Eindhoven University of Technology

MASTER

Innovating through customer co-creation in virtual communities, from a SME perspective

de Keijzer, A.J.

Award date:
2010

Link to publication

Disclaimer
This document contains a student thesis (bachelor's or master's), as authored by a student at Eindhoven University of Technology. Student theses are made available in the TU/e repository upon obtaining the required degree. The grade received is not published on the document as presented in the repository. The required complexity or quality of research of student theses may vary by program, and the required minimum study period may vary in duration.

General rights
Copyright and moral rights for the publications made accessible in the public portal are retained by the authors and/or other copyright owners and it is a condition of accessing publications that users recognise and abide by the legal requirements associated with these rights.

- Users may download and print one copy of any publication from the public portal for the purpose of private study or research.
- You may not further distribute the material or use it for any profit-making activity or commercial gain

Eindhoven, June 2010

Innovating through customer co-creation in virtual communities, from a SME perspective

By
A.J. (Arjan) de Keijzer

BSc Industrial Design – TU/e 2006
Student identity number 0535165

in partial fulfilment of the requirements for the degree of

Master of Science
in Innovation Management

Supervisors:
Dr. A. de Jong TU/e, ITEM
Dr. J.J.L. Schepers TU/e, ITEM
Ir. D. La Grand Syntens

TUE. Department Technology Management.
Series Master Theses Innovation Management

Subject headings: innovation, innovation: master theses, product development, medium and small firms, communities, marketing

Summary

Nowadays, companies increasingly involve their customers in their innovation. Some of the reasons for this trend are the high failure rate of innovative products, and the need for a decrease in time-to-market for new products. A recent example of active customer involvement in NPD in a business-to-consumer (B2C) context is customer co-creation. Customer co-creation is the practice of product or service creation that is collaboratively executed by developers and customers together. Customer co-creation puts a part of the (NPD) process outside the company so that participants can innovate themselves and the company can collect new insights (ideas and concepts).

To execute customer co-creation successfully, different success factors can be found in literature. The success factors focus on two separate aspects, namely interaction and internal organization. Literature has defined four building blocks for interaction between a company and its customers to facilitate co-creation experiences. These four building blocks are (1) dialogue, (2) access, (3) risk assessment/reduction, and (4) transparency (DART). The DART interaction factor forms the basis of a successful co-creation environment. Next to the interaction factor, there are three important factors for successful (customer) co-creation for the internal organization of the company. To be able to successfully use 'external ideas' from customer co-creation into the company there should be (5) an appropriate culture, (6) a good overview and planning, and (7) the correct capability and skills.

Due to technological developments, and to support the growing trend of customer involvement, there is an increase in online communities that facilitate interaction between producers and consumers. In these communities consumers can discuss about specific brands or products, with each other and with the company, and undertake activities (such as customer co-creation). A virtual community is "an aggregation of individuals or business partners who interact around a shared interest, where the interaction is at least partially supported and/or mediated by technology and guided by some protocols or norms".

The context of this research is small and medium enterprises (SMEs). SMEs are increasingly carrying out customer involvement activities. "When an SME is sensitive to signals from its clients the company will expand its innovative ability". But SMEs that try to innovate often have problems with planning the NPD process, a resistance to change, lack of communication, and limited or a lack of skills. Due to these limited resources, short-term goals and demands get in the way of long-term planning. Next to that, SMEs have problems with exploiting new products because of their limited organizational and marketing capabilities. The processes by which SMEs innovate remain unclear. In general, smaller companies use less formal and less rigorous (stage-gate) processes to evaluate ideas. SMEs conduct their NPD processes in a more ad hoc manner.

While there is research on customer co-creation in relation to virtual communities and large (international) companies, not much is known about customer co-creation at small and medium enterprises. This gap in research on customer co-creation in virtual communities for small and medium companies, in relation to the problems these companies have with innovating, leads to this main research question:

What are the determinants of successful customer co-creation
in virtual communities, from a SME perspective?

There is a conflict between the success factors for customer co-creation and the many problems that SMEs have with innovating. This conflict is present in each of the four success factors; DART, overview and planning, culture, and capability and skills. Although there is some conflict between the success factors for virtual communities and the problems that SMEs have with innovating, these are of less importance here. The reason for this is the presence of a customer co-creation community facilitator in the current case under investigation. This facilitator solves all of the problems that an SME would otherwise come across when implementing a virtual community on its own.

The outcome, the success, of the co-creation project is indicated by the number of ideas that may possibly be really used. This number gives an indication if any of the ideas will be further developed to an actual product.

Still, there is one important factor concerning the virtual community in relation to the outcome of the customer co-creation project. This factor is about the fit between the nature of the co-creation challenge and the people in the virtual community. This means that a specific community may be better suited for a specific type of customer co-creation challenges.

The conceptual model (Figure I) depicts how the success factors for customer co-creation are related to the outcome (success) of the customer co-creation project in a virtual community. These are all positively related. At the same time the model shows the influence of the community-challenge fit on the relationship between a success factor and the outcome of the project. This has resulted in five hypotheses: four on the positive relationship between the success factors and the outcome, and the fifth on the positive influence of the community-challenge fit on those four relationships.

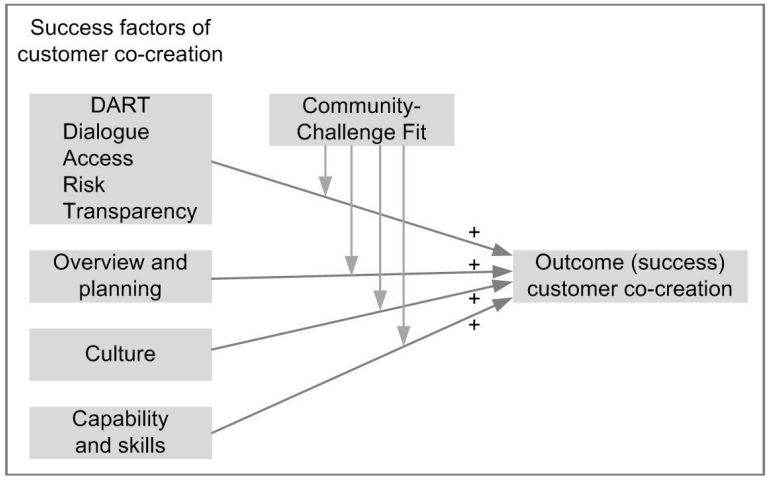

Figure I Conceptual model

This research is carried out in cooperation with Syntens, a Dutch semi-government organization which supports micro, small, and medium enterprises with innovating. Syntens has set up a customer co-creation project in which multiple SMEs will participate and post a customer co-creation challenge online. For this specific research seven SMEs will be investigated, because they are, or have been, already actively involved in customer co-creation. The website on which the SMEs will post their challenge is RedesignMe. This website maintains its own online community in which co-creation challenges can be posted.

In investigating the relationship between the success factors for customer co-creation and the success of the customer co-creation outcome, the aim is to find a linear, or causal, relationship. The method by which this is done is semi-structured interviews. Semi-structured interviews are conversational and informal in tone, and allow for an open response from respondents. The greatest value lies in the depth of information and detail that can be secured. The goal of the semi-structured interview is to investigate the company on five different aspects; the four success factors (DART, overview and planning, culture, and capability and skills) and the outcome (success) of the customer co-creation project. To develop, refine, and even pre-test questions to measure the different success factor constructs requires considerable time and effort. Implementing existing instruments can shorten this process considerable. For this reason, where possible, existing instruments have been put in place.

After the seven interviews have been conducted, there are certain variables that have to be dismissed due to the fact that these have turned out to be not usable for the final analysis. The eight variables that remain represent dialogue (2 variables), transparency, overview and planning (2 variables), culture (2 variables), and capability and skills.

To test the hypotheses, the correlation between the eight input variables and the output variable is calculated with SPSS. Kendall's Tau-b is used as the bivariate correlation coefficient, with a one-tailed test of significance. The results of this analysis are in Table I.

	Ideas that will possibly be used	Hypothesis
Comments redesign	.55** (.045)	1. A higher level of the DART interaction factor leads to a higher success of the customer co-creation outcome. **Partially confirmed**
Dialogue NPD process	.75** (.011)	
Transparency	.39 (.128)	
External sources	.51* (.060)	2. A higher level of overview and planning leads to a higher success of the customer co-creation outcome. **Partially confirmed**
Market orientation	.31 (.176)	
Process formality	-.22 (.258)	3. A higher level of corporate culture leads to a higher success of the customer co-creation outcome. **Partially confirmed**
Time perspective	.65** (.023)	
Marketing skills	.42 (.104)	4. A higher level of innovation skills and capabilities leads to a higher success of the customer co-creation outcome. **Not confirmed**

Table I Hypothesis testing (* $p < .10$, ** $p < .05$)

Main conclusions

The fact that the number of company comments per submitted redesign on the community website is positively related to the number of ideas that will possibly be used is a good indicator of how important dialogue is in a co-creation project. This is also confirmed by the significant relation between the level of dialogue in a company's NPD processes and the number of ideas that will possibly be used. Companies that already have experience in customer involvement in the NPD process, exploit this knowledge in the co-creation project.
Syntens, in their support to companies, should make clear that a co-creation project is not a cheap and easy method to collect new and perfect (product) ideas. A successful co-creation project constantly requires input from the company. Another point of importance here is that those companies for whom the co-creation project is a first attempt at customer involvement may need some extra guidance.

The time perspective and feasibility of an SME turned out to be significantly related to the number of ideas used. The significant result indicates that companies that have a more long-term view on the three given levels (company, product lines, products), are more successful in a customer co-creation project. A reason for this can be that a long-term planning means that a company better knows what its goals are for the future, and how it wants to reach these goals. Because of this planning-ahead routine, the SME is also more aware of what it wants to obtain from the customer co-creation project.
Syntens could guide SMEs that want to participate in a customer co-creation project by helping them develop goals for this project. These goals should fit in the bigger picture of what the SME wants to accomplish in the future. By aligning the (short-term) goals for the co-creation project with the more long-term goals of the company itself, the probability of receiving useful input from the project increases.

There was an almost significant relation between the use of external information and knowledge sources and the number of ideas that will possibly be used. Although slightly not significant ($p < .10$), it does indicate the importance of a culture that is open to information from outside the company. A company that has the experience to incorporate outside knowledge into its business processes is more likely to successfully incorporate ideas that have originated in a customer co-creation project. The fact that market orientation did not give any significant relation with the outcome-related variable provides an extra nuance in the hypothesis on culture. Apparently, the company's focus on the customer, which was measured by this variable, has no influence on the success of the customer co-creation project. The nuance here is between using information from external sources, and a specific focus on customers. The difference in results between these two variables could indicate that it is better to have a very broad scope to the outside world (using many sources) rather than focusing deeply on one specific type of source (customer focus).
To increase the success of a customer co-creation project, Syntens could support SMEs by examining their current experiences in collecting information from external information and knowledge sources. By determining the level of experience, they can get an indication if the SME will have trouble incorporating ideas received from outside the company.

The marketing and innovation skills of an SME did not give any significant relationship with the number of ideas that will be possibly used. Apparently, in contrast to the literature, the ability of a company to recognize, incorporate, and apply external information is not of any use when participating in a customer co-creation project.

Preface

This Master thesis is my final work to complete the MSc program of Innovation Management at the Eindhoven University of Technology. This project is executed in cooperation with Syntens, a Dutch semi-governmental organization that provides independent consult on innovation management to SMEs in the Netherlands.

First of all I would like to thank my two university supervisors Dr. Ad de Jong and Dr. Jeroen Schepers. Especially Dr. de Jong has supported and advised me through many iteration and feedback sessions. With his help this thesis has gained a much more solid and scientific base. Later on in the process also Dr. Schepers has provided me with valuable input to improve this thesis and its readability. Any inaccuracies still present in this Master thesis are solely my responsibility.

I would also like to thank my company supervisor Detlef La Grand. Detlef has introduced me to the broad topic of co-creation, via several meetings, events, and conversations, and his efforts to make it a common practice at SMEs have impressed me. Although the finalization of this master thesis has taken longer than we had both expected, I still hope that the results will be useful for Syntens in its mission to supports SMEs with co-creation

A big ‘thanks, man’ goes out to Maarten Kluitman. Together with Maarten I have gone through most of the (pre-)Master courses. We have worked together on many successful projects and assignments, sat through hours of classes, and this has always been a pleasure. Besides that, we have drunk a lot of coffee and have had many great conversations about politics, the economy, the stock market, TV, movies, and much more.

Finally, I would like to thank my parents Gerry & Gerry. Throughout the many, and long, years that I have worked on my educational development they have continually supported me, morally and financially. The fact that I have come so far to finish this work and receive the Master of Science title can be attributed for a large part to them.

Arjan de Keijzer
June 2010

Outline

1 Literature Review

1.1 Introduction

Nowadays, companies increasingly involve their customers in their innovation processes (Kausch, 2007). This accounts both for business to business (B2B) and business to consumer (B2C) customer involvement. Still, B2B and B2C customer involvement are different processes (Hanna et al., 1995). In this thesis the focus lies on the B2C type of customer involvement.

One important reason for customer involvement is the high failure rate of innovative products (Atuahene-Gima, 1995; Goldenberg et al., 2001). The main problem is that the user has needs and wishes, while the producer has the means to satisfy those needs but does not know them (Thomke & Von Hippel, 2002). Involving customers early in the innovation process helps to get a better insight in their needs and wishes, which can result in a product that is better suited to the market (Kausch, 2007).

Another reason for customer involvement is the growing speed of technological development; the need for a decrease in time-to-market for new products (Chesbrough, 2004). Companies with relatively faster new product development (NPD) processes are found to have higher product success rates (González & Palacios, 2001). One way to accomplish this is to receive input from customers early in the NPD process (Smith & Reinertsen, 1998).

Alam (2002) describes four levels of customer involvement, ranging from (1) passive acquisition of user input, (2) feedback on specific issues, (3) extensive consultation with users, to (4) customer representation in projects. While the first two levels represent a passive involvement of customers in NPD processes (limited input, feedback), nowadays customers are increasingly asked to actively contribute ideas and suggestions, as in stages three and four (Sawhney et al., 2005). A reason for this development is given by Kristensson et al. (2004). They found out that normal users are better able to come up with original and valuable ideas than professional developers. Matthing et al. (2004) found a similar result: in their research, customers' ideas were rated more innovative than those from professional service developers.

