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MASTER

Customer involvement in the development of web-based services
a field study in software-as-a-service firms

van der Velden, A.M.

Award date:
2013

Link to publication

Eindhoven, July 2013

Customer involvement in the development of web-based services:
A field study in software-as-a-service firms

by

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in partial fulfilment of the requirements for the degree of

Master of Science
in Innovation Management

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Series Master Theses Innovation Management

Subject headings: customer, user, involvement, software development (SD), new service development (NSD), product development (NPD), innovation, internet, web, cloud, services, software-as-a-service (SaaS).

"I had been concerned, from the start of my own journey, to establish some lines of inquiry, to define a theme.... If you travel on a theme, the theme has to develop with the travel. At the beginning your interests can be broad and scattered. But then they must be more focused; the different stages of a journey cannot simply be versions of one another"

V.S. Naipaul, 1989

Abstract

The emergence of web-based software services has created a global, dynamic market of new services, which increases the need to develop differentiated software and continuously deliver value to customers. This thesis therefore describes how web-based service firms can involve customers in their development processes. From an academic perspective, the aim of this research is to advance the understanding of customer involvement in the unique context of web-based software service development. Therefore, a conceptual framework is build based on a literature review. Based on this framework, a qualitative study in the global market of software-as-a-service providers is used to uncover key practices around relevant themes in customer involvement. The resulting theoretical and practical frameworks present theoretical concepts and practical guidance around operational methods, strategic considerations, difficulties and outcomes of customer involvement in the development of web-based services. These designs improve theoretical understanding and provide guidance for practitioners. This allows web-based service vendors to effectively involve customers, create better services and eventually improve market performance.

Acknowledgements

This project represents the final part of my master Innovation Management at Eindhoven University of Technology. Prior to this master program, I would always say that I wanted to play a role between technology and the market. This is not uncommon, as many industrial engineers identify themselves as the bridge between technology and the market or commercial activities. In this master program and during this dissertation project in particular, I've personally been on a journey to find out what it really means to connect technology with the market and vice versa. Therefore, this project has focused on how customers can be involved in the development of web-based services. With this report as a result, I think I am now able to define and explain the complexities that are involved in uncovering and translating customer information into the innovation process and develop solutions that provide unique value to users.

During the realization of this thesis, I have been accompanied and supported by many people. First, I would like to thank my parents, who have given me this opportunity and showed unlimited support during this process. I would also like to thank my girlfriend, family, friends and fellow classmates for their support and good times during this period. Secondly, I would like to thank my first supervisor Joost Wouters for his support. The feedback during meetings and the opportunities to discuss and reflect during group meetings with other students have been of great value for this project. In addition, I would like to thank my second supervisor, Myriam Cloodt, for her valuable feedback and positive support in the past months. This has been of great contribution to a successful completion of this project. Finally, I would like to thank the participants who have taken the time to provide the data needed for this project. Your drive and insights in creating the best software services for all of your customers was not only valuable for this project, but has also inspired me personally.

Teun van der Velden

Eindhoven, July 2013

Management summary

Introduction

The emergence of web-based software services has created a global, dynamic market of new services, which increases the need to develop differentiated software and continuously deliver value to customers. Research in both new service development and software development has emphasized the importance of involving customers in the development process for such environments (e.g. Alam, 2002; Gassman et al., 2006). Although customer involvement is addressed in new service development, its applicability to development of web-based services is unknown. Without this critical knowledge, research will be unable to fully support and explore successful development in the fast growing business of web-based software services.

Research question

From an academic perspective, the aim of this research is to advance the understanding of customer involvement in the unique context of web-based software service development. A perspective from the emerging software-as-a-service market is used as object of research to obtain new insights. For practitioners this research seeks to provide insights about how software firms can involve customers to create better services and improve performance. Therefore the main research question is:

How can firms involve customers in the development of web-based software services?

Methodology

By carrying out a literature study in the fields of new service development, new product development and software development, key theories on customer involvement are identified and synthesized within predefined themes. This results in a conceptual framework that provides a holistic view of customer involvement and includes the most important theoretical concepts for firms willing to involve customers. Based on this framework, an interview protocol is developed and data collection is carried out in software-as-a-service firms using semi-structured interviews. Next data is coded and analyzed using thematic analysis (Boyatzis, 1998). The conceptual framework developed in the literature review is thereby used as an analytical lens for analysis. Based on detailed case descriptions (within-case analysis), a cross-case analysis is performed by presenting the data in tables and looking for communalities and differences.

Discussion and conclusions

The findings indicate that the delivery and pricing model of web-based services (and SaaS in particular) results in unique characteristics that have a profound impact on their development practices. For instance, the easy accessibility and low switching cost puts more pressure on vendors to deliver value frequently. In addition, the direct insight into usage data and the ability to directly push changes to all users provides unique opportunities for vendors to iterate quickly based on direct feedback. The findings also show that vendors apply short and iterative development processes that results in a flexible process. More specifically, agile development approaches (and Scrum in particular) are employed to be able to quickly respond to market requirements and develop in short cycle times.

In terms of customer involvement, vendors collect and use customer information to create a deep understanding of customer needs and use quick iterations to get fast feedback on development efforts. While obtain customer information, SaaS vendors benefit from the large amounts of feedback they receive via support and social media channels and from the usage data that they have direct insight to. Both of these methods provide them with insightful information on customer needs and behaviors with relative little effort. In addition, they frequently employ meetings, conference calls and occasional usability tests to compliment

the data with richer customer information. In addition, vendors embed this information in the development process by using it to develop personas, prioritize the roadmap, define requirements and get feedback on plans, concept designs and working software.

Furthermore, this study showed that while involving customers, the strategic decisions vendors make are of critical importance to the way customer (information) is embedded in development and the organization in general. For example, vendors have generally limited the impact a single customer can have in the development process by not inviting them to directly join in development activities. Instead, some cases used personas to represent large groups of customers and guide the development team through the process. In addition, requirements are defined as user stories to clearly represent user needs. A key challenge for the vendors is to manage expectations that customers develop when they provide input. These expectations are not always fulfilled and can thus negatively affect customer relationships. Therefore, vendors need to formulate clear communication strategies that prevent the formation of unrealistic expectations at customers. In terms of outcomes of customer involvement, it was found that the creation of new insights and opportunities, increased customer orientation in development teams and improved quality and user value are the most important outcomes. Although it was found that web-based service vendors have short development cycles, speed of development was not found to be an outcome of customer involvement.
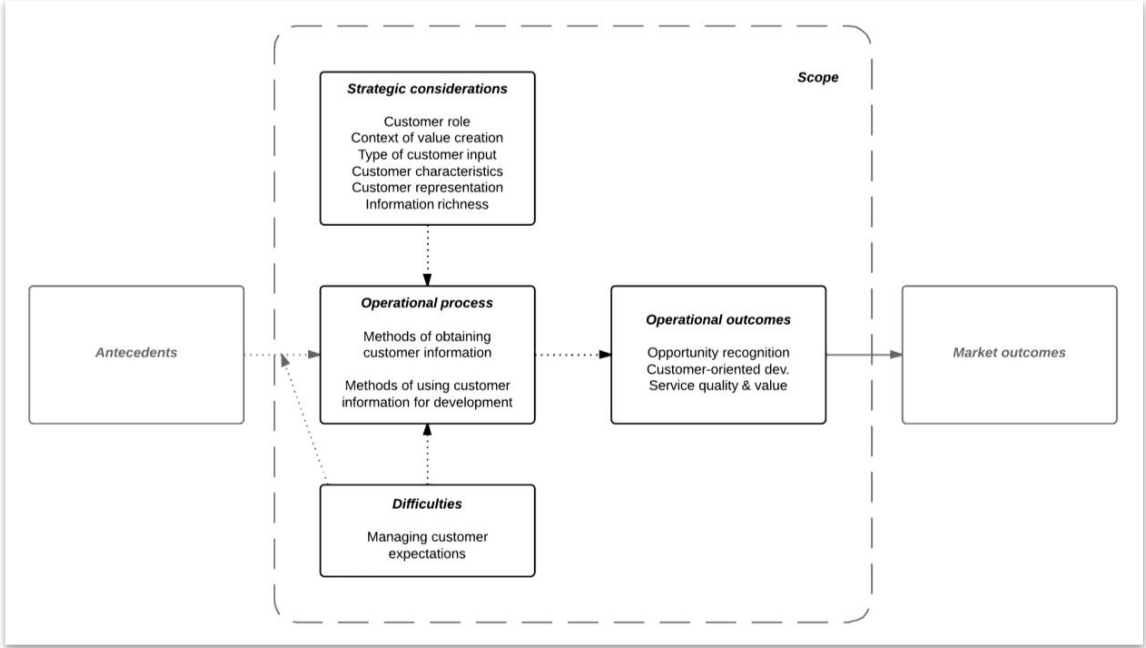
Figure 1-1 Theoretical framework

The findings as summarized above have value for both research and practice. It was found that theoretic framework as shown in Figure 1-1 is supported in this study and provided excellent guidance during data collection and analysis. Due to the holistic approach, the framework was able to capture the most relevant concepts in customer involvement (the bigger picture) and elaborate further on detailed techniques and strategies when needed. In addition to the initial conceptual framework, two new variables, information richness and customer representation, were identified to be relevant and provide new perspectives on customer involvement practices. Although the research design prohibits prescriptions, the practical framework as shown in Figure 6-2 provides guidelines for web-based software vendors that seek to involve customers in their development process. Conclusively, this framework can support practitioners to effectively involve customers in their development processes and guides them through strategic and tactical decision-making processes.
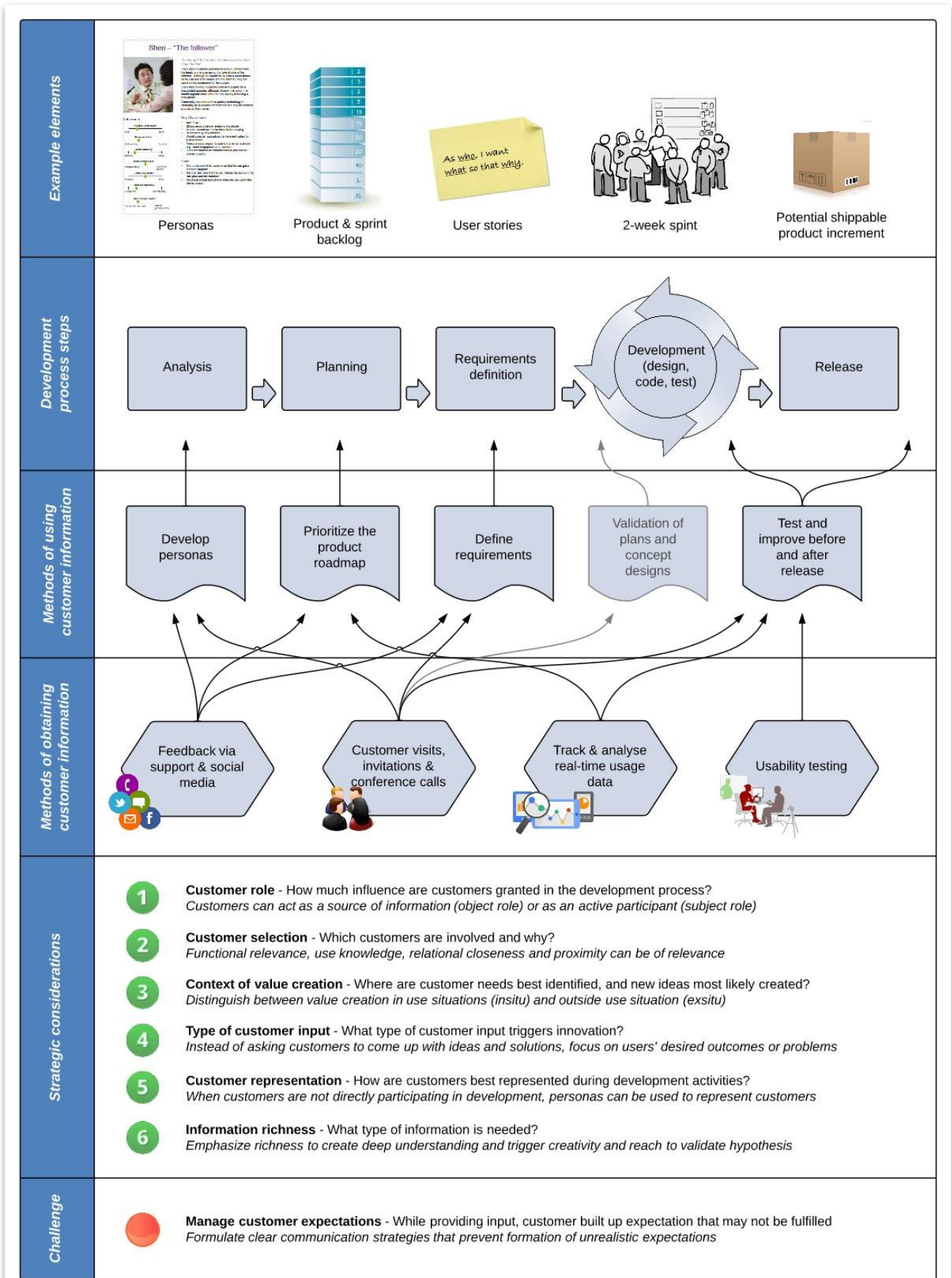
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1 Introduction

In this chapter, the study is first introduced describing the theoretical and practical background. Next, the problem definition, research question and research design are highlighted. Finally, a short outline of the thesis is presented.

1.1 Academic background

Accounting for more than 70% of the GNP and of the employment, most developed countries are becoming service economies. This has resulted in greater interest in examining systematic approaches to develop these services, often termed new service development (NSD). In this research area, one of the central themes is the role of the customers in innovation processes. Studies in NSD research have found that involvement of customers during the development process can improve service quality, reduce development cycle times and increase market performance (Alam & Perry, 2002; Magnusson et al., 2003; Carbonell et al., 2009). In addition, studies have discussed changing position of the customer, which evolved and transformed from 'passive audiences' to 'active players' and co-creators of unique value (Prahalad & Ramaswamy, 2004). To create an environment wherein the firm and customer jointly create value, interactions are required to take place in the service development process (Grönroos, 2011).

Although most studies in NSD have examined customer involvement in traditional service industries (e.g. financial and consulting services), an increasing proportion of services are now software services delivered over the Internet. Advancements in information technology have created opportunities for both completely new service ideas and digital replacements of existing (physical) services. This has resulted in a global and emerging market of new web-based software services (Cusumano, 2010), often called Software-as-a-Service (SaaS). Although the development of such software services and the effects of service delivery over the Internet are identified as a key research opportunity in NSD (Menor et al., 2002), little research exists on this topic.

As in NSD literature, the field of software development (SD) has also acknowledged active customer involvement as a key success factor (Subrananyam et al., 2010). Nonetheless, studies on how to involve customers are scarce. Customer involvement theories from the NSD stream might therefore be useful to be applied in SD contexts, providing an excellent opportunity for cross-domain knowledge sharing between NSD and SD.

In this study, service development is defined as the overall process of developing new service offerings from idea to launch stages. Customer involvement is defined as the interactions where a service provider collaborates with current (or potential) customers at various stages of the development process. The terms 'customer' and 'user' are used interchangeably.

1.2 Practical background

In the last decade, the software industry has seen a major shift from product towards services. Traditional product sales and license fees have declined, and product company revenues have shifted to service activities (Cusumano, 2008).

More recently, technologic developments have facilitated the creation of cloud computing infrastructures and platforms. These have opened an new array of opportunities for growth of on-demand software services, often called Software-as-a-Service (SaaS). According to Cusumano (2010), there is no doubt that software as a service as well as the more general infrastructure technology that facilitates this type of software delivery and pricing -cloud computing- are becoming new platforms for enterprise and personal computing. The global and emerging market of SaaS already generated $10 billion in worldwide revenues in 2010,

and is showing a healthy growth with revenues forecasted to reach $12.1 and $21.3 billion in 2011 and 2015 respectively (Gartner report, 2011[1]).

As with traditional software customers pay for licenses and install software on their own hardware, with SaaS customers pay for a subscription to access and use software functionality over a network through a hosted, web-native platform operated by the software vendor. By delivering software's functionality as a set of distributed services that can be configured and bound at delivery time, SaaS separates the possession and ownership of software from its use (Turner et al., 2003). Therefore, it can overcome many of the limitations of software products constraining software use, deployment, and evolution.

However, the SaaS-model also introduces a unique challenge to software vendors. Customers do not have to own and maintain the infrastructure necessary to run the software and they pay for SaaS services using flexible subscription models. Therefore, customers can switch SaaS vendors more easily, leading to relatively higher bargaining power for SaaS customers compared to other software models (Choudhary, 2007). As a result, SaaS vendors have to continuously focus on satisfying customer needs to reduce churn rates.

Although the implications of SaaS models on how companies create, deliver and capture value has not received much attention in literature, preliminary research suggests increased innovation pressure, a more close, direct and continuous customer relationship and increased customer-orientation and integration (Stuckenberg et al., 2011; Stuckenberg and Beiermeister, 2012). The pricing models of SaaS are based on a continuous relationship between the customer and the vendor. Because SaaS vendors operate the software themselves, they are closer to the customer and its problems and can have direct insight in usage information. Therefore, involving customers in development can be especially relevant for SaaS vendors.

1.3 Problem definition

NSD literature suggests that the customer involvement in the development can increase quality, innovation speed and market performance. However, little effort has been made to study this concept in web-based service environments. Due to changing customer relationships and increased pressure on customer satisfaction and innovation, customer involvement can be of especial relevance on SaaS vendors. The research focus of this study is therefore to investigate how SaaS vendors can use customer involvement to successfully develop web-based software services. The following problem statement is defined:

> *The emergence of web-based software services has created a global, dynamic market of new services, which increases the need to develop differentiated software and continuously deliver value to customers. Research in both new service development and software development has emphasized the importance of involving customers in the development process for such environments (e.g. Alam, 2002; Gassman et al., 2006). Although customer involvement is addressed in new service development, its applicability to development of web-based services is unknown. Without this critical knowledge, research will be unable to fully support and explore successful development in the fast growing business of web-based software services.*

1.4 Research questions

From an academic perspective, the aim of this research is to advance the understanding of customer involvement in the unique context of web-based software service development. A perspective from the emerging software-as-a-service market is used as object of research to

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[1] Gartner report (June, 2011). Forecast: Software as a Service, Worldwide, 2010-2015, 1H11 Update.

obtain new insights. For practitioners this research seeks to provide insights about how software firms can involve customers to create better services and improve performance. Therefore the main research question is:

How can firms involve customers in the development of web-based software services?

To answer this question, three sub-questions are derived:

1. *What are key theories on customer involvement in NSD literature?*

2. *What are key differences in developing web-based software services compared to conventional services?*

3. *What are key practices of customer involvement in developing web-based services?*

1.5 Research design

Research projects can be classified by three different purposes: exploratory, descriptive and explanatory. Although the study includes some explorative elements, the research design and methods used in this study are mainly descriptive. The study is structured around a holistic model that includes the major themes of customer involvement as identified in a preliminary literature review. In addition to the general development process and key characteristics of web-based services, the following themes will be studied to study the main research question:

- *Operational aspects of involvement*
- *Strategic considerations for involvement*
- *Difficulties of involvement*
- *Outcomes of involvement*

This holistic model illustrates the major themes in research on customer involvement and provides a clear structure and demarcation to this thesis. It is therefore used as a basis for the literature review, data collection, data analysis and findings and discussion.

The first and second research question is answered by carrying out a literature study in the fields of new service development (NSD; main perspective), new product development (NPD; supplementary) and software development (SD). By carefully reviewing and synthesizing literature, key theoretical concepts are identified within the main themes and a conceptual framework is developed. Based on this framework, an interview protocol is developed and data collection is carried out in software-as-a-service firms using semi-structured interviews. Participants are first questioned about the major themes before discussing the more specific concepts found in the literature review.

To answer the third research question, data is coded and analyzed using thematic analysis (Boyatzis, 1998). There are three approaches to thematic analysis: predefined, postdefined, and accounting-scheme guided (Miles and Huberman, 1994). The predefined approach involves the creation of themes prior to the stage of data collection. In the postdefined approach, the themes are inductively generated from the data collected. The accounting-scheme approach is a combination of the predefined and the postdefined approach. In this study, we took an accounting-scheme approach to thematic analysis, which involves the creation of general domains prior to the stage of data collection in which codes can be developed inductively (Miles and Huberman, 1994). These domains correspond to the major themes highlighted earlier. In addition, the conceptual framework developed in the literature review was used as an analytical lens for analysis.

1.6 Outline of the thesis

This thesis starts with a literature review in the next chapter. In this chapter, literature is reviewed and described around customer involvement in NSD and differences in developing web-based services. The result of the review will be a conceptual framework that serves a basis for the data collection in the next chapter. In chapter three, the methodology and results of the qualitative study will be described, starting with the within-case analysis. In the next chapter, results of the data analysis are described by elaborating extensively on the practices of web-based service firms in a cross-case analysis. In chapter 5, these results are discussed and compared with literature, which results in the final conceptual framework. In the final chapter, implications for research and practice, limitations of the study and directions for future research are discussed.

2 Literature

In this chapter, we aim to develop a conceptual framework for customer involvement in the development web-based service software. First, the methodology of the literature review is described briefly. Secondly, we describe the development process by explaining the new service development process, differences of web-based services and the software development process. Next key theories of customer involvement are described on the main themes identified in a preliminary literature review. Finally, a conceptual framework will be developed that aims to support the qualitative analysis in chapter 3 and 4.

2.1 Methodology

As can be seen in Figure 2-1, the literature review will be conducted in three theoretical fields: new service development (NSD), new product development (NPD) and software development (SD). The field of NSD will be our main perspective and is therefore of highest relevance. In addition studies of NPD and SD that discuss customer involvement will be used to supplement NSD literature where needed. Relevant publications are searched using combinations of keywords in search engines. Selection criteria included relevance (Figure 2-1), number of citations (more than 25 citations or at least 3 per year for recent articles), journal quality and publication date (1990-2012, recent publications are preferred). A second method that

Figure 2-1 Relevance of literature topics

is used is searching via references, sometimes called the 'snowball-method'. The idea is that a reference in one article points to other articles; references in those articles point to an even wider set. Eventually information is extracted and synthesized from the resulting publications.

2.2 Development of web-based services

This paragraph will briefly describe the NSD process, differences of web-based software services and the SD process.

