Development of Software Based Services
Structuring the service development to compete on the Internet

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A casual stroll through the lunatic asylum shows that faith does not prove anything.

- Friedrich Nietzsche

Executive summary

Software based services have come to play a central role in many markets, particularly visible in services offered over the Internet. In the wake of the transition, emerging actors are challenging the incumbents with Internet based versions of services that were previously reserved for the incumbents. Through their capabilities and financial strength the incumbents have kept their ground, but the Internet is now lowering the entry barriers. Markets in which this transition can be observed are for example communication services, payment services and betting services, all markets where the Internet has lowered the entry barriers through allowing software based services instead of the hardware based platforms earlier used. The authors of this report are intrigued by this transition since it leads to situations where emerging actors seem to both create and retain highly competitive positions while incumbent actors appears to have trouble responding.

Against the described background, this study sets out to investigate if the development structures used today among incumbent actors, primarily telecom operators, are suitable for development of Internet based services, or if other sorts of development structures would be optimal.

The specific question this thesis sets out to answer is "*How should an incumbent actor structure its service development to optimally create software based services?*"

The research question was broken down into three distinct areas of service development which were

1. *How should an incumbent actor **leverage the characteristics that distinguish services** if optimizing for the development of new services?*
2. *How should an incumbent actor structure its **governance model** for optimization of the development of new services?*
3. *How should an incumbent actor's **work method** be designed if optimizing for the development of new services?*

In order to answer the questions posted above the authors have taken the perspective of the incumbent actor, the study has been performed with assistance of a European telecom operator. The direct method used to answer the research question has been a comparative case study. 15 companies, both incumbents and providers of software based services were identified and interviewed in order to understand challenges and benefits of different development philosophies. A theoretical framework was created based on the two latter questions above, governance models and work methods, in which the empirical data was clustered. Three clear groupings were identified; Team Legacy, Team Empowered and Team Transition, from which conclusions were drawn and synthesized.

The conclusion of the study is that incumbent companies wanting to compete with Internet actors in service development must become focused on delivering a service and not a product, become iterative in their work model and become self-governing and empowered in their development.

Keywords

Acknowledgements

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1 Introduction

Software based services have come to play a central role in many markets, particularly visible in the services that are realized over the Internet. In the wake of the transition, several emerging actors are challenging the incumbents with new or modified, attractive services. There are several examples of this situation from communication services, payment services, betting services and others where the technology side of the service has benefitted a lot from the opportunities of software coding the service over standard hardware platforms and from delivering the service over standard networks, often the Internet. The incumbent competition frequently bases their services on unique hardware or hard-coded systems. The authors of this report are intrigued by these situations, where emerging actors seem to be able to both create and retain highly competitive positions while the incumbent actors seem to have trouble responding, despite profound experience and financial strength.

The authors also have a great interest in new service development, primarily because of the servicification of the developed world, where consumption that historically involved a number of products is now bundled into a service package that the customer subscribe to. When combining these two interests, the authors believe to have found an intriguing area to study, namely how companies should work with their service development to be successful with software based services.

1.1 Background of the Study

To perform this type of study, the authors have taken the perspective of the incumbent actor. This choice of perspective partly provides the opportunity to create an understanding of how to best work with the development of these types of services. However, this perspective also allows some light to be shed on the more philosophical question whether or not there is a difference in how the incumbent and the emerging companies work with their service development. This could provide the rationale for further research on if such a difference in service development has an impact on the competitive success of the emerging actors.

To be able to take the perspective of the incumbent actor, the study has been performed with some assistance of a European telecom operator. This collaboration was ideal since telecom operators are part of the group of incumbents that are finding their traditional business being challenged from new types of competitors. Internet actors are offering "free" communication services of such quality and benefits that customers to some extent are replacing the voice and messaging services provided by the operators (Fransman, 2008). There is also a growing content market where the transactions take place over the telecom operators' networks but without their involvement (Bohlin, 2009).

The use of the incumbent's perspective has also influenced the design of the empirical investigation, where half the focus has been put on incumbent actors and the other half on companies that are the emerging actors that are successfully providing software based services.

1.2 Purpose

Against the described background, the study sets out to investigate if the structures for service development used today among incumbent actors, primarily telecom operators and banks, are

adapted for development of software based services, or if other sorts of development processes would be more beneficial.

The study is intended to contribute generally to the academic understanding of the challenges and the potential solutions with the development of software based services, and more specifically to guide the incumbent practitioners in their development activities.

In this line of reasoning, the overall purpose of this study is to improve the incumbent actors' understanding of how they should work with service development to compete with Internet actors' services.

1.3 Research Question

To contribute to the purpose, one can look at several dimensions of service development. To make sure that the specific perspective of this study is adhered to, this study focuses on the service development processes and aims at answering the following research question:

How should an incumbent actor structure its service development to optimally create software based services?

Where optimally is defined as meeting the critical success factors identified in Chapter 2.2.1.

1.4 Scope and Limitations

This thesis focuses on methods for the part of service development often referred to as the idea-to-launch phase. The input of such a process is an idea that has been chosen and evaluated and the output of such a process is an internally realized product. Consequently, the thesis does not intend to cover all elements of product creation, such as idea generation, technology management, IPR-management, idea management, change management, program management, support methods and launch methods.

Factors such as competencies and responsibilities required to support the service development structure will be browsed-upon at a very general level to give the reader a flavor for the considerations to make rather than supply a conclusion in these peripheral areas.

1.5 Definitions

Since this study covers an area that is still very dynamic and constantly redefines itself, a number of definitions need to be set. These definitions are not more "true" than any alternative definitions that can be found, but they illustrate what the authors mean when using the terms in the report.

Internet actor
An Internet actor means a company that provides products, services or content over the Internet. It distinguishes itself by not owning the means of customer access, the Internet connection. Their business models may involve the access provider's billing, they may manage the payment themselves or they may use third party payment services.

Incumbent actor
In this study, incumbent actors represent the companies that for a long time have defined how to provide and deliver certain services but that are now facing fierce competition from software based

services utilizing the Internet. To exemplify contrast between incumbent actors and Internet actors: TeliaSonera is an incumbent actor while Skype is an Internet actor, Handelsbanken is an incumbent actor while PayPal is an Internet actor.

Software based service (Layer-3 service)
The term software based service is in this study synonymous with Layer 3 service even though the Layer 3 service in Fransman's (2008) work puts more emphasis on the over-the-net feature than on the software content. In this report these are defined as all services that have their technology side software based, that runs on standard hardware and that are delivered over standard networks, often the Internet. The sub-group of these services that is of interest in this study consists of the services that have traditionally been related to incumbent actors that have been providing the services over hard coded or hardware systems.

Information and Communications Technology (ICT) industry
The ICT industry includes all actors that traditionally position themselves in the telecom industry as well as companies that provide means of sharing and communicating information. Companies that provide services or content over the Internet are not automatically included, since there are several services and types of content that has nothing to do with communication. ICT actors include: telecom operators, communication system providers and software communication service providers as well as similar actors.

New Service Development (NPD) and New Product Development (NSD)
New Service Development and New Product Development regards the whole set of activities and processes that relate to an organization's creation and development of new services or new products. Included are processes like: intelligence development, technology management, product and technology strategy development, idea management, program management, culture management, supporting methods and service logic management.

Idea-to-launch process
The idea-to-launch process is a part of the NSD or NPD that takes an idea, through a set of further development and screening activities and creates a service or product that is launched in the market. All activities that are needed from the idea generation to the service launch are included.

Development structure
In this study, development structure means the combination of governance model and work method (see Chapter 4) that is used by an organization in practice during the idea-to-launch process time frame.

1.6 Delimitations

The primary delimitation the authors have had to abide to is related to the empirical material gathered throughout the research project. New service creation appears to be an area of high priority to many actors and it was consequently difficult to obtain thorough material on the different companies' idea-to-launch methods.

Additionally, this top priority of new service creation required the study to have an anonymous approach with all case studies. The anonymity was deemed indispensable when contacting companies in order to gain access to data. Even though anonymity increases the risk of the data not

being perceived as trustworthy, the authors decided that the access of more detailed data was the highest priority for the project.

Geographically, the study has had to focus mainly on Swedish companies. After the initial brainstorming of relevant companies, the approach of selecting companies relied heavily on the convenience of obtaining interviews and since the researchers were located in Sweden, companies with offices in Sweden were targeted.

New service development is a very complex area that would require extensive insight into each case study to provide a perfect answer to the research question. Since the format of this study is a Master Thesis project and since the study is of an explorative nature, the research depth has been traded for a more broad research approach making the answer to the research question will be more indicative than decisive.

1.7 Disposition

The disposition of the report follows a traditional and logical academic structure where the problem is first presented, the theoretical framework intended to assist in solving then designed, followed by an empirical study that makes up the research contribution and finally come the analysis of the findings and some conclusions that can be drawn.

Chapter 1 – Introduction
This introductory chapter presents the background and purpose of the study, followed by the research question that has guided the research project. It then discusses the scope and limitations of the study as well as the delimitations forced upon the study by external constraints.

Chapter 2 – Problem Discussion and Framing
This chapter expands on the background section of the previous chapter. It starts with a discussion of service development, including how services have become an increasingly important part of developed economies. Then the telecom industry's transition to involve more diverse actors competing with services follows, in order to exemplify the difference between the incumbent and the emerging actor. Following the identified critical success factors for developing software based services are presented and finally the research question is broken down.

Chapter 3 – Methodology
The first part of the chapter describes, discusses and motivates the chosen research methodology's parts and considerations on a high level. The second part of the chapter ventures into the considerations made during each step of the research study in order to allow the reader to validate that the activities that have been done during the research project can support the findings.

Chapter 4 – Theoretical Framework
Where Chapter 2 – Problem Discussion and Framing used previous research to signify the challenges this study intends to solve, this chapter uses literature to present potential paths to analyze in order to move forward. The chapter starts with a theoretical discussion of the similarities and differences between products and services. After that, relevant theoretical work regarding the three central themes of this study, the characteristics of services, the governance model and the development work method, are presented.

Chapter 5 – Empirical Study
This chapter presents the empirical findings from the 15 involved companies that the study has produced. The findings are presented in form of case studies in the format designed in the theoretical framework.

Chapter 6 – Analysis
In this chapter the three themes from the theoretical framework and the empirical findings from the interviews are contrasted and analyzed in order to understand how the differences in service mindset, governance model and development work method relate to each other and to the success factors of for developing software based services.

Chapter 7 – Conclusion
This chapter answers the research question by indicating which position in the created framework the incumbent actor should hold in order to optimize their service development process.

2 Problem Framing

The starting point of this chapter is an illustration of the current situation where services are accounting for more and more of today's value generation. Then the telecom industry is used to exemplify the emergence of a new competitive environment from software based services and Internet actors. The chapter ends with a breakdown of the research question and an account of the proposed value of the study.

2.1 Services in Society

The production output of developed societies has seen a quite radical shift from production of goods to production of services over the last hundred years. In year 2000 services accounted for 70-75% of GDP in OECD-countries (Edvardsson et. al., 2000). Not only is the value generated by services in society in general increasing, but also within companies traditionally seen as manufacturing companies (Rekola, 2006). Edvardsson et al. (2000) exemplify this with ABB Robotics where more than 95% of all activities are internal and external service activities.

There appears to exist tree critical changes in the economy of today that is driving the infusion of services in society (Sahlman, 1999): Firstly, there is a service infusion happening in manufacturing companies meaning that the service content of their sales is increasing, as mentioned above. Secondly, technology infusion in services is increasing drastically. This increase of technology is happening partly because it reduces costs through atomization and partly because it brings significant benefits for the consumers as it increases flexibility in time and place. The final trend in that is driving services is the networked economy. Through the use of software, IT and telecommunications the world is becoming interconnected and data is flowing between actors (Edvardsson et. al., 2000).

2.2 The Transition in the Telecom Industry

The ICT industry until today has been characterized as consisting of four distinct layers as seen in figure 1. The ICT industry provides a very convenient example of the incumbents' struggle with emerging actors, since the Internet itself is built on the telecom operators' networks and since the Internet is a major hub used by many software based services. The important feature that the telecom operators share with other incumbent actors is that historically they have all had almost a monopoly on the services that are now being realized over the Internet. With monopoly the authors here mean that for new actors to compete, they have been required to copy the incumbents' business model and way of working.
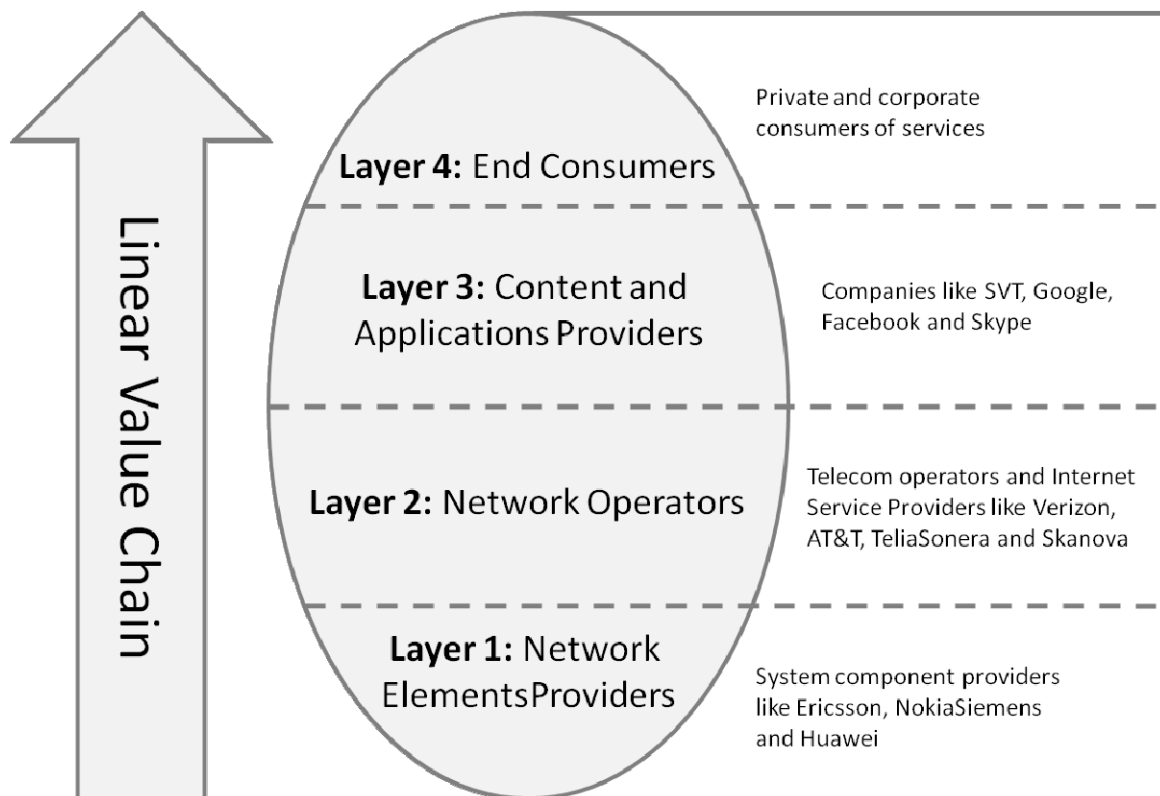
Figure 1 - An illustration of the traditional ICT industry, adopted from Fransman (2008)

As the telecom industry has traditionally been built on hierarchical structures, each layer provides a specific functionality. Layer 1 delivers the networked elements such as routers, switches and PCs which are needed to give the functionality of the access. The routers and switches cannot give the consumers any access unless there is a so called converged network in which all the individual hardware components are strung together to form the actual net, as done by Layer 2. A recent trend that is emerging is the companies only producing content and applications which they deliver to the consumer by using the network Layer 1 and 2 have created, illustrated in Layer 3 (Internet actors). Finally, in Layer 4 are the consumers both residential and business (Fransman, 2008).

Fransman (2008) continues by illustrating the relationships that exist in the marketplace. In the traditional telecom market the dominant relationships were centered on Layer 1 (who provided the communications services) and Layer 2 (who provided the phones and computers). What is presently appearing is a telecom market characterized by relationships that are centered on Layer 3. The consumers pay for network access but then consume services and content provided by Layer 3 actors. This emerging market is also known as the "post-Internet" market where there is no longer a linear hierarchy but rather a complex value web (Bohlin, 2009), as illustrated in figure 2.
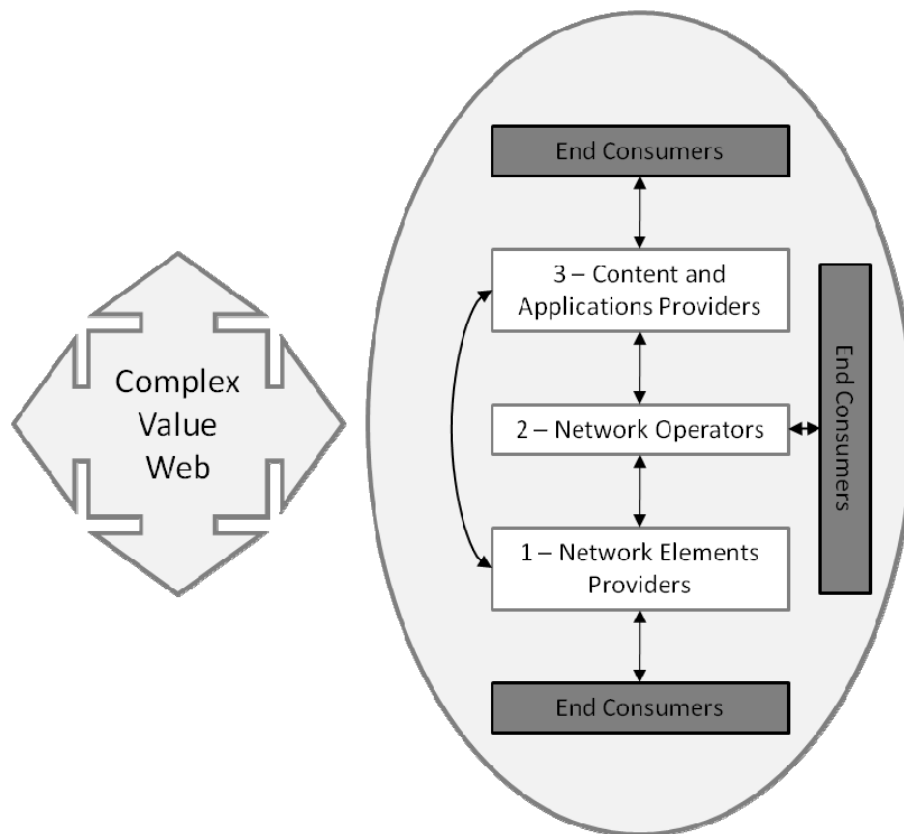
Figure 2 - The complex value web of the "post-Internet" market, adopted from Bolin (2009)

There is an important change in balance in the "post-Internet" market where network providers and network operators are moving upwards in the model to compete in Layer 3 and where content and application providers are providing services that compete with service traditionally supplied by Layer 2, thus rising new challenges for the telecom operators. Layer 1, Layer 2 and Layer 3 compete for the same customer value (Bohlin, 2009).

2.2.1 Success Factors in Layer 3

The main factors for the development process to fulfill when working with Layer 3 services have partly been identified through literature studies (see Chapter 4). Equally important for the identification of these success factors have been the empirical data gathering.

The experts in service development (companies B, E, G, H, and K) have agreed on what in their service development that is most important for their success and incumbent companies have shared their belief in where they need to improve if they are to succeed in the development of services. With these references, the success factors for developing services in Layer 3 have been identified as the following:

- Having a strong customer focus – by early and continuously involving the customer in the development of the new service, the right service will enter the market. Emerging companies agree that this is one of their success factors.
- Focusing on time to market – the emerging actors believe that they win over the incumbents because they can identify a trend and respond to it so much faster than the incumbents.

- Scoping deliveries to become smaller to allow flexibility and speed – the theory presented in Chapter 4.4 as well as the statements from emerging companies testify that smaller and iterative deliveries (making use of the service characteristics) improves speed and flexibility.
- Being able to incorporate feedback into the development projects – the software based services in focus in this study can be altered and modified easily and the emerging actors claim that their ability to listen to the users and continue to evolve the service is a major advantage.

2.3 The Research Question

To get insight into if incumbent actors need to change their development process to be successful in Layer 3, given the need to fulfill the factors above, this study is based on the following research question:

How should an incumbent actor structure its service development to optimally create software based services?

