processes, and using social media for this purpose, have on the effectiveness (time and cost) on PD processes. While Nambisan (2002) argue for difficulties of balancing effectiveness with both massive amount of customer input and having continuous customer touchpoints throughout the PD process; bearing the potential result of slowing down processes (confirmed by Company F), both Kärkkäinen et al. (2010) and Glessner (2012) promote faster and more successful development as the effect (confirmed by Company E). We are not able to conclude which standpoint is more right, but we think it is an important and interesting aspect to highlight, which would be interesting to research separately by measuring quantitatively.

It is interesting to speculate on the extensively highlighted issue of resources, or rather the lack of them, and the feasibility for SMEs to use social media. From assessing theory in the field, one might build the hypothesis that social media is a quite efficient tool in terms of resource utilization, since many applications are already well-established systems with large amounts of users. Though, perhaps a company still needs to have some sort of critical mass in terms of size and resources, regarding both number of employees and customers, in order to be able to realize the potential of social media.

High Correlation Between Perceived Potential and Amount of Customers

Even though theory claim social media applications to be quite efficient in terms of resource utilization, due to being already established systems with massive amounts of users that can be reached, there seem to be a certain critical mass that needs to be reached in terms of a company's amount of customers. This is needed for a company to be able to realize one of the major gains of using social media; the ability to facilitate communication and content sharing among a large number of users. The empirical results from our case studies show quite clearly a rather high correlation between the perceived potential of using social media in product development and the amount of customers. When having just a handful of customers, the gains of using social media are not as obvious and in these cases, physical meetings are perceived to be more valuable in terms of building strong and long-lasting relationships with customers.

Only three of the interviewed companies involve their customers in the PD process, and Company E was the only company out of the respondents who used an online application to facilitate this interaction (a suggestion box integrated into their enterprise business system, and forums for their entrepreneurs) Hence, among the empirical data gathered, this is closest to what could be deemed as using social media in product development, though it is in its correct definition not social media. Related to the above conclusion of the correlation between perceived potential and number of customers, we deem the reason to why it is Company E and not any of the other respondents being that Company E has the largest number of customers among the respondents, as well as an applicable product.

Additional Challenges Mentioned

In addition to the above mentioned primary challenges confirmed by five and six of the interviewed companies, the three challenges stated by Kaplan and Haenlein (2010) concerning the 'control of content', the 'potential generation of negative content' and the 'required frequent activity' were to a lesser extent confirmed empirically, but still underlined by three companies. Actually, all challenges listed in theory; both related to customer interaction in product development in general and to social media, except two were confirmed by at least one respondent. This shows that there, in terms of challenges at least, actually exists empirical confirmation of the stated theory, even though the confirmation of one company out of eight is to be deemed rather low. We believe that the impact of our context and case selection criteria might be one factor that can help explain this fact, and we will extend this discussion in chapter 5.1.

Perceived Benefits of Integrating Customers in Product Development Using Social Media

The various challenges stated by the interviewed companies were of natural causes more in numbers and perceived importance than the perceived benefits, since the companies currently are not using social media as a tool for integrating customers in their PD processes. Thus, in theory stated benefits of integrating customers in product development and using social media were to a lesser extent confirmed than what is the case with challenges. Nevertheless, some benefits and incentives were highlighted by the respondents when discussing future potential, and thus some of the theoretical aspects on this matter were confirmed.

Discovering customer demands (confirmed by Company A, B, C and E) and increased probability of breakthrough ideas (confirmed by Company A and E), i.e. to increase customer orientation and to use external resources for idea generation, were the most anticipated benefits by the respondents in terms of general incentives for integrating customers in the PD process. In terms of benefits related more specifically to the use of social media, 'efficient and convenient communication' (confirmed by Company E and G) and 'established platforms' with access to already a vast amount of users (confirmed by Company A, E and G) are the most emphasized ones. We agree that these are the prominent benefits of using social media, but are somewhat surprised that these benefits have not received more confirmation, since this, in our perspective and as previously stated; ought to be one of the paramount and most notable benefits. Though, perhaps the rather low anticipation from respondents can be partly explained by the fact that it is not the convenient communication with the big mass which comes with the established platforms that our respondents seek, since their customer bases do not constitute any big mass.