New service development process

Researchers in NSD have proposed both linear approaches based on models from NPD and ad-hoc models based on organizational learning and resource perspectives. Among this effort to propose NSD models, linear models from Bowers (1989) and the expanded model of Scheuing and Johnson (1989) were the first to emerge. Both of the models are waterfall models, characterized by a linear progression of discrete, consecutive process steps (Bullinger and Fahnrich, 2003). Although the waterfall model is the most common in innovation research, it has also been criticized. It results in long development lead times, communication problems, and increased costs. In addition, many service entrepreneurs do not explicitly organize NSD. Rather than developing more formal structures, service entrepreneurs regard it as an ad hoc process (Martin and Horne, 1993; Kelly and Storey, 2000). The development of services could also be considered as a process that is similar to organizational learning. The learning process is a smooth continuous development in time, while the innovation process jumps when innovations are introduced. When innovations are incremental, these jumps become smaller and thus come close to a more general learning process. Therefore, Stevens and Dimitriadis (2005) introduced a systematic learning model for NSD in the form of a spiral model. Because service sectors are considered as very diverse, De Jong et al. (2003) introduced a model that is simplified by using six key activities within two macro stages. The two macro stages consist of a search and implementation

stage, similar to what other scholars have defined as the fuzzy front-end and the execution oriented back-end of NSD (Menor et al., 2002).

Differences of web-based software services

Research has yet to come up with answers to how web-based service development is different to traditional services. Based on the handful of studies that discuss this topic, four characteristics of web-based services and their implications for development are identified:

- *Frequent and low-cost delivery*
- *Low barriers of entry*
- *High degree of outsourcing*
- *Transparent customer interactions*

First, the economies of information are dramatically different than the economies of physical items (Evans and Wurster, 1999). Contrary to conventional services, where delivery is often very labor intensive, the delivery of web-based services consists of information transactions that involve very small transaction costs (Bakos, 1998). Another benefit of delivering services over the Internet is that developing firms are not restricted to scheduled release cycles. Instead, new features and improvements are slipstreamed in on a monthly, weekly, or even daily basis and are instantly available to all users. Secondly, due to the lower costs associated with Internet, barriers to entry are much lower for web-based services (Porter, 2001). Therefore, development processes are likely to be much more entrepreneurship intensive (Menor et al., 2002). Another effect of the lower barriers to entry is that continuous innovation is needed in order to create or maintain competitive advantage (Voss et al., 1992; Sundbo, 1997). The environment of Internet services can be classified as uncertain and dynamic, in which development teams need to be able to react fast to changes in customer needs and technologies (MacCormack et al., 2001). Third, the role of outsourcing is of increasing importance in web-based services. Conventional services often do not enjoy the luxury of outsourcing production to remote locations of choice (Menor et al., 2002). With web-based services a large part of the service process occurs in the back office, reducing the need to collocate service production with the service consumption (Miles, 2005). The only elements of that provide the service experience (front-end), are the ones that appear on users' computer screen. This means that all other activities can occur in the 'back-office', often far away from the user's physical location. Finally, through the digital nature of service delivery, interactions between the customer and the service itself are very transparent. Service firms can collect usage data, analyze patterns of use (e.g. click rates) and identify new customer needs. According to Srivastava et al. (2000), this ability to track user behavior down to individual mouse clicks has brought software providers and user closer than ever before. An example of such methods is web usage mining, which is the process of applying data mining techniques to the discovery of usage patterns from web data (Srivastava et al. 2000).

Software development process

Similar to NSD process models, SD literature has also highlighted the use of both waterfall and spiral (non-linear) models. In addition to these traditional models, a new set of agile development methods has emerged during the two pas decades. The first published model of the SD process by Royce (1970) was of linear nature and derived from more general system engineering processes. Like in NSD, SD research found that the structure of such waterfall models does not allow for changes in requirements later in the process. Commitments must be made at an early stage in the process, which makes it difficult to respond to changing customer requirements. Therefore, Boehm (1988) proposed a spiral model for software development. Instead of looking at development as a sequence of activities, the spiral model represents each phase as a loop in the software process.

Dissatisfaction with those software development approaches and a global, rapidly changing environment have resulted in new approaches for software development, often termed as agile methodologies. Software businesses need to be able respond fast to new opportunities

and markets, changing economic conditions and the emergence of competing products and services. This is especially the case with the rapidly growing and volatile Internet software industry as well as with the emerging mobile application environment (Abrahamsson et al. 2003). As a result, in 2001 a group of practitioners (Beck et al., 2001) proposed a 'Manifesto for Agile Software Development' manifesto, agile manifesto states that *"Our highest priority is to satisfy the customer through early and continuous delivery of valuable software."* In the manifesto, the author's describe four shared values that represent the agile approach:

- *Individuals and interactions over processes and tools*
- *Working software over comprehensive documentation*
- *Customer collaboration over contract negotiation*
- *Responding to change over following a plan*

Agile methods address the challenge of an unpredictable world by relying on people and their creativity rather than on processes (Dyba & Dingsoyr, 2008). Others state that agile development is about feedback and change and to embrace, rather than reject, higher rates of change (Williams and Cockburn, 2003). In a comparative analysis, Abrahamsson

Figure 2-2 Simplified Scrum development process

et al. (2003) created a clear overview of the evolution of agile methods and their interrelationships. This evolutionary map, shown in appendix I, provides a perspective on number of methods and the complexity in literature. Although these agile methods are all based around the notion of incremental development and delivery, they propose different processes to achieve this. Currently, the most popular agile software development method in practice is Scrum (Forrester report, 2011[2]). According to the Scrum method, software development should not follow a repeatable and defined process. Instead, it should involve creativity, research and learning and be managed using empirical methods (Schwaber & Beedle, 2002). Scrum uses an iterative and incremental project management approach that is shown in Figure 2-2.

2.3 Customer involvement in service development

In this paragraph, key theoretical concepts relevant to customer involvement are described within the following topics:

- *Operational aspects of customer involvement*
- *Strategic considerations for involvement*
- *Difficulties of involvement*
- *Outcomes of involvement*

2.3.1 Operational aspects of customer involvement

The operational process of involvement can be separated by methods of obtaining customer information and methods of using customer information in development.

Methods of obtaining customer information

The first operational part of involving customers is the acquisition of knowledge from customers. The methods (tools, techniques, and ways of working) are the means by which information is collected and customer knowledge is developed. Firms can interact with their customers via various platforms of interaction. Traditionally, innovation literature has focused on methods that include physical environment to obtain information from customers. In NSD, Alam (2002) identified seven key methods of obtaining customer information, including face-

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[2] Forrester report (July, 2011). Water-Scrum-Fall Is The Reality Of Agile For Most Organizations Today.

to-face interviews, user visits and meetings, user observation and focus groups. In-depth face-to-face interviews and user visits were found to be the most frequently employed methods. In addition, Ekdahl et al. (1999) extensively describe observation as a method to capture customer information for developing services based on users' needs. In product development, Kaulio (1998) identified seven formal methods for obtaining customer information during development, including quality function deployment, beta testing and the lead user method. Finally, Leonard and Rayport (1997) argue that empathic design is the way to obtain customer information when the customers themselves do not recognize their needs. Therefore, customers are observed in their 'natural setting' while they use the product or service in the course of everyday routines.

The widespread deployment of the Internet has transformed development processes (Dahan & Hauser, 2002). Among many changes, it has affected how firms interact with current and potential customers during the development of products and services. To successful leverage this customer knowledge, firms can design and use virtual customer environments (VCE's), which offer radically new ways to interact and create value with customers (Nambisan, 2002). Literature has identified that virtual platforms differentiate from physical platforms of interaction because of extended reach, increased speed and persistence, lower cost and higher flexibility (Dahan & Hauser, 2002; Afuha, 2003; Ernst, 2004; Swahney et al., 2005; Fuller et al., 2006). Sawhney et al. (2005) classifies such virtual platforms in two important dimensions; the nature of customer involvement and the stage of the development process. Figure 2-3 shows a variety of Internet-based methods mapped in these two dimensions.

Figure 2-3 Methods based on virtual platforms (Sawhney et al., 2005)

Using customer information in development

The earliest stages in NSD are critical because they lay down the foundations on which the overall NSD project is built. Grönroos (1990) identified that the fundamental cause of failure in the service design process is that it is not in the hands of people who have a thorough understanding of customer needs. Essentially, customer involvement in the early stages provides ideas for creating a high-quality product that stands out from the competition (Melton & Hartline, 2010). The more detail obtained from customers early on about their expectations and preferences, the better the product and process created in the development stage. In practice firms can use customers in the early stages of the NSD process to get the service idea right (Alam, 2002). According to Ettlie & Rosenthal (2011), services and products share the same tendency to exploit customer ideas for new offerings. Although not much addressed in NSD literature, interaction with clients is also necessary in the development stage of the NSD process. In the implementation phase, firms can evaluate the complete service offering before the full rollout (Alam, 2002). In this phase, development of new services can be characterized as a controllable trial-and-error process. Alam (2002) found that when managers involve customers in the development stage, they make final modifications after observing customers' actual interaction with the new service. Melton & Hartline (2010) builds on that observation by providing empirical evidence that involving customers in the development stage leads to better preparation for the product launch, which in turn improves the product's sales performance and project efficiency.

2.3.2 Strategic considerations for involvement

In this paragraph, we describe what strategic decisions are of critical importance while involving customers. The generic strategic considerations were derived by looking at strategic communalities and differences of specific methods and strategies selected from

literature[3] as shown in appendix II. This results in four important strategic considerations that differentiate specific methods and are of high relevance to firms willing to involve customers in development:

- *Customer role*
- *Context of value creation*
- *Type of customer input*
- *Customer characteristics*

Customer role

The first consideration service providers have to make is one of critical importance for customer involvement. It determines how much influence customers are granted in the process and how customers are looked at from an innovation perspective. They can be seen either as active subjects in the development process or as objects. In the *'customer as an object'* role, customers are used solely as a source of knowledge. Customers clearly add value to the development process, but they are not (co)setting the agenda for action. Approaches that use the 'object' role of customers typically have the goal to either create an in-depth understanding of customer needs and problems or want to extract ideas from customers or users. In the second role, *'customer as a subject'*, customers actively participate in one or more phases of the development process. As a subject in the process, customers have an active role in interpreting the data (Holtzblatt & Beyer 2003), defining the meaning of service and shaping the desired direction of action with the service provider (Lundkvist & Yakhlef, 2004).

Context of value creation

Another factor that distinguishes methods of customer involvement is the context in which value is created and obtained by firms. First, with '*involvement outside use situations (exsitu)*', use information is captured outside the actual use situations, that is, in retrospect or in anticipation (Edvardsson et al., 2012). Both academics and practitioners in product development have used methods of inquiry like interviews, brainstorm meetings and questionnaires to gather information from customers. As a result, methods like voice of the customer, quality function deployment and traditional market research have been frequently applied to understand customers and develop products. However, recent studies have increasingly built on the idea that the value of products and services is embedded in the context of use (Vargo et al., 2008). Therefore, many of methods stress importance *'involvement inside use situations (insitu)'* where customer information is created and documented in the use situation as or just after it occurs (Edvardsson et al., 2012). Authors have argued that identifying needs, generating ideas and creating user innovations can be best executed in the course of user's normal activities and as a response to new challenges. This can be done using by observing or interviewing customers in their own context (e.g. Leonard & Rayport, 1997; Ulwick, 2002; Holtzblatt & Beyer 2003) or by making use of innovations created by users themselves (e.g. Von Hippel, 1988; Buur & Matthews, 2008).

Customer inputs

The third consideration is about what type of customer input is collected and used for development. Some approaches expect customers to come up with ideas and solutions, while others listen to specific desired outcomes to trigger innovations within the firm. When firms interact with customers, they will often ask their customers what they want. With '*innovation driven by customer solutions'*, firms ask customers to state their needs or come up with ideas and innovations (Herstatt & Von Hippel, 1992; Magnusson et al., 2003; Kristensson et al., 2008). Thus when asked what they want, customers will describe solutions (e.g. products, features, services). Like explained in paragraph 2.3.3, a problem with asking customers for ready-made solutions, is that their perceptions are restricted to current use. Therefore, they are more likely to suggest features that are already offered by

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[3] Only publications that report on empirical use of the method or process were included

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other firms. As an alternative to focusing on solutions, some authors suggest to use *'innovation driven by customer outcomes'* (e.g. Ulwick, 2002; Alam, 2006; Korkman, 2006). Instead of asking what customers want, these methods have focused on uncovering what customers want services to do for them. Key to this strategy is to use customer's desired outcomes as an input for innovation on which engineers can act by targeting the outcomes that are not satisfied yet. In addition to interviewing customers, techniques like behavioral observation (Leonard & Rayport, 1997) can also be used to uncover customer problems and outcomes.

Customer characteristics

A fourth consideration details the selection of customers for involvement based on their unique characteristics. First, much of the user involvement literature has focused on so-called *lead users* or as contributors to successful innovations (Rothwell, 1992). Lead users are front-end users who identify market needs before the majority of users in the marketplace (Von Hippel, 1988). According to Luthje (2004), this is because lead users have adequate technological knowledge and superior knowledge of use experience. However, lead users are typically innovators and early adopters (Rogers, 1995) and thus represent a minority of all customers. Therefore, some authors have suggested the involvement of ordinary users. As can be seen in Figure 2-4, ordinary users, in contrast to lead users, are rarely aware of the technological limitations of their ideas and can be better seen as experts in their domain of user needs. Both Kristensson et al. (2004) and Magnusson (2009) found that ordinary users tended to produce ideas that on average were judged to be more valuable and more original, but less realizable than the ideas of developers and lead users.
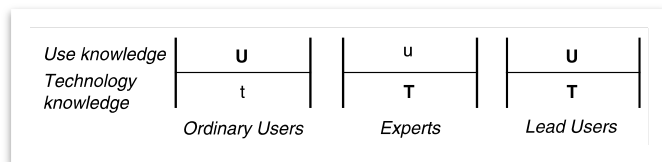
Figure 2-4 Use knowledge (U) and technology knowledge (T) among different types of users

A second common characteristic on which firms tend to select customers is *relational closeness*. Alam (2006) found that the main reason to involve close customers in the financial services industry is because confidentiality is a major issue in service development. Close customers often exchange of unique, proprietary and rich information, which leads to deep understanding of customer needs and development of superior products (Bonner and Walker, 2004). On the other hand, studies in the field of economic sociology have argued that strong ties limit the exchange of diverse information (Granovetter, 1973; Hansen, 1999). Thus, involving customers with close relationships in could limit exploration of new external information, leading to mostly incremental innovations and limiting the number of radical new services developed (Bonner and Walker, 2004; Fang, 2008).

2.3.3 Difficulties of involvement

Research on has frequently discussed barriers and difficulties in involving customers. To get a better overview of what kind of problems arise, the results from literature as shown in appendix III were sorted and synthesized into three categories: customer, process and strategic issues.

Customer issues

Issues at the customer side are core problems that do not only hinder the involvement process, but also can be a reason for service providers to not involve customers in the first place. The issue that cited most in literature is that customer perceptions are restricted to current use (e.g. Bennett & Cooper, 1981; Lettl et al., 2006). Customer can be 'functionally fixed' to their current use and conditions, which often results in an inability to think of radically new ideas and solutions, even if they have needs that could be addressed. The second issue that is described by many authors is the lack of customers' technological knowledge (e.g. Olson & Bakke, 2001; Lettl et al., 2006). This limits the customers' ability to describe their needs and ideas, because they do not know what is technological feasible and can be

overstrained due to technological complexities. A third issue described in literature is that customer intent or motivation is lacking (e.g. Nambisan, 2002; Alam, 2006).

Process issues

Next to issues at the customer side, firms can also perceive difficulties during their customer involvement process. Firms can encounter these process issues because they don't have the right methods, tools or knowledge to effectively involve customers. First, firms might find it difficult to select appropriate customers for involvement (Nambisan, 2002; Alam, 2006). To successfully involve customers, firms have to identify customers based on important characteristics (see paragraph 2.3.2). The customer knowledge necessary for this identification process, is however not always accessible. The next phase of involvement, capturing customer needs, is also described as a difficulty in literature (Nambisan, 2002). According to Bettencourt (2010), most companies do not understand what customer needs they should capture to guide service innovation or how to uncover them. In addition, Alam (2006) found that listening too closely to customers can also be a problem by risking over-customization. Therefore, it might be important to take ideas and concepts to a larger group of customers. Finally, studies have emphasized that the attitude of engineers could also hinder the customer involvement process (e.g. Olson & Bakke, 2001; Anderson & Crocca, 1993).

Strategic issues

Next to issues that are clearly related to customers and the involvement process, firms in studied samples also expressed a variety of strategic concerns. This category addresses organizational problems that managers face when deciding on the implementation of customer involvement and include issues with strategic fit, available resources and expected results. For example, Christenssen & Bower (1996) argue that staying close to customers might mislead suppliers into avoiding exploration of the opportunities provided by new disruptive technologies. In addition, Lillien et al. (2002) found that lead user methods increases time-consumption and efforts, and results in ideas with low organizational fit and that could not be patented.

2.3.4 Outcomes of involvement

Customer involvement has been considered as an important factor for successful product and service development (Cooper, 2001; Matthing et al., 2004; Alam, 2006). Despite its importance, there is a lack of empirical studies that investigate the effectiveness of customer involvement (Carbonell et al., 2009). Studies on performance effects of customer involvement in NSD are often descriptive and focus on individual measures of performance. New service performance however, is a multidimensional construct that reflects both operational effectiveness and marketplace competitiveness (Menor et al., 2002). Therefore, both operational and market outcomes of new service performance are discussed briefly.

Operational outcome measures focus on process execution and typically assess the development effort from an internal perspective. One much addressed topic is that close interaction with customers during development can reduce development cycle times. In new product development literature, Cooper (2001) stresses that seeking continual customer feedback during development validates the product design; thus reducing last-minute changes. The reduction of cycle time is also mentioned in NSD literature (e.g. Magnusson et al., 2003; Carbonell et al., 2009). In the study of Alam (2002), several managers mentioned cycle time reduction as an important objective of user involvement. A number of academics have also highlighted the significance of customer involvement in improving quality. For example, Pelham and Wilson (1996) argue that firms that seek to understand customer needs and satisfy those needs should produce products with fewer defects. In NSD, Carbonell et al. (2009) found that customer involvement has a positive direct effect on technical quality. Melton & Hartline (2010) found that involving customers in the design stage provides ideas for creating a high quality offering that stands out from the competition.

In addition to operational outcomes, researchers have also emphasized several marketing related outcomes for customer involvement. Market outcome measures reflect the market success of the given NSD effort and assess the development effort from an external perspective (Carbonell et al., 2009). Key market outcomes in NSD include both financial measures (e.g. profitability, cost effectiveness, sales) and customer measures (e.g. customer satisfaction, usage, competitiveness). Martin and Horne (1993) reported a positive relationship between customer participation in the development process and the degree of commercial success of service innovations. Alam and Perry (2002) argue that with customer involvement, it is possible to develop a differentiated new service with unique benefits and better value for the users. Other benefits proposed are rapid diffusion, user education, improved public relations and long-term relationships (Alam and Perry, 2002). Carbonell et al. (2009) showed that rather than having a direct effect on these market outcomes, customer involvement has an indirect effect by affecting operational outcomes.

2.4 Conceptual framework

In this study, the conceptual framework provides support for studying customer involvement practices in the development of web-based services. It is important that it captures the most relevant constructs for web-based service firms that want to involve customers successfully into their development process. Although it is not yet known if the bins and key topics from the framework can be applied in practical settings, the framework clearly gives a more complete view of the challenges and strategic considerations that firms might face when involving customers in development. The framework is created according to the rationale of Miles & Huberman (1994), wherein intellectual 'bins' set out and named. These bins envision the general theory derived from literature earlier in this chapter.
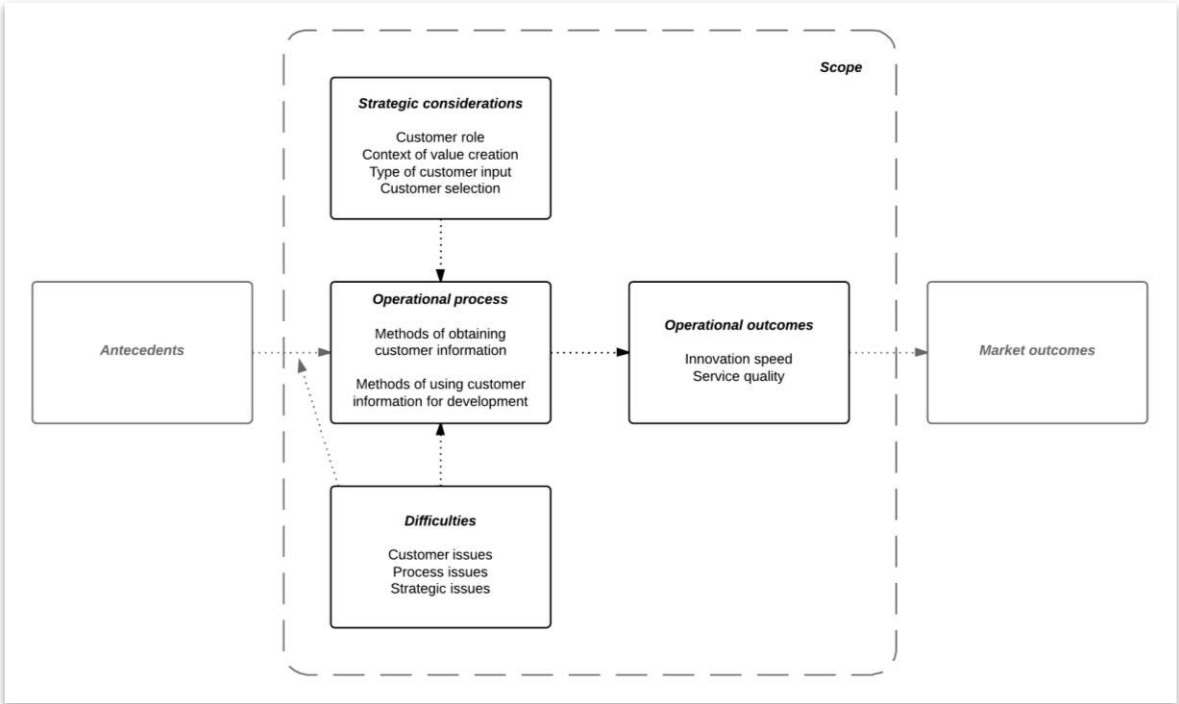
Figure 2-5 Conceptual framework of customer involvement

As shown in Figure 2-5, the intellectual bins of the operational process, strategic considerations, difficulties and operational outcomes. A complete framework would also include antecedents, which are of little relevance when firms have already decided to use customer involvement. In addition, antecedents often include factors that cannot be influenced by the firm itself (e.g. market or technology uncertainty), which is why they are considered to be outside the scope of this study. In addition, market-related outcomes are also excluded from the scope, since customer involvement has an indirect effect on market outcomes via operational outcomes (Carbonell et al., 2009).