To answer the research question, and understand whether or not the development structures presently used by incumbent actors will fulfill the characteristics outlined, the study has been broken down into three distinct areas. These areas were designed after the initial study of product development literature, see (PDMA, 2005), (PMI, 2004), (Smith & Reinertsen, 1998), and (Deschamps & Nayak, 1995), to capture the relevant parts of the process-to-be-designed. The three areas were continuously verified through the theoretical and empirical study and slightly modified to the current state:

4. *How should an incumbent actor **leverage the characteristics that distinguish services** if optimizing for the development of new services?*
5. *How should an incumbent actor structure its **governance model** for optimizing for the development of new services?*
6. *How should an incumbent actor's **work method** be designed if optimizing for the development of new services?*

These three areas have followed the authors through the study, and dictate the structure of the theoretical framework, the empirical study and the analysis.

2.4 Relevance of the Study

Even though services are becoming more and more prominent in real life, there appears to be a lack of academic focus on the creation of services. Based on the theory identified for NPD and NSD it can be seen that the existing research concerning service development has a very high-level perspective, regarding for example decisions of overall strategy and how to create a company culture that can support services. There is limited work done on how to actually create services. Some insights exist in the steps needed in creating the service (Rekola, 2006), (Edvardsson et. al., 2000) and (Stevens & Dimitriadis, 2005) but no consideration is taken to development methods.

This finding was also confirmed by Schmidt (2010) and by Spath & Fähnrich (2008) and by an ALMEGA (The Swedish Organization for Service Companies) research project asking 800 Swedish

service firms what areas of services that academia should focus on. The results were as follows (ALMEGA, 2008):

1)   Methods for service development

2)   Service quality

3)   Customer relationships.

Because of the lack of existing research on how to create services, and the demand for such research to be done, this study does not present comprehensive theoretical evidence for how to develop services. Rather, the authors focus on developing a new framework applicable for service development in the specific situation of telecom operators that choose to compete in Layer 3. The results from mapping empirical case studies into this framework are then able to provide guidance to service development practitioners on how to actually work.

3 Methodology

This chapter outlines the overall methodology used for realizing this study. The chapter starts at a high level describing the overall process used. It then details each step in the process, presenting the considerations and choices made. The overall method, which is based on Bryman & Bell (2007), is visualized in figure 3.

The authors designed the inductive process below due to limitations in existing theory on the subject. There are two main approaches to research, inductive and deductive. Deductive theory exhorts the researcher to have a clear hypothesis to validate throughout the study whilst inductive theory tries to convert findings into new theory (Bryman & Bell, 2007), (Patel & Davidsson, 2003). Since this study intends to transform empirical findings into new theory, the inductive approach was deemed as the most appropriate.
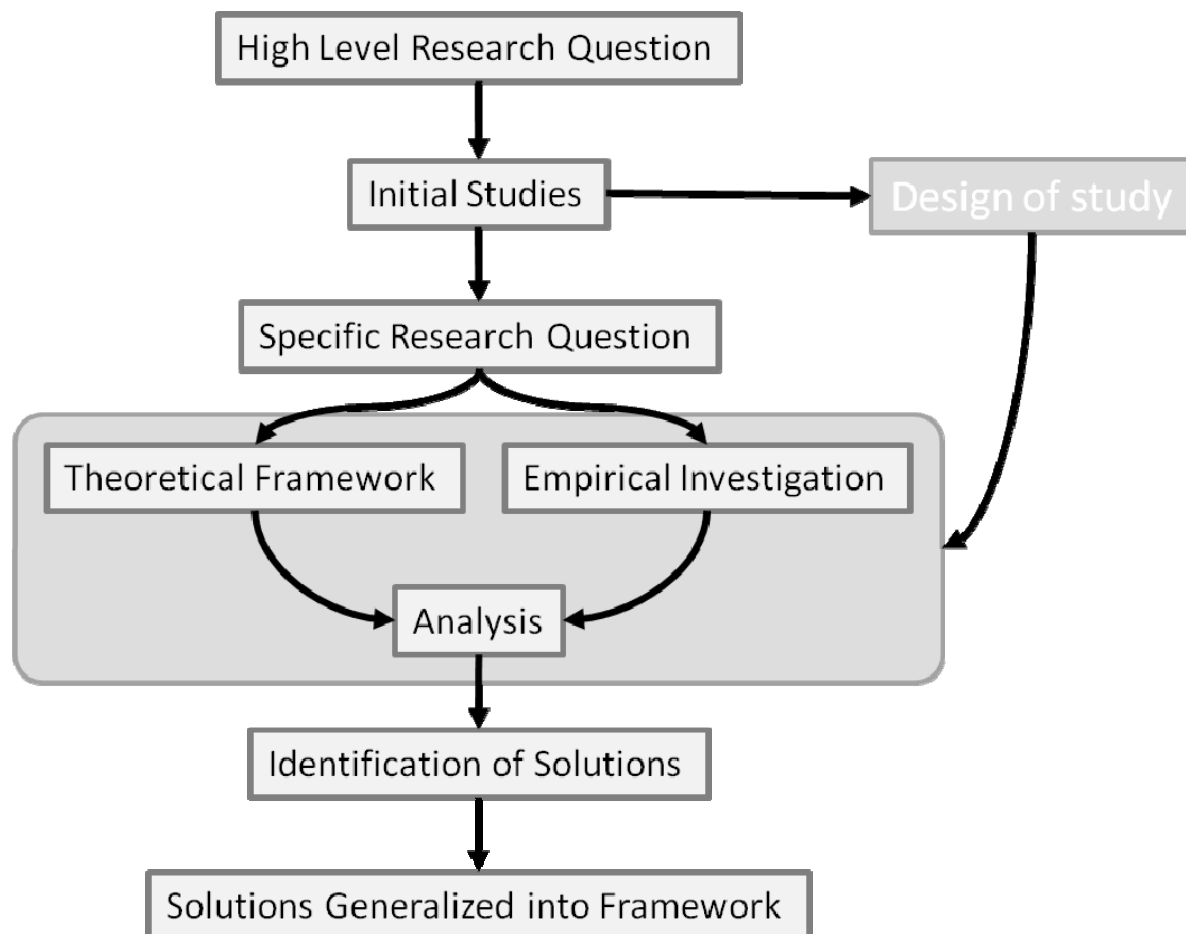
Figure 3 - The methodology of the study, based on Bryman & Bell (2007)

3.1 High Level Research Question

The initial research question for the thesis study was designed in accordance with the authors' belief that the incumbent actors had no coherent strategy when trying to compete with services. This belief had been developed through the authors' own experiences with online and mobile services and through the reading of newspaper and journal articles. During the first few scoping and definition of the project, prior to working with the sponsoring company, the research question was:

How should incumbent actors choose what services to develop given the emerging competition from Internet actors?

3.2 Initial studies – Specified Research Question

In order to validate the research question and gain access to data, the research question was pitched to the management of one of the medium sized telecom operators in Europe who found the research area interesting but did not find the suggested research question of great value to them. They thought they knew rather well what the market demanded and what their core capabilities were, but that they had an underdeveloped understanding of how to develop the demanded services. Together, the management team and the authors modified the research question to become the one that has been used throughout the study:

How should an incumbent actor structure its service development to optimally create software based services?

In accordance with Bryman & Bell (2007), the authors then let this research question:

- guide the literature search
- guide the decisions about the kind of research design to employ
- guide the decisions about what data to collect and from whom
- guide the analysis of the data
- guide the writing up of data
- stop from going off in unnecessary directions and tangents

3.3 Design of the Study – Empirical Data

The strategy chosen for the research project is a qualitative research strategy. This choice is made as the field of research appeared novel enough, seeing that no operational theoretical concepts could be identified during the initial phase of the project on which quantitative research could be based. Thus the qualitative research strategy and its accompanying inductive theoretical approach were deemed to facilitate the creation of novel theories.

As Bryman & Bell (2007) instructs, there are two main research approaches, qualitative and quantitative. These two should be seen as extremes and most research projects contain parts of both strategies. In spite of this fact it is still very important to make a well thought-out decision for which strategy to focus on (Patel & Davidsson, 2003).

Quantitative studies are most commonly connected to deductive research processes in which the quantitative data is used to statistically validate the hypothesis created by the authors (Bryman &

Bell, 2007). Since the study had not hypothesis to validate, a quantitative study was judged to be an inferior approach.

Furthermore, as a quantitative study tends to remove the influence of social factors such as politics and human interactions, and since the structured process for gathering data creates an artificial environment in which precision and accuracy may be negatively affected, the authors had good arguments for using the qualitative strategy.

Qualitative research is focused on understanding "how?" and "what is the difference?" (Patel & Davidsson, 2003). This study uses a qualitative research strategy by following the process illustrated in figure 4.
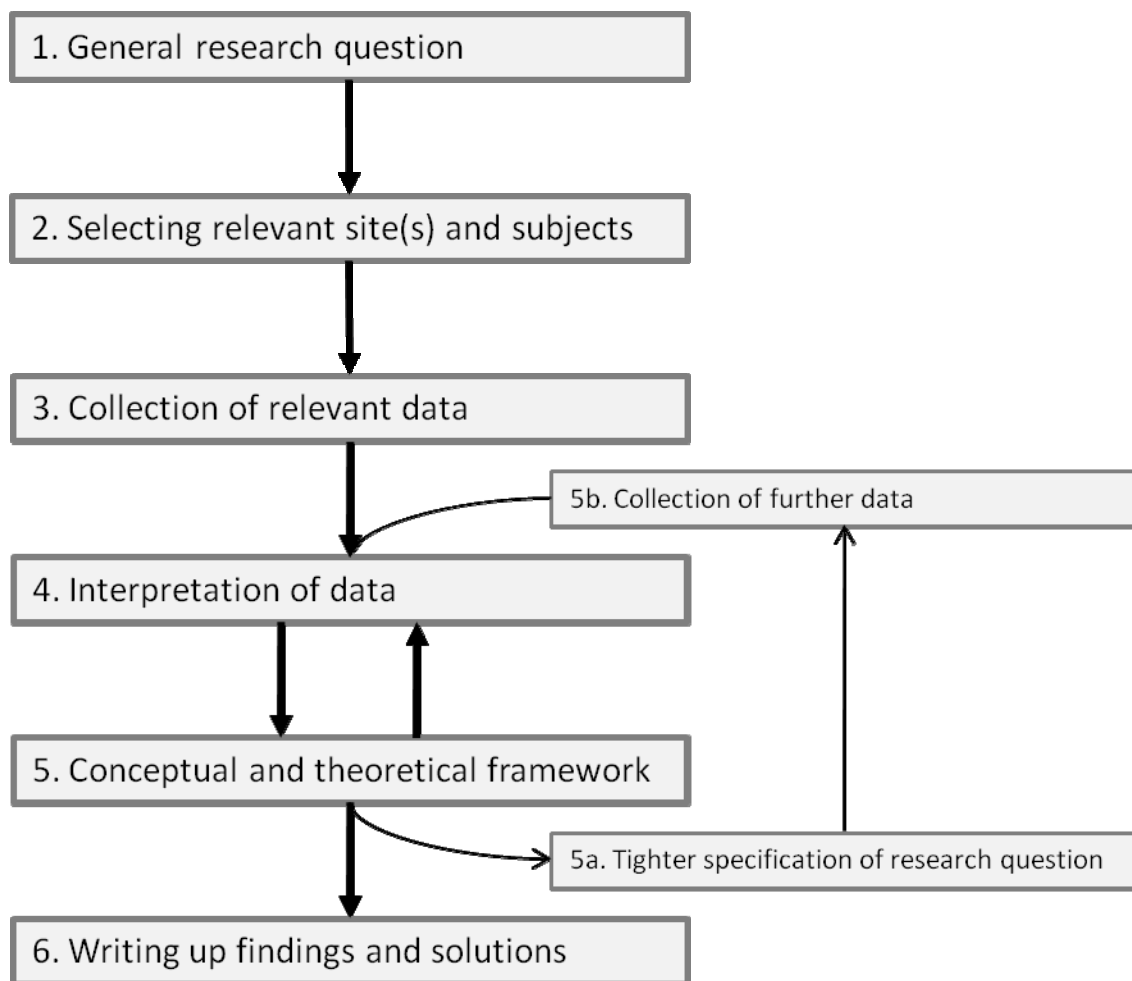
Figure 4 - The qualitative research strategy used in the study, adopted from Bryman & Bell (2007)

The main focus for qualitative studies is thus to understand the situation of the people studied in order to understand why the situation is as it appears and describe and understand the context the organization and people exist in. Furthermore, qualitative studies focus significantly on change and on the process as it recognizes that people and their context constantly changes. Finally qualitative studies usually strive towards flexibility and limited structure in order to adopt the concerns and issues valid for the interviewees, rather than the researchers, and allow working from the general to the specific (Bryman & Bell, 2007). For these reasons, the qualitative study strategy was identified as very suitable for the study and therefore selected as the research strategy.

3.3.1 Choice of Empirical Research Design

After choosing research strategy the research design for the study was chosen. Bryman & Bell (2007) define the research design as providing the framework for collection and analysis of data. There are five main research designs: experimental design, cross-sectional design, longitudinal design, comparative design and case study design (Bryman & Bell, 2007).

This research project mainly deploys case studies and comparative design. The case study design has been cited as the preferred strategy when the questions "How" and "Why" are to be answered (Yin, 2008), (Bryman & Bell, 2007). Since the research intended to find out *how* the service development process should be structured, and *why* it should be structured as such, the case study design was deemed optimal.

Comparative design was also used in the study as a way to better understand which factors that influence product development as well as how they affect the process. By comparing different contexts from the same lens a deeper understanding of the social phenomena can be reached (Bryman & Bell, 2007). Therefore the study deploys comparative design where the gathered case studies have been standardized to allow for comparison.

3.3.2 Choice of Empirical Research Method

The research method is the techniques for gathering data (Bryman & Bell, 2007). The main data source during the project has been qualitative interviews. This method was chosen because of the advice of Yin (2008) that interviews are a very common and essential source of information when conducting case studies (Yin, 2008).

Three types of interviews were conducted during the research project. Initially, a few interviews were held in order to gain understanding of the topic at hand in accordance with the process indicated in figure 5. These interviews were held with the sponsoring incumbent company. When the authors had obtained a clearer picture of the challenges at hand, focus interviews were held which then formed the basis of the case studies presented in the empirical chapter. The focus interviews were held with employees at 15 different companies. Finally, follow up interviews were held with the sponsor company in order to validate the recommendations created by the authors.
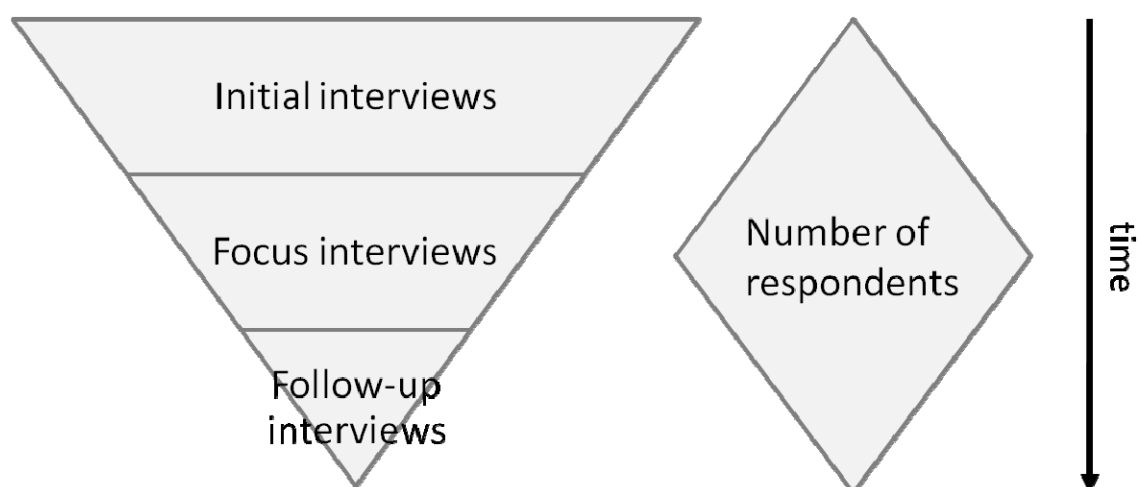
Figure 5 - The empirical research method used in the study

All interviews that form the basis for the empirical data were held in a semi-structured way. The reasons for using semi-structured interviews were that the research design and semi-structured interviews create the opportunity for comparison between different case studies and that the authors had a clear understanding of the questions to discuss prior to commencing interviews and thus had a structure for analysis. There other type of interview that can be used for qualitative studies, the unstructured interview, is one in which the interviewer asks one questions and allows the interviewee to tell them whatever they wish, whilst a semi-structured interviewer has a list of topics that should be covered (Bryman & Bell, 2007).

All interviews were made face-to-face except two which were conducted via telephone. All interviews took 1-1.5 hours. The interviews were recorded digitally and then transcribed to paper on an idea-by-idea basis. This was done in order to be able to go back and review how the respondents expressed their answers.

The research project presents 15 case studies. The choice of companies to interview was done through non-probability sampling methods suggested by Bryman & Bell (2007); relevance brainstorming, convenience sampling and snowball sampling. First the authors did a qualitative brainstorming session where relevant company types were identified. Then the most conveniently located companies that matched the profile were identified and contacted. During some interviews further case study suggestions emerged and new companies were contacted.

The reason for deploying non-probability sampling models has been the limited number of companies in Sweden working with new service development and also the fact that product development is many cases is seen as a competitive edge and thus many companies are not open with discussing the topic in an open and public forum such as an academic thesis.

The companies that participated in the study were contacted primarily by e-mail and telephone. In a few cases, the authors were introduced to the relevant interviewee by acquaintances of the authors, either at the relevant company or with some other connection to the source of information the authors aimed at.

3.4 Design of the Study – Theoretical Data

Parallel with the gathering of empirical data a theoretical framework was constructed. This was done in order to gain an understanding of the topic at hand and also to assist in the building of a recommendation. The framework is divided into the three main parts; characteristics of services, governance of service development and work methods.

The main sources for identifying literature have been database searches in ProQuest, Emerald, ScienceDirect, Chalmers Library, Gothenburg School of Economics library and Stockholm School of Economics library. The search words used were created through the authors understandings of the topics but also through the keyword classification in scientific publications. Finally three PhD students, two at Chalmers and one at Stockholm School of Economics were interviewed with the purpose of gaining input into which theories to focus on.

3.5 Creating the Analysis

For the analysis of the empirical findings, grounded theory was used. Grounded theory is concerned with trying to create theory out of data and especially suited for organizational research and follows the path described in figure 6.

Figure 6 - Illustration of Grounded theory, adopted from Bryman & Bell (2007)

From the defined research question, the study was broken into the three parallel paths defined in the theoretical framework: service mindset, governance models and work methods. The relevant theory was consulted to provide input to what previous research had shown should be the expected or at least probable outcome. The collection of data was centered on the three paths, even though a number of peripheral questions were asked to provide the contextual understanding.

The gathered theoretical and empirical data was codified to allow for comparison and the contrasting of different cases. With the theory and empirics codified into comparable categories, the authors investigated relevant themes in the empirics and searched for support or conflicts with the theory. Finally, the identified and theoretically supported claims from the analysis were transformed and explained in the study conclusion.

Grounded theory was deemed applicable since the research strategy, research design and research method were well thought through from a holistic perspective prior to commencing data gathering. Grounded theory requires data collection in contrasting settings (Bryman & Bell, 2007), something that was accomplished through the use of comparative case studies. Further benefits of using grounded theory that make it very well suited for the project are said to be (Bryman & Bell, 2007):

- It captures complexity very well
- It links with practice and facilitates understanding throughout the organization
- It facilitates theoretical work in substantive areas that have not been well researched by others

4 Theoretical Framework

This chapter presents the theoretical framework regarding product and service development. An initial discussion is held to define the concepts of "product" and "service" and also to highlight the differences between them. The product creation process and service creation process are shown as learning is deemed to be able to be drawn from both areas of knowledge. Finally product and service development governance and work-methodology are discussed, as outlined in Chapter 2.

4.1 Products and Services

The objective of this chapter is to be able to contrast between products and services which is key in order to understand which elements of product development or service development to focus on when wanting to create layer 3 services.

4.1.1 What is a product?

"A product is a thing" (Edvardsson et. al., 2000). The wording product descend from the Latin *prōdūce(re)* '(to) lead or bring forth'. The word is very commonly used and as such the meaning is "set", leading to difficulties finding academic discussions surrounding the meaning of the word.

4.1.2 What is a service?

According to Grönroos (1990, p. 27) a service is "an activity or series of activities of more or less intangible nature that normally, but not necessarily, take place in interaction between the customer and service employees and/or physical resources or goods and/or systems of the service provider, which are provided as solutions to customer problems".

According to Edvardsson et al. (2000) a service can be defined as containing three factors, technology, human and customer, which supports the definition above by Grönroos (1990). The customer is always participating in the service but can do so to different extents. Technology and humans are on the supply-side of the service and are the resources realizing the service towards the customer such as the internet and customer support. Again the human and technology content is highly varying between different services such as consulting to making telephone calls, which must be taken into account when designing services. There also exist some situations where the customer is the sole producer of the service i.e. when paying banking bills online and only interacting with a machine.