To sum up, we can conclude that while some of the interviewed companies see an increased potential of using social media in order to interact with customers in product development, a majority of the respondents do not. Several are having difficulties in assessing the benefits of using social media. Whether there actually are no significant benefits for SMEs acting within sustainable innovation to utilize social media for this purpose, or if it is the difficult and lack of ability to identify and assess the potential gains inherent in using social media more extensively, we cannot give a definite answer to. The difficulty to assess potential benefits of using social media seems to be augmented by the fact that there currently do not exist much case evidence of best practices in this area. In addition, the chosen context and case selection criteria; SMEs within sustainable innovation, also seem to have a significant impact on our results which cannot be neglected.

6.1 The Impact of Predefined Case Selection Criteria and Case Characteristics

This thesis project was initiated within the frameworks of a larger research project, and thus the specific context and case selection criteria of studying SMEs within sustainable innovation were predefined. After having analyzed both theory on the topic and empirical results thoroughly and contrasted with each other, it became obvious to us that the predefined setting have had a greater impact on our results than first anticipated. Based on this insight of the significance of our predefined context, we have built conclusions; conclusions somewhat obvious already from simply contrasting theoretical aspects, but now also rather strongly confirmed by empirics.

6.1.1 SMEs within Sustainable Innovation

Why the Idea of Customer Input within Sustainable Innovation Is Fundamentally Flawed

We would like to claim that the idea of using customer input in product development within sustainable innovation is fundamentally flawed already in the conceptual stage. Why? Because the potential value and applicability of customer input is solely limited to *what* customers demand in a product; i.e. functionality, not *how* a company should engineer and accomplish these desired functions. This is true since it is the company and their R&D staff who are the experts, not the customers (Ulwick, 2002).

Surely, there might be sustainable innovations that have provided new functionality, but sustainable innovations are in general not concerned with providing new functions (i.e. *what*), but rather instead targeted towards providing the same already existing functionality, although in a more sustainable way; e.g. requiring less resources, being renewable, etc. (i.e. *how*) (Ernst & Young, 2008). Sustainable innovations are also generally rather complex in terms of technology, and thus requiring high expertise and deep knowledge about the product and area of research. Customers are not the experts and thus rarely possess the required knowledge to be able to provide valuable input (Ulwick, 2002). Though surely, besides governmental regulations and financially motivated demands for lesser use of resources, customer (i.e. end-consumer) demand is one of the factors that drive the development towards more sustainable innovations, but still not in terms of *how* to achieve this. This is where there is a clash between the theoretical concepts; the value of customer input limited to *what* functions are demanded, contrasted with the fact that sustainable innovations rarely constitute any new functionality and the most valuable input would be *how* to achieve more sustainable products with same functionality as already exists.

The above stated conclusion is confirmed by our empirical data. None of the interviewed companies are providing new functionality with their sustainable products; they are instead developing products with already existing functions, but in a more sustainable fashion. Hence, the usability and value of customer input for sustainable innovations is truly limited, and this insight and conclusion has affected our results significantly.

6.1.2 Case Characteristics; B2Bs within Conservative Industries

Several respondents have expressed concerns related to their specific industries, while *all* of the interviewed companies are operating within B2B. Hence, some characteristics of our case studies are not the result of predefined case selection criteria, yet are still perceived to have had a great impact on our results.

Conservative Industries Hesitant to All Things New

Sustainable innovation may take place in various industries, but our empirics have mostly been gathered within industries which the respondent themselves have portrayed as rather conservative in terms of the high paced technological development and IT advancements. The respondents have claimed, in some cases explicitly and in some cases more subtle, that their customers are generally not prone to change into new ways of communication, and despite being around for some years now, social media is still deemed to be something new and not yet tested and evaluated. This affects our results since the respondents cannot fully picture social media working in their own industry. Important to bear in mind though is that we have not contrasted these empirical statements with theory on the topic of industry characteristics, and we can thus not surely indemnify any conclusions regarding this matter. It is neither the aim with this thesis, no is the results sufficient, to compare and conclude on the potential and usability of social media between different industries. Though, we do find the opinions expressed on the matter of industry characteristics as highly interesting and believe this aspect has had some notable impact on our results.