1.1.1 Customer co-creation

A recent example of active customer involvement in NPD in a B2C context is customer co-creation. Customer co-creation is the practice of product or service creation that is collaboratively executed by developers and customers together (Prahalad & Ramaswamy, 2004a). Later, a more specific definition will be presented that is related to the type of co-creation under investigation.

The type of customer co-creation that will be investigated here involves websites that maintain communities in which co-creation 'challenges' can be posted. A company can post a challenge at the website, in the form of a question or problem statement, and community members can then submit product ideas and solutions.

This specific type of customer co-creation communities supports the innovation process in its early stages (Ebner et al., 2009). This is what Cooper et al. (2002) describe as the 'Discovery' stage (Figure 1.1). It is a relatively new stage in Cooper's well-known Stage-Gate model (Cooper, 1990). It replaces the traditional idea, or 'light bulb', with a more structured and proactive way to find new product ideas. What Cooper et al. (2002) explicitly state is that the Discovery stage is appropriate for Voice of Customer (VoC) research "to identify customer's problems, unmet needs and even unarticulated needs" (p. 23). The gate 'Idea Screen' consists of collecting, judging, and accepting / rejecting ideas.

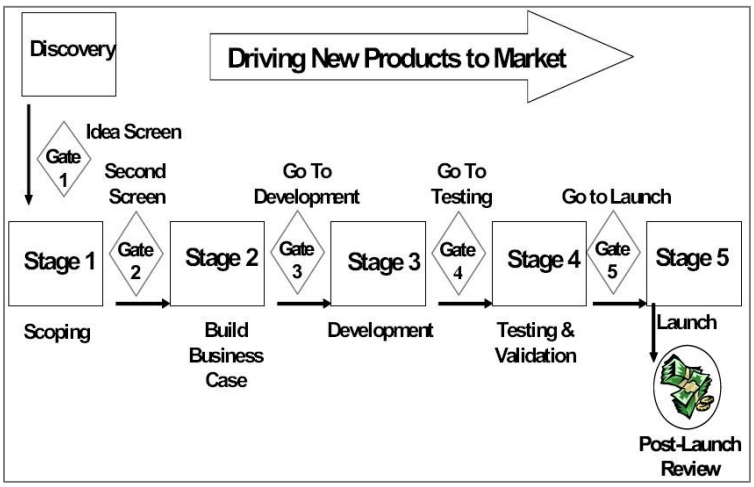

Figure 1.1 Stage-Gate model (Cooper et al., 2002, p. 22)

In this sense, the case of customer co-creation under investigation is a relatively limited type of customer involvement because it only involves the early stage(s) of the innovation process. Still, when combined with other customer involvement methods in the latter stages it can be used to involve customers throughout the whole innovation process. Some examples of these methods in the latter stages are quality function deployment (QFD) (Miguel, 2005), prototype testing (Lagrosen, 2005), and beta testing (Kaulio, 1998).

Customer co-creation in virtual communities shows a clear resemblance with the concept of crowdsourcing. This term was first introduced by Howe (2006a) and is a combination of the words 'crowd' and 'outsourcing'. "Crowdsourcing is the act of taking a job traditionally performed by a designated agent (usually an employee) and outsourcing it to an undefined, generally large group of people in the form of an open call" (Howe, 2006b). The main components of crowdsourcing are the open call format and the large network of potential labourers. The main difference with co-creation is that crowdsourcing involves a specific task that is outsourced to the public (Whitla, 2009), while co-creation is initiated by a more open question or problem statement (Lakhani & Panetta, 2007). Despite these differences the terms co-creation and crowdsourcing are used almost interchangeably, both in literature as well as practice.

Although research on customer co-creation in virtual communities is limited, there is some research on idea competitions in virtual communities (Ebner et al., 2009), specific customer co-creation communities (Lakhani & Panetta, 2007; Rowley et al.,2007; Jouret, 2009), the (mis)use of consumer labour in co-creation (Kleemann & Voß, 2008; Payne et al., 2008), and determining a research agenda (Brabham, 2008; West & Lakhani, 2008; O'Hern & Rindfleisch, 2008). Still, most of current literature has focused on large companies. What is still lacking is research on customer co-creation in virtual communities for small and medium enterprises (SMEs). Despite their smaller size, SMEs have an important role in the economy (see 1.1.2). For this reason, the companies under investigation are small and medium enterprises.

1.1.2 SMEs

This research is carried out in cooperation with Syntens, a Dutch semi-government organization which supports micro, small, and medium enterprises with innovating. According to EU legislation, an SME is "an enterprise which employs fewer than 250 persons and whose annual turnover does not exceed EUR 50 million or whose annual balance-sheet total does not exceed EUR 43 million"

(Europa, 2003). The contribution of SMEs to the overall economy is very important: for high-income countries its contribution to total employment and gross domestic product (GDP) is around 60% and 50%, respectively (Ayyagari et al., 2007).

SMEs are increasingly carrying out customer involvement activities (Van de Vrande et al., 2009; Malecki & Poehling, 1999). "When an SME is sensitive to signals from its clients the company will expand its innovative ability" (De Jong & Brouwer, 1999, p. 63). Still, many NPD projects in SMEs are not very successful (Millward & Lewis, 2005; O'Regan & Ghobodian, 2005). At first sight, SMEs have an advantage over larger companies in NPD because they have less obligations, lower investments, horizontal structures, and rapid decision making (Borja de Mozota, 2003). But this is the 'paradox of the SME' (Friedman, 2004): An SME can move quickly into a new market to grasp an emerging opportunity but lacks the budget and people to take the risk of investing in the NPD process.

SMEs trying to innovate often have problems with planning the NPD process, a resistance to change, lack of communication, and restricted skills (Lindman et al., 2008; Millward & Lewis, 2005; Tidd et al., 2005). Due to these limited resources, short-term goals and demands get in the way of long-term planning (Woodcock et al., 2000). Next to that, SME's have problems with exploiting new products because of their limited organizational and marketing capabilities (Scozzi et al., 2005).
The processes by which SMEs innovate remain unclear (Hoffman et al., 1998). In general, smaller companies use less formal and less rigorous (stage-gate) processes to evaluate ideas (Pitta, 2008). SMEs conduct their NPD processes in a more ad hoc manner. The aforementioned limitations, in resources, skills, and time, are related to the resistance to put a systematic, iterative process in place which includes testing, learning, and well-considered decision making (Millward & Lewis, 2005).

1.1.3 Research questions

The gap in research on customer co-creation in virtual communities for small and medium companies, in relation to the problems these companies have with innovating, leads to this main research question:

What are the determinants of successful customer co-creation in virtual communities, from a SME perspective?

To answer this research question, a beginning will be made by answering two sub-questions. The sub-questions are related to topics of customer co-creation and virtual communities.

What are the determinants of successful customer co-creation?

What are the determinants of successful virtual communities?

With the success of successful customer co-creation in virtual communities it is meant the success of the customer co-creation project itself. An example of this is the level of involvement by customers in the co-creation project. Also the number of ideas, or their quality, provided by the customer co-creators can be an indicator of the success of the customer co-creation project. This will be further developed in the conceptual model chapter.

1.2 Customer Co-creation

1.2.1 Introduction

The general definition of customer co-creation still remains very broad. This is especially true if one looks at the different activities that all fall under this concept (Mascarenhas et al., 2004; Potts et al., 2008; Humphreys & Grayson, 2008).This chapter aims at getting a better insight in the concept of customer co-creation. It is organized as follows: First, a general basis, the shift in value creation, will be described that accounts for all types of co-creation. Then different types of customer co-creation will be compared to each other, and mapped in one figure. By determining the specific characteristics of each type, this should lead to a definition of customer co-creation for this specific case. Finally, the current state of literature on the success factors of customer co-creation will be determined.

1.2.2 The shift in value creation

Two authors who have written about customer co-creation quite extensively are Prahalad & Ramaswamy (2002, 2004a, 2004b). They discuss the process of value creation, which is shifting from being firm-centric to a co-creation between the company and its (potential) customers. In the firm-centric situation value is created within the company, through its activities, outside the market. The market is only seen as a locus of value exchange; it is the only place where interaction with the company and its customers takes place. This is visualized in Figure 1.1.

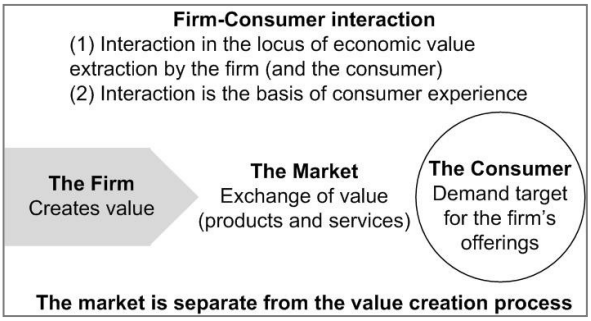

Figure 1.2 Firm-centric value creation
(Prahalad & Ramaswamy, 2004a, p. 7)

Because consumers nowadays are better informed, connected, empowered, and active, they have become aware that they also can extract value from the locus of exchange. Their inter-connectedness provides them with extra sources of information, next to the communication from the firm. Consumers are better able to make a choice with which company they want to establish a relationship, based on their preferences of value-creation. They receive this (unique) value through their experiences during the interaction with the company (Figure 1.2). What Prahalad & Ramaswamy (2002, 2004a, 2004b) describe as customer co-creation is not necessarily about NPD. Rather they also involve the day-to-day experiences that consumers have with companies and how these can be enhanced. Still, their model serves as a useful basis to understand the main concept of customer co-creation.

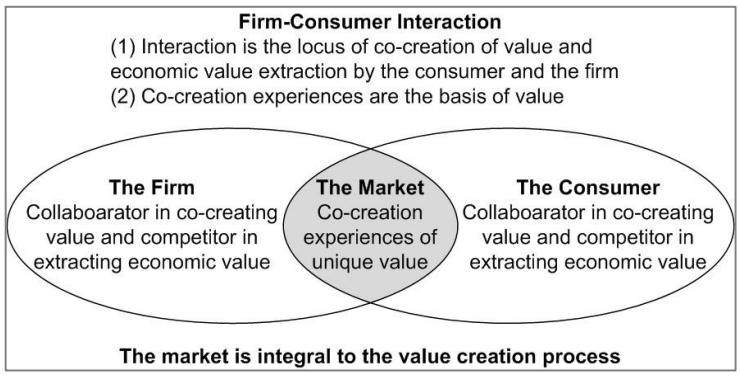

Figure 1.3 Firm-consumer value creation
(Prahalad & Ramaswamy, 2004a, p. 11)

1.2.3 Different types of customer-co-creation

Lawer (2006; Lawer & Knox, 2006) has made an attempt to distinguish the different types that comprise the broad concept of customer co-creation. This differentiation is useful because (customer) co-creation is a term used for many different customer-related activities. His research has resulted in two main criteria (scales) that together enable a mapping of the different types of customer co-creation.

1. The degree of adaptability or personalization of the value created (Y-axe).
   This scale has standard products at one end, and unique, personalized, adaptable experiences at the other.
2. The point (or "locus of innovation") where the value creation occurs (X-axe).
   This scale ranges from innovation taking place completely within the firm (with limited customer involvement), to a point where value creation occurs with individual consumers in a market or community.

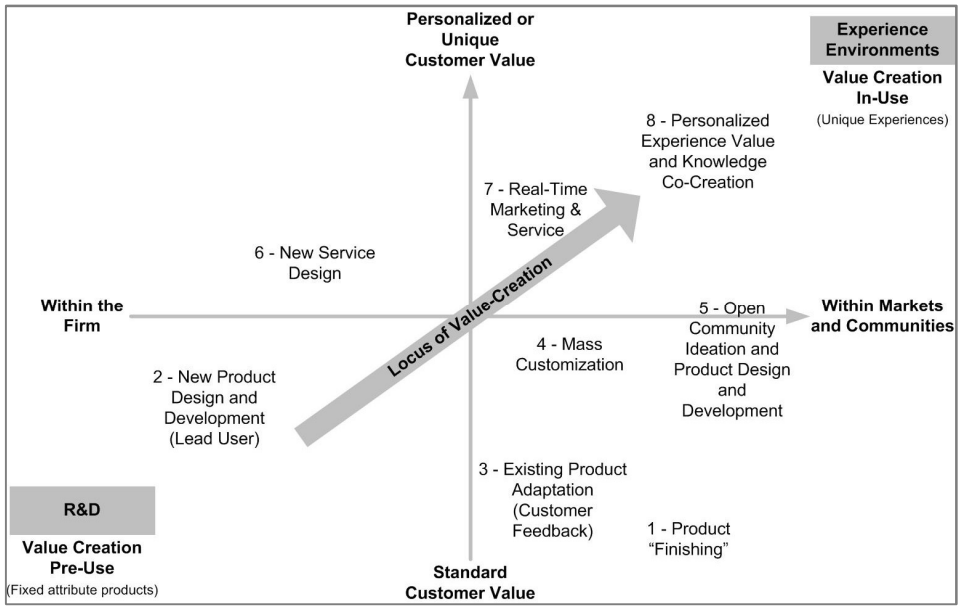

Figure 1.4 Eight styles of customer-company co-creation
(Lawer, 2006, p. 2)

Combining the two scales, Lawer (2006) has mapped eight different styles of customer-company co-creation. The total picture is depicted in Figure 1.3.