Even though these definitions of services are found, Rekola (2006) notes that the most occurring definition of services is based on the features that make services different from manufactured goods, rather than defining the service as such.

4.1.3 Difference between Services and Products

Consensus in the service marketing literature is that services hold four main characteristics that differentiated them from products. These are intangibility, inseparability, heterogeneity and perishability[1] (Fisk, Brown, & Bitner, 1993).

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[1] Other authors also detail four factors with the same meaning as Fisk, Brown and Bitner but use other wordings such as individualized, instantaneous or inseparable (Kuczmarski & Johnstone, 2005).

Intangibility appears to be one of the key differentiating factors between products and services from an academic perspective. It refers to a service not giving the customer a physical artifact when experiencing the service. This implies that the customer evaluates the experience whilst in the service, rather than the physical artifact gained. This in turn leads to the experience of the service, rather than the absolute performance of the service, being the key factor to fulfill and optimize. This also affects the approach to the development of services according to Kuczmarski & Johnstone (2005) leading to a need to involve the customer in the creation of the service to reach customer satisfaction. Even though scholars highlight intangibility as a key difference between products and services there exist research papers indicating that the customers do not understand or become influenced by this factor (Wolak, Kalafatis, & Harris, 1998).

Inseparability refers to the fact that services are consumed by the customer at the same time they are produced. This factor places the customer in the middle of the service and gives them the opportunity to affect the performance of the service and is yet another factor driving the need to involve the customer in service creation (Wolak, Kalafatis, & Harris, 1998).

Heterogeneity refers to the opportunity to tailor services to fit the individual customers' needs, something that is especially valid for services with high labor content (Wolak, Kalafatis, & Harris, 1998). This factor may not be a differentiator between products and services. If, for example, the service offered by McDonalds is studied, the heterogeneity and flexibility in their process is very low, close to zero. In the same way a B2B company only selling a few products to a few customers has the opportunity to tailor the product to the customers need.

Finally, perishability refers to the fact that services cannot be stored as products can thus making services time-dependent. This is claimed to be a concern of the supplier rather than the customer who only experience this factors when the demand is higher than the supply forcing the customer to wait for the service (Wolak, Kalafatis, & Harris, 1998).

4.1.4 Differences between NSD and NPD

The differences between services and products highlighted in section 4.1.3 irrespectively lead to the notion that the NSD process should not be identical to the NPD process.

It does not appear evident that the investigation regarding the differences between NSD and NPD is needed. According to Rekola (2006) both products and services are outcomes of a process which requires input which it transforms into some form of output and thus products and services should be treated in the same way. Even still an investigation of the differences between the two different concepts will be done.

When comparing NSD with NPD it becomes evident that NSD has not had the same academic focus and thus has seen fewer developments and new insights over the last time period. The few studies that exist have not been able to synthesize a comprehensive framework but have rather lead to contradictory findings (Stevens & Dimitriadis, 2005). According to Stevens & Dimitriadis (2005) three main differences causes the NSD being considered different to the NPD:

1)   Services have simultaneous innovation in the product and the procedure.

2)   There can be no separation between product innovation and organizational innovation.

3)   There is no difference between the creation of the offer and the consumption of the offer.

Based on these factors and since organizational perspectives appear to fit services, organizational dimensions are seen as a key factor in the NSD process (Stevens & Dimitriadis, 2005) (Edvardsson et. al., 2000). It is interesting to identify that no comment is made regarding the intangibility of services affecting the NSD even though this was highlighted as they one key characteristic of services. This appears to contradict the findings of Kuczmarski & Johnstone (2005) but supports the discussion regarding customers not being able to understand or be affected by the intangibility of services (Wolak, Kalafatis, & Harris, 1998). One must also bear in mind that the three components of a service; human, technology and customer, as defined by (Edvardsson et. al., 2000), will affect how significant the identified differences in NSD and NPD are. A service with low human content and high technology content will not require an organization innovation to the same degree as a manual service would.

Even though some insight is gained through the literature identified the majority of publications only give insights regarding the NSD at a very high-level, which are not applicable in practice. Stevens & Dimitriadis (2005) are not able to operationalize their recommended NSD and the same follows for Smith & Fischbacher (2005). This finding was validated in an interview with a PhD student claiming that the lack of operationalization of services is apparent (Schmidt, 2010).

Based on this discussion a further in-depth study of new service development based on academic findings will not be done but instead the remainder of the theoretical framework will focus on methods and models mostly connected to new product development which are deemed applicable for new service development.

4.2 Development Governance Models

The research question defined in Chapter 1 was in Chapter 2 broken down into its components; service mindset, governance model and work methods. The primary function of an organization's project governance model is to define how the progress is controlled. This chapter presents the two different governance models identified; top-down control and self-governance.

4.2.1 Top-Down Governance

Top-down control is used when the development project do not take vital decisions but instead rely on/must use an external party to take critical decisions. As the name suggests this external party is often top management. Variables the governance model balances are amongst others the frequency of decision points, which activities to conduct between which decision points, resource allocation for the development team, designating who makes the critical choices at decision points and the documentation required for the decision points. This type of governance method has been formalized into a framework called Stage-gate, which is commonly accepted and used for product and service development (Cooper, 1990).

4.2.1.1 What is Top-Down Governance?

The basic idea of top-down governance is that product development is a process and thus, like all processes, it can be managed by process management methodologies, focusing on the removal of variance, by controlling what is done in each stage of the process and that the output of each stage meets expectations. The product development process is thus managed by being divided into a

predetermined set of stages which in turn are comprised of a set of predetermined activities (Cooper, 1990), (Cooper & Kleinschmidt, 1991).

Between each stage is a gate. The input to each gate is a set of deliverables from the preceding stage and the output from the gate is a Go/Kill/Hold/Recycle-decision and an approval of a set of deliverables for the next gate. At the gates, senior managers act as gatekeepers and make the decision based on the deliverables serving as input to the gate. For the project to pass to the next stage, all deliverables required for the gate decision must be presented, and the information these deliverables provide must make the gatekeepers see the future potential of the development project (Cooper, 1990), (Cooper & Kleinschmidt, 1991).

4.2.1.2 When is Top-Down Governance Used?

Top-down governance is widely used in organizations product development process or service development process. In a PDMA best practice study, almost 60 percent of the surveyed firms used some sort of gated process (Griffin, 1997).

Furthermore, both major project management certification agencies, Project Management Institute (PMI) and Product Development and Management Association (PDMA), suggest the use of top-down governance models for all types of projects(PMI, 2004), (PDMA, 2005).

4.2.1.3 How Top-Down Governance Models Work in Detail

Top-down governance is usually introduced throughout the entire organization, meaning that all development projects must follow the outlined gates and activities. From a governance perspective, the introduction of a model that all development projects follows is the first step of controlling the development.

The gate model can be designed to include activities and deliverables that are unique for a particular industry, company, department or manager's taste. This flexibility allows managers of different levels to exert control and governance on a long term perspective, ensuring that their key wishes are regarded by each product development project (Cooper, 2009), (Cooper, 1990). Historically, a lot of development work was done without any type of model and was instead managed on an ad hoc basis. Evidence is found showing that top-down governance models are correlated with successful product development (Cooper, 2009), (Cooper, 1990).

When the top-down governance model has been implemented, senior managers assert control at the gates. This governance can appear in two ways, as a control function, making sure that the relevant activities have been performed, and as an experience and functional skill function, making sure that the content of the deliverables are correct and that the project's value potential appears positive. As a control function, gatekeepers who participated in the design of the governance model can make sure that activities in their area of expertise are performed before moving forward in the project. As an experience and functional skill function, gatekeepers can validate that the output of each activity indicates that the new development project is profitable to pursue. Furthermore, control is asserted at the gates in a comparative way, where projects are measured against each other based on the predefined criteria. This allows management to use a "survival of the fittest" approach to development projects by only giving the most beneficial project the resources to move forward. Thus a key activity for the gatekeepers at the gates is also to manage and distribute

development resources , which also can be seen as a significant component of top-down control (Cooper, 2009), (Cooper, 1990).

4.2.1.4 Pros and Cons of Top-Down Governance Models

There are several benefits of a top-down governance model. First of all, standardized stages ensure that no crucial activities in the development process are excluded or forgotten, something occurring frequently when no predefined stages and gates exists (Cooper, 1990). In particular the early steps of the product development process or service development process are commonly skipped as organizations want to progress to the actual development as quickly as possible. This has been linked to worse performance in product development (Cooper, 1990). With a top-down governance model the organization can both ensure that the right stages are in place and that the gates control that the right things are actually done in practice. It also allows central management to be a part of each project without actually working in the projects. Thus the top-down gated model places emphasis on the skill and experience of top-management rather than the individuals working with the actual development (Cooper, 1990), (Cooper & Kleinschmidt, 1991).

Killing projects is also easier at predetermined points, the gates, where discussion about Go/Kill decisions is supposed to be held. Without points in time where the future of the project is to be discussed, there exist a tendency to let the project progress regardless of the real performance and eventual changes in the environment (Cooper, 2009). If product development should be seen as a funnel, where it is cheaper to kill ideas early, it is clearly beneficial to have a governance model that facilitates the project terminations. The top-down governance model also allows upper management to take these decisions. (Cooper & Kleinschmidt, 1991)

When a top-down gated governance model is implemented the division of labor is optimized for senior managers not having to involve themselves in the operations of a project but instead making well informed decisions at the gates, thus allowing managers to manage many projects in parallel. This requires a suitable definition of gate deliverables allowing the gatekeepers to take decisions whilst being neither overwhelmed with information nor receiving material lacking key information (Cooper, 1990).

Finally, top-down governance establishes a clear chain of command where the project team reports to the project manager who reports to the gatekeepers. In this way the project manager is a singular person/contact interface for the project, making it easier for external stakeholders to communicate with the project group. Historically, projects were creatures of their own and moved from department to department without a single manager for the project, thus being very difficult to govern (Cooper, 1990).

One of the main criticisms towards top-down governance is that it stifles creativity and thus cannot explain how radical innovations occur. This criticism is understandable when related to the goal of a top-down governance, to minimize variation and streamline development projects (Trott, 2005), (Takeuchi & Nonaka, 1986).

Also, the goal of top-down governance focusing on streamlining projects into an identical flow of gates and activities is criticized on the basis that a project in its nature is something unique. Forcing all projects to progress along the same process will not enable delivery of the wanted outcome (Berggren & Lindkvist, 2001).

Also, the paperwork at gates and stages can kill the enthusiasm by taking too much resource from the project. Not only does this apply to project managers who have the responsibility for ensuring that the documentation for the next gate is being produced, but for each project team member it can be frustrating to spend time on activities that are not seen as relevant or important, and to produce deliverables that they feel are not really going to allow the gatekeepers to make a well informed decision (Cooper, 2009), (Cooper & Kleinschmidt, 1991).

Many organizations also experience problems with gates without teeth. What this means can be one of several things: that the deliverables for the gates do not enable good decisions, that there are no clear decision making guidelines, that there is no connection between available resources and current projects' demands etc. Regardless of which problem, it is important to see the product development process or the service development process as a funnel, where projects should be terminated at the gates (Cooper, 2009), (Cooper, 2005).

4.2.2 Self-Governance

When focusing on the type of activities, relationships and iterations that take place in product development, another type of governance model has emerged: self-governance. Rather than looking at product development as a process that should be managed as a process, self-governance lets the development team decide what to do, what to deliver and when to do it, while senior management only provides the resources and some sort of governance framework (PDMA, 2005). The purpose of allowing the team to decide is to enable flexibility and rapid decisions. (Dybå & Dingsoyr, 2008)

The self-governance model has two rationales. One is the problem with top-down governance slowing down the development due to the coordination and administration surrounding the gates. Rather than modifying the gates, making them "fuzzy" as Cooper (2001) suggests, or removing them and losing the process entirely, the self-governance model suggests that the development team and the management sign a contract defining the framework for the development. Within this framework the team is free to define its own processes and activities (Smith & Reinertsen, 1998). A very similar concept was named bounding box in (Dleland, 2004).

The second rationale stems from the idea that product creation should not be seen as a linear process but rather as a form of chaos, where the involved actors and ideas, and the relationships between them, do not follow a linear path (McCarthy et. al., 2006)

There seem to exist a strong conceptual connection between self-organizing teams and self-managing teams, which when applied against development show strong similarities to the concept of self-governance, see (Belkema & Molleman, 1999), (Cummings, 1978) and (Trist, 1977). In this light, the self-governance increases flexibility, in particular when working in rapidly changing environments (Belkema & Molleman, 1999).

4.2.2.1 What is a Self-Governance Model and how does it Work?

As mentioned, the key of self-governance is that the development project team governs itself within a framework, contract or agreement with senior management. This agreement is the only governance from senior management on the project, and the project manager should only report the progress in relationship to the contract, informing management of any issues causing the team

to move outside the frame and breach the contract (PDMA, 2005). Management's key task is to enable the team to deliver on the contract.

From a governance perspective the contracts can of course follow a standard checklist, making sure that senior management at least control a part of the development. Usually resources and budgets account for the basis of the contract. Senior managers' involvement in the project definition can also ensure that the framework or contract includes their key concerns. After the contract is signed, there are no gates at which senior managers can review the project and receive information about their key concerns in their preferred format (PDMA, 2005).

The governance and control of the actual development work lies with the project manager and within the team. They can choose how to fulfill the contract within the set frame (PDMA, 2005).

In order to enable the team to deliver on the contract management must create built-in instability, meaning that top management should give the project group freedom and authority to drive a strategically important and complex project thus creating the element of tension in the project group by challenging the team members to their limits. This is meant to closely unite the group and promote creativity (Takeuchi & Nonaka, 1986).

A second critical success factor is that the teams are allowed to being self-organized. According to Van Foerster (1960), self-organization is the rate of order in an NPD process that arises due to the autonomous behaviors of those involved in the process if they are not too tightly or too loosely controlled. When this happens in a NPD team they start working like a start-up company, taking initiatives and risks all whilst developing an internal agenda (Takeuchi & Nonaka, 1986). Self-organization leads to autonomy, self-transcendence and cross-fertilization i.e. that the team is able to take independent decisions, they strive towards "the limit" and they learn from, and interact with, each other. (Takeuchi & Nonaka, 1986), (McCarthy et. al., 2006)

Another key enabler of self-governance is autonomy and Takeuchi & Nonaka (1986) discuss the autonomy that has been present in all of the investigated development teams of radical innovations. Subtle control was in all the studied cases a key enabler of autonomy. Subtle control means that managers or other stakeholders outside the project influence the project indirectly through some external force.

There are seven ways to create subtle control according to Takeuchi & Nonaka (1986):

- Selecting the right people for the team

- Creating an open work environment

- Encouraging interaction with the customer

- Establishing an evaluation and reward system based on group performance

- Managing the different phases in the NPD differently

- Tolerating and anticipating mistakes

- Encouraging suppliers to become self-organized

4.2.2.2 When are Self-Governance Models Used?

According to McCarthy et. al. (2006), self-governance is primarily suited for use in early phases of an idea-to-launch process for incremental innovations, or throughout the entire process for radical innovations.

In the case of incremental innovation, the self-governance is expressed through the idea generation and brainstorming activities that usually start a product development initiative benefits from being free of top-down control. This belief is also argued by Crespell & Hansen (1998), who claim that the innovative climate has a large influence on the creativity of a person.

In the second case, where McCarthy et. al. (2006) claim that radical innovation is promoted by a self-governance model there is further support in Colarelli O'Connor & McDermott (2004) where the authors conclude that the people behind many radical innovations are driven away from the large enterprises because of the top-down control and bureaucracy. Equally interesting is the conclusion that a significant number of such people do stay and thrive in this type of organizations, simply because they have found a way to work the system, or rather work around the system (Colarelli O'Connor & McDermott, 2004).

4.2.2.3 Pros and Cons of Self-Governance Models

The main strength of self-governance seems to be that the autonomy of the team fosters creativity of the team members (McCarthy et. al., 2006), (Crespell & Hansen, 1998), (Colarelli O'Connor & McDermott, 2004). In projects where the innovative step is large, but there is no external quality or legal issue exist that must be managed, there may good reason to unleash the creativity of the project team by using self-governance.

Regarding when to use the model, it seems to work well in organizations where the development projects have very different characteristics (McCarthy et. al., 2006). This means that the suitability of the model depends very much on the organization's environment and strategy.

Self-governance also provides a good way to speed up a process that has been bogged down by stiff gates (PDMA, 2005). Instead of softening up the gates, or even removing them, without anything to replace them with, a self-governance model creates a better way to drive all stakeholders in the same direction.

Finally, the peer pressure that emerges in a team that governs itself works extremely well as motivator on many people (Takeuchi & Nonaka, 1986). This factor alone may make a self-governance model advantageous, if the team's extra hours are a larger increase than any eventual negative effects of the governance model.

An important downside is that the model neglects the benefits of standardization and re-use of old experiences (McCarthy et. al., 2006). Society and business at large have gained significantly from standardization; thus it seems plausible that at least some parts of the product development process would do as well.

Secondly, self-governance requires people able to handle complex situations (Takeuchi & Nonaka, 1986), and grow with the responsibility rather than feel stressed from working too much.

Organizations can of course compensate the people with additional incentives, but selecting the right people is still crucial.

Finally, some development projects have technical, legal, quality factors that make them less suitable for self-governance (Takeuchi & Nonaka, 1986). If the organization can run into major trouble by not following certain criteria, a top-down, gated governance model can ensure that the senior managers having the most insight and experience in the question also can control the development.

4.2.3 Discussion of Top-Down and Self-Governance

When comparing the two types of governance models, (McCarthy et. al., 2006) argue that in the early phases of the idea-to-launch process, a self-governance model that encourages creativity is advantageous. In the later stages, where the development must meet quality standards etc. a top-down, gated model is preferable.

The same distinction exists between radical innovation, and incremental innovation and modifications of existing products. In the first case, where creativity is crucial, both to generate ideas and to solve new problems, a self-governance model is preferred. In the second case, where a lot can be learned from previous projects, as most projects share many characteristics, a top-down model could be used.

4.3 Development Work Methods

Moving over to the work methods three main approaches exist to the creation of new products and services; linear (also called waterfall), concurrent and iterative (Trott, 2005). This chapter outlines the main characteristics of each model.

4.3.1 Linear Development

The linear model means that development activities are conducted in a sequential flow, where only one activity is processed at any given time. The linear model has since the end of the Second World War been the predominant innovation model, mainly due to the simplicity and its logical approach (Trott, 2005). It originates in project management models with the goal of delivering required outputs on time at the right cost (McCarthy et. al., 2006). According to the model three resources are needed to create innovation; science and technology base, technical developments and market needs. These resources can be translated into the company specific functions of R&D, manufacturing and marketing. The process of innovation was seen as a sequence of isolated steps that would occur in each of the three functions. The only variation would be if the innovation was driven by technology push i.e. by a technological advance or by market pull, the market requiring a new product, as depicted in figure 7 (Trott, 2005).
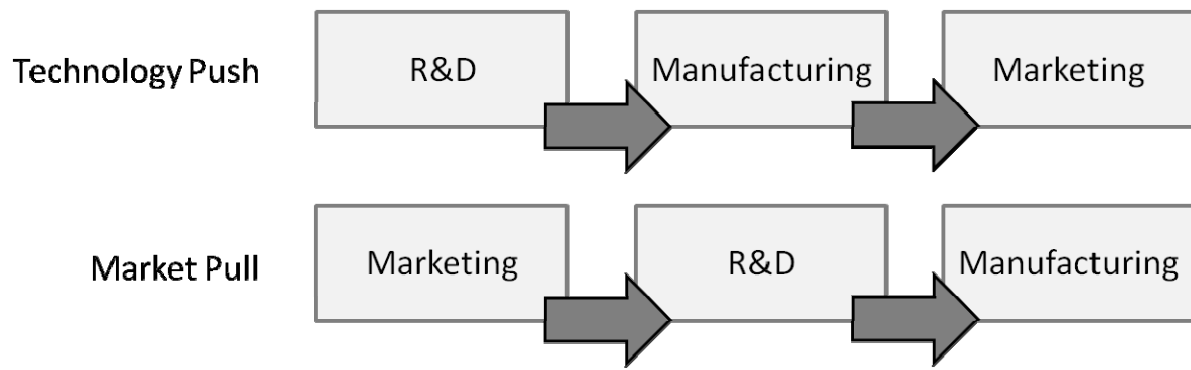
Figure 7 - Linear development process on high level, adopted from Trott (2005)

This view of innovation has also lead to a linear view of the new product creation process being an eight-stage linear model regardless of the different products the process is meant to enable as is depicted in figure 8 (Trott, 2005).