3 Within-case analysis

This chapter describes the methods and results of the first part of the qualitative study, the within-case analysis. First, the research methodologies of sample selection, data collection and data analysis are described. Secondly, the results of the within analysis are described extensively by elaborating on the findings from each of the separate cases.

3.1 Methodology

In this study, qualitative methods are used to create understanding of customer involvement practices in web-based service firms. The aim is to understand a phenomenon as a whole, i.e., as a complex system that is greater than the sum of its parts (Patton, 1990). This paragraph will describe the methods of sample selection, data collection and data analysis.

3.1.1 Sample selection

Like described earlier, the study is conducted in web-based software industry. The research particularly includes service-oriented software firms that use cloud-computing technology as a platform for service delivery. Such software services are hosted on a central place and are often referred to as "software as a service" (SaaS). In qualitative research, the sample is small and not chosen randomly. Rather, the choice of a sample is purposeful. Purposeful sampling is commonly used in qualitative research. Researchers choose participants who give a richness of information that is suitable for detailed research (Patton, 1990). In this study, the aim is to select typical SaaS vendors that provide business software to a large group of customers.

Based on three online directories of SaaS services (Bestvendor.com, Getapp.com and SaaSdir.com), firms are first selected based on three criteria. First, a service orientation is required to distinguish software services from traditional software products. One clear distinction of service-oriented software is that customers pay for a subscription to access and use software over the Internet (Turner et al., 2003). Therefore firms are only included if their pricing strategy is based on pay-as-you-go subscription models, were customers pay a subscription fee (e.g. monthly) to get the right to use the software. Secondly, the service should not be solely target consumers or enterprise business. Web-based services that are only targeted at consumers often offer part of their service free to drive fast adoption, which conflicts with the first criteria. Vendors that only market their software to enterprise customers are more likely to customize services for single customers, which outside of the scope of this study. Therefore, vendors are selected based on having small and medium business customers. Note that they may target at other segments in addition to SMEs. Third, the software should be accessible on-demand via a web-browser.

Based on these criteria, managers and executives were contacted by e-mail. The e-mail included a research flyer, which can be found in appendix IV. The participants are required to be involved with development and have adequate knowledge of the customer involvement process, which typically include positions like product manager, marketing manager, product development manager and CEO. Like in many qualitative studies, the sampling strategy was to continue until adding new cases did not result in new information or new insights. To reach this point of saturation, 41 firms were contacted of which six were willing to participate. The names of the firms and participants will not be published to maintain anonymity. After finishing data collection, one case was excluded from the sample. The participant only worked three weeks for the particular vendor, which makes it unlikely to have adequate knowledge of the development process and customer involvement practices. Therefore, it would not result in an information-rich case that is relevant if the research objective is theoretical insight (Miles & Hurberman, 1994).

3.1.2 Data collection

To study the development process and customer involvement practices, detailed descriptions will be obtained by conducting semi-structured interviews. In line with the recommendations of Yin (2002), an interview protocol is developed based on the conceptual framework depicted in the previous chapter. The questions are based on an extensive literature review and include broad questions on major themes, specific questions on theoretical concepts and follow-up probes. The protocol can be found in appendix V. Like the conceptual framework, a holistic approach was also applied to the interview protocol. Before asking about specific concepts, participants were first questioned about the specific intellectual bin in general (e.g. strategic consideration, difficulties). When possible, the interviews where taken face-to-face (2 cases), but due to the global sample size others were taken via conference calls. The semi-structured interviews have an open-ended nature and interviewees will be allowed to diverge from the questions to discuss aspects they considered relevant. However, the interview protocol will assure that important aspects are discussed. This combination results in targeted and insightful information (Yin, 2002). To increase trust in the validity of this study, additional documents like blog posts and presentations of the participants were used to verify and compliment data from interviews.

3.1.3 Data analysis

In order to analyze the collected data, recorded interviews are transcribed and carefully reviewed to highlight important issues and identify patterns in data (Miles & Huberman, 1994). Together, the interview transcripts and additional documents resulted in over 90 pages of data that serve as a start for the analysis. Next, cases are individually analyzed. As described in chapter 1, data is coded and analyzed using thematic analysis (Boyatzis, 1998). Therefore, the author has first read through the data several times and coded the data based on broad themes of the framework. Later, specific concepts of the framework were added and new concepts were developed during the process. The coding process is executed with Dedoose[4], which provides online software for qualitative analysis. After coding, the data is sorted based on the codes per case in separate documents. With all relevant data for theoretic concepts sorted out, important concepts are analyzed and described in detail. During the within-case analysis, key quotations from the interviews are used because the use of quotes adds transparency and depth of understanding (Patton, 1990). This results in five detailed case descriptions (within-case analysis) of case Alpha, Beta, Gamma, Delta and Epsilon. These will be described in next paragraphs.

3.2 Case characteristics

Table 3-1 gives an overview of the most important characteristics of the cases in the sample. The sample of this study globally oriented, which is representative for the industry. Although vendors may have strong market share in specific countries, the markets in which they operate are also globally oriented. Due to the newness of cloud technology, the companies are relatively young. Nonetheless, all firms have already attracted thousands of customers and are generally growing fast. In addition, it should be noted that the vendors serve a relatively large number of customers with a small group of employees. Conclusively, the sample consists of SaaS vendors that are showing excellent performance and growth on a global scale.

	Alpha	Beta	Gamma	Delta	Epsilon
Location	United States	Canada	Australia	Netherlands	Netherlands
Service	Project management	E-Commerce	Accounting	Business software	Accounting

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[4] Dedoose.com, Version 4.5.95, web application for managing, analyzing, and presenting qualitative and mixed method data (2013). Los Angeles, CA: SocioCultural Research Consultants, LLC.

Vendor type	Pure SaaS	Pure SaaS	Pure SaaS	SaaS & on-premise	Pure SaaS
Founded	2005	2005	2001	2005 (SaaS)	2000
Employees	~ 30	~ 150	> 15	~ 300 (SaaS)	~ 80
Number of customers	> 21.000	> 40.000	> 20.000	- (80.000 admin.)	> 45.000 (> 80.000 admin.)
Annual growth 2012	+ 130 % Customer base	+ 125 % Customer base	+ 100 % Customer base	+ 47% Revenue (SaaS)	-
Market spread	> 100 countries	> 100 countries	> 50 countries	6 countries (SaaS)	~ 26 countries
Interviewee role	Co-founder / VP Product Manag.	Data Team Manager	Co-founder / Chief Design Off.	Manager Product Development	Business Analyst

Table 3-1 Case characteristics

3.3 Case Alpha

Service	Project management
Founded	2005
Interviewee role	Co-founder / VP product management

Table 3-2 Case Alpha

Development process

The development method can be characterized as a very loose agile model. Alpha aims to release every month. First the product roadmap is defined by prioritizing a sheet of features based on product vision (50%), customer feedback (30%) and competitive landscape (20%). Next, the customer feedback on the specific feature area is summarized and often given to the developers before design and development. This feedback provides context and gives developers a sense of what customers are asking. On bigger features, an informal customer advisory group is used to give direct feedback on our plans. Then they put together a list of requirements and make functional wireframes. Usually there are a couple of internal iterations with UI/UX designers. When development starts, the people who are building it also provide input (they are users themselves). Then, parallel to the design work, a working prototype is build and tweaked. With straightforward features, no user testing is used. With others, a preview or working prototype is build and provided to users to get their feedback.

Operational aspects of customer involvement

Methods of obtaining customer information

The majority of customer feedback comes in through the *support center*, where users can ask a question or give feedback. There is a link to the support center on the top of every page of the application. In addition, customers sent *e-mail requests* and give *phone calls* to the support staff. Before larger features are built, the development team will get direct feedback on plans via *informal customer advisory groups / conference calls*. Such sessions are an open discussion in which the development team share their plans and thoughts with customers and ask them how they would like to use a particular feature. The development team often follows up with customers to get direct feedback on a functional prototype via a *web demonstration*. Another method that is used during development is *crowd-sourced feedback on designs*. Two designs are uploaded to Amazon's Mechanical Turk, a crowdsourcing marketplace, on which random people can vote which design they like better. *Tracking of real-time usage data* is also done by looking at clickstream data and actions. Tools for tracking this data are built-in by the development team themselves. Alpha also

invites users for *usability sessions.* In these sessions user were put in different use-case scenarios and asked to think aloud. Before Alpha launched their service in 2005, they organized *semi-structured focus groups* and talked to friends, family, ex-colleagues and ex-customers (from the founders' previous jobs). This early feedback helped to identify a problem space for their business.

Methods using customer information in development
The first way of using customer information in development is by *prioritizing the product roadmap.* The roadmap is a list of features based on product vision and what management thinks the competitive landscape demands. The management reviews the customer feedback from the support center and support staff on a monthly basis, and looks at what customers have asked most for. This will affect the prioritization in stack rank of releases (~30% influence). Secondly, customer information on specific feature areas is used for *requirements definition.* The interviewee gathers customer requests on a specific feature area, reads through all of them, and makes a summary. In this way, better requirements can be defined: *"The way customers actually ask for it provides a lot of good color, a good detail, that maybe I hadn't thought about it that way. If that's what they are thinking about it, then maybe I need to think a little different about it. I might need to use a different terminology or something like that."* The summaries are often also printed and given to developers, so they get a sense of what customers ask before developments starts. Finally, customer information is used to *iterate and improve on plans, designs and prototypes* during development. For example, customer advisory groups are used with bigger features to get input from customers upfront. These are open discussion over the phone wherein customers are asked to explain how they would like to use a specific feature. As development starts and a working prototype is completed, the development team might follow up with these customers and give a web demo. This can be the customers involved earlier, or customers that have requested the feature for a specific reason. Other forms of using customer information during iterations are crowd-sourced feedback and usability sessions as described in the previous paragraph.

Strategic considerations for customer involvement

Customer characteristics - When customers are involved in development, Alpha does not blindly pick anyone who has asked for a feature. They often look at customers that have requested the feature, who login frequently, who has talked to the sales team about upgrading their plan, who use the particular feature it a lot and who they think is at risk because they really want the feature.

Customer role - As described in the development process, customer input impacts the development roadmap for roughly 30%, in addition to product vision and the competitive landscape. However customers are an important source of information, it's critical to not rely on customers to set vision: *"Customers have their own jobs, so of course we shouldn't expect them to do ours. If they take the time to give feedback, it's most likely going to be an idea on how we could incrementally improve what they're using now. It's our job to have a vision for our product and to innovate ahead of the market, the competitors and ahead of what our customers might think is possible."* Therefore, the customer role is one where they clearly add value to the development process, but is no subject in the process itself.

Context of value creation - The customer information is captured both in the customer's use situation (insitu) as well as outside the use situation (exsitu). A lot of the customer information is acquired passively via the support center and support staff, which makes it difficult to classify the context of such customer feedback. However, the use of a direct link for providing feedback on each page of the software makes it more likely that customers report their feedback directly from within the use situation. Another example of insitu customer involvement practices are the usability sessions. The interviewee explained how observing users in their these studies uncovers a different type of customer information: *"When someone is using your application and you would see them pause or squint their eyes and get closer to the screen, you know there's something not working. Hopefully they're speaking out loud and say "I'm not sure what I should do next (they look close at the screen*

and their mouse is going all around), I feel like I want to share this but I'm not sure how I do that". We found out that that is really humbling, because there are things that you as a software developer think are pretty obvious. Usually a couple times per session we would be like *"How could we have missed that?" or "How could we have taught that?", It's so obvious."* On the other hand, the use of crowd-sourced feedback on designs, informal customer advisor groups and semi-structured focus groups are typical examples of capturing customer information outside their use situation.

Type of customer input - Almost all of the customer feedback Alpha receives corresponds to features and enhancements that are already on the product plan. As explained in the customer role section, Alpha doesn't look for innovative ideas or solutions in customer input: *"I can't think of too many ideas that have come from customers that we or our competitors haven't already thought of. Usually they might have thought of an innovative change to what we were picturing doing. And that might help us in to recognize the importance of it to customers. But there is not too often an amazing idea that we hadn't thought of."* Thus, customer input is mainly used to explain the different contexts around a problem or solution and in recognizing its importance it to customers; not in searching for innovative ideas or ready-made solutions.

Customer representation - During the main development activities, customers are not directly represented. The VP of Product management does however ensure that developers have regular insight into what customers think by joining conference calls and sharing customer feedback: *"We track customer feedback in our own product. Most of our developers get a daily or weekly notification of changes to the customer feedback. So at the end of every day or week, they take a quick scan though the latest feedback."*

Information richness - The two most important customer inputs for Alpha are the feedback that comes in via support and the advisory conference calls / demos. Although the feedback is used to indicate priority by looking at what is most requested (reach), the main focus is on rich information. This manifests itself in the focus on context of the feedback, the conversations during conference calls and during usability studies. Typical examples of methods focusing on reach are used less frequently, like crowd-sourced feedback on designs.

Difficulties in customer involvement
According to the interviewee, Alpha has had little to no obstacles when involving customers. The only difficulty occurs when they do not agree with customers on how a solution or feature should be. In such situations, customers may feel like: *"I've given feedback, but they didn't listen."*

Outcomes of customer involvement
According to the interviewee, the biggest benefit of customer involvement occurs when used to give context/detail to problems and solutions: *"The biggest benefit of customer involvement to me is the thoroughness. Think of it like crowdsourcing an answer, were you get all of these different flavors of how people think about a problem and a solution. It makes you think in a much wider variety. It helps me expand my mind to all the possible ways to approach a problem and solve it in our software. We get more variety from that broad base of customer's requests. So it helps us expand our horizons, filter through it and pick what we think is the best."* In addition, the customer-orientation of the development team is also a (subliminal) benefit. Developers get regular insight into what customers are thinking because they scan through the latest feedback every day or week. This repeatedly results in scenarios like this: Developer: *"You know, I saw Feature X mentioned more and more by our customers and I got to thinking about what we could do there and spent an hour or two last night and knocked it out."* Customer involvement also impacts market performance by improving the product itself: *"Our product has to sell itself. We didn't have any sales people until January 2012. So it's all been people searching and finding us, deciding to try it, deciding they liked it, deciding to buy it. So its customer feedback making a product better,*

so that people try it, like it, buy it, and then stay." The interviewee explains that by increasing the value of the product, customer involvement helps converting customers to paying customers, getting more money per customer (they stay longer) and reduce churn.

3.4 Case Beta

Location	Canada
Service	E-Commerce
Founded	2005
Interviewee role	Data team manager

Table 3-3 Case Beta

Development process

Beta classifies itself as Agile, but does not adhere to a specific Agile methodology. With about 5 releases per day, Beta is very much focused on incremental improvements. Their development process is focused on getting code into production as fast as possible, without too much red tape. Beta's development does not include much upfront planning and design and lacks an extensive testing process. The testing is generally a short and quick process, which results in a high tolerance for errors. Therefore, Beta has implemented a lot of monitoring on their software, which gives real-time insights on the performance new releases. Based on these insights, Beta can always respond quickly on bugs by providing a fix or pulling back a release. The interviewee explains that due to the fast growth of the company, the development process is in constant flux: *"It has actually grown organically, with the rapid growth of the number of employees we've tried new things and see what works. So it's continuously changing, but our values have always been to put ideas to production as fast as possible and keep testing simple. …. So we aim to keep the process as quick and iterative as possible to get quick feedback on what we're doing."*

Operational aspects of customer involvement

Methods of obtaining customer information

Most of the customer feedback Beta receives comes in via the *support system* and the *sales team*. In both cases, communication occurs via e-mail, chat, phone and social media. In terms of *social media*, Twitter is a very important platform for sales, marketing and support to communicate with customers. It is not only used for sending out messages, but also to get feedback by answering questions and participate in conversations. Next, Beta sends out *survey* to its customer every year, whereby customers get a reward after completion (e.g. one month subscription fee). In such a survey, customers are asked to rate current areas of the product and potential new features and are asked what is missing, wrong and annoying in the current offering. Another method to get in touch with customer is via *meet-ups*. Whenever an employee goes to a conference, they often look to see if there have customers in the specific city. In that case, a meet-up is organized where customers can tell what they like, dislike and looking for in Beta's product. In addition, Beta regularly meets with local Canadian customers by *visiting and inviting well known customers*. These often are customers from the very beginning where Beta has a more intensive relationship with. In these informal meetings, customers are asked how they run their business, what role Beta's service has in it and what is difficult or time consuming to use. Another form of learning from customers is by directly *tracking usage data*. Beta uses both Google Analytics and internal tools to measure usage data and performance. Finally, Beta has occasionally used third-party services for *usability studies*. In such outsources the study by providing a use scenario for a specific target group. The third-party service will then find someone who will carry out the scenario and record it.

Methods using customer information in development

The first use of the feedback that comes in *prioritizing the development roadmap*. All feedback is collected first in an internally developed system called 'EpicWant': *"If a request*

comes in, we first go to the tool and search if someone has asked for it before. If so, you can vote it up and possibly add some comments about the specific context of the request. Otherwise you can add a new item." Beta's product managers once in a while look in the tool to look for much requested items that fit within the product. Those will be scheduled on the roadmap for development. The second use of customer feedback is *providing context around use situations and problems*. When collecting feedback Beta aims to collect as much context around use situations. Subsequently the 80/20 principle is applied. The development team starts a creative process wherein a solution is created for 80% of the use situations. The other 20% of situations is considered as too specific, and are advised to develop a solution for themselves via the API. Third, Beta uses usability tests and tracks usage data to *inform and test designs.* For instance, when the usage data shows that many customers get a validation error on a specific input field, it is often is a sign that something is not clear for customers. This can therefore be input for an improved design. Another case of using data is with A/B testing. When Beta launches a new version of a screen or page, 50% of the users get access to the new page and 50% uses the old page. An internal tool will then measure performance until it Beta can say which alternative is the most successful for customers (based on a 95% confidence interval).

Strategic considerations for customer involvement

Customer characteristics - For some specific new features, customers are selected based on the relevance of the functionality for a customer. For example, Beta is currently thinking about introducing a POS-system for customer that have a physical shop, so they could integrate it with their online shop. Logically, Beta seeks to involve customers for who it is relevant to test such functionality. Otherwise, Beta meets informally with customers that can easily be visited locally and with whom Beta has built a good relationship from the beginning.

Customer role - The role of customers in the development process of Beta is limited to influencing the roadmap by providing feedback in the form of difficulties and feature requests. Beta's vision to make 'opinionated software' is inherently existent in their company culture: *"We decide what is right for customers, not the other way around. That is why we think our product is much simpler, because we say no to a lot of feature requests. This means that we only add functionality when it's useful to at least 50 % of our customers. If this is not the case, it is too specific and the product will only become more complex and difficult."* For the same reason, customers also have no influence on how new functionality will work or will look like: *"We have a UI designer for every two developer, so we are good at that. It involves a lot of creativity. There we decide how functionality will be designed in terms of usage. We want to know from customers what they want to be able to do, and then we determine how they can do that and how it will look."*

Context of value creation - Although the methods for involvement include both insitu and exsitu contexts when creating value, most value is created outside use situations (exsitu). For example, the yearly customer survey and the meet-ups organized when going to conferences are clear examples of value creation in ex-situ contexts. Customers are asked about their experiences with Beta's software in retrospect and outside use situations. Although Beta uses methods that employ in-situ contexts, customer visits are not implemented as a formal process and formal usability studies only used sporadically. Additionally, Beta aims to collect as much context around use situations when collecting feedback via the support system and sales. This helps them to filter common use situations from the more specific/unusual ones.

Type of customer input - In addition to context of use, the main type of customer information that Beta aims to uncover from customers are difficulties in use of their service and the customer's life in general: *"We generally ask things like "What costs you a lot of time?" or "What do you find difficult to use?".* The reason for doing so is that Beta is opinionated software, which means that Beta determines what is best for their customers. This is particular noticeable in their approach of translating customer input into development: *"Instead of specifically asking what functionality could make their life easier, we ask what*

makes their life difficult. Then we will then see what we can do about it. We are responsible for how the functionality will look like that we are going to build. We want to know what the difficult parts are of running an online shop, so that we can make your life easier. That's the level we're trying to keep it at."

Information richness - As described earlier in this paragraph, the main goal in involving customers for Beta is to identify what is important to a large group of customers. Therefore, methods that emphasize reach are employed most frequently. This is done by using usage data to understand customer difficulties, prioritize the roadmap, inform designs and test solutions.

Difficulties in customer involvement

For Beta the biggest challenge in involving customers is communication: *"Our biggest problem is that we say no to customers a lot, which is not a fun thing to do. … There has been some resistance, since it is nice to be of service to everybody. But that is just not what we want our product to be. Therefore we have to steer our sales team to not promise that functionality will be added, because we often won't do that. And if we do, we don't know when it's going to happen."* As a consequence, Beta has occasionally lost a customer to a competitor. Another issue related to customer involvement is that customers are often restricted to thinking inside their own use situation. According to the interviewee, it is difficult for customers to think outside the box: *"They often ask for something really specific like "I'm currently doing it exactly like this and if I would just have this feature it would be a little more efficient". We often take one step back and say "What if you would do it completely differently, it would be even easier." Because customers are often used to their approach of working, we often notice that it is difficult for them think about completely different approaches."*

Outcomes of customer involvement`

By far the most important benefit of customer involvement for Beta is the number of new customers they get due to the increased engagement and word of mouth advertising. The fact that Beta is open for input, results in increased customer engagement. This is especially noticeable on social media like Twitter: *"People ask on Twitter what e-commerce solution they should use. Instead of replying by ourselves, we place a re-tweet. Then there are always customers who are such a fan of our solution that will reply for us. So instead of saying that we are the best, customer will say that is a good product and that we listen to customers very well."* According to the interviewee, customers can be such 'believers' that they will actively convince people all over the Internet to start using Beta's solution. This worth of mouth marketing is where most of Beta's growth comes from. A second outcome noticed by the interviewee is the *improved technical quality*. Beta's focus on agility and speed makes them able to improve quality fast based on problems and reported bugs: *"If people explain what is difficult for them, or we see it based on usage data, we will do something about it. It can occur that a solution is released within an hour."* The combination of a fast and continuous development process and direct customer feedback therefore increases the quality of the product.