1. Product "Finishing".
   The customer finishes the product or service, as a co-creator of value, or actor in the business system. An example of this is Ikea which lets its customers assembly their furniture by themselves (Kambil et al., 1999). The product remains standard, but part of the value creation is taken out of the company.
2. New Product Design and Development (Lead User).
   Some expert users are invited in the company to share knowledge and contribute to the NPD process. This process takes place inside the company, with some pre-selected consumers. The resulting products are not unique to every individual consumer, but are better suited to the consumers' needs and wishes. Adapted from Von Hippel (1986).
3. Existing Product Adaptation (Customer Feedback).
   A company actively explores for customers' needs and feedback to improve their products. The key here is to focus on outcomes (customer's goals) rather than specific product attributes (Ulwick, 2002).
4. Mass Customization.
   A company provides a limited set of company-determined choices within a standard product or service, so the customer can 'personalize' it (Da Silveira et al., 2001). This results in a process that is partly taken out of the company, and which creates products that are 'unique' within a limited range of possibilities.
5. Open Community Ideation and Product Design and Development.
   A company gives up some control of the NPD process, and instead puts some of the initiative with users and creators outside the company. Examples are open-source communities, and companies like Innocentive (Lakhani & Panetta, 2007).
6. New Service Design.
   This type of co-creation is different from new product design (type 2) because often more consumers are involved and it is easier to test in markets. The customer shares knowledge, experiences, and problems to contribute to the innovation process (Matthing et al., 2004).
7. Real-Time Marketing & Service Adaptation.
   This includes high levels of customer dialogue and interaction, enabled by digital technology. Customers are able to change the value that is presented by a company, in real-time. For example, Fedex allows large corporate companies to change delivery times and destinations in real-time (Lawer, 2006).
8. Personalized Experience Value and Knowledge Co-Creation.
   "The unit of value is not the product or the service but the individual experience and its interaction with a host or experience network partners" (Lawer, 2006, p. 3), which is similar to Prahalad & Ramaswamy's (2004) focus on creating unique value for each customer.

What these eight styles of customer co-creation have in common is that they all include some form of customer involvement. Some of the styles involve customers to get input for the NPD process, while other styles provide them with more choices and personalization. It is important now to understand what differentiates them from each other, and how the current form of customer co-creation under investigation fits in one or more of these styles.

1.2.4 Customer co-creation characteristics

	1-Product Finishing	2-Lead User	3-Product adaptation	4-Mass Customization	5-Open Community Ideation	6-New Service Design	7-Real-Time Marketing	8-Personalized Experience Value
Cooperate with consumers		•				•		•
Unique, or custom, products			•				•	•
Innovate		•	•		•	•		•
Take part of process outside	•			•	•		•	
Collect consumer insights		•	•		•	•		•
Participants selected by company		•	•			•		
Participants are customer of company	•	•	•	•		•	•	•
Participants innovate themselves		•			•	•		

Table 1.1 Eight co-creation styles with eight possible characteristics
(Author's presentation)

Table 1.1 displays the eight customer co-creation styles and eight possible characteristics. These characteristics are determined in such a way that they differentiate the co-creation styles from each other. 'Cooperate with consumers' determines whether there is a direct interaction needed between the company and the customers. 'Unique, or custom, products' answers the question whether products are made to fulfill each customer's personal needs and wishes. 'Innovate' determines if new products are developed, contrary to existing products that are altered. 'Take part of process outside' sees if a part of the production/R&D/marketing process is taken outside the company to the customer. 'Collect consumer insights' determines whether the customer co-creation style gives customer input to the company. The bottom three characteristics include the participants: are they pre-selected, current customers of the company, and do they innovate themselves in the customer co-creation experience?
Some co-creation styles are quite similar, such as style 2 (Lead User) and style 6 (New Service Design), while others may be very different from each other; style 3 (Product adaptation) versus style 7 (Real-Time Marketing). Lawer's (2006) work displays a broad array of different activities that all fall under the concept of customer co-creation. Comparing this to the specific case under investigation, customer co-creation in virtual communities, this corresponds the most (if not perfectly) to co-creation style 5: Open Community Ideation and Product Design and Development. Placed in the middle at the far right in Figure 1.3, it means that this type of customer co-creation is primarily about taking the innovation process outside the company. At the same time it is not necessarily about creating unique, or personalized, experiences for each individual.
Summing up the characteristics for style 5 (Open Community Ideation) leads to this definition for customer co-creation in online communities:
Customer co-creation in online communities is about taking a part of the (NPD) process outside the company so that participants can innovate themselves and the company can collect new insights (ideas and concepts). Customer co-creation in online communities does not (necessarily) involve cooperating with consumers to create unique, or custom, products. Furthermore, participants are not selected by the company and do not have to be a customer of that company.

1.2.5 Success factors of customer co-creation

Prahalad & Ramaswamy (2002, 2004b) have defined four building blocks for interaction between a company and its customers to facilitate co-creation experiences. These four building blocks are (1) dialogue, (2) access, (3) risk assessment/reduction, and (4) transparency (DART). This DART interaction factor forms the basis of a successful co-creation environment. Next to this interaction factor, Tapscott & Williams (2006) present three important factors for successful (customer) co-creation for the internal organization of the company. They call co-creation communities 'ideagoras', where 'agora' is Greek for 'marketplace' (i.e. marketplaces for ideas). To be able to successfully use 'external ideas' from the ideagoras into the company there should be (5) a good overview and planning, (6) the right culture, and (7) the correct capability and skills.

The four building blocks of the DART interaction factor (Prahalad & Ramaswamy, 2002, 2004b), and the three internal organization factors (Tapscott & Williams, 2006) have led to seven success factors of customer co-creation:

1. Dialogue
   Dialogue means there is an intense interaction between a company and its customers. It involves shared learning, and mutual understanding, between two problem solvers. "Dialogue creates and maintains a loyal community" (Prahalad & Ramaswamy, 2004b, p. 6).
2. Access
   Providing customers access to information and tools supports them to become involved in the company-customer interaction. Without owning it, customers can still experience the value of information, and companies can expand their potential markets.
3. Risk assessment/reduction
   As customers become more involved in co-creation experiences, it is likely that they also want to know more about the risks associated with the products and services. Because the more they are involved in customer co-creation, the more responsibility they may take to reduce these risks.
4. Transparency
   Information about a company, its products, prices, and margins becomes more and more accessible. "[T]ransparency is also necessary for consumers of goods and services to become co-creators of value" (Prahalad & Ramaswamy, 2002, p. 11). A better insight in the company makes it possible to co-create products that better fit the company. This transparency of information creates trust between a company and its customers.
5. Overview and planning
   Before a company can start with customer co-creation it is important to get a clear overview of the current state of knowledge in the company, the desired state, and what is still missing. Once all this is known, the requirements and goals for the customer co-creation experience can be determined. These activities support the finding and recognition of new opportunities.
6. Culture
   The culture inside a company is important to successfully make use of the customer co-creation community. Employees need to be aware of, and open to, the fact that new ideas can also come from outside the company. If they are reluctant to this notion, the so-called not-invented-here syndrome (Katz & Allen, 1982), it will become very difficult to get satisfying results from the customer co-creation experience.

7. Capability and skills
   While ideas can come from outside the company it is important to have people inside who can understand and value them. Internal capability and skills and external input are therefore complements of each other. This ability of a company to recognize, incorporate, and apply external information is the absorptive capacity (Cohen & Levinthal, 1990).

1.3 Virtual Communities

1.3.1 Introduction

To support the growing trend of customer involvement, there is an increase in online communities that facilitate interaction between producers and consumers (Szmigin et al., 2005). Porter (2004) defines a virtual community as "an aggregation of individuals or business partners who interact around a shared interest, where the interaction is at least partially supported and/or mediated by technology and guided by some protocols or norms". In these communities consumers can discuss about specific brands or products, with each other and with the company, and undertake activities (such as customer co-creation). From a company perspective, virtual communities, or environments, have three key benefits for collaborative innovation with customers: (1) the direction of communication, (2) the intensity and richness of the interaction, and (3) the size and scope of the audience (Sawhney et al., 2005). The direction of interaction between the company and its customers changes from one-way to an interactive dialogue. By communicating, instead of only sending out information, companies can learn about and from customers. The richness of the interaction has increased because virtual communities generate also social knowledge about customers for companies, next to standard customer knowledge. A company can increase the size and scope of the audience through third parties that are able to reach a larger public.

1.3.2 Purposes

Hagel & Armstrong (1997) have defined four different purposes for virtual communities. Their distinction between purposes is widely used because of its simplicity and completeness and therefore serves as a good model to determine the purpose of a customer co-creation community. Generally, a virtual community can fulfil one specific purpose, but often it is a combination of two (or more). The purposes are basically people's basic needs that create the basis of interaction.

1. Interest
   Many virtual communities target one or a group of related interests of people. These interests can vary widely; from personal hobbies to professional business information. In the community information is shared and problems get solved.
2. Relationship
   "Virtual communities give people with similar experience the opportunity to come together – freed from the constraints of time and space – and form meaningful personal relationships" (Hagel & Armstrong, 1997, p. 19). Some examples of these experiences are professional careers, a particular stage in life, or a traumatic event.
3. Fantasy
   In a MUD (multi-user dimension) people come together to take on a (fantasy) role and interact with each other in elaborate and evolving games. Some games are far away from daily life, others can be based on real-life developments (such as sports).
4. Transaction
   Some virtual communities have developed into virtual marketplaces. In these environments people are able to trade goods with each other, or buy from the community provider (in the case of a commercial provider).

A virtual customer co-creation community mainly fulfils two purposes: interest and relationship. These communities can attract people with specific interests, such as the company or its brand(s), or the co-creation experience itself. These shared interests form a basis on which community members can interact and exchange information and experiences. In some co-creation communities there is a clear purpose of transaction: Solutions to problems are given in exchange for money or other types of rewards. Rewarding with big sums of money mainly occurs in the more high-end co-creation communities, such as Innocentive (further explained in 1.3.5). Customer co-creation communities are not about role-play in (fantasy) games. Therefore the customer co-creation community does not fulfill this purpose.

1.3.3 Visitors

Different purposes for a virtual community attract different kinds of people. But generally, in each virtual community, the different types of visitors can be categorized in different groups. The word 'visitor' has explicitly been chosen here instead of 'member', because one does not necessarily have to be a (registered) member of a virtual community to be able to use it. Both Mathwick (2002), as well as Kozinetz (1999) have come up with four different types of online community visitors, similar between both studies. They can be aligned according to two factors: their contribution to the community, and their social ties to the community. Mathwick (2002) describes these types as Transactional community members, Personal connectors, Socializers, and Lurkers. Kozinetz (1999) has named them Insider, Devotee, Mingler, and Tourist. The four user types are structured in Figure 1.4.

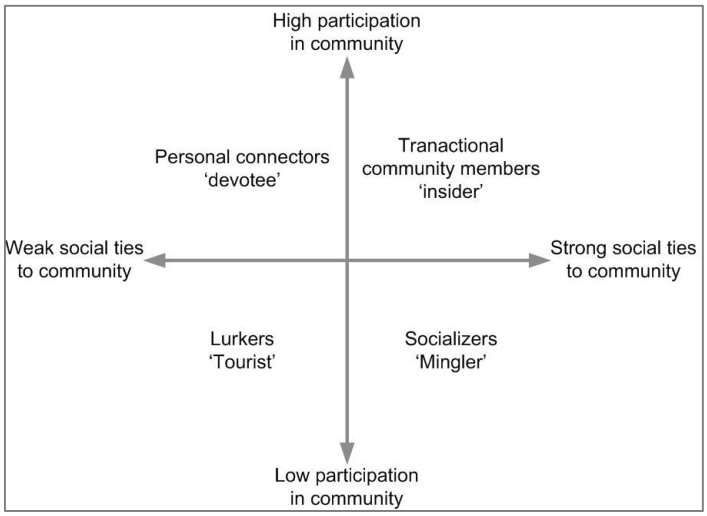

Figure 1.4 Four types of virtual community visitors (Adapted from Mathwick (2002), Kozinetz (1999))

1. Transactional community members, Insider
   These participants in virtual communities have both a high participation as well as strong social ties in the community. They engage in on-line dialogues and provide feedback to the community and its members. They are very loyal members to the community.
2. Personal connectors, Devotee
   These participants have weak social ties to the virtual communities itself or its participants. They use the Internet primarily to maintain contact with family, friend, and colleagues. If this group has found what it was looking for in a community, it remains quite loyal to it. Mathwick (2002) defines them as moderately active, while Kozinetz (1999) says they can be very active.

3. Socializers, Mingler
   This group is socially very active in the community, engaging in online relationships. Though, they contribute less to the community in the sense of knowledge development.
4. Lurkers, Tourist
   Lurkers stay on the sidelines of the community, and rather observe than participate. "This type of individual does not invest in online relationships and is significantly lower in loyalty intentions than any other group in this sample" (Mathwick, 2002, p. 49).

1.3.4 Success factors of virtual communities

Different types of virtual community visitors have different reasons to visit a virtual community. These reasons are also related to the benefits of visting a virtual community. Nambisan (2002) has identified three types of benefits that motivate a person to participate in a customer co-creation community. These are (1) product- or service-related, (2) community-related, and (3) medium-related. It should be noted that all these are non-monetary. "Users have sufficient incentive to innovate when they expect the benefits of innovating to exceed their costs" (Von Hippel, 2001, p. 84). Monetary motivations to participate in customer co-creation communities are well possible too, though. In the community of Threadless, which will be explained further in the next paragraph, successful contributors can earn prizes up to $2,500.

1. Product- or service-related benefits
   Within this type of motivation there are three directions. The first one is to enhance the overall quality of the product by participating in the co-creation project. The second motivation to participate is to gain specific knowledge about the product and its technologies. The last motivation is to satisfy creative urges and product/technology-related curiosity, not specific to the current product or technology. Transactional community members, and to a lesser extent personal connectors, are motivated by these benefits.
2. Community-related benefits
   The benefits here can be divided in four different aspects. First, participating in customer co-creation provides a sense of belonging and identity shaped by group norms. Secondly, within a group innovative and value-creating ideas can be shared. Thirdly, other business and non-business problems can be solved. Finally, the group process can satisfy the participant's desire for peer recognition, and status seeking. These are the type of benefits that socializers are looking for.
3. Medium-related benefits
   "By creating a compelling online environment where customers can interact and explore knowledge about the product and its development, organizations can provide optimal online experiences that are extremely gratifying and that lead to more intense participation in NPD" (Nambisan, 2002, p. 405).

Next to the three benefits to participate in a virtual community from Nambisan (2002), Szmigin et al. (2005) have developed a framework that includes three key elements that create customer bonding in a virtual community: (4) interactivity, (5) technical infrastructure, and (6) service value (Figure 1.5). Customer bonding, or the loyalty of customers, is an indicator of online community effectiveness (Lin & Lee, 2006).