Figure 8 - Linear new product development model, adopted from Trott (2005)

Linear development promotes tasks or activities being done one by one. When one task is completed the idea is handed over to the next department which is why the model is known as an "over-the-wall" model were the departments throw the new product over their organizational walls (Trott, 2005). The most common frameworks in this field are activity-stage and decision-stage models, which share many characteristics with the top-down governance models model as they focus on breaking down the creation into separate activities for which the goal is to reduce variation (Cooper, 1990). The models are all highly criticized for the "over-the-wall" syndrome surrounding the decision-points, or gates.

4.3.1.1 The Mechanics of Linear Development Models

When observing the mechanics and details of the linear models it is clear that the model requires significant up-front planning due to the sequential flow of activities. Before undertaking any activity there is a need to understand which dependencies and interactions the present activity has to activities later to come. If the planning is not properly done the linear flow will be broken and the product return to the not fully completed activity. Thus a project is divided into various sequential steps: writing specifications, designing and testing prototypes, developing manufacturing processes etc. for each of which a functional "expert" is assigned. The functional experts would complete their activities and pass the project on to the next expert. Each function works in isolation from the others. (Patti & Gilbert, 1997) This NPD approach also leads to functions being highly specialized (Takeuchi & Nonaka, 1986).

The linear development process leads to long lead times as one function will not start their work until the previous function has reached 100% completion (Patti & Gilbert, 1997). This is illustrated in the upper half of figure 9.
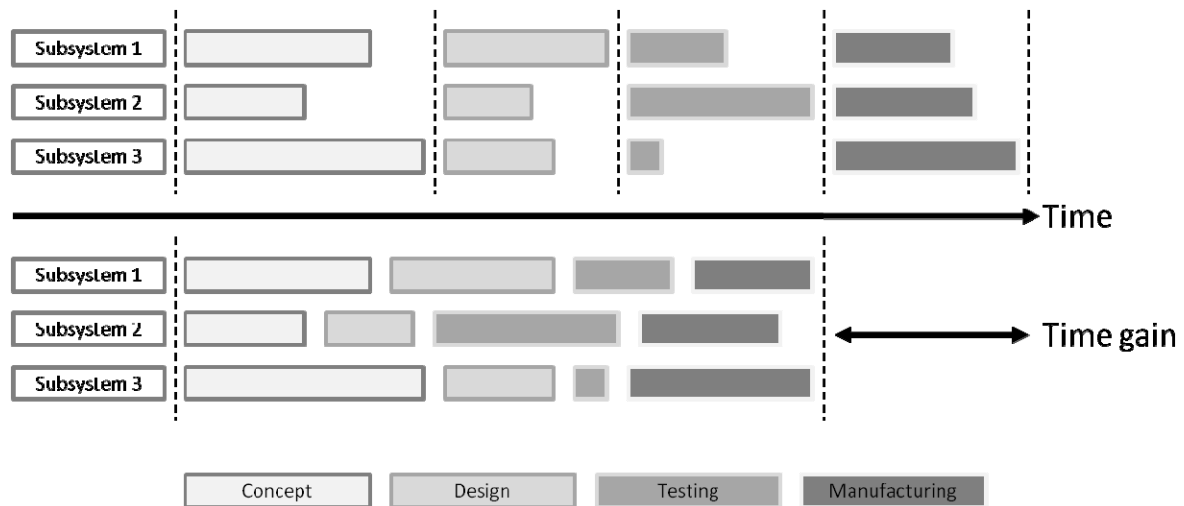
Figure 9 - Illustration of concurrent engineering, adopted from Smith (2005)

4.3.1.2 Pros and Cons of Linear Development Models

Due to the "over-the-wall" problems of linear development it is now accepted that the model hinders the new product development by giving rise to significant rework due to an earlier step executing an activity without knowing what the following activity would do also leading to significant consultation between departments (Trott, 2005). The linear model also conflicts with the goals of reducing time-to-market and flexibility (Takeuchi & Nonaka, 1986). These factors have lead to low focus on linear development models both in academia as well as practitioners.

Worth mentioning is that the linear framework illustrates NPD as a structured and ordered process which leads to a mechanistic interpretation of the actual development and in turn towards a strive for process improvement rather than focusing on how factors such as flexibility, feedback and autonomy affects the NPD (McCarthy et. al., 2006). McCarty et. al. (2006) also highlight the lack of explanation for how radical innovations emerge from within the linear, logical processes.

The reason that linear models were used until the 80s even though their evident failures are believed to be the logical flow and simplicity of the model. It may also be due to new product development being viewed from a financial perspective where cash flows out prior to in, with a linear pattern (Trott, 2005). By one processing one activity at any single point in time the risk in the project can also be controlled to a large extent.

4.3.2 Concurrent Engineering

Concurrent engineering enables the same activities that the linear development does in sequence, to be done in parallel. This is believed to shorten time to market and increase the quality of the created product. Two types of overlap between activities exist; on the border between adjacent activities and the overlapping activities extending several phases. This is illustrated in figure 10.
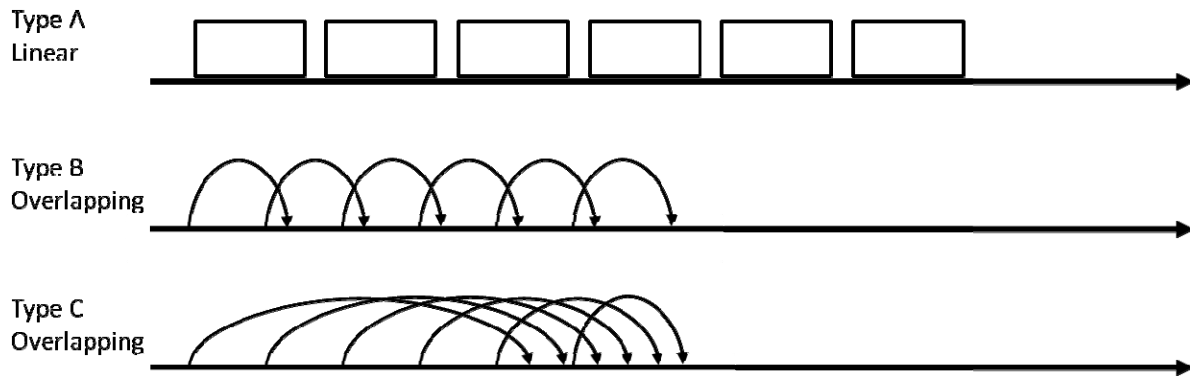
Figure 10 - Concurrent engineering, adopted from Takeuchi & Nonaka (1986)

Concurrent engineering was developed in the late 80s as a reaction to the shortcomings of the linear approach. It was developed by manufacturing companies with the idea to focus on the project as a whole rather than the individual stages. This was done by involving all functions in all activities of the project, the team being specially picked for solving the task and giving the team full ownership of the complete development process (Trott, 2005). The main difference to the linear work method is that the cross-functional team allows several activities to be started, and conducted in parallel, without waiting for the previous activity to be finalized.

The benefit on time to market by using concurrent engineering compared to a linear work method is depicted in figure 11.
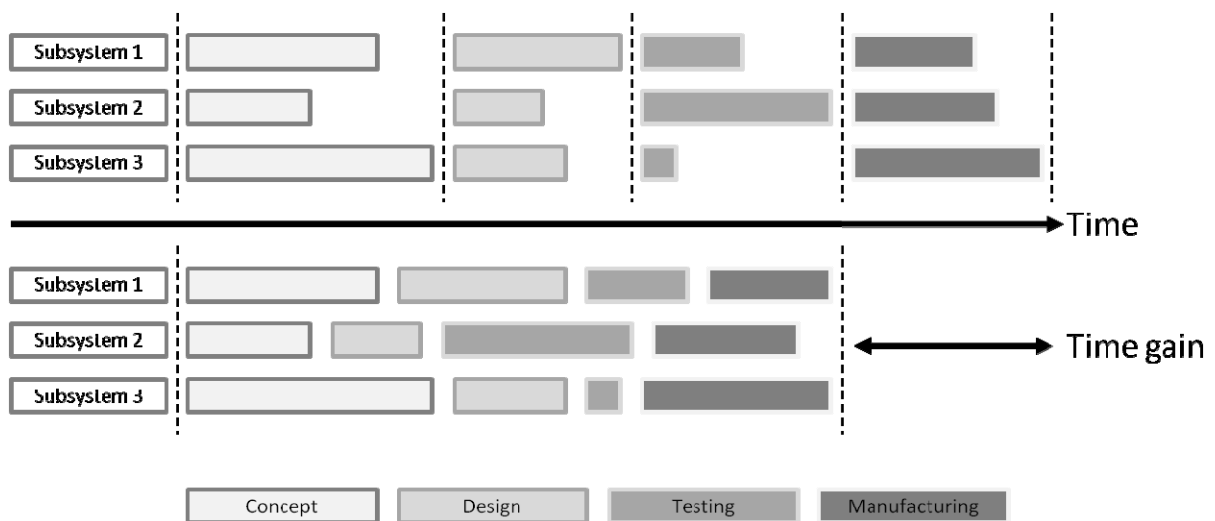
Figure 11 - Illustration of concurrent engineering, adopted from Smith (2005)

4.3.2.1 The Mechanics of Concurrent Development Models

Concurrent engineering does not change the actual activities conducted during the NPD but focuses on how they can create more qualitative output in a shorter time. Thus the main focus of concurrent engineering is soft factors rather than processes and activities. The majority of supporting elements that are described below are found in self-governing governance models.

The organizations most successful in enabling concurrent engineering all share certain factors (Takeuchi & Nonaka, 1986):

- Built-in instability
- Self-organizing teams
- Overlapping development phases
- Multi-learning
- Subtle control
- Organizational transfer of learning

A result of the factors above is that the team will self-organize which is a state where information is shared and the members of the team align their goals. This in turn leads to the group being able to work around and overcome potential bottlenecks by using overlapping phases and shorten time to market by concurrent engineering (Takeuchi & Nonaka, 1986). The sharing of information and close work between different individuals will also lead to "multi learning", a concept defined by Takeuchi & Nonaka (1986) to mean learning across groups, organizations and individuals and also learning across functions.

The governance of the NPD process and team is key for the enabling of concurrent engineering. Management need to have enough control to prevent instability and tension from turning into chaos, but at the same time not allow the control to impair creativity. Focus should be on creating self-control within the group (Takeuchi & Nonaka, 1986). McCarthy et. al. (2006) place even more focus on the balance between control and chaos and claim that the degree of control must be closely matched to the wanted outcomes of the NPD process as more control is likely to lead to a linear process and incremental innovation, whilst a more dynamic NPD will be more chaotic and fluent but also in the end result in more radical innovations.

4.3.2.2 Limitations to Concurrent Development

According to Takeuchi & Nonaka (1996) the main drivers of successful NPD in conjunction with concurrent engineering previously mentioned creates a set of limitations for when the model is suitable to use.

Products for which the benefits of concurrent engineering have been identified have all been highly visible within the companies as part of a new breakthrough process, been an innovative product as such and also been successful in the marketplace.

Furthermore it is clear that concurrent engineering requires extraordinary effort and focus from the team members throughout the entire project. The need for direct communication needed between the team members may cause the model not to be applicable for 1) mammoth sized projects such as building a space shuttle; 2) in companies which use distributed product development due to geographical structures (Takeuchi & Nonaka, 1986).

4.3.2.3 Pros and Cons of Concurrent Development Models

Benefits shown by using concurrent development models compared to a linear development model are reduced schedules for all projects, delivery of defect-free prototypes, increased production yields and shorter time to market (Bhuiyan, Thomson, & Gerwin, 2006).

These benefits were enabled through the cross-functional teams being able to increase the planning horizon early in the project, identifying risks earlier, creating better specifications, testing the design prior to beginning layout (Bhuiyan, Thomson, & Gerwin, 2006). The factors mentioned as the basis for success of the concurrent development model are aligned with the earlier mentioned aspect of concurrent engineering focusing more on soft factors such as teamwork, rather than process change, to create benefits.

To gain the benefits of concurrent engineering a higher degree of coordination is needed if compared to a linear work method. This can be done through integration tools, information technology and process coordination to mention some methods. Furthermore it is imperative to understand which activities that can be overlapping. Overlapping must be used selectively or the total time development may actually increase. The use of dedicated teams has also been identified as a key success factor for concurrent engineering which can cause conflicts with line responsibility team members may hold in organizations with weak matrix project team models (Bhuiyan, Thomson, & Gerwin, 2006).

As concurrent engineering builds on the personal meeting another barrier for the successful use may be the geographical dispersion of larger companies. It may not always be possible to relocate the development team to one location. Another issue is the divide between centralized product development versus local product development where central department may often develop products for several markets which further complicate the personal meeting (Bhuiyan, Thomson, & Gerwin, 2006).

4.3.3 Iterative Work Methods

The iterative work methods emphasize activities being done in a circular way where an activity is rapidly finalized in order to gain feedback on the result. The feedback is then looped back into the next iteration of the activity. The iterative method is meant to create products and services that are superior as they interact with the customer and other stakeholders throughout the development process and are adapted to their input in order to deliver a product or service the stakeholders and customers are really asking for. Thus iterative models also focus on scoping down projects into smaller deliveries and coping with change. This is accomplished by focusing on people rather than processes (Dybå & Dingsoyr, 2008).

The idea of iterative methods is to promote quick response to changing environments, user requirement etc. as traditional models are too rigid to cope with all cases (Erickson, Lyytinen, & Siau, 2005). This idea is expressed through work methods allowing for change by focusing on short iterations which is depicted in figure 12 showing the Scrum process, one of the most noticed iterative models.
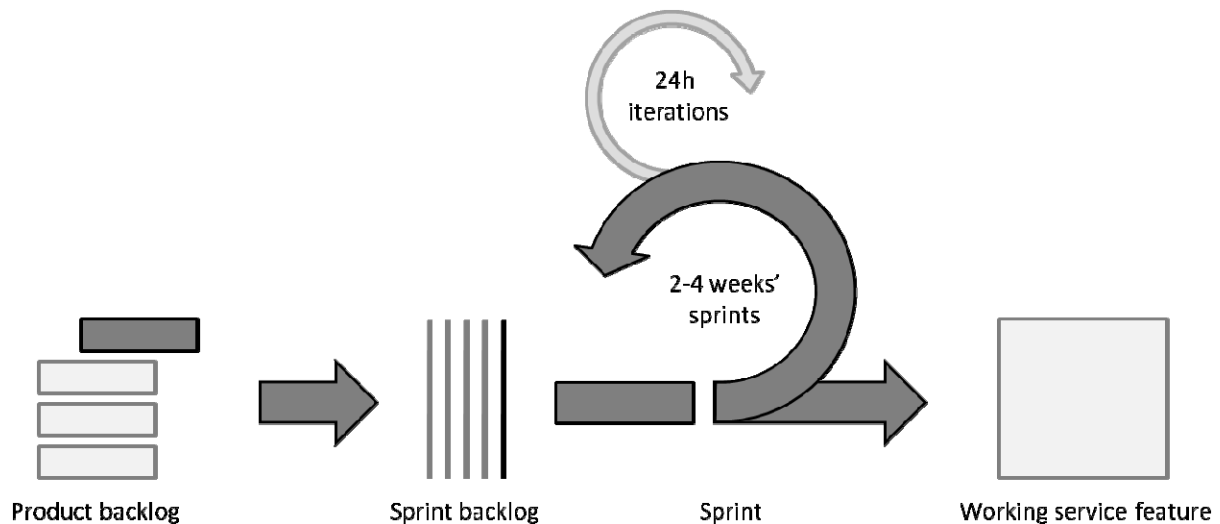
Figure 12 - The Scrum development method, adopted from Erickson, Lyytinen, & Siau (2005)

The iterative work methods are a collection of models that emerged during the 1990's amongst practitioners in the software development industry as a reaction against the basic idea of linear or concurrent ideas, emphasizing a rationalized approach (Dybå & Dingsoyr, 2008). The most cited of these are Crystal methodologies, dynamic software development method, Scrum, lean software development and Xp (extreme programming) but several other models exist.

In 2001 the agile models were formalized in the "Agile manifesto" by a gathering of software practitioners focusing on four basic principles of agile (Dybå & Dingsoyr, 2008):

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

Even though the agile models found their origin within the software industry they are becoming more and more interesting for the more "traditional" manufacturing industry as well. Evidence of this the introduction of agile manufacturing (Hasan, Shankar, & Sarkis, 2009), design of supply chains for the high-tech industry with agile methodology (Pan, 2010) and applying agile development to physical products through rapid prototyping (Vindoh et. al., 2009).

4.3.3.1 The Mechanics of Iterative Development Models

To discuss the mechanics of the iterative development methods the development model Scrum will be described.

A Scrum project starts with a planning phase where an initial software architecture and short-term plan is created. This plan is needed to commence the work but everyone in the team is aware that it may change at any time. After the planning the sprints start. A sprint is a short development phase, from one to four weeks, at the end of which a functional product should be delivered. At the end of the sprint the team and all stakeholders gather and review the output of the activity completed. During this meeting the priority of the different functions required may change, functions may be added or even removed from what is to be delivered. To manage this, the Scrum team has a backlog

with all functions required listed against which they work in a prioritized order. The functions that have been developed are tested internally and externally and the marketing team gains feedback which they, in the form of new and prioritized functionality, input in the Scrum team (Rising & Janoff, 2000). Visualization of this process is found in figure 12.

The Scrum process takes advantage of a small committed group of people for product development. Prior to the sprints the Scrum master (project manager) gets a commitment from top management that the resources are 100% committed to the project during a certain number of sprints. This is a requirement for Scrum to work as each sprint is time-boxed and supposed to deliver a functional product. If resources are removed from the Scrum team during a sprint the agreed on functionality will not be delivered on time and the work method will not deliver the wanted results (Rising & Janoff, 2000).

The iterative models described can, in terms of requirements for success, be seen as an extension of the concurrent models. They to an even higher degree require cross-functional teams constantly communicating, dedicated empowered teams and the other human and soft enablers discussed in the self-governance chapter.

4.3.3.2 Limitations to Iterative Development

The limitations of the iterative models will be discussed from a software perspective as research of iterative methods in manufacturing industries is scarce (Turk, France, & Rumpe, 2005).

Turk, France & Rumpe (2005) have investigated the assumptions behind the principles of agile and found 14 main assumptions that outline when agile models are suitable to use. These assumptions also constitute the set of limitations for the applicability of the methods. Iterative methods are suitable when (Turk, France, & Rumpe, 2005):

1) Project visibility can be achieved solely through the delivery of working code.
2) A project can always be structured into short fixed-time iterations.
3) Customer teams are available for frequent interaction when needed by developers.
4) Developers are located in a time and place enabling frequent, intensive communication.
5) Face-to-face interaction is the most productive method of communicating.
6) Developing extensive (relatively complete) and consistent documentations and software models is counterproductive.
7) Requirements always evolve because of changes in technology, customer needs, and business domains, or even because the acquisition of new customers.
8) The cost of change does not dramatically increase over time.
9) Developers have the experience needed to define and adapt their processes appropriately.
10) Teams are able and willing to evaluate themselves.
11) The best architectures, requirements, and designs emerge from self-organizing teams.
12) The evaluation of software artifacts (products and processes) can be restricted to frequent informal interviews, reviews, and code testing.
13) Reusability and generality should not be goals of application –specific software development.
14) Systems can be continuously redesigned and still maintain their structural and conceptual integrity.

Given these assumptions of the agile models in software one can understand the limitations of the models. It may though not be as simple to understand the implications for physical products.

4.3.3.3 Pros and Cons of Iterative Development Models

Within the software development industry agile models have gained significant acceptance. The reasons behind this are yet unknown but some theories are that the models are developed by developers and that they emphasize the creation of a culture accepted and promoted by the majority of developers by being autonomous and leaving room for experimentation. Rising & Janoff (2000) further claim that the benefits of agile models are the division of the final delivery into smaller packages, being able to make progress even if the final goal is not fully known, creating an environment where the entire team is responsible for all parts of the delivery, obtaining and implementing customer feedback and improving team communication.

The majority of the benefits stated above are also true for the development of a physical product, although the division of the final delivery is not as clear and the team does not need to work as closely together in all phases of the development (Trott, 2005), (Sander, 2005).

The negative aspects of iterative models have implicitly been stated when discussing the limitations of the models. Additional factors to consider are the lack of scientific support for many of the benefits claimed by advocates for agile models and that the practices promoted by the individual models such as XP seldom being applicable by the book (Dybå & Dingsoyr, 2008).

5 Empirical Investigation

This chapter provides the empirical references of the study. The chapter begins with an introduction to the case studies and then the case studies themselves are presented. The case studies are illustrated in along the format designed in the theoretical framework. The contrasting and comparisons of the case studies and the theory are done in the analysis chapter.

5.1 Case Studies

The main types of companies in the study are banks, software developers, game developers, telecom service enablers and telecom operators. Half of the companies were chosen because they are successfully developing and delivering Layer 3 services and half the companies were chosen because provide good examples of the situation of the incumbent actor. Two additional references, an IT-consultant and a service development company for the transportation industry, provided great insight in the development processes from their alternative perspectives.