3.5 Case Gamma

Location	Australia
Service	Accounting
Founded	2001
Interviewee role	Co-founder / Chief Design Officer

Table 3-4 Case Gamma

Development process

Gamma's development process is constantly in flux, so there's no 100% locked down process. Gamma is constantly looking at ways of improving and evolving its processes in an 'learning organization' model. The development process is based on agile software development practices, in the form of a modified Scrum process. *"We take aspects of Scrum and adapt it to our specific circumstances, which my view is the whole point of Agile and iterative methodology."* Nonetheless, the core process is based on the Scrum methodology and includes the application of user stories and sprints. By using 2-week sprints, Gamma is constantly working in an iterative cycle. Releases often occur during or after a sprint, but with larger features, a release can also occur after a few sprints. In prioritizing development, the past practices of Gamma can be characterized with one of the four key principles of Agile development 'people before process'. Although there is methodology and experience behind it, Gamma relies a lot on the intuition of the team. The customer team and feedback from social media channels alert the development team on what customer pain points are. The development team is aware of issues that come in through the test cycles. And on business levels, the development relies on their marketing team and strategic drive. All of these aspects feed into the prioritization process and evolution of development plans. Gamma works with three key development streams. The first is bug-fixes and maintenance, in which developers fix things that customers have found to not work properly. Secondly there is an operational stream, which includes refinement of existing features and changes for operational efficiency (e.g. processing payments). Third is the major project stream, were major features and projects are undertaken. Development in this stream is much more strategically driven rather than reactively based on customer feedback. Typically, the development cycle duration for such projects is 6-8 weeks, which gives more time to include User Centered Design practices.

Operational aspects of customer involvement

Methods of obtaining customer information

A lot of the feedback that Gamma receives comes in trough the *customer support team*. This feedback comes in via formal support channels and consists of feature requests and emails from customers. Because of the large amount of feedback that comes in, the customer support team is well aware of what customer's main pain points are. Gamma also makes use of *social media channels* to acquire feedback from customers. Twitter, LinkedIn and GetSatisfaction are actively monitored for feedback. Next to general feedback, GetSatisfaction also includes a voting functionality that can give Gamma an indication of priority. Third, Gamma uses *in-context interviews* for persona development. When possible, customers are interviewed in their workplace to uncover information about their usage context. If not, the interviews are taken over the phone. Another important way of involving customer is by employing a *user testing program.* Gamma's user testing program has been an ad-hoc process with different approaches and contexts, and they are now looking to formalize into a formal process by using the Discount User Testing method outlined by Jakob Nielsen. The interviewee has found this a very effective way of getting a lot of feedback from a minimum spent (based on experience in other businesses). It includes an initial generative user test that informs the design process and a validation process that includes usability tests. In addition, *informal meetings with key partners (including customers)* are used for advisory purposes. In such meetings, Gamma would discuss plans with them by asking things like: *"We're thinking of doing this, what do you think? How would that work? Would that meet your needs?"* Finally, Gamma also follows *usage analytics* by evaluating usage via third party analytics tools. This enables them to evaluate usage patterns and identify unexpected behavior. The interviewee explains that although Gamma is in the early days of using this method, it has already provided useful insights: *"One of the reports that we would not have expected to appear in our top ten, or even the top 20, was actually the number 3 page. We found that it's used a lot for troubleshooting and therefore appeared very high in our analytics. On the other hand there were other reports that we thought were really valued by our customers that were very rarely used."*

Methods using customer information in development

First, customer feedback that comes in through the customer support team and social media channels is one of the factors considered to *prioritize the product roadmap*. Because Gamma receives too much feedback to individually evaluate for the development team, the customer service team aggregates the feedback. Secondly, Gamma uses data from in-context interviews to *develop personas* that serve as guide through the design process. Gamma has developed a series of personas (user archetypes) that help them to identify what features to develop and how to develop them. Other key element of translating customer feedback into the development process is when *defining requirements* in the form of user stories and usage scenarios. Based on the problem space of a persona, requirements and related usage scenarios or workflows are defined. The requirements are mapped out into user stories. Gamma distincts large, 'epic user stories' and disaggregates them into smaller, individual user stories. The development team then uses these user stories to ensure that the intended customer and/or business value is delivered by the proposed/implemented solution. Finally, Gamma *iterates on plans, designs and prototypes* during design and development. As the interviewee emphasized multiple times, this currently is an informal ad-hoc process (determined on a case-by-case basis based on the project requirements and context) in which local customers are invited for generative discussions and usability tests. Based on the feedback from such sessions, the development team decides what is put into action and is incorporated into the sprint plan. As explained earlier, this user testing process is currently being revisited to incorporate a more formal Discount User Testing program. In addition, Gamma is planning co-design sessions for its next conference.

Strategic considerations for customer involvement

Customer characteristics -   The interviewee describes the selection of customer for involvement as a rather opportunistic and ad-hoc process. If Gamma knows that a customer has requested a specific feature before or uses a competitive product for it, the customer is asked to join in informal feedback loops: *"We know you have feature XYZ before with a competitive product. Let's sit down and see how our solution stacks up, what you think of it."* Similarly, if a customer would come to Gamma and says: *"We hate this particular thing and we really want you to look at it"*, they are often approached to provide feedback once Gamma has an idea about how they might address the problem. In addition, Gamma frequently meets with key partners (incl. customers) with who they have closer relationship. Similarly, when involvement requires people's presence (e.g. user testing), local customers are selected.

Customer role - Gamma does currently not invite customer to directly join the development process. With regard to customer influence on the roadmap, in the past Gamma has put an enormous weight on what customers ask for in the prioritization process There was a rather strong relationship between what customers ask and what is developed: *"When a customer says: I need to be able to do X with inventory. We'll build that feature to do X with inventory."* The product to date has been developed in this way with a healthy dose of Gamma's own analysis and ideas: *"Customers have asked for XYZ, we look at XYZ, ABC and maybe LMN, and we'll incorporate those into a specific solution because it meets the needs of more customers."* Therefore, the impact of the customer on the product roadmap has been relatively high. During the development phase, customers can only indirectly affect design and development efforts, because they are not an integral part of the development team. Note that Gamma is currently changing the way on they respond to feedback: *"We are also going through a process were we've identified what we think the market will love, based on what we see across the different requests …. Where there's a less direct relationship between what is being asked for and what we are actually producing, but we think in the end will serve the market better."*

Context of value creation - Gamma employs both methods of insitu and exsitu value creation. The majority of customers' feedback is obtained passively via the support team,

email and social media. Although such feedback is difficult to classify as in use or outside situation, it can be assumed that a good portion of this value is created in while using the product. In addition, with in-context interviews and usability studies Gamma consciously obtains customer information from in-use situations. The interviewee explains why this is valuable in involving customers: *"Every human being has a certain mental model and way of understanding the world. And my experience in user testing is that it doesn't matter how easy your design is, out of 6 participants 4 of them won't get it the way you intended it. It might still be a very usable design and they may be able to navigate it quite effectively, but when you actually see how they approach it and how they understand it, it can be quite different to the way that you thought. In seeing that diversity of understanding a perspective, we can better design the next version, but it can also open up opportunities that we didn't recognize where there."*

Type of customer input - A large part of how Gamma has developed their service is based on what customers ask for. This does not mean that the customer input is directly translated into the development efforts. The translation of customer input towards development includes a creative process of analysis: *"Asking a customer what they want is not always the best way to understand what we should be providing for them, the most effective way to meet their needs. Based the informal input channels, we do a lot of analysis internally: "Okay, we keep getting asked about this particular problem, here are the bigger picture business scenarios that we're trying to address based on that feedback." And then we can start with a creative solution that we didn't run by those customers."*

Customer representation - During actual development, Gamma has employed various techniques from User-Centered Design and Scrum that (indirectly) represent users and user needs. These methods have been described earlier and include personas, user stories and usage scenarios.

Information richness - The most frequently employed methods of customer involvement at Gamma are advisory meetings, making use of aggregated feedback and user testing. Although feedback is used to indicate the importance of requests to customers (reach), the main objective for Gamma is to uncover use knowledge via information rich methods.

Difficulties in customer involvement

A key challenge for Gamma is the integration of design-related customer involvement practices in the agile development process. Although this problem is related to a broader challenge of how to integrate the design process into the agile process, it is of particular relevance to integrating usability testing into development cycles: *"The agile process presents some distinct challenges in terms of timing into where we introduce testing into the design process. The challenge is how do you introduce a more formal design process where you have upfront design work within an agile model, and where you can incorporate feedback loops from customers in that context without taking too many sprints to do something."* A second challenge for Gamma is the recruitment of customers for involvement. Gamma's customers generally are very happy and pro-active to give feedback. Nonetheless, Gamma has found it difficult to engage that level of commitment in a more formal and regular process. Gamma is currently increasing its efforts in terms of recruitment to get a regular rotating group of customers that they can contact for testing. Even in the early days of this process, they have found this process to be a challenge: *"We don't want to be asking them every three months … if we're testing inventory and they don't use it, we obviously don't want be wasting their time in contacting them about those things."* A third challenge is managing customer's expectations during the process of involving customers. When customers provide feedback, certain expectations build up in customer's minds that are difficult to manage: *"Let's say somebody has come in and has given us feedback on a specific feature. They mentioned it through support desk and service desk, they have some ideas, so we bring them in. The expectation is that their ideas are magically going to appear in the product within a month."* The main challenge for Gamma is how to communicate and respond in such situations: *"In fairness, we need to be better in communicating with our customers about that.*

I don't have next step approach to how we address that particular challenge, but it's certainly something we need to get better at."

Outcomes of customer involvement

Gamma currently has no direct metric to measure outcomes of customer involvement. Although they are considering implementing customer satisfaction metrics in coming year, the interviewee does not think that they will ever come to a point where they can fully quantify the degree to which customer involvement has improved the business. This is also because customer centricity is embedded in Gamma's culture, that they do not know how to work any other way. Gamma has seen 700% growth over the past 5 years with a minimal effort in sales or marketing. To the interviewee, that is the number one testament to their customer-centric approach. More specifically, their practices of customer involvement have resulted in increased value and competitive advantage: *"'We're essentially tapping into a huge pool of expertise to give us a competitive advantage. Every customer that we can do that with in constructive way increases the value of our product, because if we solve the problems for them we solve the problems of lots of other customers."* In addition, the use of insitu methods like user testing can open up new opportunities: "*In seeing that diversity of understanding a perspective, we can better design the next version, but it can also open up opportunities that we didn't recognize where there."*

3.6 Case Delta

Location	Netherlands
Service	Business software
Founded	2005 (SaaS)
Interviewee role	Manager product development

Table 3-5 Case Delta

Development process

Delta uses Scrum, an agile software development that benefits from two-weeks sprints to get frequent feedback on its development efforts. The interviewee explains that by working with short development cycles, Delta aims to increase the influence of customers in the development process. The development starts with strategic market research conducted by team of a product marketer, product manager and user experience representative. The aim of this research is to plot the market in general and find out what companies and users want. As a result of this research, the team sets up a list of requirements. The level of interaction with the market and end users is very high during this process (e.g. innovation panels). The requirements are then further refined and described as 'user stories'. The product manager of the particular development team, which also acts as a 'product owner' within the Scrum method, makes the user stories more specific for the team. The team then will start the development, design and testing in sprints of two weeks. After these two weeks, a sprint review takes place wherein results are presented to a wide-oriented group of people within the company. Delta aims to release on a daily basis, but depending on the project type, development times can span over multiple sprints.

Operational aspects of customer involvement

Methods of obtaining customer information

A key input for the development process is information gathered from customers via *innovation panels*. Delta frequently organizes panel discussions where user can sign up for themselves. By inviting customers to tell about what they do and what they expect from a solution, a better understanding of customers and their needs is created. Secondly, *user research* is carried out by interaction designers to uncover needs and learn more about the user context. For this research user-centered design techniques like interviews, user diaries and general market research are employed. In addition, *usability tests* are used to evaluate developed products with real users. By observing how users complete typical tasks, Delta

receives direct feedback on the usability and performance of its products. Next, product managers and interaction designers *visit and invite customers* on occasion to talk about how customers work and use Delta's solutions. While product managers focus on learning what customers want to achieve during these visits, and interaction designers pay attention to who a customer is and how they want achieve things. The development team also *tracks usage behavior* with self-developed tools. Via these tools developers can see exactly what a particular group of users is doing during the day. Finally, Delta also uses customer information that is passively acquired via *social media, e-mail, sales* and *customer support*. This includes feedback from LinkedIn, Twitter, e-mails from user panel members and salespeople in the field. Customers can call, e-mail or chat (from within the product) to customer support.

Methods using customer information in development
First, together with Delta's own vision and goals the aggregated feedback and inputs from innovation panels *influences the roadmap*. The first use of customer information is for *requirements definition* in the form of user stories and user scenarios. User scenarios describe a day in the life of a user and the ways it uses our software during that day. A second method of incorporating customer information in development is by *developing personas* based in-depth user research. Although a persona is an archetype, it has a face, a real name and maybe even a family. This allows Delta to develop software for an actual person that is concrete and represents real users. During the design and development itself, Delta frequently *iterates with customers on plans, designs and prototypes*. When Delta has refined it requirements and design, concept designs and wireframes are often shared with customers in an early phase. The interviewee explains that such iterations can help in reducing unnecessary development costs: *"Throwing away a concept design or wireframe is not a big deal, throwing away build software is much worse in terms of costs"*. During the development of larger projects (e.g. introducing a new module), multiple innovation panels, customer visits and usability tests are also used to get feedback on development efforts. However Delta aspires to have customers join the team during sprint reviews, this is not yet the case.

Strategic considerations for customer involvement

Customer characteristics - The interviewee explains that the customer's industry/market and innovativeness are characteristics that Delta looks for when customers are involved. Delta wants to develop innovative solutions, so therefore customers must also be willing to innovate and have the capabilities to innovate. Otherwise customer selection can also be based on practical factors, like proximity.

Customer role - The methods of customer involvement as described earlier, and in particular the innovation panels, serve as an important source of input for the development process. The methods therefore ensure that customers can influence Delta's product roadmap, but it is not the only factor of influence. Delta's own product vision and goals are also of key importance in determining the product roadmap. During the development process, customers can directly influence development efforts by providing feedback in innovation panels and usability test. Because Delta involves customers in all stages of development, the impact of customers on development efforts is relatively high. With other methods like personas and user scenarios, customers affect the development process in an indirect way. The impact of customers on the development process could be higher if they were invited to join sprint reviews (which Delta aims to do in the future).

Context of value creation - With Delta's methods involvement, value is created both in in use-situation and outside use-situations. The innovation panels, which are frequently employed during development cycles, are an example of value creation outside use situations. Value is created in planned discussion, wherein customers are asked to tell about how they work (in retrospect) and what they expect of a solution (in anticipation). In similar fashion, when customers are invited to come and talk at Delta value is also created in exsitu context. With other methods like user research and usability tests, Delta consciously seeks

information form customers within use contexts. The interviewee explains that the in-context research of interaction designers is of critical importance for understanding how customers work: *"You can make beautiful online software, but the most important things in a company hang on a bulletin board. Our interaction designers look at things like a company's ambiance and what a user hangs at his monitor or door. For example, we just spoke to a customer who often leaves his pc and wants to check things on his mobile phone. You really have to spend a day within a user's environment to see such things."*

Type of customer input - The use of personas to inform design in Delta's development process is based on the goal-directed design methodology by A. Cooper. The method emphasizes the importance of focusing on a user's goals instead of tasks, functionality or features. The interviewee shows the implementation of this strategy by giving an example: *"You have to design for the user's goals. That goal wouldn't be to print an invoice, but to get your money on time."* This shows that Delta is consciously using outcomes as an input for innovation rather than functionality or solutions.

Customer representation - During actual development, Delta uses personas to represent customers: *"Persona is a technique with which you aim to create a stereotype image of a user, so that if you succeed satisfying the persona it represents a larger group of people."* In this way, developers and designers can create a better understanding of what a typical user's life looks like. In addition, Delta uses methods from Scrum that (indirectly) represent user needs. In addition to the earlier described user stories and usage scenarios, one team member (the product manager) will be in the role of 'product owner', who's rask is to represent the customer interests.

Information richness - By frequently employing discussion panels and doing extensive user research, Delta's methods of involvement are more focused on richness of interaction rather than on reach.

Difficulties in customer involvement
The biggest challenge for Delta currently is to manage customer expectations during involvement. Clear communication is key for managing expectations and customer relationship: *"When you involve customers, they expect information and clarity about what you are going to do in return. Sometimes we clearly have to say no, which is our biggest point for development."* Another difficult part of the involvement process is that not all customers are always willing to join. Delta has found that bigger firms tend to are more likely to join than smaller firms: *"Smaller companies are busier with keeping their head above water and doing things they like."* In similar fashion, making sure you talk with right type of customers is a challenge as well: *"If you only talk with the most trendy and technology-oriented companies, it represents only 5% of the market. If you want to target market also includes the other 95% you will need to involve them too."* The interviewee also found that involving potential customers is more difficult than involving current customers. Since non-customers are the people that can result in growth, Delta finds it of critical importance to involve them into the development process.

Outcomes of customer involvement
Although the interviewee cannot establish links between customer involvement practices and specific business outcomes, the involvement of customers has certainly benefited the development process and output quality. The biggest benefits are the insights and inspiration that are obtained during the process, which results in better ideas. According to the interviewee, this also affects the quality because Delta has a better understanding of customers and what they want to do. Another benefit is the customer-oriented mindset of the development team, who have a better sense for who they are building the software. The direct and indirect (personas & user stories/scenarios) involvement increases the effort of the development team: *"Involving customers improves the mind-set of the development team because know better for who they are doing it. I think that the more real users are, the better the effort will be."*

3.7 Case Epsilon

Location	Netherlands
Service	Accounting
Founded	2000
Interviewee role	Business analyst

Table 3-6 Case Epsilon

Development process

Epsilon has implemented an agile development process (Scrum), with a focus on small projects and flexibility. This allows them to quickly adjust and redirect when needed. Epsilon releases at least every month and works with two-week development cycles (sprints). Within Epsilon there is a 'product council', which is a group of internal stakeholders that decide on the project roadmap. This is a person (internal) for whom the development team builds and presents their work. When a project is set up, multiple scenarios for the different solution directions are prepared. Next, the size of the project is determined (e.g. S/M/L) and the project is further defined on feature level. Features are the main blocks within a project, and while defining them lead developers are involved. Then the development times are estimated per feature (e.g. a half sprint) and deliverables are defined. Based on these two variables, the features are sorted on importance. For Epsilon it is key to first focus on the main functionalities. Nice-to-have features will come later, often based on customer feedback. Once features are known, they will be split into user stories. The goal is that the whole team first put their effort in the most important block of the sprint, so that after two weeks they can always deliver something: *"If you pick up five things, deliver nothing, and say that you will finish it in another two weeks, you have done nothing for two weeks. Ultimately you build for your users, and a user can't do anything with five half functions. Two whole functions on the other hand, is useful."* Delivering something every development cycle also ensures early feedback on your development efforts. Finally, a two week cycle always ends with a demo to the sponsor, stakeholders and other teams. The team receives feedback from the sponsor. Development times often span multiple sprints, but a release is put out at least every month.

Operational aspects of customer involvement

Methods of obtaining customer information

Much of the feedback comes in trough the *support team*, which includes feedback via e-mail, phone, online forms and chat. In general, the support team evaluates the feedback and sends relevant issues and requests to business analysts. Next, Epsilon communicates via *social media* with its customers where it occasionally receives feedback via Twitter, LinkedIn and Facebook. Similar to support, people responsible for social media evaluate and forward relevant feedback. However much feedback comes in via support and social media, development is more focused on direct contact with specific customers. This happen via *customer visits, invites* and *conference calls*. A business analyst would have conversation wherein is asked how customers would like a function to work and what they need. Or in a later stage, working functionality or demos are shared to get feedback. Finally, Epsilon actively *tracks and analyzes usage data* with internally developed tools. A lot of information is tracked and can be requested from the database. These measurements can be used to find out how customers use a particular functionality.

Methods using customer information in development

First, customer feedback and usage data are used for *prioritization*. Projects are prioritized by the product council based on vision, customer feedback and governmental regulations. In addition, data is used to indicate the yields of projects like *"It results in x new customers"* or *"It applies to X% of our customers"*. Based on this information, the product council can make informed decisions on the roadmap. Next, customer feedback is used for *requirements definition*. Epsilon talks to customers to determine what new functionality should be able to

do and how. This results in user-stories, which often are described in a format like*: "A user wants to be able to do something, because he cannot do it / wants to do it in the future."* In a later stadium, customer information is used while *iterating and improving on working software*. This happens both before and after release of the software. Before release, demos are shared with select customers to get early feedback. After release, Epsilon can still respond relatively quickly to feedback of the majority of the users. According to the interviewee, this is a big advantage of web-based software. 25% of the development time is allocated to enhancing existing functionality. In the future, Epsilon aims to get feedback earlier by sharing designs, do A/B testing and camera supported usability tests. Epsilon plans start sharing design mockups in the coming year: *"The moment where you are making your first design mock-ups, is where you want to involve customers … You can show two or three variations. That is like A/B testing, which you want to do as early as possible. We are still growing towards a process like that … It is something that we want to move towards in the coming year."* Although currently only working functionality is shared, this clearly shows that Epsilon is aiming to involve customers earlier in the process. Another approach of (indirectly) using customer information in development is the use of *personas*. Based on conversations with customers, personas (user archetypes) are developed to emphasize for who the development team creates the software.

Strategic considerations for customer involvement

Customer characteristics - Customers are mainly selected for involvement based on use of the desired functionality and a customer's match with a persona. With over 60 functionalities, Epsilon has to make sure that it involves the right customers when working on a specific functionality. Thus, one method is to invite customers that Epsilon has contacted earlier about a particular functionality area. Additionally it is important from a development perspective to involve customers that are a close match with the previously developed personas. In other cases, practical considerations like proximity can influence selection.