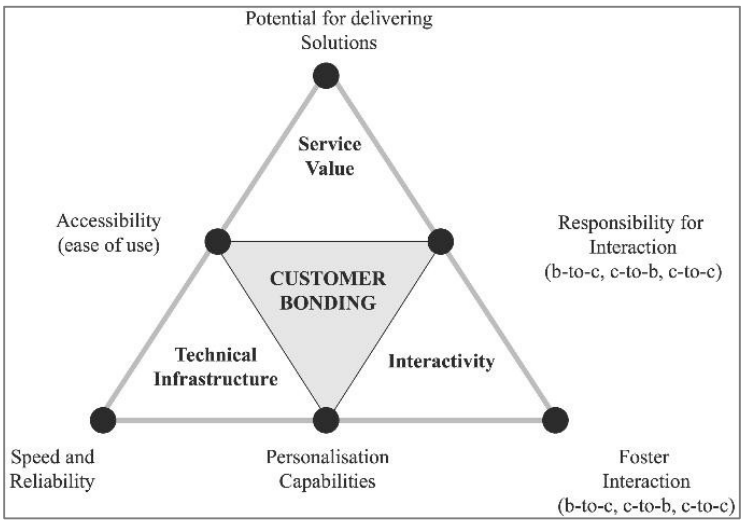

Figure 1.5 The customer bonding triangle framework (Szmigin et al., 2005, p. 489)

4. Interactivity
   Interaction stands for all the communication that takes place in the community. This is the communication between participants, and between participants and the organization. "That people are involved and interacting with one another, should lead to greater interest than just receiving information" (Szmigin et al., 2005, p. 489).
5. Technical infrastructure
   The technical infrastructure is the medium in which the interaction takes place. Its speed and reliability are of high importance here. If a virtual community is technologically not reliable (slow or many downtimes, for example) customers will lose their loyalty to the community. Improvements in (interactive) technology have made it possible that many customers can become co-creators.
6. Service value
   The service value is this specific case means that participants can contribute to the community by co-creating. It is the 'solution' to their need of contributing ideas to the community. "The potential for delivering solutions is related to customer satisfaction" (Szmigin et al., 2005, p. 490). If customers have the feeling that their need that cannot be completely fulfilled by the virtual community they will not contribute anymore.

1.3.5 Customer co-creation communities

An example of a company that makes use of a virtual co-creation community is LEGO. It has created a community, LEGO Factory[1], where LEGO enthusiasts can contribute ideas and new designs. Participants build a virtual LEGO model, and present it on the website. On the website, all the designs are displayed, and can be purchased directly online. There are design competitions, and the winners' designs go into actual production (Bessant, 2008; Bughin et al., 2008). Furthermore, user communities have grown around LEGO's Mindstorms, a LEGO 'brain' with sensors and actuators that can be programmed. These communities consist of a wide range of different people, including technology and programming experts. The size of the community and the involvement of leading-edge experts have lead to a situation where the community has surpassed LEGO's R&D laboratories in Denmark in knowledge and application development (Snow et al., 2009).

[1] http://factory.lego.com [Last visited May 31, 2010]

Another example of a company that has incorporated a virtual customer co-creation community is Threadless[2]. In this case the company is primarily based on the co-creation community. "Threadless.com's business model revolves around an ongoing competition to which anyone, professional graphic designers and amateurs alike, can submit designs for new t-shirts. The community is polled on both the designs (…) and willingness to buy. Threadless uses this information to select for production six to ten new designs each week" (Lakhani & Panetta, 2007, p. 101).

For SMEs, developing and maintaining an online co-creation community can be a real challenge. This is due to the costs that are related to the hardware, software, and personnel that are needed to incorporate such a community into the company (Thomas et al., 2004). To take this (financial) responsibility out of the hands of companies (small and big), multiple companies have arisen that have created an online customer co-creation community where co-creation 'challenges' can be posted. An example of such a company is InnoCentive[3]. InnoCentive, which started as a spin-off from Eli Lilly and Company[4], a global pharmaceutical company, offers a high-end online customer co-creation community. Companies that have difficult science-related problems can post them at the Innocentive website. The importance and difficulty of these problems is expressed in the cash prizes that are awarded for a good solution; these prices can range from $5,000 to $100,000. InnoCentive serves as a knowledge broker; it provides the seeker firm with a solution and the intellectual property (IP), and in return Innocentive receives a fee and the problem solver the price money (Lakhani & Panetta, 2007).

1.4 Conclusion

First, the sub-questions that have been presented in 1.1.3 and answered in 1.2.5 and 1.3.4 will be summarized:

What are the determinants of successful customer co-creation?

According to literature, the determinants of successful customer co-creation are (1) dialogue, (2) access, (3) risk assessment/ reduction, (4) transparency (DART; Prahalad & Ramaswamy, 2002, 2004b), (5) culture, (6) overview and planning, and (7) capability and skills (Tapscott & Williams, 2006).

What are the determinants of successful virtual communities?

The determinants of successful virtual communities are (1) product- or service-related benefits, (2) community-related benefits, (3) medium-related benefits (Nambisan, 2002), (4) interactivity, (5) technical infrastructure, and (6) service value (Szmigin et al., 2005).

Returning to the main question of this thesis,

What are the determinants of successful customer co-creation in virtual communities, from a SME perspective?

[2] http://www.threadless.com [Last visited May 31, 2010]
[3] http://www.innocentive.com [Last visited May 31, 2010]
[4] http://www.lilly.com [Last visited May 31, 2010]

It is now important to investigate how the different success factors are related to SMEs. While the given success factors are quite general in nature, it would be interesting to see how they withstand analysis in a real-life context. To be more specifically, are the success factors related to the success of customer co-creation projects that have been carried out by SMEs? This will be further elaborated on in the next chapter, which will develop a conceptual model.

2 Conceptual Model and Hypotheses

2.1 Conflict

2.1.1 Success factors for customer co-creation

There is a conflict between the success factors for customer co-creation and the many problems that SMEs have with innovating. This conflict is present in each of the four success factors; DART, overview and planning, culture, and capability and skills.

The lack of people, internal and external communication, and time in SMEs (Lindman et al., 2008; Millward & Lewis, 2005; Tidd et al., 2005) conflict with the DART interaction factor of customer co-creation (Prahalad & Ramaswamy, 2002, 2004b). This is because all four of its building blocks (dialogue, access, risk, transparency) require input from people (which costs time), and involve communication to the outside world. If there are not enough people, with not enough time, that do not know how (or do not want) to communicate with customer co-creators it is likely that the co-creation project is less successful.

The presence of only a short-term planning, in combination with unclear processes in SMEs (Lindman et al., 2008; Woodcock et al., 2000; Hoffman et al., 1998), lead to a conflict with the success factor overview and planning (Tapscott & Williams, 2006). Customer co-creation projects need a clear process with goals and requirements to make the outcome useful and with that successful.

A resistance to change that is present in some SMEs (Millward & Lewis, 2005) conflicts with the success factor culture that demands for an openness to ideas from outside the company (Tapscott & Williams, 2006; Katz & Allen, 1982). If an SME is hesitant to accept input from outside the company, it becomes difficult to make a co-creation project successful.

The lack of (marketing) skills in SMEs (Scozzi et al., 2005; Lindman et al., 2008) conflicts with the success factor capability and skills (Tapscott & Williams, 2006; Cohen & Levinthal, 1990). It is important for an SME, conducting a co-creation project, to be able to judge incoming ideas from the co-creation project on its value to make it a success.

2.1.2 Success factors for virtual communities

Although there is some conflict between the success factors for virtual communities and the problems that SMEs have with innovating, these are of less importance here. The reason for this is the presence of a customer co-creation community facilitator (see 3.3) in the current case under investigation. This facilitator, which facilitates the customer co-creation project for each of the participants, solves all of the problems that an SME would otherwise come across when implementing a virtual community on its own (Thomas et al., 2004). This accounts for the technical infrastructure, the interactivity, as well as the service value (i.e. the customer bonding elements; Szmigin et al., 2005). Even the possible rewards and benefits (Nambisan, 2002) are taken into account.

2.2 Community-challenge fit

Still, there is one important factor concerning the virtual community in relation to the outcome of the customer co-creation project. This factor is about the fit between the nature of the co-creation challenge and the people in the virtual community. This means that a specific community may be better suited for a specific type of customer co-creation challenges (Dholakia et al., 2004; Whitla, 2009). This community-challenge fit has an influence on the relationship between the success factors for customer co-creation and the outcome of the customer co-creation project in a virtual community. It moderates the influence of the success factors in such a way that when the community-challenge fit is high it strengthens the relationship and when the fit is low it weakens this relationship.

2.3 Success of the co-creation project

The success of the co-creation project can be measured on different levels. One could look at the number of product introductions, or increase in sales. But these are long-term measures and therefore beyond the scope of this research (Hultink & Robben, 1995).
The success of the customer co-creation challenge can also be measured by the success of the challenge itself. Examples of this are the number of ideas posted, or the number of useful ideas. Also any (short-term) possible side-effects that may have emerged from the customer co-creation challenge, such as new business contacts, or exposure in the media, can be taken into account.
Somewhere in between this long-term and short-term measures on success are the expectations from the company on how much ideas will be actually used as input for future products. Although this is a short-term measure, it does give an indication of the long-term effects of the customer co-creation challenge.

2.4 Conceptual Model

The conceptual model (Figure 2.1) depicts how the success factors for customer co-creation are related to the outcome (success) of the customer co-creation project in a virtual community. These are all positively related. At the same time the model shows the influence of the community-challenge fit on the relationship between a success factor and the outcome of the project.

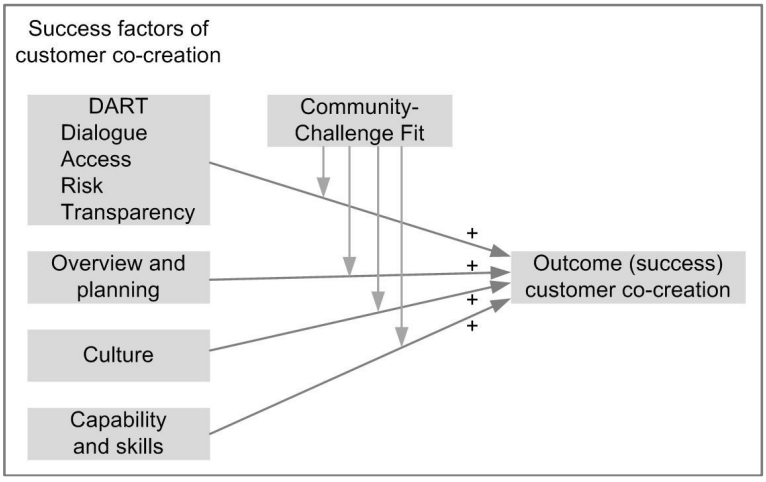

Figure 2.1 Conceptual model (Author's presentation)

2.5 Hypotheses

From the conceptual model five specific hypotheses can be derived that can be investigated and tested on the customer co-creation challenges. These form the basis on which further research will be constructed.

1. A higher level of the DART interaction factor leads to a higher success of the customer co-creation outcome.
2. A higher level of overview and planning leads to a higher success of the customer co-creation outcome.
3. A higher level of corporate culture leads to a higher success of the customer co-creation outcome.
4. A higher level of innovation skills and capabilities leads to a higher success of the customer co-creation outcome.
5. A higher community-challenge fit makes the effects of the success factors on the customer co-creation outcome stronger.

3 Methodology

3.1 Research setting

3.1.1 Introduction

This research is carried out in cooperation with Syntens, a Dutch semi-government organization which supports micro, small, and medium enterprises with innovating. A full company description can be found in Appendix A. Syntens has set up a customer co-creation project in which multiple SMEs will participate and post a customer co-creation challenge online. Syntens supports the SMEs by financing the costs for posting the challenge online, and by advising them in developing a suitable challenge. The participating SMEs have been selected by Syntens. This was done by contacting all of the SMEs from the 'SME innovation top 100' of the most innovating SMEs from The Netherlands (Syntens, 2009c). As a result, 19 SMEs were interested in, and willing to, participate in Syntens' customer co-creation project. Next to that, some other SMEs that were interested and suitable have joined the customer co-creation project.

3.1.2 Sample

For this specific research seven SME's will be investigated, because they are, or have been, already actively involved in customer co-creation. Therefore, this group of SMEs is a purposive sample (Cooper & Schindler, 2006); they are explicitly chosen for this research because of their involvement with the customer co-creation project. The participating SMEs, including a short description, can be found in Appendix B. In general, the SMEs all develop and/or produce their products themselves. Most of the companies operate in a business-to-business (B2B) or business-to-business-to-consumer (B2B2C) market, while some (also) serve the B2C market directly. Each individual SME is the unit of analysis (Van Aken et al., 2007), the focus of interest.

3.1.3 Community

The website on which the SMEs will post their challenge is RedesignMe[5].This website maintains its own online community in which co-creation challenges can be posted. A company can post a challenge at the website, in the form of a question or problem statement, and community members can then submit (product) ideas and solutions. Within this environment there is also the possibility for community members to communicate to each other, discuss the posted solutions, and ask questions to the companies that have posted a challenge. At the end of the challenge, usually one or two months after the challenge has started, the company can reward the best ideas with virtual money. This virtual money ('RDM's') can be exchanged for gifts (MP3-players, gift cards, etc.) from the online shop.

[5] http://www.redesignme.com [Last visited May 11, 2010]

3.2 Research method

3.2.1 Introduction

In investigating the relationship between the success factors for customer co-creation and the success of the customer co-creation outcome, the aim is to find a linear, or causal, relationship. This means that the state of one variable (success factor) is responsible for the state of another variable (outcome). Though, in business research this cause-effect relationship is less explicit than in the natural sciences (Cooper & Schindler, 2006). Furthermore, a communication approach is taken, contrary to an observatory approach. Observation can be performed on conditions, behavior, events, people, and processes. By communicating with people one learns more about attitudes, motivations, and intentions (Cooper & Schindler, 2006). Because of the nature of the research topics (culture, transparency, etc.), a communication approach is preferred.