Banks were chosen as incumbent representatives since they have traditional computer aided products, they have recently made the transition to e-banking and they are now integrating their payment services both across devices and with revenue sharing programs with many stores. Software developers were chosen since most of their services are relevant approximations of the Layer 3 services that are in focus of the study. Game developers were chosen much for the same reason as software developers, but with the additional dimension that their services are used for entertainment and the end users must really enjoy using them. Telecom service enablers were chosen since they both build crucial systems for incumbent companies' services to run on and since they therefore have the chance to take leadership in how services are developed. Finally, telecom operators were chosen to provide alternative reference material the incumbent actor and illustrate how things are done today and how they, with insight in all limitations, believe services should be developed tomorrow.

5.1.1 Case Study Overview

Company Index	Company Type	Typical Customer	Geographical Market	Employees	Turnover	Interviewee Position
A	Bank	Private and corporate customers	Europe	20 000 – 50 000	>100 billion SEK	Senior Business Development Manager
B	Online Gaming	Playing end users corporate customers	Global	1000 – 10 000	1 - 5 billion SEK	Manager of Product Managers
C	Automotive Services	Automotive industry	Europe	n/a	n/a	Business and Service Developer
D	Communication Software	Corporate customers	Europe	<100	<100 million SEK	Development Director
E	Mobile Applications and Services	Mobile phone owner	Global	50 000 - 100 000	>100 billion SEK	Application Store Manager Nordic
F	IT-consultancy	Companies with complex IT systems	Europe	1000 – 10 000	500-1000 million SEK	Project Manager
G	Online and Mobile Gaming	Corporate customers	Global	<100	<100 million SEK	Head of Development
H	Online Payment	Private customers and e-commerce companies	Europe	100 - 1000	100 - 500 million SEK	Head of Development
I	Telecom Operator	Private and corporate customers	South-East Asia	50 000 - 100 000	>100 billion SEK	Program Release Manager
J	Bank	Private and corporate customers	Europe	20 000 – 50 000	30 – 60 billion SEK	Product Manager Mobile Services
K	Game Development Studio	Gamers	Global	100 - 1000	100 - 500 million SEK	Project Manager
L	Bank	Private and Corporate Customers	Europe	20 000 – 50 000	30 – 60 billion SEK	Development Program Manager
M	Telecom Operator	Telecom services	Australia	100 – 1000	n/a	Project Manager
N	Telecom System Supplier	Telecom operators	Global	50 000 - 100 000	>100 billion SEK	Strategic Product Manager for Software Platform
O	Telecom Operator	Telecom services	Europe	1000 – 10 000	30-60 billion SEK	Product Manager, Project Manager, System Managers

Table 1 - Overview of the 15 case studies

5.1.2 Company A

Company Type	Bank
Typical Customer	Private and corporate customers
Geographical market	Europe
Employees	20 000 – 50 000
Turnover	>100 billion SEK
Interviewee	Senior Business Development Manager

Table 2 - Overview of Company A - Bank

Company A is a large European bank. The interviewee's group works at the cash management department with all products that are payment related, including both consumers and companies, and with cash flow optimization.

5.1.2.1 Service Mindset

Company A explicitly says that it works with services. The services are centered on the customer and technology as the enabler of the service and have a low human component. The human component that exists is mainly focused on development and maintenance of the technology platform which delivers the service. As technology is the major service-side component in the delivery of Company A's services, the development projects focus highly on technology development, especially since Company A has a complex technological platform.

Company A has some services in a B2B setting where they tailor services according to input from major customers. The customer focus of Company A is also show in that they interact with the customers to gain input on their services from all over the country and from different types of customers through round table discussions and discussions with strategic customers. Company A's involvement of B2C customer is limited and the services are primarily tested by dedicated testers prior to launch. Finally, Product management is measured on customer interaction.

5.1.2.2 Governance Model

Company A uses many elements from top-down governance. Most significantly they have a standardized governance model which all development projects should follow. The model has five gates for which document requirements are highly specified. Within the stages, the activities and the outputs are specified as well. The gatekeepers taking go/kill decisions at the gates are rather senior managers with a high level view of the projects running within the company at the moment. Being a traditional bank, Company A must ensure low risk in everything it does. It would be a scandal if they would lose a single Euro; hence their governance is focused on minimizing risk.

The different types of projects that Company A conduct have different budgets which are set on a Nordic or country level. Before budget negotiations, the development side prioritizes the wanted ideas/projects, then senior management provides a budget and finally the development side makes a final prioritization and starts negotiating with the countries. The budget process is thus centrally driven.

Company A staff their projects to allow resources to work on a limited number of projects at any given time. They also separate development resources from the line organization as they recognize that the priority of the line organization is stability rather than change as it is for development. This

factor is also where Company A exhibits traits from self-governance, team work is important to them and they strive towards increasing teamwork.

5.1.2.3 Work Method

The company's product development process can either start in a discovered customer demand, general product development or in regulatory or other types of forcing demands, such as regulations. After the initial screening, the idea enters the product coordination process and a formal pre-study is initiated. In the early phases of B2B services, Company A tries to involve all stakeholders, even customers, thus working concurrently. Even though there is a decision gate after the pre-study, most product development projects that have succeeded through the first screening are either mandatory because of legal issues or have a specific customer that will pay for it and will therefore go all the way.

In the following development phase, product management creates a specification list and business requirements describing what IT is asked to develop. In the process of creating the specification, product management holds workshops with IT and other stakeholders to make sure that they ask for the right things and for things that can really be developed and implemented. In the communication between orderer and supplier Company A tries to work in an iterative way with cross-functional teams. In the specification, product management is aware of what systems that will be involved and write functional criteria directed towards the systems. After the requirements are defined the system architects and analysts at the IT department break down the functional demands into system changes which are then developed into the new service. This creates a situation that is almost iterative initially but becomes rather linear towards the end.

5.1.2.4 Pros and Cons

Company A usually needs at least 3-6 months after the development project is started to launch a product in the market. The main reason for not taking more time appears to be that when a project is started and the resources allocated, they can really focus on that project.

Company A is quite good to work with the strategic B2B customers, but has problems to fulfill all requirements concerning new services from the mass market. Their system infrastructure does not allow external the feedback loops that real customer involvement enables. It is an important problem as without involving the customer the risk of the service not meeting customer expectations is large.

5.1.3 Company B

Company Type	Online Gaming
Typical Customer	End users playing their games and corporate customers using their platform
Geographical market	Global
Employees	1 000 – 10 000
Turnover	1 – 5 billion SEK
Interviewee	Manager of Product Managers

Table 3 - Overview of Company B - Online Gaming

5.1.3.1 Service Mindset

Company B's service is centered around the customer and on technology with rather limited human interaction from the service provider. The human interaction that takes place regards the development and maintenance of the technological platform that enables the service as well as some customer care. The strong focus on the customer in the service consumption makes the customer an important stakeholder also in the service development process. Company B's service is to a large extent identical for all customers even though there are numerous parameters that can be tweaked and are therefore quite product centric.

The technological focus of Company B's services has made them invest in an entirely new system that was build modular and open from the bottom and up. Company B believed that keeping the old system would prevent them from being quick and responsive in their development and delivery of new services. Furthermore, with the new platform Company B believes that it can involve the customer earlier in the development and use beta-testing like evaluations.

5.1.3.2 Governance Model

Company B has some top-down influences in that they have a defined structure for how to take an idea from the market department to development and build a new service around it. In particular the company's single development backlog where all new service development ideas are defined and prioritized. However, there are many more signs of self-governance:

Company B has 12 development teams with different focuses and with a product manager working against each development team. All new service ideas that are relevant to less than four product managers and that takes less than 20 days to implement are managed directly and jointly by the involved product managers. The product managers are in this sense very empowered and since they work directly towards the development teams the whole governance model is run from the bottom and up. Even for larger ideas that are developed in project form, all communication with the developers goes through the product manager who in close collaboration with the development team designs the development work and prioritization.

5.1.3.3 Work Method

Company B has a rather iterative work method. The first step in Company B's process is monitoring the company's environment. They study how their customers use their systems through sophisticated intelligence tools and they also look at what their competitors are doing. From this business intelligence, reports are aggregated and sent to product management from which new ideas are generated.

The product manager conceptualizes the idea, defines what needs to be done in order to implement it and how the activities should be done. After an idea has been approved for development and implementation, every three weeks the product manager and his development team looks at the backlog and choose the blocks with highest priority to develop over the next three weeks. Since each development block includes an entire feature, there are new features out from each development team every three weeks. If feature improvements are identified, the feature can re-obtain its high priority position in the backlog and be released in a new version three weeks later. For crucial features that require additional verification, the feature may also be put back on the development backlog if improvements are needed.

Company B is working hard to become even more iterative by involving more beta development and beta version testing by customers.

5.1.3.4 Pros and Cons

Company B believes that having the product managers working directly with the development teams is a major strength since he becomes an expert in both the market demand and the service solutions in his area and can therefore be very responsive and good at delegating. Furthermore, the self-governance governance and iterative work method allows Company B to be very flexible when targeting the development efforts, both since the development teams are taking part of the prioritization discussions and because it is possible to refocus all teams every third week.

5.1.4 Company C

Company Type	Automotive Innovation
Typical Customer	Automotive industry
Geographical market	Europe
Employees	n/a
Turnover	n/a
Interviewee	Business and Service Developer

Table 4 - Overview of Company C - Automotive services

Company C is a technology research and development company directed towards the transportation industry. The Interviewee works as business and service developer at a department called Transportation Information and Communication. They do research on new transportation services and assist transportation companies to develop new services that they can monetize.

Company C works with a 5-10 year planning horizon and develop new technologies that other companies will later turn into a product or service that can be sold, and act as a competence center that can support these companies in the development.

5.1.4.1 Service Mindset

Company C explicitly state that they work with services, but do not differ between services and products specifically in how they think. They have a specific NSD framework which is slightly more iterative than their NPD frameworks. The services of Company C appear to have a equal part human, customer and technology and thus they see the services as constantly evolving as the human part continuously learn as they provide the service to the customer.

Company C also has a significant customer focus. They have for example devised a work method for how to involve customers in the early phases of their new service development framework which they call the Co-Creation Process. Their approach is to create the service together with one, or a few, key customers and then let another company finalize and launch the service to the entire market.

5.1.4.2 Governance Model

The general product development process of Company C emphasizes that new product development is expensive, and that making changes late in the process is even more expensive. Thus they deploy a structured process with clearly defined gates, stages and gate deliverables in a top-down manner. Company C deploys four gates and has defined the stages as iterations.

Still, Company C works in less rigid and formalized manner when developing services compared to when developing products. All stakeholders align on a goal at the beginning of the process, and each development step makes progress towards the goal, but in a flexible and iterative manner where the team has the mandate to create prototypes and define the way forward for the new service. The process appears similar to the bounding box or development contracts as described for self-governance.

The budget for a development project is still set in traditional ways where the initial idea is broken down into the activities that need to be done, and each activity is assigned a cost value. The difference lies in the level of detail, where less work is put into the budgeting initially since everyone is aware that several items will change, which is also the mindset of budget owners.

Company C also works to a large extent with cross-functional teams. This applies both directly in the project teams and indirectly by making sure to have all relevant competencies in the organization.

5.1.4.3 Work Method

Because of the distant development horizon of Company C, they start their development process in a far-looking PESTEL framework, studying customer behavior and industry trends. They usually start out small and work tightly together in the cross-functional team with the customers and end-users in the Co-Creation Process. A number of key customers are used as lead-users and participate in development workshops together with sales people and software developers. The team meets in several workshops where they together, iteratively, define and create the service that is to be launched.

After the workshops Company C creates a prototype version of the service which is offered to lead-users, free of charge, to gain feedback and find areas of improvement. This process can then cycle a couple of times before a final first pilot prototype is created. The first pilot prototype is used as reference to find paying customers for the commercial pilot. When the service goes into a pilot phase, the market department is made aware of what is about to be developed, since they are the ones that will later market and sell the service.

5.1.4.4 Pros and Cons

The iterative process with customer involvement is believed to shorten time to market as a dedicated user allows for fast feedback. The alternative, where customer information is gathered through statistics and survey, creates timely feedback loops and the participation of the customer is rarely enthusiastic.

5.1.5 Company D

Company Type	Communication Software
Typical Customer	Corporate customers who want to offer communication services to end users
Geographical market	Europe
Employees	<100
Turnover	<100 million SEK
Interviewee	Development Director

Table 5 - Overview of Company D - Communication Software

Company D develops and sells unbranded communication software that their customers can package and re-sell to corporate or private end-users.

5.1.5.1 Service Mindset

Company D sells its services with quite extensive involvement of all three service parameters: human, technology and customer. Since Company D work with corporate clients they develop a unique communication solution for each customer, and therefore put in quite extensive human work in each delivery and continuous development. The human parts are not as evident in the actual service realization. The modular technological platform is configured for each new customer and frequently new development has to be done. Company D's service involves the end user since there are people communicating that use it.

5.1.5.2 Governance Model

Company D is rather small, thus senior management becomes involved on an operative level in many activities and the developers are required to handle more responsibility without middle managers. It is therefore difficult to tell if it uses a top-down or self-governance governance model. Top-down characteristics of Company D includes the involvement of senior management in the decision making. The signs of self-governance include the lack of a standardized and tightly controlled development process, the empowerment of the developers and customer interaction. Company D does not need more structure in the development work than it has, the interviewee believes, because of its size and because each new client may have new or different requirements. The involvement of the customer in the development work serves two purposes for Company D, first, it makes sure that they develop and deliver the service that is actually requested, and second, it makes sure that there is always someone willing to pay for every hour spend on developing the system.

5.1.5.3 Work Method

Company D has a work method that is iterative on all levels. On the highest aggregation level Company D tries to keep all development projects short, 4-8 months, to ensure that the scope can remain intact throughout the project and to ensure that the customer obtains something of value early.

As with all idea-to-launch processes, Company D starts off with the idea generation. The idea can come from within the company or, as is more common, from a customer. The next step is for Company D to look into their IT system and investigate whether it is possible to realize the idea by

configuring the system or if real development work is required. Their modular system often allows them to realize ideas with a lot of configurations and just a little bit of new development.

The second step for Company D is to get customer commitment. They rarely develop functions unless they have a customer who wants it and will pay for it. This is partly because they need to secure the revenue and partly because they want to work closely together with a customer when doing the development work, to make sure that the end product is something that people want. When getting customer commitment, Company D often have creative discussions and workshops with the customer. They have found out that the customer's original idea is rarely what the customer really wants. By explaining what Company D can do today, and what they could do with some development, and discussing how this fits with the customer's desire, they come up with a package together.

5.1.5.4 Pros and Cons

Company D believes that a major strength is their modular software system that allows them to create rather unique communication solutions in a very short time by configuring the modules to do what the clients want. Even doing further development on a module is rather easily done since the developers are experts on their modules.

5.1.6 Company E

Company Type	Mobile Software Applications and Services
Typical Customer	Mobile phone owner
Geographical market	Global
Employees	50 000 - 100 000
Turnover	>100 billion SEK
Interviewee	Application Store Manager Nordic

Table 6 - Overview of Company E - Mobile Applications

The development work that is described in this section is only a part of Company E's development work. Since the part described is clearly separated from the other types of development at Company E, its value to the study is kept unaffected.

5.1.6.1 Service Mindset

The applications that Company E develops in this way have a small human side, a varying customer side and a large technological side. The customer involvement depends on the type of software application. In the early development, Company E employees act as customer proxies but if the service goes into beta stage, real customers are involved in testing and feedback.

5.1.6.2 Governance Model

When Company E develops services internally, there is an early stage lab environment, open to all employees, where any employee can start up a development project and have all other employees give input and feedback. If a service is deemed to be potentially successful it is put in a late stage lab environment where it is open for the public to test. After beta testing in the late stage lab, the service is either terminated or finalized and put in phones or enables for download.

The governance of this type of development is extremely self-governance. There is no control on what is developed or how it is developed. Instead, people are encouraged to use their creativity and

have a self terminating development funnel, where applications and services that people see the potential in are attracted attention and people who want to contribute.

5.1.6.3 Work Method

The work method is very iterative. The employees at Company E are encouraged to submit new ideas and to develop the ideas themselves. Company E has a software framework where ideas are posted ad development work kept updated so that all employees can monitor the progress and give feedback. Applications or services that acquire enough attention and positive response are moved to a public beta testing environment where it can evolve into something that is officially released or where it is terminated.

5.1.6.4 Pros and Cons

The major benefit of this way of developing services is that it leverages peoples' creativity and generates ideas, services and half-developed services that can either be valuable in themselves or that can later be turned into more strategic services. The downside is that this way does not suit strategic service development at all, and Company E has two other development processes with very different characteristics for such development.

5.1.7 Company F

Company Type	IT-consultancy
Typical Customer	Companies with complex IT systems
Geographical market	Europe
Employees	1000 – 10 000
Turnover	500 – 1 000 million SEK
Interviewee	Project Manager

Table 7 - Overview of Company F - IT-consultancy

The interview with Company F focused on the specific project that the project manager was working on and does therefore not represent the entire company but only the approach during the specific project and the interviewee's experience.

5.1.7.1 Service Mindset

The service that was developed during the project had low customer involvement, low human involvement (after release) and high technological involvement. The project involved the client extensively during the development but did not involve the end customer of the service.

5.1.7.2 Governance Model

The governance of the project was a mix of top-down and self-governance. The company in which the interviewee worked had a very rigid top-down model, with strict gates, senior gate keepers and clear documentation requirements. However, between the gates, the interviewee and the team were allowed to work as they pleased, as long as they fulfilled the aggregated criteria.

Therefore the interviewee empowered the team and applied the Scrum methodology on the project meaning among other things that the project manager empowered the developers. During sprint periods of two weeks, the developers worked on a number of prioritized development stories and designed their work on their own.

5.1.7.3 Work Method

The work method began with the approval of the idea and the development project by senior management at the client company. When the client made a go decision the client and the development team together discussed what features should be in the service, the visual appearance and the functions. The team also set a time frame for the project where there were major tollgates: development start and start of sales.

The development team then started to develop visualizations of the service, either in pictures, slides or simple code and continued to have workshops with the client and with potential end-users to make sure that they understood the client's needs. The visualizations worked as a communicative vehicle and the clients often changed their mind about a number of features when listening to the input from the end-users. This process went on until the specification was approved at the development start toll gate.

In Company F's project, the team focused on the development list that was created during the specification phase, where each feature was a piece of the service that in itself would be of value for the client. The development calendar time was boxed into two week sprints, and the project manager was able to ensure that s number of working features would be developed in each sprint. The features were prioritized together with the client and the ones with highest priority were selected for the first sprint of two weeks of development work.

After the two weeks of development, the finished features were tested for quality and demonstrated to the client who had the opportunity to provide feedback. Usually they also conducted end-users testing of the features to make sure that the usability aspects were being addressed throughout the project. The feedback was transformed into items that were put on the same list as the features and ranked in order of priority.

5.1.7.4 Pros and Cons

The interviewee believed that a major advantage of the self-governance and iterative model he applied in the project is that it can be done within the stages of a more rigid top-down model. Furthermore, the time-boxing made it almost certain that the project would deliver on time. However, it was much less certain on what would exactly be included in the final delivery.

The weakness of the model, according to the interviewee, is that it requires a rather low complexity and system interdependence in the technological side of the service in order for the backlog and lack of detailed planning to be viable. Furthermore, he would not have tried it if the development team had not been co-located from the start.

5.1.8 Company G

Company Type	Online and Mobile Gaming
Typical Customer	Corporate customers
Geographical market	Global
Employees	<100
Turnover	<100 million SEK
Interviewee	Head of Development

Table 8 - Overview of Company G - Online Gaming

Company G works with the development of online and mobile games and the development and maintenance of back-end platforms that support the games. It works with direct consultancy work and with more game-centric development projects.

5.1.8.1 Service Mindset

Company G wants to deliver a service to their customers consisting of not only the game platform but also the skill they have surrounding the platform and the customer experience they have from previous services. Their game platform is mainly based on technology and customers, as the customer uses the gaming platform, but their ambitions to include their extensive skill and experience in creating the gaming experience is dependent on their staff.

Company G strives towards having a customer focus and does not only value input from customers but also values active customers. This is critical as no project is the same and in order to fulfill customer requirements they want to have close communication and feedback loops with the customer.

5.1.8.2 Governance Model

Company G's governance philosophy is that there can be no universal development model that is applicable to all projects since what is developed is unique. Thus the development team must sit down at the project start and define how the present project should be managed. Company G has a "library" of support models but these should not dictate the development work but instead work as inspiration for how to work "this time". Thus they do not work in a standardized way with gates or any top-down concepts, but rather empower the development team to define how to work towards the challenges posed. The management team in the company has a meeting every Monday where they prioritize between projects but the teams themselves prioritize within each project.