Customer role - Customers can indirectly affect the development roadmap due to the mechanisms described earlier. However, it is only via the roles of sales, marketing and consultancy in the product council that customers can indirectly influence prioritization. The interviewee describes that ultimately customers and vision are the two things that can affect the development process: *"We are a commercial company, so if customers say they want X, we're not going to build Y, because they pay us."* The only way other customers can give feedback on design/development efforts is on retrospective; that is on demos or when software is already released.

Context of value creation - Although some of the passively collected feedback via support and sales might come from users reporting from within their use situation, most value that comes from customers is collected outside use situations. With the most frequently employed methods, customer visits / invites and conference calls, customer information is collected in anticipation or in retrospective. The interviewee notes that in the future Epsilon wants to implement camera-based usability tests, which would be a good example of in-situ involvement. For now, it can be concluded that Epsilon does not actively capture customer information in use context.

Type of customer input - When identifying needs for development the focus is mostly on desired functionalities. A business analyst might ask questions like *"What functionality do you want?"*, *"What do you do every day and how would you prefer to do it?"* and *"How do see it in three years from now?"*. Next, the business analyst might guide customers into thinking differently. This can be done in a creative process where the business analyst uses techniques like removing rules. For example, one might say that a bookkeeper is no longer required have equal values of credit and credit. This triggers people to think further. This often results in multiple ideas and desired functionalities that serve as an input in the requirements definition process as described earlier.

Customer representation - Customers are indirectly represented in the development process by personas, user stories and an internal stakeholder, who will be in the 'sponsor' role for a particular project. The sponsor will give feedback as if a customer would do and stands for the project within the organization.

Information richness - Although Epsilon also employs usage data to inform development, the main method of involvement is by meetings and conference calls with customers. In such meetings, they would ask customers

Difficulties in customer involvement

The interviewee explains that generally not many difficulties occur when involving customers. The only challenges exist when customers are no longer willing to participate and in managing customer expectations. Although the Epsilon's customers generally are willing to participate in involvement practices, it can happen that customers don't want to be involved anymore. The interviewee explains that this can be caused by general discussion or other events. Fortunately, this does not happen frequently. Secondly, customers might find it difficult to understand the development process. Customers do often not understand that what they get to see (e.g. a preview) not always will be released or will be released later then they expect. Epsilon is an agile organization, which means that they work on what is most important at that time. Therefore it can occur that parts of a project a put on hold, even it can be very important to a particular customer. That can be difficult to that customer, because he may have put in a lot of effort for that specific feature.

Outcomes of customer involvement

The biggest advantage of involving customer for Epsilon is that they get insights that they otherwise may not have noticed: *"Sometimes you create a tunnel vision during a project, because you are to focused on the end result. At the moment a customer looks at it and says "Have you thought of that?", it's often the case that you haven't. That's why we bring in customers."* Secondly, the customer involvement ensures that developers know for why and for whom they are building the software: *"The people that develop want to know why they are developing it … Involving customers gives us the opportunity to explain why something needs to be developed in a certain way. Doing this improves the perception of the developer, the feedback of the developer and the end result."* In addition, personas also result in improved customer orientation of developers, since it will trigger discussions like *"Does the user really want this?"* or *"I think this is not logical for users."*. It also improves quality, since testers know how the software is used. This helps them in setting up test scripts. A third advantage of the methods described earlier is that it has resulted in unique selling points. You get unique selling points. This occurs when a business analyst look at how accountants work and asks what they want to do. For example, when they saw that an account has to make a completely new journal entry to edit a small error, they improved the design so that accounts could make direct changes. When such a new feature is shown to other customers, they would often say: *"That's useful, other software doesn't have that."* In this way, Epsilon enables unique selling points and improved competitive advantage.

4 Cross-case findings

In this chapter, the second part of the data analysis is presented in a cross-case analysis. The findings of the within-case analysis are compared to find insightful similarities and differences. First, the methodology of analysis is explained. Next, general observations that relevant for this study but are directly represented in the conceptual framework, like SaaS characteristics and the general development process are described. Next the findings within the main themes of this study are presented, including operational aspects, strategic considerations, difficulties and outcomes of involvement.

4.1 Methodology

For the cross-case analysis, within-case descriptions are compared per concept and further summarized in comparison tables, so that comparisons of the case data can be made and patterns are identified. By identifying similarities and differences, we seek to provide further insight into issues concerning the development process and customer involvement by (analytically) generalizing the case study results. Studying multiple cases makes it possible to build a logical chain of evidence (Yin 1994; Miles and Huberman 1994). In other words, we use the cross-case analysis to seek a chain of evidence on the basis of the framework.

4.2 General

The first section of the findings describes SaaS characteristics and implications, the (agile) development process and customer centric design influences.

4.2.1 SaaS characteristics

In this paragraph, we briefly highlight the most important distinct characteristics and implications of SaaS as mentioned by the participants. Table 4-1 gives an overview of the most frequently mentioned characteristics.

	Alpha	Beta	Gamma	Delta	Epsilon
Easy accessibility	- Bottoms-up adoption - Consumerization of software / IT	- Less technology for users - Access to wider public - Other type of customers	-	-	- More consumer good - No complex decision process - Set-up in 3 min
Service provision & responsibility	-	-	- Trust & ongoing relationship - Greater responsibility	- Greater responsibility - Service provider	- Service provider - Think with customer / make life easier
Instantly push changes to all users	- Instantly push out changes - No upgrade process	- Everyone uses same version - No need to convince upgrading	- Upgrades immediately available to all customers	- All customers on same code-base - Make today, use tomorrow	-
Direct visibility in usage data	- Visibility in usage data	-	-	- Direct insight in usage - Developers are closer to customer	- Direct insight in usage
Low switching costs	- Low switching costs - Puts pressure on delivering value frequently	-	-	- Customers can cancel every month	- More interchangeable

Table 4-1 Unique characteristics of SaaS

A key trend in the software industry that affects SaaS firms is often called the 'consumerization of information technology'. Traditional business software can often be characterized as complex and difficult to use. Buying involves a long decision process including consultants, research, maintenance contracts, large expenses and long-term decisions. The adoption includes a top-down approach where high level executives push it down to users. These days however, software is increasingly adopted with a bottoms-up approach, where users bring their own devices and apps. Although this adoption process does not apply to all cases, all SaaS software is much easier accessible for customers: *"Let's say you're a small business owner and you decide to use our product. You come home, start your computer and you are signed up in 3 minutes."* (Epsilon).

The ease of accessibility has a lot to do with the delivery and pricing model of SaaS, which has implications for both vendors and its customers. The manager of product management at Delta explains that by using the SaaS delivery model, vendors have become service providers: *"The responsibility is greater. In the past it was just on CD, now it includes the environment, accessibility, performance, security, etc. So you are, not to say a full service provider, but you are a service provider."* For customers this means they have a lot less to manage around the software. In the case of Beta, this has resulted in different type of customers: *"E-commerce was only available for professionals … You had to run your own servers and needed much knowledge around regulations. Because we now do that for customers, it's not just simpler for existing shop owners, but it also becomes accessible to a new group of customers … The average customer is now is a mother with two children that makes knit stitches in-between."*

A third characteristic of the SaaS model is that changes can be pushed out to all users immediately, as often as the vendor wants. There is no need to upgrade for customers, and vendors don't have to put effort in convincing customers to upgrade. According to the data team manager of Beta, this is why they can focus on continuously improving their service, making customers lives easier and provide good support. In addition, this adds even more responsibility to do what is right for customers, since they cannot decide to upgrade or not. Another major difference of web-based services is the direct insight that vendors have into usage. According to the vice president of product management at Alpha, this is a unique characteristic that provides direct feedback: *"A lot of our app is based on the usage data. You can instrument your app to see clickstream data and actions, see what features are used and not … And after you make a change in a new release you can see usage changes … That's a big difference from the old model where the software was on your customer's machine, and you had no visibility into it."* According to the interviewee of Delta, this is why customers are much closer to developers in SaaS environments.

Next, the subscription-pricing model of SaaS software makes it easily accessible for people, but also easier to stop using it. Customers can cancel every month and have relatively low switching costs, since there is no need to uninstall anything and data can often be exported or moved. Therefore, vendors perceive more pressure to deliver value frequently and keep customer satisfaction high.

4.2.2 Development process

	Alpha	Beta	Gamma	Delta	Epsilon
Development method	- Agille - 'loose Agile'	- Agile - Incremental	- Agile - Modified Scrum	- Agile - Scrum	- Agile - Scrum
Releases	- Monthly	- Daily	- 2-Weekly	- Daily	- Monthly
Comments	- No specific method - Internal iterations - Parallel design /	- Strongly focused on incremental improvements - No specific	- 2-week sprints (iterations) - People before process (rely on team's intuition)	- 2-week sprints (iterations) - First strategic market research - Design,	- 2-week sprints (iterations) - Focus on small projects - 'Product

	development - Testing only on comprehensive features - UI/UX design	method - Quick and iterative process - Not much upfront planning - No extensive testing - Strong focus on UI design	- Upfront design work and test cycles for major projects and features - User-centered / interaction design principles	development and testing during sprints - Sprint reviews with internal wide-oriented group - User experience design	council' decides on roadmap - Teams develops for a 'sponsor' - Present to sponsor and others after sprint - User-centered design

Table 4-2 Development process

Like described in the literature review, dissatisfaction with current software development approaches and a global, rapidly changing environment have resulted numerous agile development methods (see appendix III). All cases in the sample classified themselves as 'agile' and three of the cases used a specific agile development methodology. The implications of the SaaS delivery and pricing model as described in the previous paragraph make the agile approach a good match and appropriate method for SaaS vendors. The participant of case Alpha thinks that pressure on frequent delivery and the real time feedback make agile an obvious choice: *"Everyone has gone to much more agile/iterative development models, because you can get your features, improvements, enhancement requests and bug fixes pushed out to all of your customers quickly and frequently. And you've got all this data and real-time feedback in the app and via support on how it's going. Thus it makes sense to iterate and do this quickly versus wait and have the Microsoft model, having a release every year or so."* Key elements in this approach are quick, iterative development cycles and incremental improvements, which creates flexibility and ensures early feedback on development efforts. The business analyst of Epsilon clearly explains the agile approach by using a metaphor about construction: *"Let's say you are building a flat with 6 floors. You are building the second floor and you show the first floor to your customer and he says: "I wanted a bathtub and you build a shower." The advantage of being agile is that you're already aware of these changes while building the second floor. So you can then cancel your orders and build bathtubs into the other floors. Traditional project driven approaches would first build 6 floors and then find out that all showers can be thrown away and rebuild."*
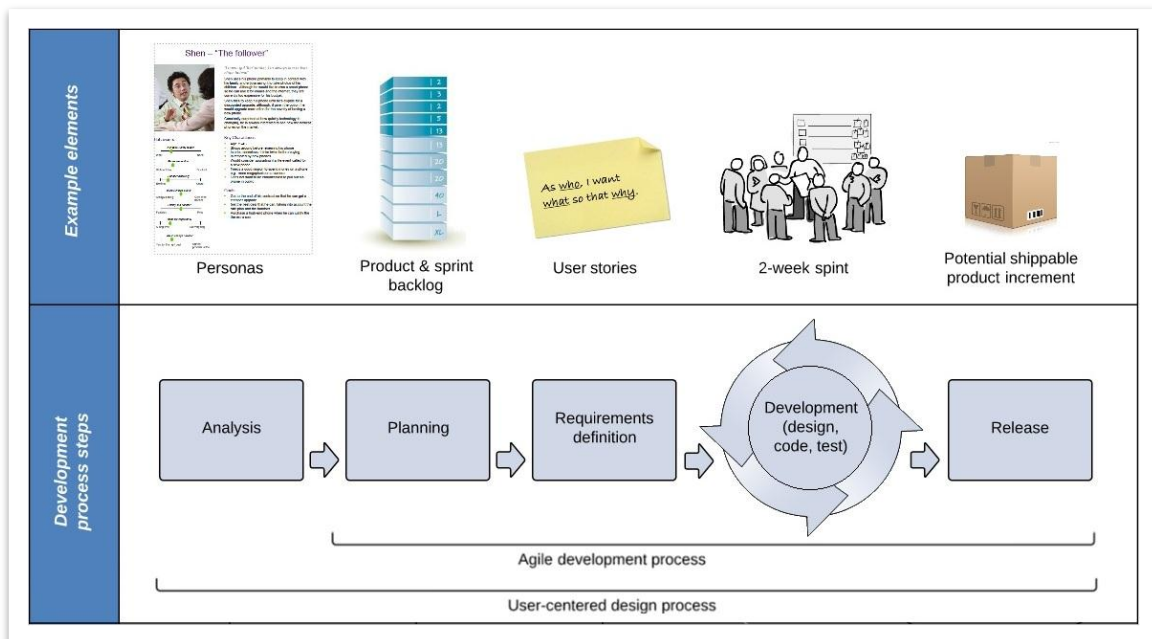
Figure 4-1 Overall development process

Figure 4-1 shows a general representation of the development process. Three of the five cases used the Scrum method specifically, which includes two-week iterative develop cycles

(sprints) and user stories. In addition, the inclusion of user-centered design is especially notable by the upfront research and analysis. It should be noted that participants explained that the development process is never 100% locked down. Vendors are constantly looking at better ways to do things and improve their processes. Most cases adapt their development process according to the size of a feature/project. For instance, since the aim is to keep the development cycle as short as possible, upfront analysis and user testing is often only applied with larger features. During the planning and requirements phase, priorities are set and requirements are described and further refined into smaller steps. In the scrum method, these requirements are written as user stories, which will be explained later in this chapter. During the development iterations, development members work on the design, code and tests. With larger features, the development phase can span multiple iterations. This method results in frequent releases, which is a key feature of agile development and SaaS in particular.

Customer-centricity and design

The ongoing developments in the discipline of software development and the implications of SaaS as described in the previous paragraph have resulted in increasing customer focus and influence. Although the cases mostly have worked in a customer centric way from the start, participants have emphasized the importance of (user-centered) design practices in this process. According to the participant of Delta, this has resulted in a greater influence of customers in software: *"Due to SaaS and developments in software development, the influence of users in software is greater than before … Software was traditionally build by people that could program, but those are not necessarily the people that understand customers best … Now we have added the user experience discipline to that profession. Before it was only a programmer and an information architect. It was already great that you could automate, whether it was easy to use actually did not matter."* In other cases, the influence of design disciplines is also of great importance. For example, Gamma has actively implemented user user-centered / interaction design principles from the early beginning. Customer-centricity is a fundamental part of running their business: *"Customer centricity is built in on a lot of different areas of the business … We have never lost sight on the customer in everything we do. Even at the strategic level, we're always thinking what will give the most value back to our customers."* In addition, design is of key importance for Beta: *"For every two developers we have one UI designer, so we are pretty good at that."*

4.3 Methods of obtaining customer information

As can be seen in Table 4-3, four key methods of obtaining customer information are identified and will be described in this paragraph. In addition, some other methods like meet-ups, innovation panels and crowd-sourced feedback were applied by software vendors. These are however not used by the majority of the cases and are not further elaborated.

	Alpha	Beta	Gamma	Delta	Epsilon
Passive acquisition of feedback	- Support center (online) - E-mail and calls (support)	- Support & sales (email, phone, chat) - Social media (Twitter most important)	- Support team - Social media channels (Twitter, LinkedIn & GetSatisfaction)	- Support & sales (phone, email & chat) - Social media (Twitter & LinkedIn)	- Support team (email, phone, online and chat) - Social media (Twitter, LinkedIn & FB)
Customer visits, invitations & calls	- Informal advisory groups / conference calls - Web demos	- Informal meetings with well-known local customers	- Informal meetings with key partners (incl. customers)	- Meetings (product managers & interaction designers)	- Customer visits / invites and conference calls
Track & analyze usage data	- Tracking usage data (self-built tools)	- Tracking usage data (Google Analytics + internal tools)	- Usage analytics (Third party tools)	- Tracking user behavior (self-built tools)	- Track and analyze usage data

| Usability testing | - Usability sessions | - Usability study (outsourced) | - User testing program | - Usability testing | - |
| Other | - Semi-structured focus groups
- Crowd-sourced feedback on designs | - Email surveys (every year)
- Local meet-ups when going to a conference | - In-context interviews | - Innovation panels (panel discussions)
- User research (e.g. interviews, mobile diaries) | - |

Table 4-3 Methods of obtaining customer information

4.3.1 Passive acquisition of feedback via support and social media

One thing all cases reported is that they receive a lot of feedback via support mechanisms and social media. Customers frequently provide feedback to support, which mostly can be contacted via a support center/forum (online), e-mail, chat and phone. In addition, social media platforms are used as input for development by four cases. Most of these platforms are not only used to send out messages to customers, but also to receive feedback and have conversations about how customers use these services. Of the different social media platforms, Twitter and LinkedIn are generally explained as the most valuable platforms for receiving feedback. Feedback via both support (and in some cases sales) is passively obtained, since the software vendors themselves are not initiating the feedback. They only have to ensure that they are open to the input from customers by providing them the various platforms for conversation. Thus, the software vendors already receive a lot of feedback without specifically asking for it. This provides them with a unique opportunity to analyze and use such customer knowledge for development process. Therefore, most cases have set up a system to collect the large amount of feedback in an effective way. Such mechanisms allow support (and in some cases sales) teams to define context of the feedback and include vote counts to indicate how often a specific feature is requested.

4.3.2 Customer visits, invitations and conference calls

Another important method of obtaining customer information that is employed by all cases is by meeting with customers. This is done by either visiting customers at their place, inviting customers to the vendors' office or by setting up a conference call. Employees that talk with customers in such settings are often directly involved in development and include product managers, business analysts, UI/UX designers and sometimes developers. In most cases, the meetings are of an informal character. Based on the within-case analysis, three different purposes for these informal meetings can be identified. First, researching behavior and needs is something that all cases focus on during meetings. The second purpose of getting early feedback on plans and design is used less frequently. In this case, the development team would share plans or concept designs in the form of wireframes or non-functional designs with customers. They would then ask what customers think of it and if it would meet their needs. Thirdly, working functionality can be shared as web demos or via screen sharing in conference calls to get feedback on development efforts before release.

4.3.3 Track and analyze real-time usage data

Participants noted that the direct visibility of user behavior is a big benefit of online software. All of the cases take benefit of this opportunity by tracking and analyzing usage data. Four of the cases have internally developed tools to track measure user behavior. Two cases use third party tools to get insights into patterns and unexpected behaviors (one uses both). Overall, the tools are designed to analyze behavior by tracking clickstream data, actions, patterns, use frequencies, validation errors, etc. This gives development teams direct insights on how customers use their product, which can uncover unforeseen patterns of use. In addition, usage data can also be applied to measure if specific solutions perform well. The example of A/B testing as explained by Beta's data team manager illustrates well how such measurements can improve decision making during the development process: *"We do a lot of A/B testing. This means that when a new version of screen or page is made, 50% of our customers get access to it, while the other 50% uses the old page. After that, you look at the*

difference in how successful customers are with it … We have internal tool that shows when we can say with 95% confidence that variation B is better than A. From the moment we know that, all customers are switched to the new page." Thus, usage data cannot only be used to inform design and development, but also to test solutions based on performance.

4.3.4 Usability testing

A fourth method participants highlighted as a valuable method of getting feedback is usability testing. In usability tests, users are observed while using the product. Users are given a short assignment or use scenario that needs to be carried out. As an example of in-person observation in usability testing, the Vice President of Product Management at case Alpha describes a usability session: *"During a redesign, we often brought in one or two persons … We might give them a little scenario like: Just pretend that a friend said "Hey this is a great tool for managing a project or getting team task list". … So just go to our website, sign-up, we're going to look over your shoulder, and please think out loud. So tell us what you're thinking as you go through each step and be brutally honest. We would see a lot of things in those sessions and we continued to do those every now and then."* Although usability sessions where implemented less frequently than the other methods, the four cases that used this method found the sessions to be very beneficial. We further elaborate on this in paragraph 4.5.

4.4 Methods of using customer information for development

In this paragraph, five uses of customer information as shown in Table 4-4are described.

	Alpha	Beta	Gamma	Delta	Epsilon
Developing personas	-	-	- Create personas based on in-context interviews	- Create personas that represents group of users	- Develop personas based on conversations with customers
Prioritizing the product roadmap	- Monthly review of requests by management - ± 30% influence on roadmap	- Internal tool for tracking requests (incl. vote count) - Reviewed by product managers	- Service team aggregates feedback - Feedback considered in prioritization	- Aggregated feedback from support and innovation panels influences roadmap	- Product council uses feedback and usage data to make informed decisions on roadmap
Definition of requirements	- Read through feedback - Summarize - Provides context	- Provides context of use situations - Solution needs to apply to 80% of use situations	- Define & refine (epic) user stories & usage scenarios	- Define user stories and user scenarios	- Define & refine user stories
Validation of plans & concept designs	- Seek advice on development plans - (Experimented crowd-sourcing designs)	-	- Seek advice on development plans - (co-design sessions in near future)	- Share concept designs & wireframes - Feedback via innovation panels/meetings	- (share design mockups in near future)
Test & improve before and after release	- Web demos - Usability sessions	- A/B testing	- Currently ad-hoc usability testing - (moving to formal Discount User Testing)	- Usability testing	- Show demos (screen sharing in conference call or show service via web)

Table 4-4 Methods of using customer information for development

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4.4.1 Developing personas

Three of the five cases reported to use personas during their development process. They developed a series of personas that serve as a guide trough the design and development process. Cases have implemented personas as part of the user-centered design philosophy. Personas are user archetypes that help development teams with keeping a focus on who they are developing for. Personas are created based on interactions with real users (e.g. observations, interviews, research). A persona has a real name, and often includes specific user characteristics, demographics, behaviors, motivations and goals. The purpose of personas is to make the users seem more real, to help designers and developers keep realistic ideas of users throughout the process. As the business analyst of Epsilon explains, this triggers the development team to be more customer-oriented: *"Developers do not interact much with customers. We describe personas so that they know for who they are developing. We give them a real name. You are building it for him, who lives in this way, this is what's important for him, these are the tv-show he watches, etc. So that developers for an image. This often triggers discussions, because developers would ask things like "Does the customer really want this?" or "I think this is not logical for users"…. So we try to trigger that."* In addition, the participant noted that with the use of personas, they can more easily select customers involvement.