3.2.2 Survey

The choice for a communication approach means that people will be surveyed. A survey is a measurement process which is used to collect information during a (highly) structured interview, with or without a human interviewer. While the term 'survey' is used interchangeably with the term 'questionnaire' in practice, these are not the same; a questionnaire is a specific type of survey. In general there are four types of surveys: the face-to-face interview, (mail) questionnaire, telephone interview, and the Internet survey (De Leeuw, 2008).

By providing each participant with the same survey one can obtain comparable data between subjects. Using the correct statistical measures, survey findings and conclusions can be generalized to larger populations (Cooper & Schindler, 2006).

Surveys have certain advantages as a primary data-collecting approach because of their versatility. Different types of (abstract) information can be gathered by questioning participants. Also, some well-chosen questions can provide information that would be much more difficult to obtain by observation. Furthermore, surveying by telephone, mail, or computer (internet, e-mail) makes it possible to reach participants over large distances without any extra time or costs (Cooper & Schindler, 2006).

3.2.3 Semi-structured interviews

A specific type of survey is the semi-structured interview. "A semi-structured interview is a verbal interchange where one person, the interviewer, attempts to elicit information from another person by asking questions. […] semi-structured interviews unfold in a conversational manner offering participants the chance to explore issues they feel are important" (Longhurst, 2003, p. 117). Semi-structured interviews are conversational and informal in tone, and allow for an open response from respondents. There are various advantages of semi-structured interviews compared to other survey methods. The greatest value lies in the depth of information and detail that can be secured. The interviewer has more possibilities to improve the quality of the information received than with another method. During the interview the interviewer can adjust the language according to the specific situation and participant. Also because the interviewer receives the information directly from the participant, vocally and visually, he can provide immediate feedback, refine questions, and ask further if an answer is unclear (Cooper & Schindler, 2006).

Preparation of the interview is essential. The interviewer needs to be acquainted with the topic of interest, and has a clear understanding of the goal of the interview. A list of actual questions, or at least different themes that need to be addressed, ensures that one covers the whole topic and receives all the information required (Longhurst, 2003). Next to that, a recording of the interview guarantees that all information is stored.

3.2.4 Data gathering

While semi-structured interviews are generally a method to gather qualitative data (Chi, 1997), the goal here is to gather data from the interviews that can be analyzed quantitatively. Although there are methods to 'code' verbal data into pieces that can be quantified, these are more useful to measure underlying constructs (Culp & Pilat, 1998). Besides that, they lack some objectivity due to the coder's influence (Chi, 1997). A more direct way is to ask questions that require an answer that is directly quantifiable. Quantitative data can be expressed numerically or classified by some numerical value. Compared to qualitative data it is more factual, controlled, objective, and generalizable (Crowther & Lancaster, 2008). Besides quantitative, the data gathered is also primary; "Primary data does not actually exist until and unless it is generated through the research process" (Crowther & Lancaster, 2008, p. 74), for example by an interview. Secondary data is information which already exists in some form but was not collected for the purpose of the current research.

3.3 Interview development

The goal of the semi-structured interview is to investigate the company on five different aspects; the four success factors (DART, overview and planning, culture, and capability and skills) and the outcome (success) of the customer co-creation project. To develop, refine, and even pre-test questions to measure the different success factor constructs requires considerable time and effort. Implementing existing instruments can shorten this process considerably (Cooper & Schindler, 2006). For this reason, where possible, existing instruments have been put in place.

3.3.1 DART

The four parts that make up the DART factor, dialogue, access, risk, and transparency, will each be investigated separately.

The first indicator of dialogue, the interaction between a company and its customers, will be determined by finding out in which stages of the NPD process , and with what intensity, the company interacts with (potential) customers. For this the work of Gruner & Homburg (2000) is used. They determined six stages in the NPD process in which customer interaction is possible. The stages include idea generation, product concept development, project definition, engineering, prototype testing, and market-launch. Although they researched the influence of customer interaction in the individual stages on new product success, this is the beyond the scope of this research.

A second indicator of dialogue between a company and its (potential) customers is the number of comments by the company during the co-creation challenge. To be more precise, it is the number of comments by the company's community manager divided by the total number of ideas ('redesigns') submitted. The choice for a ratio (comments/redesigns), instead of the absolute number of company comments, is that more input from the community (redesigns) also requires more input from the company (comments). This measure does not need to be conducted during the interview; instead it comprises online research in the co-creation community of RedesignMe.

To determine the access part of DART, the different ways that (potential) customers have access to information from the company are measured. Some examples of this are the company website, a customer service desk, a YouTube channel, and presentations. The different points of access to the company will be counted, so they can be compared to the rest of the sample.

The risk sharing between a company and its customers is determined by asking which risks are shared and to what extent. Some examples of these risks are financial risks, and the risk to expose your intellectual property (IP).

Transparency of company information is measured on four different aspects. These are the company itself, its (future) products, prices, and margins. The question is not only if any of this information is shared with (future) customers, but also to what extent.

3.3.2 Overview and planning

The overview and planning factors consists of two scales: time perspective, and process formality (Tatikonda & Montoya, 2001).

The time perspective is related to both overview and planning. It determines whether there are plans and goals on which the company aims for, and how far in time these plans reach. This time perspective of the company is measured on three different levels. These three levels are the time perspective for future plans for (1) the company in general, (2) new product lines, and (3) new products. Next to that the likeliness of each of these three time perspectives is asked, i.e. how likely it is that the future plans will be fully met in the given time perspectives.

Process formality analyzes how these plans and processes are executed. It "represents the degree to which rules, policies, and procedures govern the product development work activities. It typically occurs via utilization of structured processes for managing the project" (Tatikonda & Montoya, 2001, p. 156). This scale measures to what degree project management rules and procedures are (1) formalized via documents, (2) actually followed, and (3) if progress reviews are held.

3.3.3 Culture

The culture, the openness to ideas from outside the company, is measured on two different scales; market orientation (Deshpande & Farley, 1998), and use of external information and knowledge sources (Laursen & Salter, 2006).

While market orientation can be defined as the complete process of generating, disseminating, and responding to market information (Kohli & Jahworski, 1990), here the focus lies very specifically on the willingness and ability to gather customer information. Therefore, market orientation is "the set of cross-functional processes and activities directed at creating and satisfying customers through continuous needs assessment" (Deshpande & Farley, 1998, p. 213). This scale specifically measures the company's focus on the customer. If a company has a clear focus towards it customers, it is likely that it will accept new ideas from that customer more easily. This variable primarily focuses on the first step in Kohli & Jahworski's (1990) definition; the generating of market information. The second (disseminating) and third (responding) step will be measured in the capability and skills division (3.3.4).

The external sources scale (Lauren & Salter, 2006) lists numerous possible sources from areas like the market (competitors, suppliers, etc.), institutional (universities, other public sector), specialized (environmental and safety regulations), and others (trade associations, conferences, etc.). This measures the willingness, and experience, a company has with receiving new knowledge, new ideas, from outside the company.

3.3.4 Capability and skills

The capabilities and skills of a company, in the field of marketing and innovation, are measured by their investments in innovation (Nassimbeni, 2003) and their marketing (and innovation) capabilities (Vorhies & Morgan, 2005).

The investments in innovation, as a percentage of yearly turnover, are measured on four levels. These four levels are (1) new materials, (2) new products, (3) new production technologies, and (4) new working methods. They are an indication of the willingness and ability to innovate.

The marketing capabilities, compared to close competitors, are measured on eight different fields. These fields are: (1) product development, (2) pricing, (3) channel management, (4) marketing communications, (5) selling, (6) market information management, (7) marketing planning, and (8) marketing implementation. "[E]ach marketing capability is positively and directly related to firm performance, indicating that these marketing capabilities are sources of competitive advantage" (Vorhies & Morgan, 2005, p. 83).

3.3.5 Outcome

The outcome, the success, of the co-creation project is indicated by the number of ideas that may possibly be really used. This number gives an indication if any of the ideas will be further developed to an actual product. Although this is not the actual number of products that will result in a product, it does give the best insight whether the provided ideas from the community are useful to the company.
Also, the overall opinion by the company whether the co-creation project was a success, on a scale, is asked. Finally, more general questions on the co-creation project are asked. These do not necessarily contribute to the quantification of the outcome, but do provide some background and interpretation to the given answers.

3.3.6 Interview procedure

Except for some open questions and questions that require an exact figure, most of the questions make use of a 5-point Likert scale. A Likert scale with five points provides enough differentiation between low and high scores as well as it is easily interpretable. Likert scales with more than five points do not necessarily give better results (Dawes, 2008). Also, one could argue that a Likert scale, even with more than five points, still remains just an interpretation of a latent variable (Clason & Dormody, 1994).
Almost the complete survey was conducted as a (semi-structured) face-to-face interview. Except for the market orientation scale; this was conducted as a short written questionnaire. The reason for this is that most of the questions require some extra explanation, as well as some extra interpretation of the answers, to fill out the survey properly. The market orientation survey does not need this extra explanation and was therefore handed out directly after the interview.
For each SME, one person was interviewed. All of the interviewees were, or had been, involved with the customer co-creation project, but were also able to answer the questions on the company characteristics. Their functions ranged from managing director (owner), senior manager, to account manager.
The complete interview can be found in Appendix C.

3.4 Community-challenge fit

Although different attempts have been made to create an indicator of the community-challenge fit, this has proven to be difficult and has resulted in no usable indicators. The goal here was to create a profile of the RedesignMe community, its specialties, and preferences, which could be compared to each of the seven co-creation challenges. By comparing them, a ranking could then be made on the appropriateness of the challenge for this specific community.
One approach has been to investigate the user profiles of successful RedesignMe users. Successful RedesignMe users are those who have gained rewards (‘RDMs’) for one or more or their contributions in a co-creation challenge. In their user profiles, community users can indicate which ‘role’ they (want to) have in the RedesignMe community. The roles they can choose from are ‘all rounder’, ‘marketeer’, ‘engineer’, ‘designer’, and ‘consumer’. This could be an indication of the overall profile of the whole community. But because this is not an obligatory question to answer in the profile, and by default the role of ‘all rounder’ is filled in, this is not a reliable source to base a community profile on. This comes to expression in the fact that of the 120 successful RedesignMe users, 88 are an ‘all rounder’ in their profile[6].
Another way to describe the community-challenge fit is to let the company RedesignMe rank the seven co-creation challenges. They have both the knowledge on appropriate co-creation challenges, and likely a good insight in the RedesignMe community. Unfortunately, a request to the company

[6] Measured on March 17, 2010

RedesignMe to rank the seven co-creation challenges on appropriateness was turned down. The reason for this was that, according to RedesignMe, by principal, every type of co-creation challenge is appropriate for the RedesignMe community. While this is probably not completely true, this reaction from RedesignMe is likely to come from a social-desirability bias: "[T]he tendency of subjects […] to present themselves in socially acceptable terms in order to gain the approval of others" (King & Bruner, 2000, p.81).
A last attempt was to personally rank the seven co-creation challenges, based on their appropriateness for the specific RedesignMe community. But due to the author's heavy involvement with the companies and their co-creation challenges in the interview sessions, this turned out to not be feasible. Because of the insights gained in the interviews, especially the outcome of the co-creation projects, this would become a very subjective measure. Because the outcome (success) of the different co-creation projects was already known, it would be difficult to objectively develop an input variable. This backwards reasoning (the successful co-creation projects were probably more appropriate) does not create a correct, and reliable, basis for ranking the co-creation challenges.
Because a community-challenge fit variable could not be developed, hypothesis 5 (see 2.5) cannot be investigated and is therefore left out from further analysis.

3.5 Data analysis

To test the relationship between the success factor and the outcome the Kendall rank-order correlation coefficient T (or tau-a, T_{xy}) statistic will be used. The reason to use this method is that it is a non-parametric statistic and therefore requires fewer assumptions, which is convenient with a sample size of only seven (Chen & Popovich, 2002). This measure requires that the data is ordinal, and therefore can be presented in a ranking. This means that for each variable measured (success factors, outcome) the results are ranked according to the score on that variable.
The ranking of SMEs on a specific success factor can be compared to the ranking based on the outcome variable. According to the hypotheses these rankings should be similar; a high score on a success factor should result in a high score on outcome. The Kendall rank-order correlation coefficient T is the difference between the probability that, in the observed data, two variables are in the same order and the probability that these are in a different order. The possible values of T range from +1 to -1. A perfect positive or negative relationship is indicated by +1 or -1, respectively. A value of zero indicates there is no relationship at all between the variables. To reject the null hypothesis (that the variables are unrelated in the population) T needs to be significant. This significance depends on the value of T and the sample size (N) and can be found in pre-determined tables (Siegel & Castellan, 1988). When some scores are tied (i.e. they have the same value) the tau-b statistic can be used, which is similar to T (tau-a) (Siegel & Castellan, 1988; Kinnear & Gray, 2004).

4 Results

4.1 Omitted variables

After the seven interviews have been conducted, there are certain variables that have to be dismissed due to the fact that these have turned out to be not usable for the final analysis. These are access, risk, investments in innovation, and positive/negative side effects.

Access, the number of different ways that (potential) customers have access to information from the company, gave very mixed results. Where some companies where able to list numerous ways in which people could access information from the company, others could only come up with some of the more obvious ways of access (website, telephone). This does not mean that this last group of companies in fact has minimal ways of access to company information, though, but probably the interviewees were not immediately aware of these access possibilities. Therefore, because of the low reliability of the access variable, this variable has been left out of further analysis.

Concerning the risk variable, most respondents were only able to give one example of risk sharing (often something financial) or none at all. Besides that, they could not very well indicate the extent to which this risk was shared. Because of this low response, and its unreliable intensity, this variable has been left out of further analysis.

An indication of the investments in innovation, as a percentage of yearly turnover, proofed to be very difficult for most respondents. The few who were able to provide a percentage could not split this up in the four levels given (company, products, production, working methods). Therefore, because most of this data is incomplete or missing at all, this variable was omitted from further analysis.

Because most of the companies could not think of any positive or negative side-effects related to the co-creation project, this variable was also omitted from further analysis.

4.2 Scoring

For the remaining variables, each score per company is calculated. This has resulted in nine variables on which each company has a score. For each variable, the underlying scores per question are summed. This accounts for both the questions that have been answered on a Likert scale, as those that required an exact number. These different types of scores are not mixed within one variable; a variable is composed of either the summing of Likert scales, or exact numbers.