Furthermore, to allow new developments, continuous improvement and specific customer tailor-made development, Company G has two development teams, one operations/line-organization team, one customer support team and one consultancy team. This separation of development types ensures that resource the allocation is clear from the start. The teams are fixed over time. Thus Company G is highly focused on their team structure. Regarding resourcing each team in Company G only works with a very limited number of projects in parallel.

5.1.8.3 Work Method

Company G's development is highly iterative in order to be able to fulfill the customers requirement on their service. Company G has producers that lead the development against the required specifications and are also supposed to go beyond the specifications and assist the client in areas they do not fully understand. This is part of Company G's customer focus.

When the client and Company G have aligned the expectations on the end service, Company G starts to prioritize the different parts to develop. In each project the development team prioritizes between functions to develop for the coming time period. An important principle for Company G is to always develop a feature until it is usable before moving on to the next and always starting with the feature that will make the customer most happy.

During the development Company G has high client involvement and allows end-users to test the working features. In the cases where the development concerns and idea that was generated internally, they still try to find a real customer to test beta versions of the service.

5.1.8.4 Pros and Cons

Company G's iterative development method reduces the demands on the client. The client doesn't have to know exactly what it wants from the start as it will be able to test each feature during the development and can thereby discuss what it wants relatively to what has already been developed. This is a major strength according to the interviewee since there is a general lack of competence in ordering.

5.1.9 Company H

Company Type	Online Payment
Typical Customer	Private customers and e-commerce companies
Geographical market	Europe
Employees	100 – 1000
Turnover	100 – 500 million SEK
Interviewee	Head of Development

Table 9 - Overview of Company H - Online payment

Company H offers the end consumer a service, which allows the customers to pay their invoices over time. It has two distinct types of customers, the online stores which use the payment service to ensure the revenue from the sales and the end users who use the service to pay in a more convenient way.

5.1.9.1 Service Mindset

The service of Company H mainly consists of the customer and technology. Their service is web-based and the customer interacts with the application but the company also has customer support which is highly manual. In order for the technology to support the speed and flexibility of Company H's process they have invested in a stable and flexible system platform that allows their type of development. As Company H focuses on the consumer market and on online stores they do not tailor their services according to the need of each customer but rather configure the back-end of the service to fit the enterprise system of the store.

5.1.9.2 Governance Model

When a new idea is generated in Company H it needs to be accompanied by a business case which is generated through a template which gives the idea a priority. The backlog is viewed by top management in the company who can reprioritize the backlog thus focusing the company's development efforts in a certain direction. This is the only standardized stage, documentation or gate that the company uses, thus their top-down governance is very light.

The planning for the execution of the ideas is conducted on a team level with the product manager and the actual developers, and according to the Scrum methodology that Company H has adopted the developers have a large responsibility. This is also reflected in the very high requirements Company H has for recruiting new developers. The planning is thus conducted in a cross-functional manner with the developers and the product managers.

Company H is also very particular with the ideas on the backlog being possible to develop during one sprint. This is in order for the development team to be able to deliver working functionality after each sprint which can be ready to be released. This creates flexibility and speed in their process according to the interviewee.

5.1.9.3 Work Method

Company H's idea-to-launch process starts with an idea form that can be completed and submitted through their intranet. Anyone at the company can access the form and submit an idea. The registered idea is then placed in the product backlog, in accordance with its priority number.

After the review meeting, each product manager sits down with his development team and plans for the next two-week sprint. The top priority ideas on a particular product manager's list are assigned story points illustrating the relative effort it will take to develop it. Since the team knows how many points it usually manages in a sprint, they can thereby create an understanding of what they will do during the next two weeks. Each story is broken down into tasks, and the estimation is considered once more before the final plan for the next sprint is set.

During these meetings the development team and the product manager make sure that all ideas are ready for development before they are put in a sprint. The development team may request the product manager to return with a better specification of what is wanted. This step is also the major quality assurance. As the product manager, the business analyst and the developers together discuss and form a joint picture of what will be developed in an iterative way they can make sure that the functionality tests that will be performed during the sprint really takes care of the critical functionality asked for.

5.1.9.4 Pros and Cons

There are three major advantages of Company H's process according to the interviewee. One is the structure it provides to the development work. It makes it easy to communicate status and what is going on since Scrum is a transparent process. The second is the prioritization of the development work. With the product backlog and the product management meetings every other week, everyone can see what is in the pipeline and what has high priority. The third advantage is the reduction of administration of this process. Limited planning, and a situation where everything that is developed is developed to a working feature, reduces overhead costs.

5.1.10   Company I

Company Type	Telecom Operator
Typical Customer	Private and corporate customers
Geographical market	South-East Asia
Employees	50 000 – 100 000
Turnover	>100 billion SEK
Interviewee	Program Release Manager

Table 10 - Overview of Company I - Telecom operator

Company I is a major telecom operator with a national monopoly heritage. It is the dominant actor in its market.

5.1.10.1   *Service mindset*

Company I is currently implementing a new technology framework to facilitate the development and delivery of telecom and online services and content. This framework creates a standardized way to communicate with all the back-end systems that are still in use to handle communication services. The intention is to develop services with little human interaction, reduced technological interaction and a lot of customer interaction.

5.1.10.2   *Governance Model*

Company I has a standard top-down governance model with strict gates and gatekeepers, and defined stages. With the introduction of the technology framework, an attempt has been made to test all new service development projects against the framework, to see if they can be developed therein. The idea is that each new service that is developed on the framework will add standardized functionality that can be re-used in the next project and thereby increase the future development speed.

5.1.10.3   *Work Method*

The work method of Company I is a mix of concurrence and linear, where activities may take place in parallel but where the concurrence is not optimized making the development have to wait for lagging activities. The service delivery framework has added the opportunity to be more iterative since it has a "sand box environment" where new services can be tested with almost-for-real experiences.

5.1.10.4   *Pros and Cons*

Company I believes that the top-down governance with a lot of standardized processes and documentations is good since it provides an effective way to communicate in a large company. On the other hand, many employees see it as very bureaucratic and inflexible.

5.1.11 Company J

Company Type	Bank
Typical Customer	Private and corporate customers
Geographical market	Europe
Employees	20 000 – 50 000
Turnover	30 – 60 billion SEK
Interviewee	Product Manager Mobile Services

<div align="center">Table 11 - Overview of Company J – Bank</div>

Company J is a bank and the interviewee works at the department for mobile services.

5.1.11.1 Service Mindset

Company J's services mainly consist of customers and technology, but they do have a component that is customer support which is part of the service that the customer evaluates. To support the development of the services Company J has, from the launch of the Internet bank platform, seen the advantages of building an open, flexible and configurable system that their services can connect to. Thus, development of a new interface that uses existing system functions only requires 2-3 months to develop. The technology end systems, on the other hand, are very complex and sensitive and it takes 6-+12 months to make changes in them.

The company work significantly with customers, or customer proxies, someone who can represent the customer in a correct way. This is mainly the focus in the initial parts of the development process in order to validate what the service that should be created actually is and to be able to fulfill real customer requirements.

5.1.11.2 Governance Model

Company J has a top-down governed service development. They have standardized gates, activities to perform in the stages and extensive documentation to present at each gate for which templates exist. The gatekeepers are often senior managers. Thus Company J's development process has a clear structure but in practice it is modified depending on the project. The gatekeepers or steering group for each project have the mandate to allow the project not to deliver certain documentation, or not to execute certain activities. Even though this flexibility appears to exist, the choice is top-down governed as it is the steering group who can make the decisions. However, the overall stages and gates are usually the same.

Company J is very concerned with working in a cross-functional manner. The interviewee put emphasis on that Company J involves all stakeholders early in the development process to avoid situations where the market side sends unrealistic requirements to the technical side. Cross-functional teams also indicate a certain degree of self-governance.

Company J has dedicated development teams to each development project. This ensures that each developer can focus on the project at hand rather than being spread over several tasks. It is still the gatekeepers who have the mandate to give the projects the resources needed to make progress.

5.1.11.3 Work Method

Company J works both a linear, concurrent and iterative manner depending on which phase of the development they are in. Initially they work iteratively with workshops and prototyping to validate

what to develop. During development they work in a concurrent manner, but at a higher level the development and testing is done linearly.

The first stage that takes place in Company J after an idea is created is a needs analysis. During the needs analysis all relevant internal functions are represented, and sometimes even external end-users and third party suppliers and can be done as a series of workshops or just the needs analysis manager proceeding on their own.

If the project is approved, the pre-study stage is commenced. During the pre-study a more comprehensive business case is developed. The stage involves a lot of prototypes that are tested on real users. These prototypes are not necessarily advanced but allow the end-users to test certain functions or evaluate the interface.

The development stage consists of creating more advanced prototypes and user interfaces prior to the actual development. Testing goes on in parallel with the development, and there is a major functionality and acceptance test period in the verification phase.

5.1.11.4 Pros and Cons

The process provides a structure that everyone at Company J can relate to. Still it does not force all development projects into a form that does not fit. If the steering group of a project does not find it relevant to perform certain activities they can make a decision to let the project skip them. Usually it is only the large and complex projects that follow the entire development process.

5.1.12 Company K

Company Type	Game Development Studio
Typical Customer	Gamers
Geographical market	Global
Employees	100 – 1000
Turnover	100 – 500 million SEK
Interviewee	Project Manager

Table 12 - Overview of Company K - Game Developer

Company K develops successful games to PC and gaming consoles and the interviewee works as project manager for one of the games that they are currently developing.

5.1.12.1 Service Mindset

The interviewee believes that Company K views their games as services and had some focus on the further development and patch releases to keep the game fresh longer. However, in the delivery of a fully functional game, Company K shows many similarities with product-centric companies in that the upgrading work is very small compared to the initial development.

Company K's service has a low human involvement, but high customer and technology involvement in the realization of the service – playing the game. Nevertheless, Company K had no, or low, customer involvement in the development of the game, except at the very end when the beta version was developed and beta testers assisted in finding bugs.

5.1.12.2 Governance Model

Company K has a top-down governance model that is designed to control the development direction of the game. Within that model, it has an extreme self-governance model where each development team is assigned a task and is then left to solve it as the team members find appropriate. Company K used two-week development cycles so after two weeks each development team demonstrate what they have created for the game's lead team (senior managers). The lead team approved or disapproved of the teams' work and may put the task back on the backlog to be improved at a later development cycle. Depending on what types of tasks the lead team decide to develop for a cycle, the development teams may be rearranged to make sure that the right competence is in the right team.

5.1.12.3 Work Method

The work method, on a high level, is very linear and designed to capture the key parts of the development of a game. There is a pre-production stage with concept development, design and planning and first production. The production stage is where the game is developed after pre-production.

Even though Company K on a high level is linear, they are highly iterative in the stages. Within each stage, Company K works with two-week iterations. During the pre-production stage, all parts of the game are "proved" by the creation of working prototypes. These prototypes are iterated until the lead team is satisfied, and then Company K's executives must approve before the development project may ramp up and enter the production stage.

During the production stage, the two-week iterations continue. The lead team defines what is to be developed by each team over the next two-week development sprint and the teams fix it.

5.1.12.4 Pros and Cons

The major benefit of the combination of top-down and self-governance and the short development cycles in the iterative work method is that Company K can shift focus very rapidly. This acquired flexibility is very important since the company continuously develop new ideas that are valuable only if implemented in a game.

Another advantage is that the reduction of rigid structures and empowerment of the development teams is found to be attractive by the creative developers who tend to shun everything that attempts to control them and their work.

Finally, since each development team is assigned a set of development tasks for the next two weeks, they are allowed to focus intensively on their work. This focus creates ownership and accountability of the features that are developed, and in turn generates a very high initial quality.

5.1.13   Company L

Company Type	Bank
Typical Customer	Private and Corporate Customers
Geographical market	Europe
Employees	20 000 – 50 000
Turnover	30 – 60 billion SEK
Interviewee	Development Program Manager

Table 13 - Overview of Company L - Bank

Company L is a major Northern European bank and the interviewee works as program manager for all development projects at the retail department. The role encompasses the responsibility to strategically coordinate projects, making sure that the right project is started at the right time and ensuring that all projects receive the required resources.

5.1.13.1   Service Mindset

Company L's services mainly consist of customers and technology, but is has a customer support component which is manual and still part of the service the customer evaluates. As technology is the major service-side component in the delivery of Company L's services, and Company L has a complex technological platform, development projects highly focus on technology development.

Company L tries to work with customers, mainly during the first step of the development process in order to verify with customers that the service idea is really worth developing. However, there is no direct involvement of the customer throughout the development.

5.1.13.2   Governance Model

Company L is top-down governed. They have standardized gates, stages and activities the project must complete to be allowed to make progress. Furthermore they also have an elaborate centralized project planning process where all projects are time slotted for the coming years to come on a very high level. In that process, all ideas that the company wants to implement are weighed against each other and a list is made with all projects that will be performed during the next 1-4 years. Company L wants to put a major emphasis on risk minimization. The complex technology platform they have force them to have a holistic approach to new service development.

The sponsor responsible for the development idea is a part of the project from day one and is responsible for the project, the resources and the budget and is regularly in contact with the project manager. The project sponsor is usually a senior manager, the larger and more complex the project is the more senior the sponsor usually is.

Company L is working towards having dedicated developers, though they can be working on 2-3 projects at any given time at the moment, in particular the key personnel like the system architects. No project may be started until a critical resource mass is available, to avoid that a project is started but not finalized due to unavailable resources.

5.1.13.3   Work Method

Company L works with cross-functional teams and concurrently in certain parts of their development but overall appears to deploy a linear approach with each function completing one action before dispatching the project to the next responsible.

The first step of the development process is to verify with customers that the idea is really worth developing. This type of verification is done on a project by project basis. The second step of the processes is to translate the business idea into use cases. Product management communicates the business requirements and IT translates. IT then transfers the use cases to internal developers and external suppliers and the product management verifies that the translations include their requirements. Company L frequently uses consultants as middle-men in the communication process.

5.1.13.4   Pros and Cons

The major advantage of Company L's way of working is that they have very good control of the development work on a high level. However, the quality securing processes take too much time, argues the interviewee. Top-down managers system and quality reviews are not fully integrated in the development process. Quality is crucial for banks, but if quality would be tested throughout the development process the time to launch could be sped up greatly.

5.1.14   Company M

Company Type	Telecom Operator
Typical Customer	Telecom services
Geographical market	Australia
Employees	100 – 1000
Turnover	n/a
Interviewee	Project Manager

Table 14 - Overview of Company M - Telecom operator

Company M is a small niche telecom operator using the back-end systems of one of the larger actors in its market.

5.1.14.1   Service Mindset

Company M's services have a relatively low technological involvement, a high customer involvement and a medium human involvement. This is dues to the company being owned by a large telecom operator who controls all the systems except one billing system, one customer care system and the wholesale gateway that allows them to provision the owner's systems.

5.1.14.2   Governance Model

Company M has a top-down governance model in theory but since the company is rather small the actual project teams are rather empowered in practice. The communication climate is very open as the company only occupies two floors in the building where they are located. Company M has a tradition of promoting people from the customer care department which has led to a situation where most employees have a good understanding of both their current work and the customers. With such competence, it is easier for management to empower development teams.

5.1.14.3   Work Method

The work method of Company M is rather linear on an aggregated level and starts with market requirements, communicated as use cases where all customer activities are described and are then transferred into system requirements for the three systems. The actual development work is concurrent as all systems and all development teams per system can work with their assigned activities in parallel.

5.1.14.4 Pros and Cons

The small size of a company in a traditional business with traditional development ideas generates more empowerment and flexibility by itself. This is very advantageous according to the interviewee; since the company automatically becomes fast in its development. The simple system architecture with only three major systems to work with also facilitates the new service development.

5.1.15 Company N

Company Type	Telecom System Supplier
Typical Customer	Telecom operators
Geographical market	Global
Employees	50 000 - 100 000
Turnover	>100 billion SEK
Interviewee	Strategic Product Manager for Software Platform

Table 15 - Overview of Company N - Telecom system provider

Company N is a large hardware and software provider in the telecom industry. The interviewee works as strategic product manager at a department responsible for a major software platform. The role of the product manager is to gather and prioritize the market requirements and develop the software platform as well as owning the budget for the platform.

The development work at the particular department of Company N concerns software only. The development work that takes place consists of improvements of the platform, evolution and development of the platform and integration of the platform with customers' systems.

5.1.15.1 Service Mindset

Company N views their software platform both as a product and a service. Customers have the choice to purchase the platform and have it customized to fit their needs, or they can choose to purchase the standard platform and follow the updates that Company N launches. The service is almost only based on the customers using the technology platform, i.e. the software platform, but Company N also has a human part of the service through their interaction with the customers supporting them and trying to develop their business.

Company N has an extensive customer focus. Their innovation process usually starts in a customer idea that is being integrated into the platform. They also try to work iteratively with the customers to gain their feedback during development of the new functionality they are integrating into the platform.

5.1.15.2 Governance model

Company N works with a mix of top-down governance and self-governance. As they work with Scrum they do have a framework in which they operate their new service development projects but the framework is very light on top-down elements. They work with a backlog that is prioritized by the strategic product managers who can be said to be a part of the team. Their long term roadmap is aligned with senior managers but the strategic product manager has the right to deviate from the plan if needed to fulfill customer requirements.

A major facilitator of the development method is the usage of dedicated development teams, the interviewee believes. Since each team works on a function at the time, they can make sure that

there is output from every sprint that product management can test, verify and comment on. The development resources are set, meaning that senior managers to not distribute resources at any gates, but that there is a specific number of developers available for the coming sprint.

Company N does not fully work in accordance with self-governance. They do not have full co-location of the entire development team and communication for what to develop still show relationship signs of orderer and supplier organizations rather than working in cross-functional teams.

5.1.15.3 Work Method

Company N works iteratively and with small work packages in order to be able to deliver a complete function after each sprint that can be used to gain customer feedback.

For Company N, the development process usually begins with a customer idea. The ideas for development can besides being customer input also stem from an internal business intelligence process, following trends or through internal idea generation.

When the interviewee or his strategic product management colleagues have prioritized the ideas and communicated the idea with the system architects, the department uses an iterative development method, with three-week sprints. Every third week, strategic product management goes through the backlog and prioritizes the work for the next sprint.

When the development idea has been communicated from the product manager to the system architect, it is broken down into user stories and delegated to the development teams who in turn break down the user stories into work packages. In both cases where the information is transferred, both parties work closely together to try to avoid misunderstandings. Each sprint ends in a demonstration. At the demonstrations, the mismatches in communication are identified and the development can be redirected for the next sprint. Product management can also take these demonstrations to the customer and demonstrate the work progress and ask for input on modifications.

5.1.15.4 Pros and Cons

The interviewee believes that his department achieves a good balance between the trustworthiness created by the roadmap with its strategic development and the flexibility allowed by the iterative development sprints.

Even though Company N has worked hard to improve internal communication, the interviewee believes that there is still a lot left to do. Since many development teams are located off-shore, language barriers exist. Also, the product manager cannot go to the developer's screen and point at the features that must be corrected. Such communication takes place via video link. At the moment Company N is working on finding uniform terminology and work methods that allow them to be iterative despite the distance.

5.1.16 Company O

Company Type	Telecom Operator
Typical Customer	Telecom services
Geographical market	Europe
Employees	1 000 – 10 000
Turnover	30-60 billion SEK
Interviewee	Product Manager, Project Manager, System Managers

Table 16 - Overview of Company O - Telecom operator

Company O is a large telecom operator without national monopoly heritage. Several interviews have been conducted within the company.

5.1.16.1 Service Mindset

Company O's services have strong customer and technology involvement but the company actively tries to reduce the human involvement of the service delivery to keep the costs down. Even though the customer is central in the service realization, Company O does not involve the customer in the service development. The process itself is not very customer-centric. The high technology involvement has high impact on the service development since Company O has many old and complex systems that are difficult and time consuming to alter.

5.1.16.2 Governance Model

Company O's development work is governed by a stage-gate model where the investment decision gate involves senior executives. The stages have quite clear instructions for what to do, but in practice the successful project managers adapt their work methods in the stages themselves, and make sure to deliver as expected at the gates in their own way. This makes the company's governance model rather top-down, but those who can avoid the top-down and empower themselves are the ones that deliver their development projects most successfully.

5.1.16.3 Work Method

Company O's work method is somewhere between linear and concurrent. Except on the most aggregated level, the work method allows for concurrence of activities. However, the company's development work is not optimized for concurrence and situations where one system or activity delays the entire development project are frequent.

Company O has a sophisticated idea-to-launch process that promotes the minimization of risk by a rigorous planning phase early on. New service development ideas converge at the product managers, regardless if they come from external customers or internal idea generators. During the following pre-study the high level business case is transformed into a detailed business case. Product management specifies exactly what that they want, business analysts and system architects translate it into system modifications and work packages which are assigned cost estimations.