4.4.2 Prioritizing the product roadmap

As described in the previous paragraph, all cases receive a lot feedback from customers passively via support and social media. They have therefore built internal tools to collect feedback effectively. When new feature requests come in, employees can use a voting mechanism for functionalities that have been requested before. Due to the large amount of feedback that is received, this voting mechanism gives a good indication of the importance of a particular request to the customer base. All cases make use of this this information to (partly) determine the product roadmap. Typically, people responsible for the product roadmap (e.g. product manager) regularly look through the list of requests and evaluate feature areas that have been requested frequently. This process is explained by the data team manager of Beta: *"We track all feature requests in an internal tool. Because we are easily reachable, we get a lot of feedback … The product managers occasionally look if there are things that are requested often and fit within the product. Subsequently these will be scheduled for development."* Note that the product roadmap is often prioritized based on vision and customer feedback. The relative importance of customer feedback in defining the roadmap is likely to vary per case.

4.4.3 Defining requirements

The second method of incorporating customer information in the development process occurs while defining requirements. Although all cases integrate feedback in this process, they have different approaches in doing so. The most common method of requirements definition in the sample is by describing user stories. User stories are part of the Scrum software development methodology and are thus applied by the three cases that have implemented this method. User stories are plain-language descriptions of requirements from the end-user perspective. They serve as bridge between users, designers and developers and are written sequences of actions and events that lead to an outcome (e.g. "As a <role>, I want to <do what > so that I could <benefit how>."). Development teams generally aim to narrow down the higher-level requirements as far as possible by refining them into separate user stories. For example, Gamma uses large 'epic user stories' and disaggregates them into smaller, individual user stories. The development team then makes sure that the proposed solution meets one of those user stories. The two cases that do not use user stories or scenarios also use customer feedback while defining requirements. The vice president of product management of Alpha describes that he gathers customer request on a specific feature area and reads all of them. This provides him detail and variety of tough to define good requirements.

4.4.4 Validation of plans and concept designs

Three cases reported that they actively seek for feedback on plans or concept designs. At Delta, development teams first focus on refining its requirements and concept design. After this process, concept designs and wireframes are often shared with customers in an early phase. The manager of product management at Delta explains that such iterations can help in reducing unnecessary development costs: *"Throwing away a concept design or wireframe is not a big deal, throwing away build software is much worse in terms of costs".* In other cases, the development team does not specifically share designs, but consult customers to get early feedback on what they are planning to design/develop. For example, Gamma has identified a number of key customers that they consult for such purposes. In an informal meeting, plans are shared and customers are asked to give advice: *"We're thinking of doing this, what do you think? How would that work? Would that meet your needs?"* The interviewee of Gamma also notes that they have planned to further engage customers in the design process by organizing co-design sessions during their next user conference. In addition, the Business Analyst at Epsilon emphasized that they plan start sharing design mockups in the coming year and Alpha has experimented with crowd-sourcing designs. Conclusively, we can say that involvement during concept development is currently limited, since only one case actually shares concept designs. Nonetheless, advisory conversations and short-term plans indicate that participants do see value in receiving feedback in early phases. Therefore, its relevance might increase in the future while practices improve.

4.4.5 Test and improve before and after release

Another frequently application of customer information is in the latest stages of the development cycle. All participants report that they actively seek and use feedback on working functionality before and/or after release. In the first case, the development team shares web demos with selected customers or receive feedback from usability testing. This is often done by following up on the customers that they have talked to earlier about the particular functionality. Sharing demos and usability testing is often only applied with extensive, larger features. With straightforward features, demos are often not shared and no user testing is applied. In this case, the development team relies on the customer feedback and usage data that is collected after release. As multiple participants explained, the ability to release and adapt quickly after release is a key difference in development of online software. Because of this ability, no extensive testing is required and development teams can respond quickly to simple feedback (e.g. bug reports). The data team manager of Beta explains how they can sometimes have a solution released within an hour: *"When we get a bug-report, it can occur that the solution is online within an hour. The development process is very much focused on getting code into production as fast as possible, … If we put something online that is buggy we will take it back offline or provide a quick solution. The testing phase is short and quick. We have a lot of monitoring on the product, so we can see quickly if something works correctly."*

4.5 Strategic considerations

In this paragraph, the analysis of strategic consideration related to involving customers is described. Based on the conceptual framework, we elaborate on customer characteristics, context of value creation, type of customer input and the customer role. In addition, customer representation and information richness are introduces as new concepts.

4.5.1 Customer characteristics

	Alpha	Beta	Gamma	Delta	Epsilon
Functional relevance & use knowledge	- Requested the feature - At risk, really wants it - Using the feature a lot	- Functional relevance	- Requested feature before - Uses competitive product	-	- Based on earlier contact on functional area

	Alpha	Beta	Gamma	Delta	Epsilon
Relational closeness & proximity	-	- Close relationship with local customers	- Key partners - Local when it involves peoples' presence	- Practical (proximity)	- Practical (proximity)
Other	- Login frequently - Talked to sales about upgrading	-	-	- Market / industry - Innovativeness	- Match with persona

Table 4-5 Customer characteristics

When customers are actively involved based on the software vendor's initiative (no passive acquisition of feedback), most cases report that they do not use a formal selection process. Although some cases select customers on a more strategic basis (e.g. innovativeness, match with persona, use of competitive products), the overall picture shows that customers selected based on functional relevance / user knowledge and more practical considerations like relational closeness and proximity. A characteristic mentioned by four cases is the relevance of a feature/functionality for customers. In practice, this either means that the user wants the functionality to be implemented or uses the particular functionality a lot. This is identified by looking for customers who have provided feedback on a particular functionality in the past or who have talked to sales or support about it. The business analyst of Epsilon explains how this might work in practice: *"I would walk to our colleagues of sales and I say that I'm working on invoicing, so I'm looking for a customer who makes about 10-20 invoices per month. Not all at once, but the type of entrepreneur that works hard and prefers to do its administration between diner, coffee and watching the news. Then the sales team would find someone for me where I can drive to and talk with."* Another approach to identifying feature relevance is by looking at usage data. Customers that use a particular functionality a lot is often involved during development of that feature. Secondly, vendors have frequent contact with local customers or mentioned proximity as a practical consideration while involving customers. Two of the cases reported that they have built close relationships with these local customers. The fact that SaaS vendors often have a global customer base makes it more difficult for them to involve customers in physical environments. Therefore, vendors might seek out to local customers that they can visit and invite: *"We have a few local customers in this area that we know well. We often visit them or they come to our office. We have a more intensive relationship with these customers, we know them personally."* (Beta). Thus in addition to functional relevance and knowledge, proximity and relational closeness are relevant characteristics while involving customers.

4.5.2 Customer role

	Alpha	Beta	Gamma	Delta	Epsilon
Role (customer as _object_ or _subject_)	- Object	- Object	- Object	- Object - (customers in sprint review team in near future)	- Object
Impact on roadmap (_what_ is developed)	- Medium impact (30%) - Do not rely on customers to set vision	- Relatively low impact - Only when relevant to >50% of customers - Say no to a lot of requests	- Relatively high impact (will lower in the near future) - Product till date based on customer feedback and own analysis	- Medium impact - In addition to own vision and goals	- Medium impact - Rather indirect impact via conversations with different roles among the organization
Impact on design & functionality (_how_ it will work & look)	- Relatively low impact - Limited to requirements phase and	- No impact	- Relatively low impact - Limited to requirements phase and	- Relatively high impact - Active feedback on development	- Relatively low impact - Limited to requirements phase and

feedback on working software		feedback on working software	efforts in all stages	feedback on working software

Table 4-6 Customer role

None of the cases had customers directly represented in the SD process by a asking them to join the development team. The vice president of product management at Alpha clearly describes why it's important for them to keep a little distance and not rely on customers to set vision: *"Customers have their own jobs, so of course we shouldn't expect them to do ours."* Similarly, Beta's vision to make 'opinionated software' is inherently existent in their company culture. However they do value customer feedback, their 'opinionated' approach explains the limited role of customers in development: *"We decide what is right for customers, not the other way around. That is why we think our product is much simpler, because we say no to a lot of feature requests."* Generally, customers are no active participants in development, and can thus only influence the development efforts indirectly. The indirect influence that customers do have is manifests itself in two ways. The first method of influencing the development process is by providing feedback before development is started. As described before, this feedback is used to prioritize the roadmap and to define requirements, and thus influences the agenda of software vendors. However, the influence of single customers is rather limited, since vendors often only implement functionality that is requested by a majority of the customers. The second method of influencing development is by providing feedback on plans, designs and prototypes. Although this method is only for selected customers, the relative impact on development efforts is higher. This is because customers often are in direct contact with the development team via web demos, meetings or usability tests. Conclusively, it can be said that the customer's role is indirect and limited to providing feedback on specific issues and feedback in general. In this way, they can indirectly influence what is developed and how it is developed. Customers do not have an active role in interpreting the data, defining the meaning of service and directly shaping the desired direction of action with the software vendor. The overall role of customers can thus be considered as an 'object' rather than an active participant or 'subject' of the development process.

4.5.3 Context of value creation

	Alpha	Beta	Gamma	Delta	Epsilon
Context of value creation (exsitu vs. insitu)	- Both insitu and exsitu	- Mostly exsitu	- Both insitu and exsitu	- Both insitu and exsitu	- Mostly exsitu
Insitu methods	- Usability sessions	-	- In-context interviews - Usability tests	- User research (visits) - Usability tests	-
Comments	- Usability studies (in-situ observation) uncovers new / different information	- Collects context around use situations	- In-situ observation shows diversity in approach and understanding and opens up unrecognized opportunities	- Insitu research is important to understand how users work - Most important things in company hang on a bulletin board	- (camera based usability tests in near future)

Table 4-7 Context of value creation

Most feedback is obtained passively via support systems and social media, which makes it difficult to classify the context wherein value is created. Software services often include a direct link for providing feedback on each page, makes it more likely that customers report feedback directly from within their use situation. Even so, since vendors did not provide insight into the value creation process of users, the author cannot make valid statements on

the context of passive feedback that vendors receive. Other methods that are often used to obtain customer information are customer visits, invitations and conference calls. Although cases report to 'look over the shoulders of customers' while using the product occasionally, most value is created during discussions wherein customers are asked to tell about how they work (in retrospect) and what they expect of a solution (in anticipation).

Nonetheless, three out of five cases proactively involve customers within their use situations and found it a very valuable practice. The method used to do so include customer visits, in-context interviews and usability tests. In addition, Epsilon reports that they plan to implement camera-based usability tests in the near future. The participant of case Alpha explained how observing users in their use situation during usability tests uncovers a different type of knowledge: *"We found out that that [observations made in usability studies] is really humbling, because there are things that you as a software developer think are pretty obvious. Usually a couple of times per session we would be like "How could we have missed that?" or "How could we have taught that?"* Similarly, Delta consciously seeks information form customers within use contexts by employing user research and usability tests. Their in-context research of interaction designers is of critical importance for understanding how customers work. In addition, Gamma consciously obtains customer information from in-use situations via in-context interviews and usability studies. Therefore, we can conclude that in terms of volume of feedback and obtained feedback, most value is created outside customers use situations (exsitu). Nonetheless, the vendors that capture value in use situations (insitu) via customer visits and usability testing have found that this uncovers a new/different type of information. This helps them in understanding user perspectives and opens up previously unrecognized opportunities.

4.5.4 Type of customer input

	Alpha	Beta	Gamma	Delta	Epsilon
Type of customer input	- Functionality - Does not look for innovative ideas and solutions	- Difficulties - Focus on uncovering what makes life and product use difficult	- Functionality - Focused on what customers asked for - (Less direct implementation of customer ideas in future)	- Outcomes - Focus on user's goals, not tasks, functionality or features	- Functionality - Focus on uncovering desired functionalities - Guide customers to think different
Use of input for development	- Explain different contexts around problem/solution - Indication of importance for customers	- Explain context of use situations - Internal creative process to develop a solution that makes a customers' life easier	- Asking customers what they want is not best approach - internal analysis on feedback results in creative solutions	- Goal-Directed Design - Design for users' goals	- Desired functionalities used as input to requirements definition (user stories)

Table 4-8 Type of customer input

Four out of five cases do not rely on customers for ideas or solutions. These cases agree that customers are not the best source when it comes to finding new and innovative solutions. For example, Gamma's development process is very customer centric, but the interviewee does not aim to ask customer directly what they want: *"Asking a customer what they want is not always the best way to understand what we should be providing for them, the most effective way to meet their needs."* Instead, the cases employ different approaches to use customer input in the front-end of their development process. While obtaining information from users, they focus use context, difficulties, user goals or guiding customers to think different. In addition, the vendors put effort in an internal creative process where customer input is analyzed and innovative solutions emerge. Thus, they use customer input as a trigger for internal creativity. Gamma provides an example of such a creative process:

"Based the informal input channels, we do a lot of analysis internally: "Okay, we keep getting asked about this particular problem, here are the bigger picture business scenarios that we're trying to address based on that feedback." And then we can start with a creative solution." This is in line with Beta who is confident that they know what is best for customers. Therefore, they focus on difficulties in use when collecting feedback, so that they can take responsibility of coming up with the best solution: *"Instead of specifically asking what functionality could make their life easier, we ask what makes their life difficult. Then we will then see what we can do about it. We are responsible for how the functionality will look like that we are going to build."* Thus, although all cases have different approaches in translating customer needs into development, they generally agree that directly implementing ideas suggested by customers is not the best approach to create innovative offerings.

4.5.5 Customer representation

In addition to the concepts from the conceptual framework, based on the data analysis, customer representation is also identified as a relevant strategic consideration. Table 4-9 shows if and how cases have represented customer in development.

	Alpha	Beta	Gamma	Delta	Epsilon
Direct / indirect representation	- Indirect representation	- No representation	- Indirect representation	- Indirect representation	- Indirect representation
Customer representation in development	- Feedback summaries and notifications	-	- Personas - User stories - Usage scenarios	- Personas - User stories - Use scenarios - 'Product owner' role	- Personas - User stories - 'Sponsor' role

Table 4-9 Customer representation

As described in paragraph 4.5.2, none of the vendors had customers directly represented in their development team. Instead, four of the five software vendors have implemented mechanisms that ensure that users and user needs are (indirectly) represented during the core development process itself (design, coding, and testing). As described in the previous chapter, user stories, user scenarios and personas are specific techniques are used by three of the five cases. However they are all used for different purposes, they all result in a more customer-oriented development process by representing typical customers (persona), customer behaviors (user scenario) and customer needs (user stories). In addition, case Alpha employed customer feedback by sharing customer feedback summaries with developers. They are automatically notified on a daily or weekly basis of new feedback by using their own product (a collaborative project management tool. As described in paragraph 4.7.2, the use of these methods makes team members aware of who they are developing for and triggers them to think from the perspective of customers. Therefore, it can be concluded that representing customers during development should be considered as valuable alternative to having customers directly participating.

4.5.6 Information richness

A second strategic consideration that is included based on the analysis is information richness. Based on this dimension, methods of involvement can be distinguished on rich information and high reach. Table 4-10 provides an overview of the methods and focus in terms of information richness among the cases.

	Alpha	Beta	Gamma	Delta	Epsilon
Use of information richness vs. reach	- Both - Focus on richness more than reach	- Both - Focus on reach more than richness	- Both - Focus on richness more than reach	- Both - Focus on richness more than reach	- Both - Focus on richness more than reach

| Most important methods | - Advisory groups/calls
- Using collected feedback | - Use data to understand use difficulties, inform designs & test solutions | - Advisory meetings
- Using collected feedback
- User testing | - Innovation panels
- User research | - Meetings and conference calls |

Table 4-10 Information richness

As shown in the table above, all cases have employed both methods emphasizing richness and reach. Four of the five cases have however focused more on richness than reach to create a deep understanding of user needs and behavior. Contrary, Beta has put more emphasis on reach by applying data to understand what is important for the majority of customers and test performance. As proposed by Sawhney (2005), Figure 4-2 shows some examples of methods that are used by the cases classified along the dimensions of information richness and stage of development.

The consideration of information richness is of especial relevance for SaaS vendors, since the direct insight in usage data and relatively large amounts of feedback provide high reach. This information can be considered as relatively low in richness, and can be applied to identify patterns in usage and to validate assumptions and designs. On the other hand, methods like usability testing, meeting customers physically and conference calls are considered high in richness and low in reach. With these methods, vendors have the ability to create a deep understanding of customer needs and behavior via rich conversations. Both of these typologies have its value for development, thus vendors should carefully consider when they can best apply information rich methods or high reach methods.
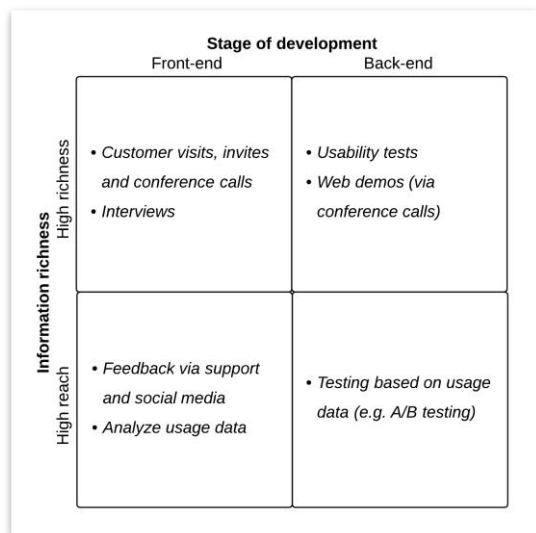
Figure 4-2 Example methods in dimensions of information richness (adapted from Sawhney, 2005)

4.6 Difficulties of involvement

Table 4-11 provides an overview of the difficulties that vendors perceived while involving customers. Generally, most cases reported no major difficulties or resistance while involving customers. The majority of the cases reported that customers are often willing to participate and provide feedback without too much effort from the software vendor itself. The challenges are mostly unique, except for managing customer expectations.

	Alpha	Beta	Gamma	Delta	Epsilon
Managing customer expectations	- When customers give feedback and don't agree on how a solution should be, they might feel like we didn't listen	- Saying no to customers a lot occasionally leads to internal resistance and customers leaving	- Customer expectations build up during involvement - Communication is the main challenge	- While involved, customers expect information and clarity on plans - Saying no is biggest challenge	- Customer put effort in involvement and are disappointed when a feature is not released or put on hold
Other	- Little to no difficulties	- Customers are restricted in thinking inside their use situation	- Integrating design practices in agile development - Engage customers for frequent formal involvement	- Customers don't want to join - Talking to the right customers - Involving potential customers is difficult	- Generally not much difficulties - Occasionally customers don't want be involved anymore

Table 4-11 Difficulties of involvement

4.6.1 Managing customer expectations

When customers provide input of any kind, they often build up some expectations on how and when the software vendor will handle that input and what is delivered. When these expectations are not fulfilled, it can negatively affect customer relationships, engagement and satisfaction. All five cases have found the management of these expectations a challenge and have described examples. The first example is of Beta, who classifies its solutions as 'opinionated software'. Therefore, they say no to customer requests a lot: *"Our biggest problem is that we say no to customers a lot … There has been some resistance, since it is nice to be of service to everybody. But that is just not what we want our product to be. Therefore, we have to steer our sales team to not promise that functionality will be added."* Consequently, Beta has occasionally lost a customer to a competitor. The main challenge for Gamma and other cases is how the communicate and respond in such situations: *"In fairness, we need to be better in communicating with our customers about that ... I don't have next step approach to how we address that particular challenge, but it's certainly something we need to get better at."* In summary, the expectations of customers during involvement are difficult to manage and can therefore negatively affect the customer relationships. To overcome this challenge, vendors need to define communication strategies concerning the value and results customers can or cannot expect from the involvement process.

4.7 Outcomes of involvement

Participants note that they do not have direct metrics that indicate that customer involvement practices directly affect a specific business metric. Nonetheless, participants described several benefits as shown in Table 4-12. We elaborate on the three most cited of them in this paragraph. In addition, participants noted that this also affected their market/financial performance. However, the participants identified different mechanisms and metrics in describing these outcomes.

	Alpha	Beta	Gamma	Delta	Epsilon
Recognition of new insights & opportunities	- Expands your horizon of thought on problem or solution	-	- Opens up unrecognized opportunities	- Insight and inspiration result in better ideas	- Get insights that are normally unnoticed
Customer-orientated development teams	- Customer-oriented development team	-	-	- Customer-oriented mindset in development - Better effort	- Improved customer orientation in development team
Increased value and quality	- Increased value of product	- Improved technical quality	- Increased product value	- Better understanding of users improves quality	- User-oriented testing improves quality for users
Other	- Converting to paying customers - More revenue per customer - Reduce churn	- New customers due to increased engagement and word of mouth	- Competitive advantage - Growth rate is testament to customer centricity	-	- Develop unique selling points

Table 4-12 Outcomes of involvement

4.7.1 Recognition of new insights and opportunities

First, four of the cases mentioned that their customer involvement practices results in the recognition of new insights and opportunities that vendors themselves did not think of. Both the reach and richness of methods as described in paragraph 4.5.6 can be of value in this case. The volume of feedback can help in expanding a vendor's horizon by revealing different perspectives on a specific problem or solution. For example, at Alpha the wide variety of feedback helps them in expanding their horizons: *"Think of it like crowdsourcing an*

answer, were you get all of these different flavors of how people think about a problem and a solution. It makes you think in a much wider variety. It helps me expand my mind to all the possible ways to approach a problem and solve it in our software." On the other hand, information rich methods like face-to-face conversation and observation (e.g. user testing) often result in new insights and opportunities that otherwise would be unnoticed. For example, Epsilon often finds that customers provide new insights that otherwise are unnoticed due to tunnel vision: *"Sometimes you create a tunnel vision during a project, because you are too focused on the end result. At the moment a customer looks at it and says "Have you thought of that?", it's often the case that you haven't."* Thus, by collecting a wide variety of use perspectives and using information rich methods of involvement, vendors can identify and take advantage new insights and opportunities.