Implications of Being within B2B

Since the interviewed companies are operating in different industries and the aspect of comparing industry characteristics has not been the aim of research in this study, we cannot tie conclusions drawn to a specific industry. Though, a characteristic that applies to all interviewed companies are the fact that they are all within B2B. Since one of the main characteristics of being a B2B company; generally having fewer customers than firms within B2C, clash with our conclusion drawn that number of customers is one of the aspects that have greatest impact on the potential and usability of social media, this cannot be reviewed differently than concluding that this specific characteristic of interviewed companies has severe impact on our results.

6.3 Suggestions for Future Research

In our opinion, the most interesting part of our study and conclusions to build further on with future research is our hypothesis of a rather limited value of customer input within sustainable innovation. As presented above, we have identified what we interpret as a clash between theoretical concepts (which has also been partly confirmed by empirics) when it comes to apply customer input within sustainable innovation; the value of customer input limited to what functions are demanded (Ulwick, 2002), contrasted with the fact that sustainable innovations rarely constitute any new functionality and the most valuable input would be how to achieve more sustainable products with same functionality as already exists (Ernst & Young, 2008, as well as found in empirics). Such a future research would have to dive deeper into the potential value and limitations of customer contributions in product development, but also to study sustainable innovations more thorough in order to conclude on the aspect of functionality.

Another aspect to build upon, which has shown to be of significant importance for our results, is the one of conservative industries and settings claimed to hamper the usability of social media. If researched deeper, one might be able to accurately conclude on to what degree social media can be used even in conservative industries, and perhaps also provide suggestions of how to overcome the specific barriers and constraints that are related to conservative industries.

In addition, to complement our qualitative research, a quantitative study would be highly interesting in order to be able to statistically conclude on and compare how companies perceive and rank the potential benefits and challenges of social media in product development, and to get quantitative measures on how companies really perceive the potential of using social media. It would be even more interesting if one was able to add measures of innovation performance; e.g. how many new products or improvements a company aims at introducing each year and how well they meet these goals - and in addition to contrast these measures with a similar reference group of companies who do not use social media in their product development.

Another interesting research would be to find one or several prime examples of companies, still within the research context (i.e. SMEs within sustainable innovation), but which truly utilize social media to a great extent in their product development, and conduct an even deeper qualitative study of these sort of "best practice firms" and their actions and mechanisms within the area of interacting through social media. It would be highly interesting to research how these potential companies have overcome the barriers and challenges of using social media stated in theory, and how they perceive to benefit within the area of product development from using social media to interact with their customers.

7. References

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7.1 List of Figures

8. Appendix

8.1 Appendix 1 - Interview Guideline

Background Information

- What industry are you operating in?
- Which are your main markets?
- What type of products are you developing?
- Business to Business or Business to Consumer?
- How many employees are there in the company?
- How many of these employees work within R&D?
- Who are your customers?
- How many customers would you estimate that you are working with; i.e. selling to?

The Product Development Process and Customer Interaction

- Do you have a formalized PD process, and in that case; what formal steps do you have?

- How do you perceive the potential for integrating customers in your PD process and in what stages do you see highest potential?

- How do you currently communicate with your customers and ensure that the products you are developing match your customers' demands?

- How do you select which customers to interact with?

- What incentives do you use in order to get customers to interact with you?

- What do you perceive as the impact of customer involvement on innovation activity?

    - What general incentives do you see for customer involvement in product development?

    - What general challenges or drawbacks do you see for customer involvement in product development?

Social Media

- Do you currently use social media within product development?

    - *If you do;* For what reasons? E.g. marketing (pushing info), market intelligence, active communication with customers, other)

    - *If you do not;* For what reasons?

    - *Do you allow employees to interact with customers through social media?*

    - *Do you provide education/training for employees in interacting with customers through social media?*

- What benefits do you see for using social media within product development to interact with customers?

- What challenges do you see for using social media within product development to interact with customers?

    - How do you think the challenges you mention can be mitigated?

- Do you use any social media applications internally within the company?

- Do you think the fact that you are an SME affects your capability to use social media?