During the development phase the project manager designs how to work to accomplish the detailed specifications of the product manager. There is a large number of documents and forms that the project manager should fill in to make sure that all relevant information is included in the communication with the steering group.

5.1.16.4 Pros and Cons

The two major strengths of the current process, the interviewees agree, are that it ensures the quality of the output and it provides a common language and framework that all people in the organization can relate to.

Since many of the development projects that Company O performs regard network upgrades or roll-outs, rigorous planning is vital to ensure that no part is forgotten that will delay the entire network's finalization date. For these types of projects, the quality parameter is crucial.

The development process is followed too literally sometimes, some interviewees believe. They argue that smaller projects should have a more flexible approach, but the fact that it is specified in such detail makes many projects follow it in detail. When the process is followed literally and the project concerns a service, the development time is unnecessarily long.

6 Analysis

As described in the problem discussion, the research question for this thesis is: *How should an incumbent actor structure its service development to optimally create software based services?*

The methodology used to answer this question included the construction of a theoretical framework consisting of three factors; level of service mindset, governance model and development work methods, and conducting multiple case studies on different companies and industrial sectors. In this chapter the analysis is created to form a logical bridge between the theory and empirical parts and the results of the study.

The analysis starts with the clustering of the empirical findings into the frame of reference created by two of theoretical parameters of the theoretical framework: governance model and work method. This generalization of the companies allows extrapolation of findings into clusters differentiating themselves from each other based on a few critical factors. The service mindset parameter is incorporated on a case by case basis and provides some of the most important critical factors differentiating the clusters.

The clusters that are identified are described, the characteristics of the companies of each cluster are discussed and finally, each cluster is contrasted against the four factors critical for development of Layer 3 services identified:

- Having a customer focus
- Focusing on Time to market
- Scoping deliveries to become smaller to allow flexibility and speed
- Being able to incorporate feedback into the development process

This approach intends to allow a logical flow between the theory and the empirical data, clearly lead to the conclusions and enable a synthesis of the two different arenas, academia and industry.

6.1 Clustering the Case Studies

In the analytical model, the companies were independently positioned before the clustering was made. To fully appreciate the analysis and the conclusions of the study, it is crucial to understand this. For example, Company D and Company K are more similar than Company D and Company M, even though the latter two are part of the same cluster. The value of the clustering, however, is that a number of central characteristics are shared within each cluster, and to get a valuable discussion and contrasting, the identification was necessary. The clusters are analyzed individually. The rationale behind placing a company in a particular is justified in the relevant cluster section. The clustering is illustrated in figure 13.
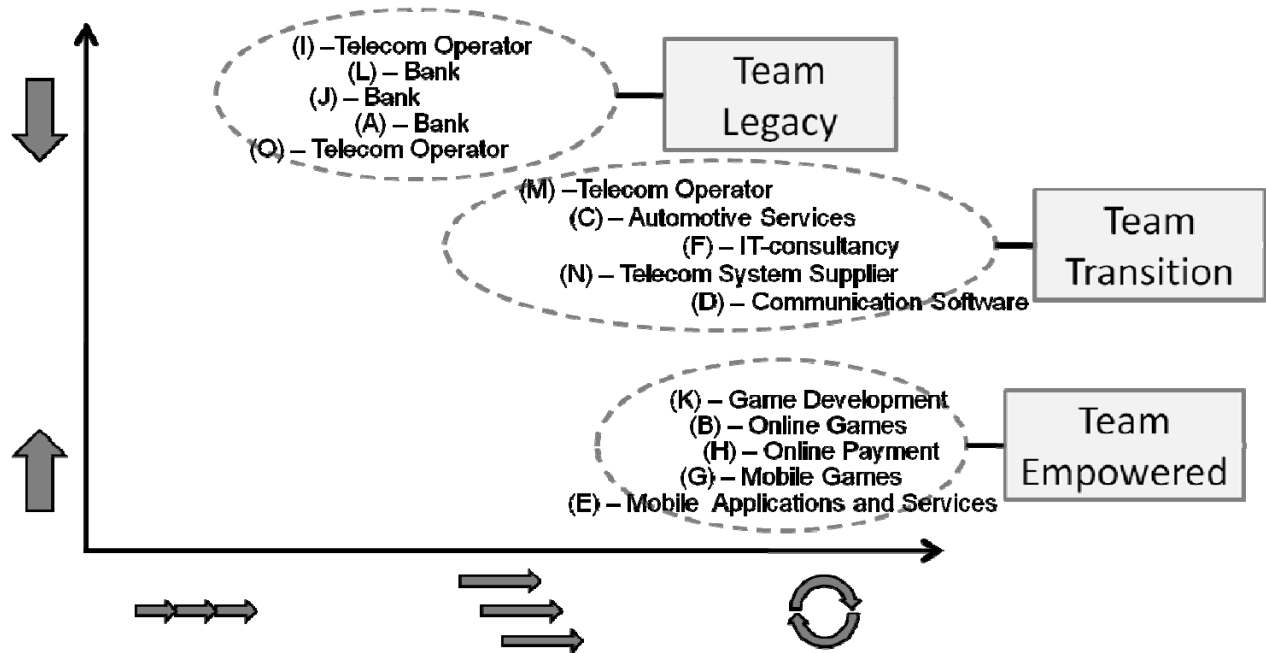
Figure 13 - Clustering the case studies

6.1.1 Team Legacy

Team Legacy consists of banks and telecom operators, in the form of Companies A, I, J, L and O.

6.1.1.1 Cluster Description

The companies active in the banking industry see themselves as delivering a service to the customers. This is to some extent true for the telecom companies as well, even though they also show indications of a more product-centric focus in their development. The banks have a higher focus on the customer during the innovation process, illustrated by them working closely with customers, or even as company A having incentives for product managers to interact with customers. The telecom operators do not appear to involve the customer as actively.

The services offered by the companies in Team Legacy all have a high technology and customer content, but very low human content on the supply side, limited to customer support. This fact, in combination with the complex technology systems all actors of Team Legacy have, enforces the development projects at the companies to become very technology focused.

Regarding governance all companies in Team Legacy demonstrate top-down governed development with rigid gates and with stages deploying predefined documents to deliver at each gate and activities to complete during the stages. The budget and resource allocation processes of the companies differ, but in all companies the top managers own the allocation of resources. It is also usually senior managers outside the project that are the gatekeepers.

One reason for playing in Team Legacy is being a large company with many development projects in parallel and having distributed development. All companies in the cluster exhibit this characteristic. All the companies in the Team have an almost centralized IT structure but still market activities in the NPD are carried out locally.

Regarding work methods most companies exhibit the same pattern, being mainly concurrent in the front-end while becoming concurrent or linear during the later stages, the actual development and testing. They are concurrent in the meaning that they usually deploy cross-functional teams to investigate the different sides of the value potential of the service idea. The companies of Team Legacy have a clearly linear approach when they develop all the code needed prior to commencing testing of the entire delivery, but the actual coding in done in several systems in parallel. Banks appear to work more iteratively than telecom operators, especially in the planning phase where customers are involved in order to gain their feedback.

6.1.1.2 Team Legacy's Service Mindset

Using the service component definition given by (Edvardsson et. al., 2000), the companies in Team Legacy all have services that have a high technology and customer content. This causes the development projects to be very technology focused as all new services require new technology infrastructure rather than a new organizational infrastructure. This enables the companies' services to be close to products in the sense of not affecting the organizational structure of the companies.

Based on the four service dimensions detailed by Fisk, Brown, & Bitner (1993) most of the companies show a medium service mindset. Intangibility and inseparability theoretically leads to a need to involve the customer in the development to gain their feedback and align the service development with the customers' expectations and needs. However, no company of Team Legacy is really good at customer involvement. The companies appearing most active when it comes to this factor are the banks with the telecom operators not being as customer focused.

Observing the opportunity to tailor services for individual customer needs another division of the companies must be done. B2B relationships, which are most prominent in the banks, use customization of the services, but when viewing the banks' B2C relationships and telecom operators' B2C relationships, a low customization is identified. This appears logical as the business model in a mature market is to compete by providing the right level of service at a low price.

Even though all companies in Team Legacy strive towards having a service mindset, they all score rather low in the four service dimensions when applied in practice. Combined with the technology infrastructure that must be developed for new services, companies in Team Legacy actually work more in a product-centric manner. This is very evident in them delivering a product in the sense of focusing on performance measures and the concrete functions and features of the products rather than focusing fully on the customer experience which should be the key driver of development according to Fisk, Brown, & Bitner (1993) and Edvardsson et. al. (2000).

6.1.1.3 Team Legacy's Governance Model

One main factor for signing up for Team Legacy is that large and mature companies require focus on risk minimization. In order to minimize risk, top management must be involved in all major decisions and extensive documentation and testing is required during the development process. This factor was identified in all cases studied and appears to be the main driver of the top-down governance all Team Legacy companies exhibit. All companies have numerous standardized gates and stages with predefined activities and significant documentation to be delivered for each gate. In essence the companies follow the basic model of the stage-gate model which appears highly suited for situations where consistency and risk minimization is the key focus (Cooper, 1990).

Cooper (2009) further claims that a top-down governance model allows senior managers to influence all product development models, even in large companies, with a relatively low effort. This goal can be seen in how the companies in Team Legacy use the governance model with upper management gatekeepers having a view of all projects on a high level and being able to compare them at decision points. The goal of having a comparative process can be understood when viewed in the light of the lack of development resources. Team Legacy companies want to give the development project with the best outlook resources to continue and thus an external view is needed to distribute the resources in which case a top-down governance model appears to fit well. Also connected to this view is that regulatory projects must almost always be highly prioritized to be implemented rapidly. To do so management must own the development resources and again it makes sense for the team legacy companies to use the top-down governance model given their current situation.

The company showing the highest degree of flexibility, or self-governance, in their development process was company J, indicating that the governance board for each project has the mandate to adapt the number of gates the project should use based on the size and complexity of the project. It is still hard to position this as self-governance as it is not the project team making this decision but rather the governance board. In the case studies, the companies gave several practical reasons for not having more adaptable processes as; the security board cannot have meetings every week, having to match release cycles of our systems etc. This rigidity in turn appears to drive development time which is expected based on figure 9 in Chapter 4.4.1.1 by (Smith P. G., 2005).

A final note is that all companies in Team Legacy are companies that have a geographically distributed business. In such an environment, self-governance based on personal meetings and dedication may not be suitable.

6.1.1.4 Team Legacy's Work Method

When focusing on the development, none of the companies in the cluster appear to have a detailed work model. In practice this results in concurrent or even linear development but examples were identified where specific project managers used a more iterative approach for certain sub-projects or in the early phases of projects. The use of concurrent or linear development appears to be due to the size of the companies and them being active in mature markets. The size of the companies and their geographical distribution drives distributed development making communication more complex which, in turn, tends to drive linear development methods (Turk, France, & Rumpe, 2005).

Furthermore, the companies are all active in markets which are rather mature and where cost appears to be very important. This drives less time for meetings and communication as well as reduced access to key resources. The lack of key resources makes many resources work on multiple projects simultaneously as is the case for companies A, J, L, or even as in company O's case were the resources are divided between the line operations and multiple development projects. This forces significant planning and time-slotting which in turn is a key driver of linear development models, a claim supported by (Patti & Gilbert, 1997).

The concurrent/linear development model Team Legacy mainly deploys also causes low communication and interaction between the different departments. This becomes apparent when observing how the market organization interacts with the IT organization to specify the development

requirements. In company A and J some form of limited interaction i.e. though a workshop where the requirements are discussed is held, whilst in company I the requirements are written by the market organization and handed over to the IT organization for interpretation. In company O the degree of interaction highly depends on the product manager and project manger working the case. This gap in communication is one of the key improvement areas as identified by the companies themselves and they are working on closing this gap to be able to work more in a concurrent manner.

Even if all companies in Team Legacy were to move towards cross-functionality in their teams it is not sure that they would reap the full benefits of concurrent development models. Concurrent development not only requires cross-functional teams but also teams that are self-organizing and empowered (Takeuchi & Nonaka, 1986). The companies in Team Legacy are all large and have complex infrastructure and technology systems. A team would need extensive knowledge regarding all systems, groups and organizations in the company in order to be able to be empowered and work individually and for the development to be successful. This is confirmed by Takeuchi & Nonaka (1986) claiming that concurrent engineering appears to work best when the development regards a new, innovative product not conflicting with current products. Hence it is understandable why Team Legacy demonstrate characteristics from both linear and concurrent engineering. This also applies for iterative development and can be an explanation for why iterative development is not used more in this context.

6.1.1.5 Layer-3 Development Factors

Summarizing the service mindset, governance models and work methods of Team Legacy a few key points appear crucial to highlight from the analysis.

Regarding customer focus, the service mindset of all companies clearly provide the impression that they have a customer focus and would benefit from involving the customer in the development work. However, in practice the customer is frequently forgotten or not prioritized in the development work which appears to be in line with the theoretical description of both top-down governance and linear/concurrent work (see Chapter 4.2 and 4.3) where customer involvement for feedback is not central.

All companies of Team Legacy are skilled in reducing risk and handling complexity, that is why they exploit explicit top-down governance models, but at the same time they are very slow when regarding time to market. The use of linear/concurrent work methods also provides further time delays when mistakes are discovered that all other activities have to wait for. A normal development time for a service is above 12 months.

The rather product-centric development of Team Legacy's companies leads to large development projects counteracting the scoping of deliveries into smaller packages to increase flexibility and speed. The top-down governance supports large projects since there is a lot of administration per project (Cooper, 2009) and the fewer projects the less administrative work.

Also, Team Legacy's top-down governance, linear/concurrent work and non-inclusion of the customer in the development (despite claimed service mindset) leads to a situation where the companies are not being able to incorporate feedback into the process.

The effects of the governance and work methods of Team Legacy actors appear to be long time-to-market, not having a customer focus, delivering large, product-centric projects and not being able to incorporate feedback fully into the development project, hence fulfilling very few of the critical Layer 3 development characteristics as identified in Chapter 2.

6.1.2 Team Transition

Team Transition is the least coherent cluster of the identified three. From an analytical point of view, the grouping is still interesting, rather than placing the companies as border line cases in the other two clusters, since the cluster has interesting stories to tell. The companies of Team Transition are companies C, D, F, M and N.

6.1.2.1 Cluster Description

Regarding service mindset, none of the companies of Team Transition develop and sell physical artifacts – products. The services are all highly technology centered as most other companies in the study.

Regarding governance model, the companies of Team Transition separate themselves from those of Team Legacy by having more empowered teams and less top-down control. This is seen in the relatively lower amount of paperwork required for managers to make decisions, less focus on following pre-specified process activities and in decentralized decision making.

It is interesting to contrast the companies of Team Transition with those of Team Empowered since the difference between the clusters is not that apparent. Company C's development teams are only empowered in the front-end while the following development work is done in a top-down governance model. Company F follows the client's development instructions and thereby automatically follows their usually more top-down governance model. The reason why Company F is not located higher on the governance scale is that they specialize in agile development and work with empowered teams therein. Company M has a development process that could be described as top-down, but in practice all decisions are made much more informally and with significant flexibility in the information required to make decisions.

Company D and N are positioned closely to Team Empowered but find themselves in Team Transition as both work with direct customer demand and develop what the customer orders. Even though the iterative nature of their work ensures feedback loops, the fact remains that the customer pays for a feature that it wants and can therefore almost dictate the development structures used. Company N has another characteristic that separates it from Team Empowered in the strategic development. Such development, which is required to remain credible in the industry, believed the interviewee, is managed from the top in a more structured way.

Regarding work methods, all companies except Company M and to some extent Company C work with iterative development. Company D primarily iterates in the front-end activities where the customer is involved as much as possible to create the right look-and-feel to the communication product's interface. Company F has a lot of experience with iterative development but as the interviewee said, as a consultancy firm they must adhere to the development methods of the client, and it is therefore difficult to position Company F correctly with regards to work methods. Company

N has a very iterative work method but they also seem to work significantly with strategic development.

6.1.2.2 Team Transition's Service Mindset

The services of the companies in Team Transition all have human, technology and customer involvement, thereby qualifying for Edvardsson et. al.'s (2000) definition of the service. All companies except Company C mainly have technology and customer involvement, while some of Company C's services also have a large human component because of their B2B customer segment.

All companies agree that the value of their offering lies in the experience of it, a belief that answers to Fisk, Brown, & Bitner's (1993) intangibility characteristic of services. Heterogeneity can be found within all companies' services as they modify the services to adapt to customer needs. However, these adaptations all remain within the framework of what is possible by easy configurations of the system, rather than designing the service individually for customers.

All companies except company M works in close collaboration with their customers acknowledging the service feature that the experience is more important than the performance parameters. It should be stressed that these companies do not work directly with end users and that their B2B relationships allow for rather easy customer involvement.

6.1.2.3 Team Transition's Governance Model

Team Transition's governance was positioned between top-down and self-governing.

All companies except Company D are organizations with strong relationships to companies in Team Legacy like situations. Company C works closely with a major automotive company, company F sells consultancy services to many traditional companies, company M is owned by a legacy telecom operator and the part of Company N that the interviewee represented is still is a part of Company N that in its entirety would fit well in Team Legacy. Since top-down gated governance models are widely used among all sorts of companies to manage complexity and reduce risk (Griffin, 1997), it is natural that companies with legacy relationships are more prone to be influenced by such governance than younger companies , as is the case with Company D and most companies of Team Empowered.

The companies of Team Transition are small to medium sized. Regarding governance, there is a quite natural explanation for being somewhere in between top-down and self-governance in that a major weakness of self-governance is that it neglects the re-use of old experiences (McCarthy et. al., 2006) and in that smaller companies have less experience to codify into standardized processes. Furthermore, an advantage of top-down gated governance is that there is a clear chain of command (Cooper, 1990); something less important in an organization small enough for senior management to be well initiated of all development work in progress. Finally, the companies of Team Transition all explain that they understand the importance of development flexibility and short time to market, and claim that they need to empower their development teams to reach these two ends. These three factors explain why Team Transition is not governed as top-down as the Team Legacy companies.

6.1.2.4 Team Transition's Work Method

The linear model conflicts with the goals of reducing time-to-market and flexibility (Takeuchi & Nonaka, 1986) which can be seen with the companies of Team Transition since they all avoid working linearly. The iterative work method allows for frequent feedback and since the companies of Team Transition work with services where the value is in the experience of the service, it seems natural that they benefit from the iterations making sure that the test experiences provide feedback and improvements for the service. The collective idea communicated from the interviews with Team Transition companies is that they have moved from linear/concurrent towards more iterative work methods because of such realizations.

The legacy relationships do not seem to prevent the companies of Team Transition to use more iterative work methods. There is no difference to be found between Team Empowered and Team Transition in terms of work methods. This is slightly surprising since iterative work methods is said to require more dedicated empowered teams than the concurrent work method (Rising & Janoff, 2000). One should bear in mind that the Team Transition cluster is not coherent and that the most iterative companies of the cluster are also those that are most self-governed.

As Dybå & Dingsoyr (2008) report, there is still lacking academic evidence of the true advantages of iterative work methods. This could very well support a claim that only the smaller companies who by nature are more entrepreneurial and innovative dare to believe in it, while the larger companies wait for validated results before they spend large sums transforming their work methods. Since the company sizes of Team Empowered's companies are very similar to those of Team Transition, no conclusions can be drawn as to why there is a difference in governance.

6.1.2.5 Layer-3 Development Factors

Regarding the four development factors for developing services as Layer 3 actors, Team Transition shows a slightly higher adherence to a service mindset than Team Legacy does.

The companies of Team Transition have a clear service mindset and also involve their customers in the development process to a quite large extent. This can be explained by the fact that several of the companies work with B2B relationships where they define and develop the service together with the customer.

The reduced top-down governance and introduction of iterative work methods seem to have led to shorter time to market. In particular the scoping of activities and projects into smaller deliveries reduce time spent on the scoping and development. The iterative nature of Team Transition's development work automatically creates feedback situations, and since the companies frequently involve the customer this feedback becomes highly relevant.

6.1.3 Team Empowered

The companies of the empowered cluster all work with iterative work methods and with empowered development teams. Company B, E, G, H and K belongs to this group.

6.1.3.1 Cluster Description

All companies of Team Empowered except Company K work explicitly with services that are created while consumed. The human involvement in the realization of the service is low while the

technology and customer involvement are high. The companies' services vary in heterogeneity, where Company E and Company K deliver rather homogenous offers.

The self-governance is expressed in different ways in different companies. For all companies in the cluster, the development teams are empowered to translate the deliverable into work packages. For Company G, Company E and Company K and to a large extent for Company B and Company H, the client is seen more as a development partner than a customer.