4.7.2 Customer-orientated development teams

Three out of five cases mentioned that the previously described methods of using customer information in development results in increased customer orientation of the development staff. They explain that those methods ensure that developers know for who they are building. By frequent insight into customer feedback, direct contact with customers and the use of personas, developers are triggered to think about customers and its needs. For example, at Alpha developers frequently read through relevant feedback: *"Developers get regular insight into what customers are thinking because they scan through the latest feedback every day or week. This repeatedly results in scenarios like this: Developer: "You know, I saw Feature X mentioned more and more by our customers and I got to thinking about what we could do there and spent an hour or two last night and knocked it out."* Like the participant of Delta, the business analyst of Epsilon also thinks it benefits developers to know for who they build the software: *"The people that develop want to know why they are developing it … Involving customers gives us the opportunity to explain why something needs to be developed in a certain way. Doing this improves the perception of the developer, the feedback of the developer and the end result."* Thus, customer involvement can positively affect the mindset and effort of developers in creating customer-centric solutions.

4.7.3 Increased value and quality

All of the cases reported that their customer involvement practices improved value and/or quality of their offering. By continuously uncovering information around use contexts, difficulties and needs, vendors built up use knowledge and identify new opportunities. As described earlier, agile development processes improve their ability to quickly address these issues and tap into opportunities. As the chief design officer of Gamma explains how solving customer problems increases value for all customers: *"We're essentially tapping into a huge pool of expertise to give us a competitive advantage. Every customer that we can do that with in constructive way, in a way that increases the value of our product."* Similarly, Beta has also found ways to improve quality fast based on problems and reported bugs: *"If people explain what is difficult for them, or we see it based on usage data, we will do something about it. It can occur that a solution is released within an hour."* In other cases, vendors might tap into new opportunities identified during customer involvement. At Epsilon this occurs when a business analyst look at how accountants work and asks what they want to do. For example, when they saw that an account has to make a completely new journal entry to edit a small error, they improved the design so that accounts could make direct changes. When such a new feature is shown to other customers, they would often say: *"That's useful, other software doesn't have that."* Thus, by continuously solving customer problems and tapping into identified opportunities, software vendors increase the value and quality of their products.

5 Discussion

First, the general development of SaaS is discussed briefly. Next, the main findings around customer involvement practices are shared. Third, the conceptual framework is adapted based on the findings.

5.1 Developing Software-as-a-Service

In this study, it was found that a series of trends and implications of the SaaS delivery and pricing model have impacted (and mainly benefited) how SaaS vendors work. Based on the explanations of participants five distinct characteristics were identified. In line with Srivastava et al. (2000), it was found that the ability to have direct insight into usage data brings software vendors closer to its customers than before. In addition to direct usage insight, participants mentioned the following specific characteristics of the SaaS model:

- *Easy accessibility*
- *Service provision & responsibility*
- *Ability to push changes to all users*
- *Low switching costs*

Together with ongoing development of the software development profession, these characteristics have resulted in the adoption of agile development approaches, customer-centric business practices and an increased influence of (user-centered) design practices in development. In line with MacCormack et al. (2001) and agile development literature (e.g. Williams and Cockburn, 2002; Abrahamsson et al., 2003), the development process was found to be very much focused on quick and iterative development cycles, which ensures flexibility, frequent releases and quick feedback on development efforts. It was found that the ability to quickly respond feedback after release results in a reduced need of extensive testing. Although agile adoption has increased in the past decade (Forrester, 2011[5]), little was known about the adoption of agile in SaaS firms specifically. In this study all cases reported to have implemented agile processes, however two cases did not use a specific methodology. Nonetheless is was found that direct insight in usage and the ability to directly push changes to all users makes the agile approach a good match and appropriate method for SaaS vendors. In line with adoption rates in the overall software industry (Forrester, 2011[5]), the Scrum development method was adopted by three of the five cases. User-centered design practices were found to be applied by the majority of the cases (three). Although, design research is outside the scope of the literature study, there is an increasing interest in integration of agile development and user-centered design practices (Fox et al., 2008).

## 5.2 Operational aspects of customer involvement

The customer involvement practices of the cases were first studied based on methods of obtaining customer information and methods of using customer information in development. In general, the methods of involvement are found to serve two major objectives:

- *Creating a deep understanding of customers and its needs*
- *Iterate and improve based on customer feedback*

Nonetheless, the methods of obtaining customer information and feeding it into the development process are more complex than these two approaches suggest. Therefore, this process is graphically shown in Figure 5-1.

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[5] Forrester report (July, 2011). Water-Scrum-Fall Is The Reality Of Agile For Most Organizations Today.
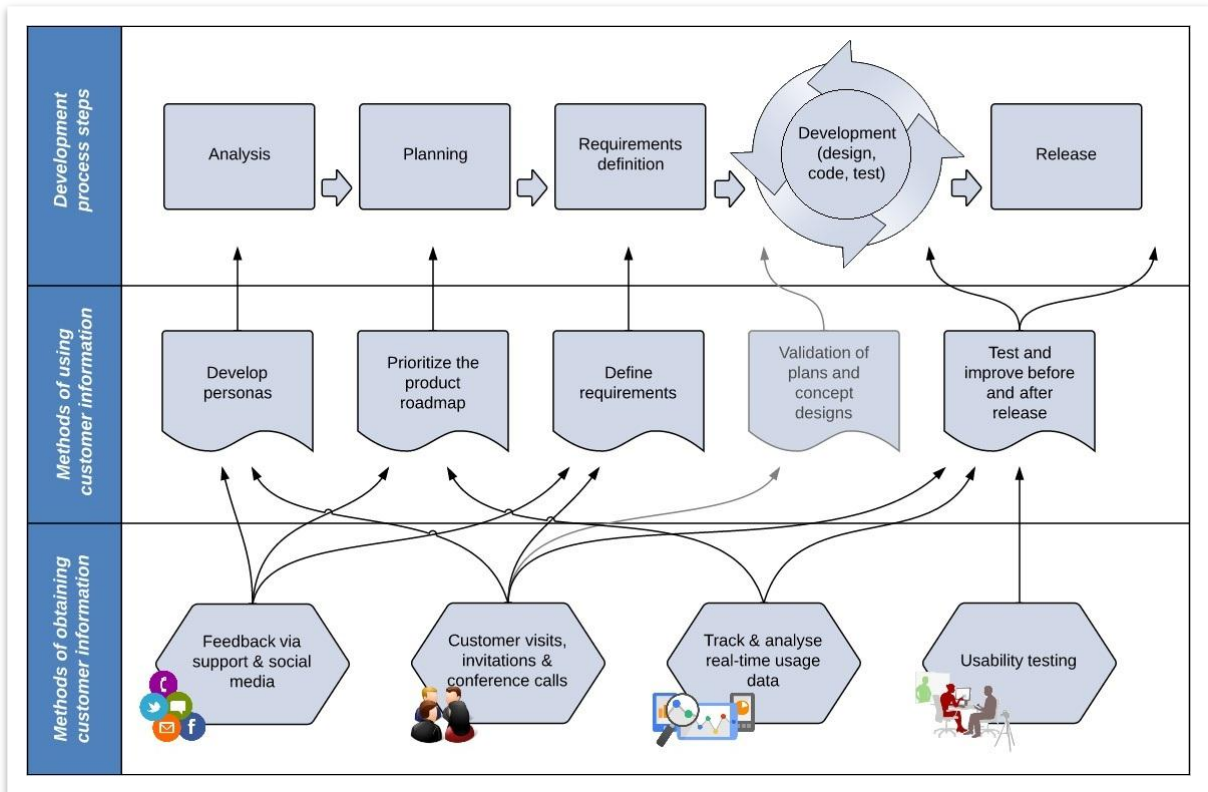
Figure 5-1 Overview of methods in obtaining and using customer information for development

Methods of obtaining customer information

Literature has highlighted both physical and virtual environments. Although web-based service firms create and deliver value in a digital world, it was found that they uncovered customer information in both physical and virtual environments. Four main methods of obtaining customer information were identified during the field study. Vendors reported to receive large amounts of feedback via support and social media. Similar to what Alam (2002) found in NSD, customer visits, invitations and conference calls were frequently applied to directly get feedback and create a better understanding of customers and its needs. Third, users are observed during usability tests, which have found to be a valuable source of feedback. Usability testing is in line with the ideas of Leonard and Rayport (1997), who suggest to observe the customer in his/her 'natural setting' while he/she is using the product or service in the course of everyday routines. Finally, the direct visibility into customer usage is actively used to track and analyze customer behavior. Cases have developed internal tools to measure and analyze specific behavior. This is similar to the process of web usage mining, where data mining techniques are applied to discover usage patterns from web data (Srivastava et al. 2000).

Methods of using customer information for development

In NSD literature, research has focused on techniques to uncover customer information and activities that customers perform during the development process (e.g. Alam, 2006). During this study, it was found that in addition to methods of obtaining customer information, identifying specific methods for using customer information in development provided a better classification of the operational process. In using the obtained customer information in development process, five methods were identified. First, cases developed personas (user archetypes) based information from real customers. They serve as guide through the design and development process. This use of abstract representations of users originated in marketing, and is now used in software development to engage members of a development team effectively (Pruitt & Grudin, 2003). Secondly, the large amount feedback received gives an indication of its importance to customers, and is thus used to prioritize the product

roadmap. Third, all cases used customer information in defining requirements. Although different methods were used to do so, user stories are a popular method. User stories were created Beck (2000), and represent requirements from the point of view of the user, not the developer. Cohn (2004) recommends to describe them in the following template: 'As a <user role>, I want <goal> so that <reason>'. Next, some vendors seek feedback on plans and concept designs. Although four cases see the importance of getting feedback this early, involvement in this phase is currently limited. Finally, depending on project/feature size, development teams test and improve both before and after release.

5.3 Strategic considerations for involvement

The four strategic considerations from the conceptual framework were found to be a relevant classification for making strategic decisions for involvement. Contrary to literature in NSD and NPD, customer selection is based on relatively practical customer characteristics like functional relevance and proximity. SaaS vendors did not actively look for lead userness, which is a much discussed theme in NPD and NSD literature (e.g. Von Hippel, 1988; Luthje, 2004). Instead, they tend to focus more on use knowledge, which results in involvement of ordinary users that can be seen as experts in their domain of user needs (Magnusson, 2009). Similar to what Farrell (2001), Bonner and Walker (2004) and Alam (2006) found, vendors also frequently involved customers based on a close relationship.

In line with Leonard and Rayport (1997) and others, the context of value creation is also identified as a key strategic consideration. In addition to traditional methods that capture customer information outside use situations (exsitu), firms also employed insitu methods (Edvardsson et al., 2012). Observing users during usability tests and researching customer behavior in their use situations are examples of methods that benefit from insitu contexts of value creation. Although not applied by all cases, vendors that actively involved customers within their use situation found this to be very beneficial. They found that it helps them in understanding user perspectives and opens up previously unrecognized opportunities.

In literature researchers have on one hand discussed methods that uncover ideas and ready-made solutions to drive innovation (Herstatt & Von Hippel, 1992; Magnusson et al., 2003; Kristensson et al., 2008) or on the other hand focused on outcome-driven approaches (Ulwick, 2002; Alam, 2006; Korkman, 2006). In this study, it was found that most cases do not rely on ideas and ready-made solutions as an input to their development process. They agree that customers are not the best source when it comes to finding new and innovative solutions. Instead, they have different approaches, that not all can be classified as outcome-driven. While obtaining information from users, they focus use context, difficulties, user goals or guiding customers to think different. Therefore, this research suggests that the concept 'type of customer input' might need to be extended to include inputs like customer problems.

Many methods around customer involvement in NPD and NSD prescribe active participation of customers in the development (e.g. Buur & Matthews, 2008; Herstatt & Von Hippel, 1992). Similarly, agile development methods often also require an active participatory role of customers in development (Cockburn, 2002; Kautz, 2010; Boehm, 2002). Contrary to this literature, in this sample customers were not considered as active participants of the development process. The influence of customers in development is found to be indirect. Thus the customer role is considered as an 'object' rather than an active 'subject' of the development process. Generally, customers can only influence the roadmap when the particular issue is important to more customers. Because of the large amount of feedback vendors get and direct insight in usage data, they can easily identify what is important to large group of customers. The influence customers can have on how functionality should work and look like is more direct, but determined by a smaller number of customers that is asked provide direct feedback.

In addition, two new strategic considerations are identified based on the analysis. First, customer representation during development is an important consideration for involvement. In this sample, cases have used personas and user stories to indirectly represent customers.

This might explain the previous finding that customers are not active participants of the development process, since the customers are already represented by the use of personas, user stories and usage scenarios. Participants explained that when they could satisfy the persona, this stands for a large group of customers. Therefore, this might be more effective than participation of a single customer.

Secondly, information richness is of special relevance to web-based services. Vendors receive large amounts of feedback and have insight into usage data that both have a bigger emphasis on reach rather than richness of information. Although all cases employ methods that emphasize reach and richness, most vendors focus more on methods that emphasize rich information. This is likely because rich information better supports their objective of creating a deep understanding of customer needs. On the other hand, information focusing on reach (e.g. usage data) is used to find out what is important and what works for a large group of customers. Overall, this classification is in line with the dimension 'nature of collaboration' by Sawhney (2005), which makes the distinction between reach and richness in virtual collaboration.

5.4 Difficulties of involvement

In terms of difficulties in involving customers, literature frequently reported difficulties and obstacles around customer involvement. Research described issues around customers' abilities, difficulties during the involvement process and strategic issues. Although cases in the sample mentioned some of these difficulties, it was found that is did not hinder them very much during involvement. Only one common difficulty was identified. A key challenge for the vendors is to manage expectations that customers develop when they provide input. These expectations are not always fulfilled and can thus negatively affect customer relationships. Therefore, vendors need to formulate clear communication strategies that prevent the formation of unrealistic expectations at customers.

5.5 Outcomes of involvement

Literature reported both operational and market-related outcomes from customer involvement. Participants suggested three outcomes as a result of their involvement practices. In line with literature (e.g. Carbonell et al., 2009; Melton & Hartline, 2010), increased value and/or quality of the service was identified as an outcome. By continuously solving customer problems and tapping into identified opportunities, software vendors increase the value and quality of their products. Another major benefit is the increased recognition of new insight and opportunities that are otherwise unnoticed due to tunnel vision. Third, development teams are more customer-oriented due to specific involvement practices. For example by reading trough customer feedback or using personas, developers have a much better idea for who they are building and what customer needs are.

Remarkably, the reduction of development cycle times, a key benefit found in literature (e.g. Cooper, 2001; Carbonell et al., 2009) was not supported in this study. Since SaaS vendors have short development cycles, one might think that customer involvement practices have a role in this. However, participants explained that this is not the case. Their speed of innovation is more like to be attributed to their agile organizations and processes. As one participant noted, instead of speeding up development, customer involvement practices like upfront user research and extensive user testing could actually delay releases.

5.6 Theoretical framework

Overall, the holistic approach of the conceptual framework served as an adequate basis of the qualitative study. In this paragraph, the conceptual framework is adapted based on the findings described in this chapter. This results in a theoretical framework (
    Figure 5-2).
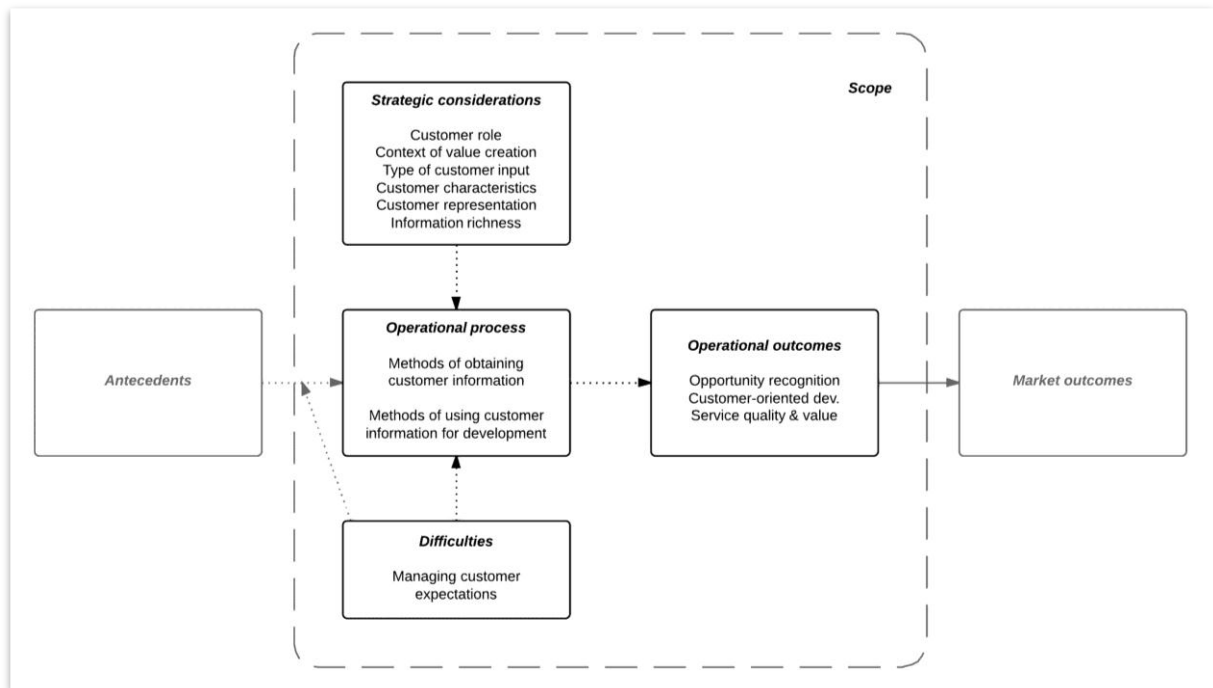
Figure 5-2 Final conceptual framework

As can be seen in the previous paragraphs, the classification of methods for obtaining customer information and using it for development have served well to study the operational process of involvement. As described before, the strategic considerations have been extended with two additional concepts. The categorical classification of difficulties is no longer relevant for the final framework, since only one difficulty was identified. In terms of the operational outcomes, one outcome (service quality/value) was similar to the conceptual framework. The two other dimensions (opportunity recognition and customer oriented development) replace innovation speed, which is not supported by this study.

6 Conclusions, recommendations and reflection

The aim of the final chapter of this study is to review the results in relation to the wider context in which it is located. Therefore, we elaborate on the theoretical and practical implications of this study. At last, the limitations of this study are highlighted and directions for further research are defined.

6.1 Theoretical implications

The results of this study have multiple implications for research. First, the study highlights emerging practices of web-based service development and the involvement of customers in it. Although web-based services represented a global and emerging market (Cusumano, 2010) and the development of such software services are identified as a key research opportunity in NSD (Menor et al., 2002), little research exist on this topic. In this study, we specifically focus on development web-based services. We showed that the delivery and pricing of web-based services (and SaaS in particular) impose unique characteristics that have a profound impact on their development practices. For instance, the easy accessibility and low switching cost puts more pressure on vendors to deliver value frequently. In addition, the direct insight into usage data and the ability to directly push changes to all users provides unique opportunities for vendors to iterate quickly based on direct feedback. These characteristics show that the development of web-based services requires more research from both NSD and SD perspectives. The findings also show that vendors apply short and iterative development processes that results in a flexible process. More specifically, agile development approaches (and Scrum in particular) are employed to be able to quickly respond to market requirements and develop in short cycle times.

In terms of customer involvement, vendors collect and use customer information to create a deep understanding of customer needs and use quick iterations to get fast feedback on development efforts. While obtain customer information, SaaS vendors benefit from the large amounts of feedback they receive via support and social media channels and from the usage data that they have direct insight to. Both of these methods provide them with insightful information on customer needs and behaviors with relative little effort. In addition, they frequently employ meetings, conference calls and occasional usability tests to compliment the data with richer customer information. In addition, vendors embed this information in the development process by using it to develop personas, prioritize the roadmap, define requirements and get feedback on plans, concept designs and working software.

In addition, this study showed that while involving customers, the strategic decisions vendors make are of critical importance to the way customer (information) is embedded in development and the organization in general. For example, vendors have generally limited the impact a single customer can have in the development process by not inviting them to directly join in development activities. Instead, some cases used personas to represent large groups of customers and guide the development team through the process. Furthermore, requirements are defined as user stories to clearly represent user needs. In terms of outcomes of customer involvement, it was found that the creation of new insights and opportunities, increased customer orientation in development teams and improved quality and user value are the most important outcomes. Although it was found that web-based service vendors have short development cycles, speed of development was not found to be an outcome of customer involvement. Instead, the agility of the development process was mentioned as the reason for quick development. This might indicate that literature (especially in NPD/NSD) should focus more on the development approaches rather than techniques like customer involvement to improve innovation speed.

Secondly, the holistic approach of customer involvement grounds broader theoretic concepts to practice. In the academic fields of both NPD/NSD and SD, broader conceptual theories around customer involvement have emerged in the past two decades. Most of these theories are only conceptual and provide little guidance in how customers can actually be involved.

Especially in SD literature, agile development methods have emphasized close customer collaboration and involvement as a key principle (Boehm, 2002; Sommerville, 2007). In this study, a theoretical framework is created that emphasizes key theoretical concepts around how customers can be involved in software development processes. It was found that the framework is supported in this study and provided excellent guidance during this study. Due to the holistic approach, the framework was able to capture the most relevant concepts in customer involvement (the bigger picture) and elaborate further on detailed techniques and strategies when needed. In addition to the initial conceptual framework, two new variables, information richness and customer representation, were identified to be relevant and provide new perspectives on customer involvement practices. While developing the conceptual framework, it was designed for application to a wide variety of services. This study supports the framework in the unique context of web-based services. Further research should investigate if the model is supported in other contexts and further operationalize the variables for quantitative analysis so that causal relationships can be identified.

Third, because of the cross-domain approach of this study, it opens up new opportunities for knowledge sharing in future studies. Although academic fields of SD and NPD/NSD face similar challenges, they have focused on different aspects of development (Nambisan & Wilemon, 2000). In general, the SD field has focused on technologies, techniques, methods and process metrics, while NPD and NSD have focused more on organizational factors like performance, processes, project management and communication. This study has explored the quick, iterative development of software services and customer involvement practices. Both of these themes include opportunities for cross-domain knowledge sharing. For instance, the application of agile development and user-centered design approaches in other product or service environments could be explored (see paragraph 6.4).