It is important to note that the individual variables that make up one factor are kept intact. For example, the two variables ‘external information sources’ and ‘market orientation’ that together form the success factor culture are kept separate. The reason for this is that the individual variables give a much better insight in what they represent, especially if there is a significant relationship with the outcome variable. Furthermore, combining different variables to one variable can distort an underlying relationship with an outcome variable that may or may not be there. This can result in a significant relationship while in reality there is not, or the other way around. The scoring of the seven companies on the nine variables can be found in Table 4.1. The ranking of the company on the specific variable is given in between brackets.

	Comments redesign	Dialogue NPD process	Transparency	External Sources	Market orientation	Process formality	Time perspective	Marketing Skills	Ideas used
Company X	0.49 (4)	3.00 (2)	2.50 (4)	2.50 (4)	3.80 (3)	3.00 (7)	3.83 (1)	3.63 (1)	3 (2)
Eximion	0.92 (2)	2.17 (5)	3.25 (1)	2.44 (5)	4.40 (1)	3.33 (4)	3.00 (5)	3.00 (7)	2 (3)
Idee Systems	2.00 (1)	3.33 (1)	3.00 (2)	3.00 (1)	4.10 (2)	4.33 (1)	3.67 (2)	3.63 (1)	5 (1)
Phoenix	0.41 (6)	2.83 (3)	3.00 (2)	2.56 (3)	2.50 (7)	3.33 (4)	3.50 (3)	3.50 (3)	2 (3)
Robopos	0.45 (5)	1.83 (7)	1.75 (7)	2.44 (5)	2.70 (6)	3.33 (4)	2.50 (7)	3.13 (5)	1 (5)
Schiebroek	0.56 (3)	2.33 (4)	2.50 (4)	2.81 (2)	3.70 (4)	3.67 (2)	3.33 (4)	3.13 (5)	1 (5)
Smart-Sign	0.14 (7)	2.00 (6)	2.50 (4)	2.38 (7)	3.70 (4)	3.67 (2)	2.67 (6)	3.38 (4)	0 (7)
AVERAGE	0.71	2.50	2.64	2.59	3.56	3.52	3.21	3.34	2.00

Table 4.1 Scores of SMEs on nine variables (ranking in between brackets)

4.3 Correlation of input variables

The data from Table 4.1 are analyzed with the software program SPSS. First, a correlation matrix with the eight input variables is constructed. While a correlation matrix is normally used in a regression analysis to test for multicollinearity (Field, 2005), it can also provide interesting information on how the different input variables are related.

Kendall's Tau-b (*T*) is used as the bivariate correlation coefficient, with a two-tailed test of significance. Kendall's Tau-b is appropriate here because there are some ties between scores within a variable, i.e. some companies have the same score for a particular input variable (Siegel & Castellan, 1988; Kinnear & Gray, 2004). The choice for the two-tailed test of significance is due to the fact that there is no prediction (hypothesis) on how these input variables correlate to each other (Field, 2005). The results of this analysis are in Table 4.2.

	Comments redesign	Dialogue NPD process	Transparency	External sources	Market orientation	Process formality	Time perspective	Marketing skills
Marketing skills	-.05 (.878)	.65** (.046)	.06 (.871)	.31 (.351)	.00 (1)	.06 (.871)	.65** (.046)	1
Time perspective	.24 (.453)	.91** (.004)	.27 (.427)	.49 (.129)	.20 (.543)	-.05 (.874)	1	
Process formality	.16 (.634)	.05 (.874)	.12 (.738)	.27 (.422)	.16 (.630)	1		
Market orientation	.59* (.068)	.29 (.362)	.49 (.149)	.05 (.878)	1			
External sources	.49 (.129)	.59* (.068)	.22 (.521)	1				
Transparency	.37 (.266)	.37 (.266)	1					
Dialogue NPD process	.33 (.293)	1						
Comments redesign	1							

Table 4.2 Correlation matrix of input variables (* $p < .10$, ** $p < .05$)

Most of the correlations between the input variables are low and non-significant. There are however some variables that correlate significantly. The two variables 'dialogue in NPD process' and 'time perspective and feasibility' show a significant relationship of $T = .91$ ($p < .01$). They are highly related, which can also be witnessed in their rankings in Table 4.1; only the first two ranks differ between the two variables. It is therefore likely that in further analysis these two variables will show similar results. This already comes to expression in their relationships with the variable 'marketing and innovation skills'. Both 'dialogue in NPD process' ($T = .65$, $p < .05$) and 'time perspective and feasibility' ($T = .65$, $p < .05$) are significantly related to this variable.

4.4 Hypotheses testing

To test the hypotheses, the correlation between the eight input variables and the output variable is calculated with SPSS. Again, Kendall's Tau-b is used as the bivariate correlation coefficient, but this time with a one-tailed test of significance. The reason for the one-tailed test of significance is that there are directional hypotheses on how these variables correlate to each other (Field, 2005); a high score on a success factor is related to a high score on outcome (success). The results of this analysis are in Table 4.3.

	Ideas that will possibly be used	Hypothesis
Comments redesign	.55** (.045)	1. A higher level of the DART interaction factor leads to a higher success of the customer co-creation outcome. **Partially confirmed**
Dialogue NPD process	.75** (.011)	
Transparency	.39 (.128)	
External sources	.51* (.060)	2. A higher level of overview and planning leads to a higher success of the customer co-creation outcome. **Partially confirmed**
Market orientation	.31 (.176)	
Process formality	-.22 (.258)	3. A higher level of corporate culture leads to a higher success of the customer co-creation outcome. **Partially confirmed**
Time perspective	.65** (.023)	
Marketing skills	.42 (.104)	4. A higher level of innovation skills and capabilities leads to a higher success of the customer co-creation outcome. **Not confirmed**

Table 4.3 Hypothesis testing (* $p < .10$, ** $p < .05$)

Hypotheses 1-4 will now each be evaluated.

1. *A higher level of the DART interaction factor leads to a higher success of the customer co-creation outcome.*

Of the DART interaction factor, only the dialogue and transparency parts can be analyzed (see 4.1). Related to the dialogue part is the 'company comments per redesign' variable; the number of comments posted by the company during the challenge divided by the number of ideas posted. This variable is significantly positively related to the number of ideas that will possibly be used ($T = .55$, $p < .05$).
The second aspect of the dialogue part is the presence of 'dialogue' with (potential) customers in the company's NPD process. This variable is significantly positively related to the number of ideas that will possibly be used ($T = .75$, $p < .05$).
Transparency of information, which information is shared with customers and to what extent, was not significantly related to the output variable.
Based on these results, the hypothesis can only be partially confirmed, because of the dialogue part of the DART factor that has given significant results.

2. *A higher level of overview and planning leads to a higher success of the customer co-creation outcome.*

Overview and planning is made up of two variables 'process formality' and 'time perspective and feasibility'.
Process formality, the degree to which rules, policies, and procedures are put in place, was not significantly related to the number of ideas that may possibly be used.
Time perspective and feasibility, the reach of future plans on different levels, did give a significant result. This variable is significantly positively related to the number of ideas that will possibly be used ($T = .65$, $p < .05$).
Based on these results, this hypothesis can be partially confirmed.

3. *A higher level of corporate culture leads to a higher success of the customer co-creation outcome.*

The culture, the openness to ideas from outside the company, is measured by two different variables; 'market orientation', and use of 'external information sources'.
Market orientation, the scale that measures the company's focus on the customer, was not significantly related to the output variable.
The use of external information sources was almost significantly positively related to the number of ideas that will possibly be used ($T = .51$, $p < .10$).
Based on these results, this hypothesis can be partially confirmed.

4. *A higher level of innovation skills and capabilities leads to a higher success of the customer co-creation outcome.*

The 'marketing and innovation skills' variable was not significantly related to the number of ideas that will possibly be used ($T = .47$, $p > .10$).
Based on these results, this hypothesis cannot be confirmed.

5 Discussion

5.1 Conclusions

The results of the hypotheses testing will now be further explained and interpreted. In other words, what do the given results mean, and how should they be dealt with? Next to that, a more practical advice for Syntens will be provided. This advice serves as a basis on which they can optimize their support for SMEs that will, or want to, participate in a co-creation project.

5.1.1 DART

The fact that the number of company comments per submitted redesign on the community website is positively related to the number of ideas that will possibly be used is a good indicator of how important dialogue is in a co-creation project. A dialogue between the company and the community ensures that the contributed ideas respond better to the given challenge, and fit better to the company. Answering questions, and providing feedback on the suggested ideas, helps in directing the co-creators to the desired type of solution and increases the overall quality.
This is also confirmed by the significant relation between the level of dialogue in a company's NPD processes and the number of ideas that will possibly be used. Companies that already have experience in customer involvement in the NPD process, exploit this knowledge in the co-creation project. They know better what to expect from the project, and how to react to it. At the same time, a significant relation between the level of dialogue in a company's NPD processes and the number of company comments per submitted redesign was to be expected, but this was not present.
Despite the theory that transparency of information is a success factor for customer co-creation, this was not substantiated by the current research. One possible reason for this may be that the co-creation projects that have been investigated are relatively basic. For most of the companies they are a first attempt to involve customer in the NPD process in this way. This has resulted in not too difficult tasks, which require not that much information from the company. And because not much company information is required, a transparency of information is also not so necessary. It may be that if the co-creation challenges had been more difficult and elaborate that the transparency of information variable would have given a significant relationship with the outcome of the co-creation project.

Syntens, in their support to companies, should make clear that a co-creation project is not a cheap and easy method to collect new and perfect (product) ideas. A successful co-creation project constantly requires input from the company; what you seed is what you harvest. Another point of importance here is that those companies for whom the co-creation project is a first attempt at customer involvement may need some extra guidance. Those who have no experience yet with dialogue in the NPD process may be helped with extra information on how to communicate during the co-creation project, with the goal of receiving more useful input from the community.

5.1.2 Overview and planning

The time perspective and feasibility of an SME turned out to be significantly related to the number of ideas used. One interesting point to make here is that the scoring on the feasibility part of this variable did not much differ between the seven companies. The real difference was made in the time perspective part. In fact, the ranking of the seven companies on the whole variable compared to the ranking on only time perspective scores was exactly the same. This is a good thing, since the time perspective part was based on actual plans while the feasibility part was more based on an expectation. This has made the variable therefore more reliable.
The significant result indicates that companies that have a more long-term view on the three given levels (company, product lines, products), are more successful in a customer co-creation project. A

reason for this can be that a long-term planning means that a company better knows what its goals are for the future, and how it wants to reach these goals. Because of this planning-ahead routine, the SME is also more aware of what it wants to obtain from the customer co-creation project.
Process formality did not give any significant relation to the outcome variable. Apparently, the presence of formalized procedures and progress reviews is not related to the success of the customer co-creation project. As was also mentioned in the discussion on transparency, a possible reason for this non-significant relation may be that the co-creation projects that have been investigated are relatively basic. These projects do not require that much effort from the SME and the presence of any formalized procedures does not yet have much influence on the outcome of a co-creation project. It may be that customer co-creation projects that require more effort and resources from the SME, and are more long-term, benefit more from a high process formality.
Another reason may be that this was the first attempt for all of the seven SMEs to participate in a customer co-creation project. Therefore, it is unlikely that in any of the SMEs already specific procedures have been put in place to manage such a project. It may well be that in the future, when SMEs have gone through multiple customer co-creation projects, those companies who have a high process formality will have incorporated the co-creation project in their procedures. At that point, they are likely better able to benefit from these projects and with that probably be more successful.

Syntens could guide SMEs that want to participate in a customer co-creation project by helping them develop goals for this project. These goals should fit in the bigger picture of what the SME wants to accomplish in the future. By aligning the (short-term) goals for the co-creation project with the more long-term goals of the company itself, the probability of receiving useful input from the project increases. Although process formality is, at this point, not related to success, it may still be useful for an SME to determine a roadmap to benefit the most from a customer co-creation project.

5.1.3 Culture

There was an almost significant relation between the use of external information and knowledge sources and the number of ideas that will possibly be used. Although slightly not significant ($p < .10$), it does indicate the importance of a culture that is open to information from outside the company. A company that has the experience to incorporate outside knowledge into its business processes is more likely to successfully incorporate ideas that have originated in a customer co-creation project. On the other hand, those companies that are more closed to the outside world, in terms of information gathering (and sharing), will also have more trouble in finding the right ways to use ideas from a customer co-creation project. Related to the corporate culture, an example of such problems is a hesitance, or even reluctance, from employees to accept ideas from outside the company.

The fact that market orientation did not give any significant relation with the outcome-related variable provides an extra nuance in the hypothesis on culture. Apparently, the company's focus on the customer, which was measured by this variable, has no influence on the success of the customer co-creation project. The nuance here is between using information from external sources, and a specific focus on customers. Using information from external sources represents the experience that a company has, while the measure on customer focus does not necessarily say anything on using this information. The market orientation variable, therefore, may have been more about 'intention' rather than 'action'. Furthermore, the difference in results between these two variables could also indicate that it is better to have a very broad scope to the outside world (using many sources) rather than focusing deeply on one specific type of source (customer focus). The idea behind this is that many different ('weak') sources provide a company with a lot of different types of information, while one

strong source only provides one type of information. This idea is related to the theory of 'the strength of weak ties' (Granovetter, 1973).

To increase the success of a customer co-creation project, Syntens could support SMEs by examining their current experiences in collecting information from external information and knowledge sources. By determining the level of experience, they can get an indication if the SME will have trouble incorporating ideas received from outside the company. Depending on the level of experience, Syntens can help the SME prepare to lead new ideas into the company. This help can range from setting up the co-creation project, assigning people with responsibilities, to lowering their personal boundaries for external ideas.

5.1.4 Capability and skills

The marketing and innovation skills of an SME did not give any significant relationship with the number of ideas that will be possibly used. Apparently, in contrast to the literature, the ability of a company to recognize, incorporate, and apply external information (absorptive capacity: Cohen & Levinthal, 1990) is not of any use when participating in a customer co-creation project.
One possible explanation for the non-significant results may be that the method used to determine the marketing and innovation skills measures the relative level, compared to competitors. Companies that operate in a market with heavy competition may have the same relative level compared to a similar company that operates in a market with less competition, while their absolute skill-level may be very different. Next to that, it is also the SME's self-determined level. This means that it may not represent the actual level of marketing and innovation skills of an SME.