Company E's work takes place without any clear development structure. Company G's development philosophy is that all development projects are unique and that no universal model or process is applicable to all situations. Thus, they have a library of models and processes to serve as inspiration and support, allowing the development team to design their own model or process optimally. Even though Company B, Company H and Company K have product managers who prioritize the work for every sprint, the development teams are empowered to break down the deliverable into work packages and plan their own work .

The iterative work method also means working closely together in a team, the customer or product manager throughout the development, to ensure that all stakeholders share the same view of what is to be developed. This also means that they constantly develop product features that are ready to be used and therefore valuable on their own. For example, Company G always develops a feature until it is usable, and they always start with the feature that will deliver most value for the client. Since they can show working prototypes of product features early on in the project, they create a trusting relationship with the client allowing them to receive vital feedback and modification of the deliverable. Both Company B, Company H and Company K use a feature list for the entire development project, developing and testing the features with highest priority every 2-3 weeks. A finished feature should ready for use, but may be added to the feature list once more, if it requires further iteration.

All companies except Company E have explicit methods for prioritizing their work. Every development team has a thought through work load for the next sprint, rather than a number of projects in parallel that vary in intensity and split each developer's focus. Furthermore, all companies in Team Empowered have full control of the systems their development relates to.

6.1.3.2 Team Empowered's Service Mindset

The empirical investigation identifies three major themes explaining why the five companies' development work is located in Team Empowered: Volatile markets requires flexibility, entertainment products requires creativity and products that benefit from updates and further development require continuous development. The three themes enforce the creation of a service mindset among the Team Empowered companies. Flexibility is promoted by having a service mindset, where heterogeneity factor makes the service configurable to fit the detailed needs of different actors. The entertainment theme ensures that the companies regard the fact the service being experienced when consumed. The upgradability theme is linked to the flexibility just described.

According to Edvardsson et al.'s (2000) service definition, all companies of Team Empowered deliver services. There is some human involvement, mostly through development and customer support, there is a large technological involvement since all services are software based, and there is a major

customer involvement as all companies need the customer to experience the service to generate value.

All companies except Company K have explicit service mindsets. Also, since the services all have significant technology involvement, the technology systems can enable and scale the services instantly.

According to Kuczmarski & Johnstone (2005), the key factor of a service is that it is valued by the customer experience rather than any absolute performance measures making customer involvement extremely important in the development of services. All companies of the cluster seem to have realized this but only two of five explicitly involves real customers in the development work, company E and G. Amongst the other companies two involve customers to some extent during the later stages, companies B and H, while one believes that internal experts provide the best development feedback. All companies' preliminary work is however based on extensive customer insight through competitor intelligence, market studies and customer focus groups.

6.1.3.3 Team Empowered's Governance Model

The companies of Team Empowered are active in volatile markets that require flexibility and the empirical evidence show that this was solved by all companies through working with empowered development teams. This is aligned with theory claiming that self-governance is primarily used in the early activities of the development (McCarthy et. al., 2006), when working with radical rather than incremental innovation (Crespell & Hansen, 1998), when encouraging creativity (Crespell & Hansen, 1998) and when speed is important (PDMA, 2005).

The second theme, entertainment products benefit from creativity in the development process, applies to Company B, Company G and Company K who all develop games and gaming experiences. Regarding governance, all three companies believe that creative people cannot be contained in rigid structures or processes and still perform well. This perception is shared by Company H and Company D who may not focus on entertainment in the end product but still claim to require significant creativity in the development work. The self-governance model focuses on people rather than process (Dybå & Dingsoyr, 2008) and such empowerment encourages creative people to excel (Takeuchi & Nonaka, 1986), (McCarthy et. al., 2006), (Crespell & Hansen, 1998) and (Colarelli O'Connor & McDermott, 2004).

All together, the companies of Team Empowered provide empirical proof of the theoretical claims regarding governance. When flexibility, speed and creativity are important factors, self-governance appears to provide several advantages.

6.1.3.4 Team Empowered's Work Method

Volatile markets require flexibility and Takeuchi & Nonaka (1986) argue that linear development conflicts with flexibility since each part of the development chain is unaware of the other development components. Concurrent engineering suffers from the flaw that it requires significant coordination (Bhuiyan, Thomson, & Gerwin, 2006) thus making it slow and inflexible, albeit more flexible than the linear approach. The iterative work method is designed to cope with changing environments and user requirements. It does so by focusing on individuals and interactions over processes and tools, working products over comprehensive documentation, customer collaboration over contract negotiation and responding to change over following a plan (Dybå & Dingsoyr, 2008).

Thus the theoretical support for the work method chosen by Team Empowered clearly promotes flexibility.

The second theme, regarding entertainment requiring creativity, has less direct support in the theoretical framework when it comes to the work method. However, since the relevant Companies believe entertainment is linked to being flexible and enabling the incorporation of feedback when dealing with the users' experiences, and since the theory supports the link between flexibility and iterative development, the indirect link seems to be in place.

The third theme identified concerns continuous development. Company B drives customer retention through constantly updating their products with new demanded features. Company E releases its products early to get feedback through the development community and improve the final product by using the feedback. Company H is expanding its business and benefits from adding new features to their product as they grow. Company K uses product upgrades to drive marketing, and combine the release of a new game feature with a marketing campaign.

Thus it appears that services that benefit from being released several times are well suited for an iterative work method, seeing that a central part of the iterative model is to develop fully functional features per work sprint (Rising & Janoff, 2000). This becomes even clearer when comparing iterative work methods with linear or concurrent models where the service upgrade would require a new process start or that the development takes a step backwards in development to the phase where the upgrade work can begin.

6.1.3.5 Layer-3 Development Factors

The companies of Team Empowered have a strong customer focus. They involve the customer in the development, both during development and through feedback cycles after the service is launched.

Team Empowered have very short time to market for most service development projects, to a large extent because of the empowered development teams that take decisions instantaneously without waiting for senior management approval. This empowerment requires technology platforms that are modular allowing the development teams to make decisions without having to coordinate with all other modules at every change.

Team Empowered's companies also become fast due to the iterative work methods, allowing them to develop fully functional features that are released and can be updated. Thus, they become very flexible and quick by scoping the delivery into smaller packages. The iterative work methods automatically generate feedback mechanisms, both within each development project and between the different versions of the services, since there is always a next version of the service about to be released.

In summary, reconnecting with the key development characteristics for Layer 3 services, Team Empowered fulfill the four factors the most of all the identified clusters. They have extensive customer focus, they have small deliverables to enable flexibility and short time to market and they also enable and incorporate feedback into their development. Furthermore, their choice of governance and work method is supported by literature claiming that self-governance creates speed, flexibility and creativity and iterative work methods allow for flexibility and shorter time to market.

6.2 Empty Clusters

In the company mapping according to governance model and work method four distinct areas are identified which are not occupied by any company. A short discussion is held here about why this may be the case. Prior to this discussion, one cautionary comment is in place; all different industries and all different types of companies are not represented in the empirical data. The existing sample bios may account for potential mismatches between theoretical constructions and empirical findings. The empty clusters are seen in figure 14.
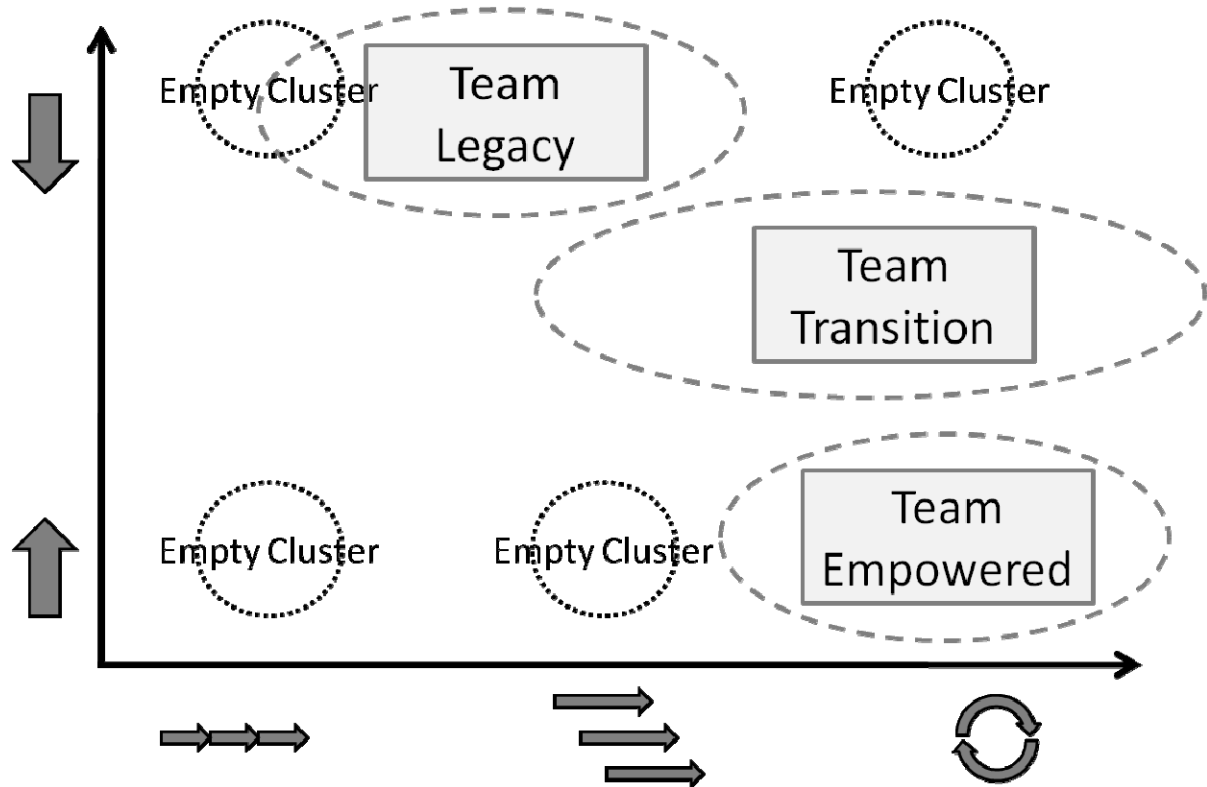

Figure 14 - The empty clusters

6.2.1 Top-Down – Linear

According to the theoretical discussion of linear models it is fairly accepted that pure linear models are not well suited for development (Trott, 2005) and thus it was not expected to find any company in this area.

However, Team Legacy demonstrates linear development behavior in some aspects, which could indicate three things;

- Linear models really provide the logical choice when feeling stressed as all activities are isolated from one another
- The organizational part of product development vests on a technology system and if the system requires a linear approach the organization will work linearly
- It is difficult to move away from linear models to more concurrent models

These factors are not validated but it could be interesting for a future research to investigate these hypotheses.

6.2.2 Self-Governance – Linear

The use of the linear development model has been discussed above. To reinforce the argumentation why no company claims this area, the self-governance approach is developed for flexibility, adaptability and speed by allowing the group to do what they feel is best. Linear development models advocates isolation between different activities and departments. The service coming out of a system where each department does exactly what it wants and then hand the service over to the next department without any coordination will most likely not be successful. Thus it does not appear controversial that no companies occupy this area.

6.2.3 Self-Governance – Concurrent

It is somewhat surprising that no companies occupy the self-governance concurrent development area. The reason it appeared plausible that some companies would deploy this model is that according to Takeuchi & Nonaka (1986) concurrent development is successful if the team has freedom, authority, is self-organizing and the management only deploy subtle control over the development.

The authors still believe that this type of company exists and should be quite numerous based on the theoretical findings. Concurrent development appears to fit best with development of physical products that are innovative and does not affect the current business significantly and there is an apparent lack of this type of company in the study.

Another factor likely to have contributed to the result is that certain parts of concurrent development are easy to adopt and use whilst others are much harder. Examples of this is companies A and J who try to create cross-functional teams and work in workshops with the entire team, or company O having representatives from all functions in the company in the governance board. In this sense they have tried to move from top-down concurrent to empowered concurrent with little success. Aspects of product development such as control and decision-making power may be much more difficult to relinquish as it is culturally anchored in not only the organization but also industry structures.

6.2.4 Top-Down – Iterative

Based on the theoretical discussion it was difficult to speculate if any companies would occupy this area. Iterative development is created for allowing the team to test, try and test again in order to learn and adapt to a rapidly changing and flexible environment with many unknowns (Dybå & Dingsoyr, 2008).

If top management would like to govern the development process they would almost have to be part of the development team or they would slow down the process significantly. The option is models having a more iterative approach between decision points, i.e. developing the software iteratively, which could be seen as a version of the top-down iterative approach, and it was somewhat surprising not to find any case where this was employed. Some of the companies in Team Legacy try to move towards a more iterative work method between their decision points but are not yet fully there.

7 Conclusions

The conclusion for incumbent companies wanting to work with service development is based on the critical success factors for service development in Layer 3 that were identified in Chapter 2. The conclusion is made with regards to the structures needed for successful service development.

7.1 Conclusions for Layer 3 Service Development

The research question this paper set out to answer was: *How should an incumbent actor structure its service development to optimally create software based services?*

The conclusion is that incumbent companies wanting to compete with Layer 3 actors in service development must focus on delivering a service and not a product and also become iterative and self-governing in their development. These conclusions are detailed below.

7.1.1 Service Mindset

Incumbent companies wanting to develop services in Layer 3 need to focus significantly on delivering a service rather than a product. A service has three components; human, customer and technology. Layer 3 services consist mainly of customers and technology. Any company wanting to develop services needs a simple, open and modularized technology infrastructure in order to allow for fast and qualitative service development. They also need to interact significantly with the customer during development, especially in the definition phase of the new service development in order to gain insight into the customers' experience of the service. In order to enable customer interaction incumbent companies must enable shorter and faster releases of new functions to enable testing amongst customers.

7.1.2 Governance Model

Incumbent companies wanting to develop services in Layer 3 need to become self-governing in their development. Self-governance allows the people working with the actual development, thus having the most information, to take decisions regarding what to develop and how to develop it. This increases flexibility, time to market and the quality of the product created. Services are to a large extent about experiences and entertainment for which creative development teams are needed, something that is enabled through self-governance.

7.1.3 Work Method

Incumbent companies wanting to develop services in Layer 3 need to become iterative in their work method, especially in the early phases of new service development. By doing so, they create the opportunity to gain customer and stakeholder feedback during the development process which can be integrated into the further development. Iterative work methods also enables shorter time to market through supporting phased delivery, less up front planning, time boxing and not tying up resources for a long duration.

The iterative approach enables flexibility as it allows for faster changing of priorities and deliverables in the product development. Also, iterative development promotes the complete development of one function during one sprint and thus the functions delivered after the sprint are available for the market to launch.

Figure 15 visualizes the governance and work method conclusions that have been done.
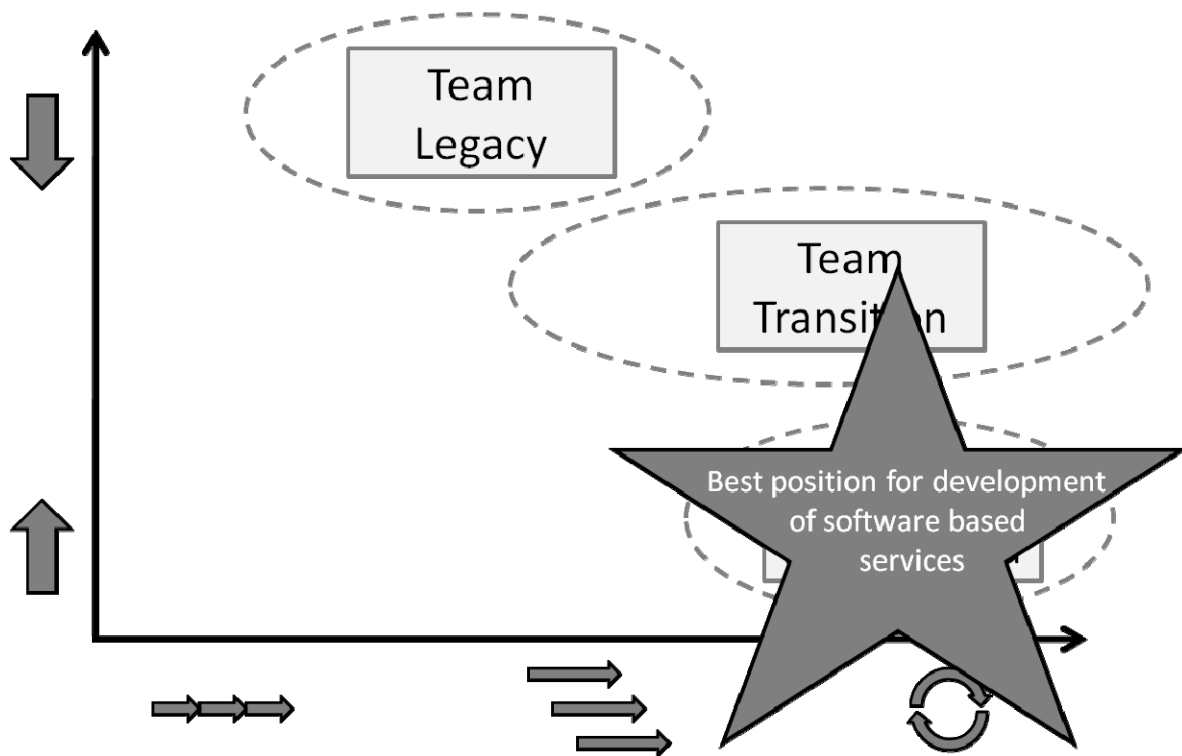

Figure 15 - The suggested position for incumbent companies' development

7.2 The Way Forward

The research project has shown that the move towards a more iterative approach with self-governance will allow the incumbent companies to challenge Layer 3 actors when it comes to delivery of services.

The incumbent companies must identify if they are willing to focus on, and invest in, service development, as the changes described above are significant in magnitude and may even question the very core of the companies' cultures. As such, one way to implement the solutions could be to create a separate organization for the services whilst maintaining the current organization for their present large, product -focused projects.

No matter which strategy the incumbents choose to follow when moving forward, they are facing interesting challenges as the boundaries and functions in the markets are being re-defined through the use of the Internet.

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Appendix A – Interview Template

All interviews were held in Swedish over about one hour per interview. The interviews were held with some time distance between them, so the authors had the chance to tweak some questions as the interview experience grew. However, the basic questionnaire has been kept rather intact so what is presented as a translation below is almost exactly what the authors had as support during the interviews.

1. Explain our scope and purpose
    1.1. What do we mean by "software based services"
    1.2. What do we mean by service development
2. Introductory/Warm-up questions
    2.1. In what line of business is your company?
    2.2. In what line of business is your department?
    2.3. What is your role at your company?
    2.4. From a service development perspective, what kind of services do you develop?
3. Development process questions
    3.1. How would you describe your development process, from idea to launch?
        3.1.1. What is most difficult?
        3.1.2. What is most critical for success?
    3.2. Going through your process step-by-step:
        3.2.1. How do you work in the idea phase? How do you define what to develop?
        3.2.2. Do you ever work with external partners this early?
        3.2.3. Do you work with abstract or concrete conceptualization?
    3.3. Do you define who the customer is this early?
    3.4. How do you work regarding internal "buyers" defining service requirements that the developers should meet when developing?
        3.4.1. On what technical and functional level do "buyers" and developers communicate?
        3.4.2. How do you perceive your flexibility in this phase?
        3.4.3. Is the work iterative in any way?
        3.4.4. How do you communicate (face-to-face, mail, workshops...)
        3.4.5. Who owns this process ("buyer", development team, project manager)?
    3.5. Do you work with conscious sizing of projects to keep delivery speed up and have a manageable number of parallel projects?
    3.6. How much planning/analysis work do you do initially and how much do you plan as you go?
    3.7. How do you manage requirement changes from the "buyer" during the development process?
    3.8. How much control does management exert on how the development is actually being done?
    3.9. Have you changed your development process with the growing competition of "Internet companies"?
    3.10. How do you focus between Time-Cost-Quality?
        3.10.1. When is Time critical?
    3.11. How do you manage the back-end systems as you develop more and more services?

3.12.   How do you work with technology roadmaps and service roadmaps?
4. Roles and responsibilities
    4.1. Are your development teams working in system silos or service silos?
    4.2. How do you ensure the continuous evolution of both the systems and the services?
5. Cooperation/procurement
        5.1.1.How do you work when parts of the service has to be purchased from an external source?
        5.1.2.How do you ensure that knowledge is kept within the company (regarding such parts)?
        5.1.3.How would you like to involve your customers in the ideal world?
6. Back-end system perspective
    6.1. Have you designed your back-end system in any specific way to facilitate the inclusion of new services in existing systems?
    6.2. Do you consciously work to minimize the number of systems?
7. Service life cycle
    7.1. How do you hand over the service from development to up-and-running?
    7.2. How do you work with continuous development of your services?
    7.3. How do you make use of the knowledge created during the development?
    7.4. How is the "buyer" of the service-to-be-developed involved in the up-and-running of the service?