6.2 Managerial implications

As described before, the involvement of customers is of especial relevance in software development. With the growth of service-oriented software over the Internet, software providers perceive increased pressure to develop software that meets the needs of customers and is easy to use. To do so, customer-centric development and involvement of customers are of critical importance. Although the research design prohibits prescriptions, the practical framework as shown in Figure 6-2 provides guidelines for web-based software vendors that seek to involve customers in their development process. The framework highlights methods of obtaining customer information that create a better understanding of customer needs and difficulties of use. Next, several methods show how and when customer information can be of use for development purposes. Third, specific strategic considerations and challenges create awareness and guide customers in implementing customer involvement practices. Conclusively, this framework can support practitioners to effectively involve customers in their development processes and guides them through strategic and tactical decision-making processes.
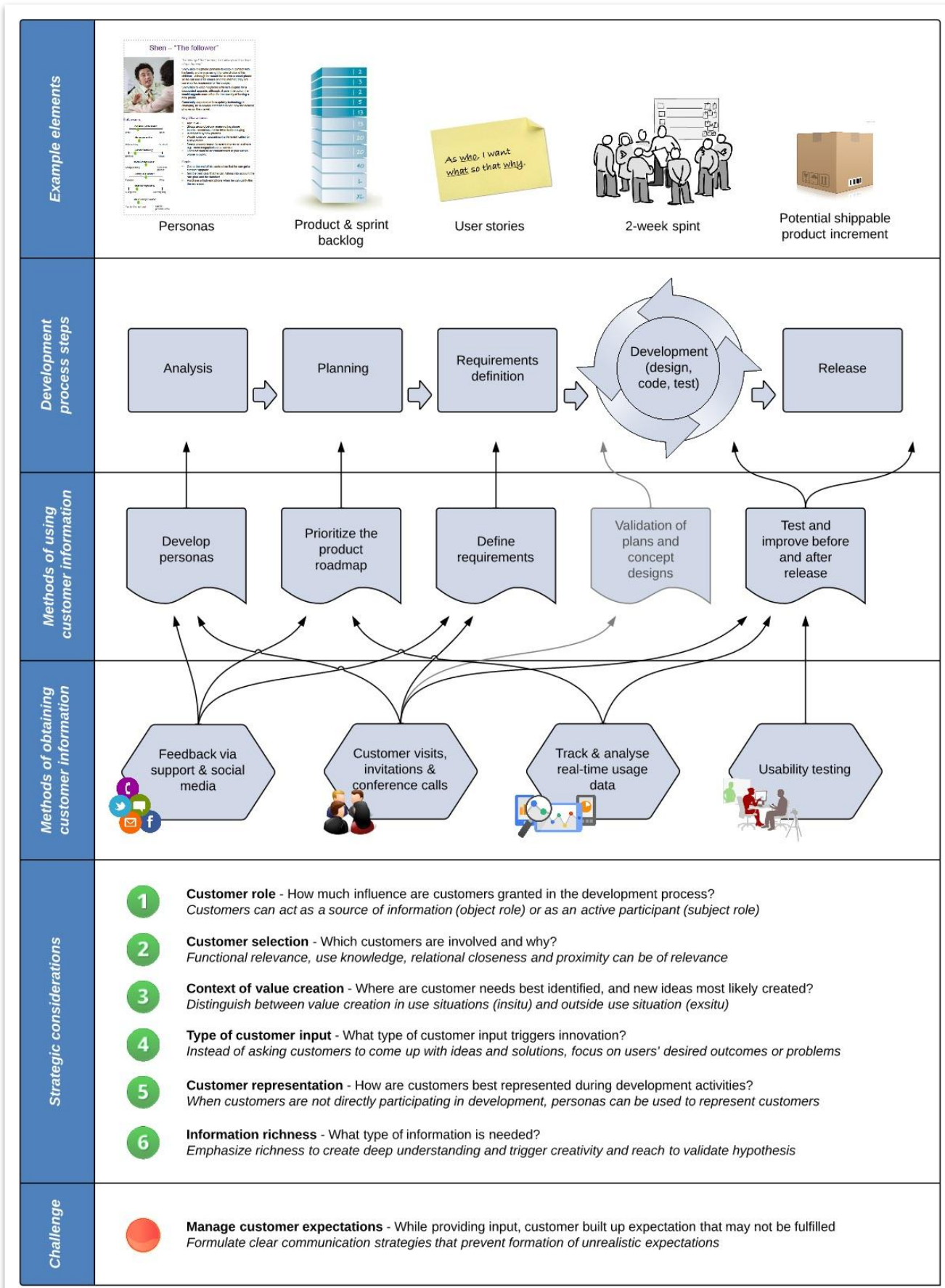
Figure 6-1 Practical framework for involving customers in the development of web-based services

6.3 Limitations

As with any explorative study, this one is also subjected to limitations. First, like many other studies on this subject direct performance outcomes of customer involvement are not measured and could thus not be determined. Quantitative research is needed to identify the relationships between concepts and operational and market related outcomes. Secondly, the exploratory nature required to use a holistic approach of analyzing customer involvement. This can occasionally limit the depth of knowledge obtained during data collection, since many topics need to be covered and time during interviews can be limited by the interviewees' schedule. Third, like many other academic projects the limited time and resources results in some limitations. The limited sample size constrains the generalizability of the results. In addition, cases were selected on SaaS delivery model and target market. Therefore, generalizability to other types of web-based firms is limited. However, to improve external validity, this study included a global sample (4 countries), which increases the generalizability to the global world of web-based services. In addition, different types of software solutions are included. An additional limitation of the small sample size is that key practices come from specific methods (Scrum, user-centered design) that are adopted by three of the five companies. Therefore, future studies with larger sample sizes should further study the adoption of these methods across web-based services. Another effect of the resource constraint is that only one interview was taken per case. The evidence would be stronger of multiple interviews were used. However, the use of triangulation with additional data sources is likely to improve evidence. In addition, this study took the perspective from the vendor. Ideally, customers should also be interviewed to improve evidence and create a better understanding of the phenomenon from a customer perspective.

6.4 Directions for future research

Based on the reflection of literature and the study's results, the author proposes three new directions for future research. First, quantitative studies should be carried out to increase evidence of customer involvement practices and its relationship to operational and market outcomes. In such studies, the theoretical framework developed in this study could serve as a base model to start with. The constructs outlined in the model should therefore be quantified so that studies can point out relationships between the concepts and performance. Next, studies might also investigate the adoption of user-centered design practices (e.g. personas and usability testing) and its integration with the development process. Extensive user research and user testing are time-consuming activities and can thus conflict with the fast and iterative characteristics of agile development processes. In addition, since Scrum and user-centered design practices were adopted by three of the five cases, further research should study the adoption of these practices in web-based software vendors across larger sample sizes. Third, research could explore opportunities that involve cross-domain knowledge sharing between NSD and SD. Especially the application of agile methodologies to other service types might provide answers to issues of new service development. Both SD and NSD literature have first described their development process with linear development models and later moved the discussion to non-linear cyclic models. However, where NSD literature is still discussing these two models, SD literature has made a shift towards iterative and agile models that are now common practice. Since many researchers argue that services require a more continuous, iterative model for innovation, agile development methods might be an excellent subject for cross-domain knowledge sharing. In addition, the applicability of user-centered design principles for other service types should be explored. The application of techniques that create a better understanding of service users and its needs (e.g. personas) and represent customers during development might be a valuable addition in service development processes.

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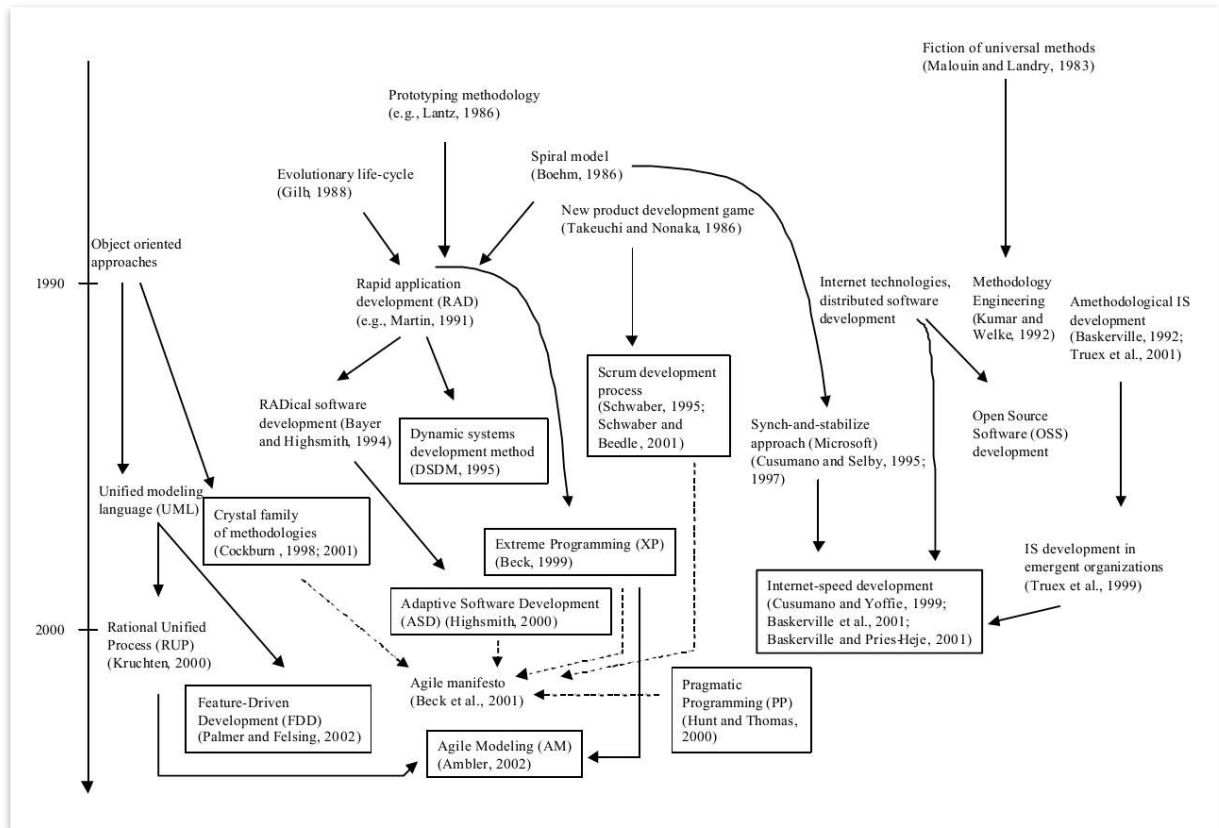# Appendix I   Evolutionary map of agile SD methods

Figure 6-2: Evolutionary map of agile software development methods (Abrahamsson et al., 2003)

Appendix II   Methods & strategies of involvement

Author(s)	Method, context and definition	Key strategies in involving customers

Herstatt and Von Hippel (1992)	Case study on the use of the lead user method in new product concept development.	*Lead user method:*
		Systematically look into user potential as innovators by collecting information about both needs and solutions from users at the leading edges of the market.
		Lead user process:
		- *Specification of lead user indicators by identifying important trends and high expected benefits.*
		- *Identification of lead users who:*
		   ○ *Are ahead on the identified trends.*
		   ○ *Expect high benefit from innovations along these dimensions.*
		- *Develop product concepts in a workshop with a group of selected lead users and company engineers/experts.*
		- *Test whether lead user concepts appeal to ordinary users.*

Holtzblatt and Beyer (1993)	Descriptive article on customer-centered design using contextual inquiry and design techniques.	*Contextual inquiry provides techniques to get data from users in context: while they work at real tasks in their workplace.* Contextual inquiry: - *Gather data through contextual interviews, where the interviewer observes the user at work and can interrupt at any time to ask questions.* - *Put the people making design decisions in front of the user.* Contextual design: - *Don't bring users in design meetings or laboratories, but build on user's strengths by doing all your work in their own context.* - *Interpret customer data together, as a team.* - *Use diagrams and model languages to capture your understanding of your customer's work.* - *Iterate continuously with customers and use them as source of ideas.*
Leonard and Rayport (1997)	Discussion on the use of empathic design in the front-end of NPD.	*Emphatic design is a set of techniques that uses observation –watching customers use products or services – to access information that is not accessible through other research methods.* Unique information gathered by this method: - *Triggers of use* - *Interactions with the user's environment* - *User customization* - *Intangible attributes of the product* - *Unarticulated user needs* Process of emphatic design: - *Observation of customers carrying out normal routines or work.* - *Capturing data from cues (visual, auditory and sensory) and open-ended questions.*

		- Reflection and analysis of all possible problems and needs. - Brainstorming to transform observations in visual representation of possible solutions. - Developing prototypes of possible solutions.
Ulwick (2002)	Descriptive article on the outcome-based innovation method, derived from the author's experiences.	*Outcome-based approach:* - *Don't ask customers what they want, ask what they want your products to do for them.* - *Focus on desired outcomes, not solutions.* Outcome-based interviewing process: - *Plan outcome-based interviews that deconstruct, step by step, the underlying process or activity associated with the product or service.* - *Select a diverse group of customers that are directly involved with the product.* - *Capture desired outcomes by translating solution statements into outcomes (ask why) and discussing each step in using the product.* - *Organize the outcomes by grouping them under each process step.* - *Validate interview results by rating outcomes' importance and satisfaction in a survey.* - *Focus on desired outcomes important to customers but not yet satisfied.* - *Use outcomes as input to the innovation process.*
Magnusson (2003)	Experiment comparing new service ideas of ordinary users and professional developers in the mobile phone industry.	Customers as idea generators: - *Customers are not observed or interviewed, but customers themselves identify needs and generate ideas in the course of their normal activities.* - *User ideas can be seen as a learning tool to better understand needs.* - *User ideas serve as a source of inspiration and the input to the design process.*
Lundkvist and Yakhlef (2004)	A conversational perspective to customer involvement in service development, explained using a case study of Swedish Post Office.	Conversational approach: - *Language is not a medium for transferring information and ideas, but a process during which ideas and knowledge are created.* - *Customer motivation is constituted in conversation and not based on a contract.* - *Language and conversation are key processes for collective creativity.* - *Dialogue creates 'collective actor', commitment to action.*
Korkman (2006)	Theoretical publication on customer value formation in practice.	In an *ethnographic approach,* the ethnographer participates in the lives of people, watches what happens, listens to what is said, asks questions, and collects available data in order to understand the issues with which he is concerned (Hammersley & Atkinson, 1983). Applied to understanding customers in service development: - *Focus on understanding customer practices; this is where value is embedded.*

		- *Service suppliers should improve these customer practices in order to build value for the customer and a more valuable role for itself in the customer's activities.* - *The customer should not be perceived as an independent decision-maker, but as embedded in social and material contexts.* - *Focus on techniques that investigate customer's practical value forming as a practitioner, not trying to get in customer's heads (practices instead of cognition).*
Buur & Matthews (2008)	Case study on combining three user-driven design and innovation approaches into a 'participatory innovation process'.	Based on three existing approaches: - Lead-user approach*: Companies find and exploit innovative initiatives developed by users.* - Participatory design*: End-users are invited to participate and contribute as co-designers throughout the development process.* - Design anthropology*: Selectively applying anthropological theory to challenge existing conceptualizations of products, services, technology, users and use.* Combined approach *'participatory innovation'*: - *A dedicated activity that takes people's practices and needs as a starting point to generate business opportunities in the form of products and services.*
Kristensson et al. (2008)	Case study on strategies for successful customer involvement in technology-based services.	Specific strategies for customers as idea generators: - *Derive knowledge from user situation: Users become aware of their needs through real experiences.* - *Derivation from various roles: A wider array of valuable ideas can be obtained when users are encouraged to consider the various roles they play in life.* - *Analytical tools: Provide users with information, tools and expertise concerning the present and future technologies, platforms, components etc.* - *Apparent benefit: Users are intrinsically motivated by an apparent personal benefit.* - *Avoiding negative brainstorming effects: Brainstorming exercises isolated from user's contexts don't trigger to think about practical problems and valuable ideas.* - *Limited expertise: Familiarity in a particular domain can inhibit the generation of creative solutions. Limited expertise is not a barrier to creative thinking.* - *Ensuring heterogeneity: Representation of a broad spectrum of potential users ensures diversity in the generated service ideas.*

Table 6-1 Literature - Methods & strategies of customer involvement

Appendix III   Difficulties in customer involvement

Author(s)	Context of study	Key problems in involving customers
Bennet & Cooper (1981)	Discussion of market pull and technology push models.	- *Customer perceptions of their needs are restricted to the familiar, items they can relate to.* - *Customers have limited ability to verbalize what they want, particularly when they do not know what is technologically feasible.* - *The expressed customer needs are dynamic, and may therefore have changed before commercialization.*
Anderson & Crocca (1993)	Story and reflections on a co-development project.	- *Customers cannot describe needs in engineering terms which makes it difficult for engineers to understand the requirements.* - *The craftsperson's attitude of developers makes it difficult for them to give up unfinished work.* - *The maintenance of appropriate boundaries is a complicated aspect when engineers work in a customer's domain and vice versa.*
Christensen & Bower (1996)	Discussion on disruptive technology based on the hard-disk market.	- *Staying close to customers might mislead suppliers into avoiding exploration of the opportunities provided by new disruptive technologies.*
Leonard & Rayport (1997)	Discussion on the use of empathic design in the front-end of NPD.	- *Customers can be so accustomed to current conditions that they don't think to ask for a new solution-even if they have real needs that could he addressed.*
Olson & Bakke (2001)	Implementation of lead user method in a high tech firm.	- *Product concepts generated by lead users are not expressed in the technical language used by NPD personnel and are valued lower because of this technological ambiguity.* - *Engineering oriented personnel increased the inertia of technology push by making it more prestigious and comfortable to develop close relationships with big technology suppliers.* - *No pressure from market conditions, the firm's financial status, or management to make permanent changes to established routines.*
Lilien et al. (2002)	Experiment of idea generation by lead users in new product development projects.	- *Ideas developed by lead users might have a low organizational fit.* - *The lead user method might result in ideas that could not effectively be patented.* - *Lead user methods increase time-consumption and efforts compared to alternative idea generation approaches.*

Nambisian (2002)	Theoretical examination on the design of virtual customer environments.	-	*Difficulty to locate an appropriate set of customers in a cost-effective manner.*
		-	*Difficulty in creating appropriate incentives to foster customer willingness to participate.*
		-	*Difficulty of capturing the customers' knowledge*
Alam (2006)	Qualitative research on customer interactions in fuzzy front-end of innovation in financial service firms.	-	*Identification of appropriate customers is difficult (confidentiality; customer knowledge necessary)*
		-	*Conflicting objectives and intent between customers and managers*
		-	*Listening too closely to customers (risk over customization)*
Lettl et al. (2006)	Multiple case study analysis on user involvement in radical innovations.	-	*Users can be users can be 'functionally fixed' to their current use context and therefore unable to develop radically new ideas.*
		-	*Users might have difficulties in providing valid evaluations of concepts and prototypes as no reference product for the radical innovation exists.*
		-	*Users are more than likely overstrained due to the high technological complexities involved.*
		-	*Lack of motivation can stem from high anticipated switching costs and from the fear that existing knowledge becomes obsolete.*

Table 6-2 Literature - Difficulties in customer involvement

Appendix IV Research flyer

Involving customers in the development of web-based software services

What is your customer's contribution to innovation? Learn how customers can be effectively involved in your development process by joining a multiple case study in the cloud software industry.

Research in both (agile) software development and new product / service development have emphasized the importance of involving customers in the development process for creating superior products and services in short development cycle times (e.g. Highsmith and Cockburn, 2001; Alam, 2002; Gassman et al., 2006). Although the relevance of collaborating with customers in the development process is acknowledged by both research and practice, little is known about <u>how</u> customers/users can be effectively involved.

Therefore, this study will focus on how customers can effectively be involved in the development of web-based software services (SaaS). Based on an extensive review of academic literature, this study addresses the following research questions:

- *Where in the development process do customer inputs occur (and how)?*
- *What strategic considerations are made to involve customers more effectively?*
- *How do web-based firms interact with customers?*
- *What are key problems with involving customers?*
- *How do customer involvement practices affect operational and market performance?*

This study aims to both assess existing theories and explore for new insights in the dynamic market of web-based software services that address these questions.

Research methodology

In an extensive review of academic literature in the fields of product/service development and software development, a theoretical framework for customer involvement software development is created first.

Next, based on this framework, practices of leading companies in the web-based software industry will be examined using semi-structured interviews.

Finally, data will be coded and analyzed using software specifically designed for qualitative studies. Results will be confronted with theory and findings are presented to both academics and participants.

Appendix V   Interview protocol

Introduction

Introduce the subject of the project and define key concepts

<u><FIRM></u>

You founded <FIRM> in <YEAR>, can you tell me more about the background of <FIRM>?

> Growth? Number of users? Number of employees?

> Who are your customers? What are their characteristics?

> Unlike traditional software, you're providing software as a service, does this have an impact on your relationship with customers? How?

Development process:

Could you describe your development process from idea generation / specification to launch?

> What are the main stages/steps in the development process?

> Iterations? Continuous? Time between new releases?

> Is developing SaaS different to traditional software products? How?

Do you use a specific software development methodology (e.g. agile methods)?

> Does this method specifically address the role of customers in the development process?

Customer involvement in the development process

Do you think it's important to involve customers in development? Why?

How are customers generally involved in the development of <FIRM>?

> In which phases/steps of the development process are customers involved? How?

How intense are customers involved in your development process?

> Do you actively take initiative to involve customers? How?

> Do members of the development team directly interact with customers?

How do you interact with customers during development?

> Does being a global, web-based company change the way you interact with customers?

> Via which communication channels do you interact?

> Do you use specific tools/software for interaction?

Strategic considerations for customer involvement

Do you have specific methods or strategies for customer involvement?

> What do you do to improve the process of customer involvement?

What is the goal of involving customers?

> What results are expected from the process?

How much influence are customers granted in the development process?

> Can customers (co-)set the agenda in development phases or do you just use them as a source of information?

When customers are involved to identify needs or generate ideas, where does this happen?

> Are customers observed/questioned in their use-environment?

> Do you observe customer behavior on your website? How, do you use a specific tool?

What kind of customer information do you use as input to your innovation process (e.g. ideas, needs, stories, problems, outcomes)?

> How does the development team handle these inputs?

Are customers specifically selected for participation?

> Based on what characteristics?

Challenges / issues when involving customers

Did your firm need to overcome obstacles before they could involve customers?

> Are there people in the firm who think involving customers is not beneficial?

Have problems/difficulties occurred during the active involvement of customers?

Perceived benefits of customer involvement

What are the main reasons to actively involve customers in development?

What are the main benefits of customer involvement?

> Does it benefit the development process? How?

> Does it benefit the quality of the final product/service? How?

> Does it benefit market performance? How?

Closing