Due to the possible validity problems with measuring this variable, it is difficult to derive any advice for Syntens in their guidance of SMEs that want to participate in a customer co-creation project.

5.2 Limitations

One of the limitations of the current research is the small sample size. Although research on a sample size of seven can be analyzed with non-parametric methods (such as Kendall's rank-order correlation method), its results are less generalizable to the overall population. Therefore, the conclusions from this research do give an indication of the relationship between the success factors of customer co-creation and the outcome of the customer co-creation project, but are only truly significant for the sample on which analysis has been conducted.
The second limitation in this research are the underlying differences between the companies in the sample. Even though all the participating companies are SMEs, the differences in company size can still be large. This accounts for the number of employees, as well as the yearly turnover. Also the markets that the SMEs serve can vary greatly. Some operate only in the B2B market, others only in the B2C market, a combination of both, or for example the B2B2C market. Furthermore, not all the SMEs operate in the same industry. These differences between the SMEs have not been taken into account in the current research, but it is possible that they do have an influence on the relationship between the input and output variables, or on the output variable directly.
A third limitation is the different types of customer co-creation challenges that have been posted by the seven SMEs. These challenges varied quite widely in technicality, conceptuality, as well as the effort needed to make a contribution. Also the requested type of input differed between challenges; some examples of this are the design for a physical product, a conceptual marketing campaign, a creative logo design, or ideas for software improvement. These differences between challenges may have had different influences on the on the outcome (success) of the customer co-creation challenge.

The fourth limitation is related to the method with which most of the data has been gathered, the semi-structured interview. When interviewing persons, it is possible that they present themselves, and the company they work for, in a more acceptable manner than is actually true. The probability of such a social-desirability bias (King & Bruner, 2000) may have influenced the participants answers on the question about the different success factors, and with that the overall results.

5.3 Future research

Concerning some of the limitations aforementioned (5.2), future research could focus on finding a larger, and more homogeneous, sample. This homogeneity can be developed on multiple dimensions, such as company size, type of market (B2B, B2C, etc.), industry, and the type of co-creation project. Or, one could specifically focus on the differences in one of these dimensions to find out if these have an influence on the outcome of a co-creation project.

Future research should also develop methods to determine the overall level of the DART interaction factor (Prahalad & Ramaswamy, 2002, 2004b). While in this research the dialogue and transparency levels of each of the SMEs could be determined, the methods used to achieve the same for access and risk turned out to not be feasible. Therefore, the sharing of risks between the company and its customers can be developed further. An example of this is to specify risk on multiple dimensions, such as financial, performance, physical, psychological, social and time-related risks (Stone & Grønhaug, 1993). This more in-depth specification, as was also done with the marketing capabilities measure, makes is easier to measure the overall construct, especially when interviewing participants. This also accounts for the measure on the different ways (potential) customers have access to (information of) the company. By preparing an extensive list with possible ways of access, similar to the list with external information and knowledge sources, participants will be better able to indicate how consumers can access their company's information.

Besides these two DART variables, also an improved method to measure the marketing and innovation skills of a company may provide a better understanding of the potential relationship between this variable and the outcome of the co-creation project.

It would be interesting to see how the success factors for customer co-creation relate to the outcome (success) of more intense and long-term customer co-creation projects. As was mentioned before, the co-creation projects under investigation were quite basic in nature and short-term. Besides that, these projects operate mainly in the first, 'discovery', stage of the NPD process (Cooper et al., 2002; see 1.1.1). It is possible that the relationships found change when customers are more intensely involved throughout the whole NPD process over a longer period of time.

The long-term success of customer co-creation projects is another aspect that could be investigated. This longitudinal research could determine how many new products have originated from the co-creation project. Furthermore, the contribution of these new products on yearly turnover and profit could also be established. An example of this is the return on investment (ROI) of a new product, which is a good indicator of its success (Swink & Song, 2007).

References

Alam, I. (2002). An exploratory investigation of user involvement in new service development. *Journal of the Academy of Marketing Science*, 30(3), 250-261.

Atuahene-Gima, K. (1995). The influence of new product factors on export propensity and performance: An empirical analysis. *Journal of International Marketing*, 3(2), 11-28.

Ayyagari, M., Beck, T., Demirgüç-Kunt, A. (2007). Small and medium enterprises around the globe. *Small Business Economics*, 29(4), 415-434.

Bessant, J. (2008). Dealing with discontinuous innovation: The European experience. *International Journal of Technology Management*, 42(1-2), 36-50.

Borja de Mozota, B. (2003). *Design Management: Using design to build brand value and corporate innovation*. New York: Allworth Press.

Brabham, D.C. (2008). Crowdsourcing as a model for problem solving: An introduction and cases. *Convergence: The International Journal of Research into New Media Technologies*, 14(1), 75-90.

Bughin, J., Chui, M., Johnson, B. (2008). The next step in open innovation. *The McKinsey Quarterly*, June, 1-8.

Chen, P.Y., Popovich, P.M. (2002). *Correlation: Parametric and nonparametric measures*. London: Sage Publications.

Chesbrough, H. (2004). Managing open innovation. *Research-Technology Management*, 47(1), 23-26.

Chi, M.T.H. (1997). Quantifying qualitative analyses of verbal data: A practical guide. *Journal of the Learning Sciences*, 6 (3), 271-315.

Clason, D.L., Dormody, T.J. (1994). Analyzing data measured by individual Likert-type items. *Journal of Agricultural Education* 35(4), 31-35.

Cohen, W.M., Levinthal, D.A. (1990). Absorptive capacity: A new perspective on learning and innovation. *Administrative Science Quarterly*, 35(1), 128-152.

Cooper, D.R., Schindler, P.S. (2006). *Business research methods* (ninth edition). New York: McGraw-Hill.

Cooper, R.G. (1990). Stage-gate systems for managing new products. *Business Horizons*, 33(3), 44-54.

Cooper, R.G., Edgett, S.J., Kleinschmidt, E.J. (2002). Optimizing the Stage-Gate process: What best practice companies are doing – Part one. *Research-Technology Management*, 45(5), 21-27.

Crowther, D., Lancaster, G. (2008). *Research methods: A concise introduction to research in management and business consultancy* (second edition). Amsterdam: Elsevier Butterworth Heinemann.

Culp, K., Pilat, M. (1998). Converting qualitative feedback into quantifiable categories. *Journal of Extension*, 36 (5).

Da Silveira, G., Borenstein, D., Fogliatto, F.S. (2001). Mass customization: Literature review and research directions. *International Journal of Production Economics*, 72(1), 1-13.

Dawes, J. (2008). Do data characteristics change according to the number of scale points used? An experiment using 5-point, 7-point and 10-point scales. *International Journal of Market Research*, 50(1), 61-77.

De Jong, J.P.J., Brouwer, E. (1999). *Determinants of the innovative ability of SMEs: Literature review*. Zoetermeer: EIM.

De Leeuw, E. (2008). Self-administered questionnaires and standardized interviews. In Alasuutari, P., Bickman, L., Brannen, J. (Eds.) *The Sage handbook of social research methods* (313-327). London: Sage Publications.

Deshpande, R., Farley, J.U. (1998). Measuring market orientation: Generalization and synthesis. *Journal of Market Focused Management*, 2 (3), 213-232.

Dholakia, U.M., Bagozzi, R.P., Pearo, L.K. (2004). A social influence model of consumer participation in network- and small-group-based virtual communities. *International Journal of Research in Marketing*, 21 (3), 241-263.

Ebner, W., Leimeister, J.M., Krcmar, H. (2009). Community engineering for innovations: The ideas competition as a method to nurture a virtual community for innovations. *R&D Management*, 39(4), 342-356.

Europa (2003). *Definition of micro, small and medium-sized enterprises*.
URL: http://europa.eu/legislation_summaries/enterprise/business_environment/n26026_en.htm [Last visited June 1, 2010]

Field, A. (2005). *Discovering statistics using SPSS*. London: Sage Publications.

Friedman, K. (2004). Design management for small and medium-sized enterprises. *Proceedings of the Second International Workshop on Design Support*, Cardiff, UK, 10-11 November.

Goldenberg, J., Lehmann, D.R., Mazursky, D. (2001). The idea itself and the circumstances of its emergence as predictors of new product success. *Management Science*, 47(1), 69-84.

González, F.J.M., Palacios, T.M.B. (2002). The effect of new product development techniques on new product success in Spanish firms. *Industrial Marketing Management*, 31(3), 261-271.

Granovetter, M.S. (1973). The strength of weak ties. *The American Journal of Sociology*, 78(6), 1360-1380.

Gruner, K.E., Homburg, C. (2000). Does customer interaction enhance new product success? *Journal of Business Research*, 49(1), 1-14.

Hagel, J.H. (III), Armstrong, A.G. (1997). *Net gain: Expanding markets through virtual communities*. Boston: Harvard Business School Press.

Hanna, N., Ayers, D.J., Ridnour, R.E., Gordon, G.L (1995). New product development practices in consumer versus business products organizations. *Journal of Product & Brand Management*, 4(1), 33-55.

Hoffman, K., Parejo, M., Bessant, J., Perren, L. (1998). Small firms, R&D, technology and innovation in the UK: A literature review. *Technovation*, 18(1), 39-55.

Howe, J. (2006a). The rise of crowdsourcing. *Wired*, 14(6).
URL: http://www.wired.com/wired/archive/14.06/crowds.html [Last visited June 1, 2010]

Howe, J. (2006b). *Crowdsourcing: A definition*.
URL: http://crowdsourcing.typepad.com/cs/2006/06/crowdsourcing_a.html [Last visited June 1, 2010]

Hultink, E.J., Robben, S.J. (1995). Measuring new product success: The difference that time perspective makes. *Journal of Product Innovation Management*, 12(5), 392-405.

Humphreys, A., Grayson, K. (2008). The intersecting roles of consumer and producer: A critical perspective on co-production, co-creation and prosumption. *Sociology Compass*, 2(3), 963-980.

Jouret, G. (2009). Inside Cisco's search for the next big idea. *Harvard Business Review*, 87(9), 43-45.

Kambil, A., Friesen, G.B., Sundaram, A. (1999). Co-creation: A new source of value. *Outlook Magazine*, 3(2), 23-29.

Katz, R., Allen, T.J. (1982). Investigating the Not Invented Here (NIH) syndrome: A look at the performance, tenure, and communication patterns of 50 R&D Project Groups. *R&D Management*, 12(1), 7-20.

Kaulio, M. A. (1998). Customer, consumer and user involvement in product development: A framework and a review of selected methods. *Total Quality Management & Business Excellence*, 9(1), 141-149.

Kausch, C. (2007). *A risk-benefit perspective on early customer integration*. Berlin: Springer.

King, M.F., Bruner, G.C. (2000). Social desirability bias: A neglected aspect of validity testing. *Psychology and Marketing*, 17(2), 79-103.

Kinnear, P.R., Gray, C.D. (2004). *SPSS 12 made simple*. Hove: Psychology Press.

Kleemann, F., Voß, G.G. (2008). Un(der)paid Innovators: The commercial utilization of consumer work through crowdsourcing. *Science, Technology & Innovation Studies*, 4(1), 5-26.

Kohli, A.K., Jaworski, B.J. (1990). Market orientation: The construct, research propositions, and managerial implications. *The Journal of Marketing*, 54(2), 1-18.

Kozinetz, R.V. (1999). E-Tribalized marketing?: The strategic implications of virtual communities of consumption. *European Management Journal*, 17(3), 252-264.

Kristensson, P., Gustafsson, A., Archer, T. (2004). Harnessing the creative potential among users. *Journal of Product Innovation Management*, 21(4), 4-14.

Lagrosen, S. (2005). Customer involvement in new product development: A relationship marketing perspective. *European Journal of Innovation Management*, 8(4), 424-436.

Lakhani, K.R., Panetta, J.A. (2007). The principles of distributed innovation. *Innovations: Technology, Governance, Globalization*, 2(3), 97-112.

Laursen, K., Salter, A. (2006). Open for innovation: The role of openness in explaining innovation performance among U.K. manufacturing firms. *Strategic Management Journal*, 27 (2), 131-150.

Lawer, C. (2006). Eight styles of firm-customer knowledge co-creation. *White Paper*.
URL: http://www.theomcgroup.com/OMCpapers [Last visited June 1, 2010]

Lawer, C., Knox, S. (2006). Customer advocacy and brand development. *Journal of Product & Brand Management*, 15(2), 121-129.

Lin, H.-F., Lee, G.-G. (2006). Determinants of success for online communities: An empirical study. *Behaviour & Information Technology*, 25(6), 479-488.

Lindman, M., Scozzi, B., Otero-Neira, C. (2008). Low-tech, small- and medium-sized enterprises and the practice of new product development: An international comparison. *European Business Review*, 20(1), 51-72.

Longhurst, R. (2003). Semi-structured interviews and focus groups. In Clifford, N.J., Valentine, G. (eds.) *Key methods in geography* (117-132). London: Sage.

Malecki, E.J., Poehling, R.M. (1999). Extroverts and introverts: Small manufacturers and their information sources. *Entrepreneurship & Regional Development*, 11(3), 247-268.

Mascarenhas, O.A., Kesavan, R., Bernacchi, M. (2004). Customer value-chain involvement for co-creating customer delight. *Journal of Consumer Marketing*, 21(7), 486-496.

Mathwick, C. (2002). Understanding the online consumer: A typology of online relational norms and behavior. *Journal of Interactive Marketing*, 16(1), 40-55.

Matthing, J., Sandén, B., Evardsson, B. (2004). New service development: Learning from and with customers. *International Journal of Service Industry Management*, 15(5), 479-488.

Miguel, P.A.C. (2005). Evidence of QFD best practices for product development: A multiple case study. *International Journal of Quality & Reliability Management*, 22(1), 72-82.

Millward, H., Lewis, A. (2005). Barriers to successful new product development within small manufacturing companies. *Journal of Small Business and Enterprise Development*, 12(3), 379-394.

Nambisan, S. (2002). Designing virtual customer environments for new product development: Toward a theory. *Academy of Management Review*, 27(3), 392-413.

Nassimbeni, G. (2003). Local manufacturing systems and global economy: Are they compatible? The case of the Italian eyewear district. *Journal of Operations Management*, 21(2), 151-171.

O'Hern, M., Rindfleisch, A. (2008). Customer co-creation: A typology and research agenda (working paper). *WisconsInnovation*. Wisconsin: Wisconsin School of Business.

O'Regan, N., Ghobodian, A. (2005). Innovation in SMEs: the impact of strategic orientation and environmental perceptions. *International Journal of Productivity and Performance Management*, 54(1/2), 81-97.

Payne, A.F., Storbacka, K., Frow, P. (2008). Managing the co-creation of value. *Journal of the Academy of Marketing Science*, 36(1), 83-96.

Pitta, D.A. (2008). Product innovation and management in a small company. *Journal of Product and Brand Management*, 17(6), 416-419.

Porter, C.E. (2004). A typology of virtual communities: A multi-disciplinary foundation for future research. *Journal of Computer Mediated Communication*, 10(1).

Potts, J., Hartley, J., Banks, J., Burgess, J., Cobcroft, R., Cunningham, S., Montgomery, L. (2008). Consumer co-creation and situated creativity. *Industry & Innovation*, 15(5), 459-474.

Prahalad, C.K., Ramaswamy, V. (2002). The co-creation connection. *Strategy + Business*, 27(2), 1-12.

Prahalad, C.K., Ramaswamy, V. (2004a). Co-creation experiences: The next practice in value creation. *Journal of interactive marketing*, 18(3), 5-14.

Prahalad, C.K., Ramaswamy, V. (2004b). Co-creating unique value with customers. *Strategy & Leadership*, 32(3), 4-9.

Rowley, J., Kupiec-Teahan, B., Leeming, E. (2007). Customer community and co-creation: A case study. *Marketing Intelligence & Planning*, 25(2), 136-146.

Sawhney, M., Verona, G., Prandelli, E. (2005). Collaborating to create: The Internet as a platform for customer engagement in product innovation. *Journal of Interactive Marketing*, 19(4), 4-17.

Scozzi, B., Garavelli, C., Crowston, K. (2005). Methods for modeling and supporting innovation processes in SMEs. *European Journal of Innovation Management*, 8(1), 120-137.

Siegel, S., Castellan, N.J. (1988). *Non-parametric statistics for the behavioral sciences* (second edition). New York: McGraw-Hill.

Smith, P.G., Reinertsen, D.G. (1998). *Developing products in half the time: New rules, new tools* (second edition). New York: John Wiley & Sons, Inc.

Snow, C.C., Strauss, D.R., Culpan, R. (2009). Community of firms: A new collaborative paradigm for open innovation and an analysis of Blade.org. *International Journal of Strategic Business Alliances*, 1(1), 53-72.

Stone, R.N., Grønhaug, K. (1993). Perceived risk: Further considerations for the marketing discipline. *European Journal of Marketing*, 27(3), 39-50.

Stultiëns, R.G.L. (2009). *Collaboration between SMEs and external designers in product innovation*. Master Thesis. Eindhoven: Eindhoven University of Technology.

Swink, M., Song, M. (2007). Effects of marketing-manufacturing integration on new product development time and competitive advantage. *Journal of Operations Management*, 25(1), 203-217.

Syntens (2009a). *Syntens – Jaarverslag 2008*. Annual Report.
URL: http://publications.onlinetouch.nl/9 [Retrieved November 16, 2009]

Syntens (2009b). *Over Syntens*.
URL: http://www.syntens.nl/syntens/Wat-doet-Syntens.aspx [Retrieved November 16, 2009]

Syntens (2009c). *MKB Innovatie Top 100*.
URL: http://www.syntens.nl/innovatietop100/MKB-Innovatie-Top-100-home.aspx [Retrieved November 16, 2009]

Szmigin, I., Canning, L., Reppel, A.E. (2005). Online community: Enhancing the relationship marketing concept through customer bonding. *International Journal of Service Industry Management*, 16(5), 480-496.

Tapscott, D., Williams, A.D. (2006). *Wikinomics: How mass collaboration changes everything*. New York: Portfolio.

Tatikonda, M.V., Montoya-Weiss, M.M. (2001). Integrating operations and marketing perspectives of product innovation: The influence of organizational process factors and capabilities on development performance. *Management Science*, 47(1), 151-172.

Thomas, B., Packham, G., Miller, C., Brooksbank, D. (2004). The use of Web sites for SME innovation and technology support services in Wales. *Journal of Small Business and Enterprise Development*, 11(3), 400-407.

Thomke, S.H., Von Hippel, E. (2002). Customers as innovators: A new way to create value. *Harvard Business Review*, 80(4), 74-81.

Tidd, J., Bessant, J.R., Pavitt, K. (2005). *Managing innovation: Integrating technological, market, and organizational change* (third edition). Chichester: John Wiley & Sons Ltd.

Ulwick, A.W. (2002). Turn customer input into innovation. *Harvard Business Review*, 80(1), 91-97.

Van Aken, J.E., Berends, H., Van der Bij, H. (2007). *Problem solving in organizations: A methodological handbook for business students*. Cambridge: Cambridge University Press.

Van de Vrande, V., De Jong, J.P.J., Vanhaverbeke, W., De Rochemont, M. (2009). Open innovation in SMEs: Trends, motives and management challenges. *Technovation*, 29(6-7), 423-437.

Vorhies, D.W., Morgan, N.A. (2005). Benchmarking marketing capabilities for sustainable competitive advantage. *Journal of Marketing*, 69(1), 80-94.

Von Hippel, E. (1986). Lead users: A source of novel product concepts. *Management Science*, 32(7), 791-805.

Von Hippel, E. (2001). Innovation by user communities: Learning from open-source software. *MIT Sloan Management Review*, *42*(4), 82-86.

West, J., Lakhani, K.R. (2008). Getting clear about communities in open innovation. *Industry & Innovation*, 15(2), 223-231.

Whitla, P. (2009). Crowdsourcing and its application in marketing activities. *Contemporary Management Research*, 5(1), 15-28.

Woodcock, D.J., Mosey, S.P., Wood, T.B.W. (2000). New product development in British SMEs. *European Journal of Innovation Management*, 3(4), 212-221.

Appendix A: Company Description

Syntens[7] is an organization network for entrepreneurs. Its mission is to stimulate SMEs to innovate, thereby enhancing the innovative force of the Netherlands and supporting sustainable growth. Syntens focuses on SMEs with five or more employees in the sectors construction, creative industry, food and agriculture, logistics and wholesale, and industry and human health, making its potential customer base 240,000 organizations.

Syntens is an independent foundation, founded on January 1st, 1998, and has around 400 employees, divided over eleven locations. These locations are situated in three regions that coincide with the business units the organization is split up in, namely Northeast, West, and South. The main contractor of the organization is the department of Economic Affairs providing €32 million of the total €44 million budget. The other €12 million come from other local, national, and European public agencies (Syntens, 2009a).

Syntens tries to stimulate SMEs to innovate sooner, better, and faster by combining its own and its partners' knowledge, skills, and networks. Five basic functions are conducted, namely advising SMEs one-on-one (both short- and long-term), transferring knowledge to SMEs (through workshops etc.), redirecting SMEs to other organizations (e.g. linking organizations with knowledge institutes), building clusters of SMEs (to stimulate cooperation in innovation processes), and finally Syntens has an antenna function (maintaining sector innovation plans). To be able to advise as many organizations as possible, Syntens focuses on interventions taking limited time, up to a maximum of sixteen hours per organization per year. (Stultiëns, 2009, p. 12; Syntens, 2009b)

[7] http://www.syntens.nl [Last visited May 11, 2010]

Appendix B: Sample Description

Company X

This company wants to remain anonymous to let the competition unaware of their future developments. It operates in the B2B market of 3D measurement equipment.
Challenge: Develop new company logo.

Eximion

Eximion has developed Kalydo, a powerful platform for developing and publishing console quality web games. It operates primarily in the B2B and B2B2C market.
Website: http://eximion.com[8]
Challenge: What is your idea/vision of the Kalydo virtual console if you have complete freedom?

IDEE Systems

Idee Systems has been developing intelligent information features for more than 30 years that help logistics in the Netherlands to save costs and environment.
Website: http://www.idee-systems.nl[8]
Challenge: How do we achieve a greater awareness of the product ITAS within the transport industry within a short time, demonstrate its potential, and appeal to the target group.

Phoenix BV

Phoenix BV is a metalworking factory which has specialized itself in designing and producing sheet metal parts and constructions in small and medium-sized series.
Website: http://www.phoenixmetaal.nl[8]
Challenge: Design a concept or a fully worked out design, which can be produced by using rubber pad stamping technology.

Robopos

RoboPos stands for Robotic Point of Sale. RoboPos develops and markets advanced (B2C) vending machines. One can buy products directly in the store or via the website, after which the products can be collected with a code at the store.
Website: http://www.robopos.nl[8]
Challenge: Ideas for products that can be sold via vending robot systems, and suggestions for the deployment of the systems.

Schiebroek Dakbedekkingen

Schiebroek roof covering makes roof covering for the purpose of new estate and renovation in combination with maintenance. It operates primarily in the B2B market.
Website: http://www.schiebroek.nl[8]
Challenge: Come up with new tools to make the work of our roofers safer and easier.

Smart-Sign

Smart-Sign is a subcontractor of advertising columns for the illuminated sign industry.
Website: http://www.smart-sign.nl[8]
Challenge: Design an innovative stand alone Led lighted light/advertising column in which several techniques are combined.

[8] Last visited May 31, 2010

Appendix C: Interview

DART (Dialogue, access, risk, transparency)

Dialogue

Could you indicate the presence, and intensity, of any interaction with customers during different stages in NPD process?

Stage	No interaction	Limited	Some	Regular	Intense
Idea generation					
Product concept development					
Project definition					
Engineering					
Prototype testing					
Market launch					

Access

In which different ways (potential) customers are able to come into contact with, or find information about, the company (different websites, telephone, conferences, etc).

Risk

Are risks shared with customers, and in what way and to what extent? (for example, financial risk)

Type of risk	Limited	Some	Regular	Intense

Transparency

Which information is shared with customers, and to what extent?

Information on	No sharing	Limited	Some	Regular	Intense
Prices					
Margins					
Future plans					
Future products					

Culture

Use of external information and knowledge sources

Which of the following sources are used?

Source	Not	Limited	Some	Regular	Intense
Market					
Suppliers of equipment, materials, components, or software					
Clients or customers					
Competitors					
Consultants					
Commercial laboratories/R&D enterprises					
Institutional					
Universities or other higher education institutes					
Government research organizations					
Other public sector, e.g., business links, government offices					
Private research institutes					
Other					
Professional conferences, meetings					
Trade associations					
Technical/trade press, computer databases					
Fairs, exhibitions					
Specialized					
Technical standards					
Health and safety standards and regulations					
Environmental standards and regulations					

Culture

Market orientation.
(to be filled in by the respondent during/after the interview)

For the following sentences, can you indicate whether you totally agree (++), totally disagree (--), or something in between.

	--	-	-+	+	++
Our business objectives are driven primarily by customer satisfaction					
We constantly monitor our level of commitment and orientation to serving customer needs					
Our strategy for competitive advantage is based on our understanding of customers' needs					
We measure customer satisfaction systematically and frequently					
We have routine or regular measures of customer service					
We are more customer focused than our competitors					
I believe this business exists primarily to serve customers					
We poll end-users at least once a year to assess the quality of our products and services					
Data on customer satisfaction are disseminated at all levels in this business unit on a regular basis					

Overview and planning

Process formality

To what degree are project management rules and procedures:

	Not	**Limited**	**Some**	**Regular**	**Intense**
Formalized via documents (contract books, sign-off forms)					
Actually followed					
Progress reviews held (design, gate, phase, or stage reviews)					

Long-term versus short-term perspective

What is the time perspective (in years) for future plans for

	≤1	**2**	**3**	**4**	**≥5**
The company in general					
New product lines					
New products					

For all these perspectives, how likely is it that they will be fully met?

	Not	**Unlikely**	**Uncertain**	**Likely**	**Certainly**
The company in general					
New product lines					
New products					

Capability-skills

General innovativeness

Could you give an indications of investments, as a percentage of yearly turnover, in

- New materials
- New products
- New production technologies
- New working methods

Marketing (and innovation) capabilities

To be rated on the main topics (in bold), the sentences serve as extra explanation.

Compared to close competitors, the skills in

	--	-	-+	+	++
Pricing					
Using pricing skills and systems to respond to market changes Knowledge of competitors' pricing tactics and changes Doing an effective job of pricing products/services					
Product development					
Ability to develop new products/services Developing new products/services to exploit R&D investment Successfully launching new products/services Insuring that NPD efforts are responsive to customer needs					
Channel management					
Strength of relationships with distributors Attracting and retaining the best distributors Adding value to our distributors' businesses Providing high levels of service support to distributors					
Marketing communication					
Developing and executing advertising programs Advertising management and creative skills Brand image management skills and processes Managing corporate image and reputation					
Selling					
Giving salespeople the training they need to be effective Sales management planning and control systems Selling skills of salespeople and management Providing effective sales support to the sales force					
Market information management					
Gathering information about customers and competitors Using market research skills to develop effective marketing programs Tracking customer wants and needs Analyzing of marketing research information					
Marketing planning					
Marketing planning skills Ability to effectively segment and target market Marketing management Thoroughness of marketing planning processes					
Marketing implementation					
Organizing to deliver marketing programs effectively Translating marketing strategies into action Executing marketing strategies quickly					

Success of the co-creation project

How many good ideas were posted in the co-creation challenge?

Innovativeness of the good ideas
Number of good ideas that are:

- New to the world:
- New to the market:
- New to the company:
- Good, but not new:

Number of ideas that possibly go into production:

Any positive side effects:

Any negative side effects:

On a scale from 1-5, would you consider the co-creation project as a success, why or why not?

1 – no success	2	3	4	5 – great success

What do you think of co-creation in general?