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Improving the Service Design Process in an IT Company

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Preface

The studies in the Industrial Management program have really broadened my mind business-wise and have changed my perspectives towards many issues in the real-life. Even though from time to time it has been tough to combine the studies, domesticity and day job, at the end it is really rewarding to see how much I have learned.

I really appreciate the opportunity given by my employer to participate in the Industrial Management program. I want to thank my supervisor Pasi Ulkuniemi for his support during the studies and also my colleagues for all the valuable conversations and opinions.

I am also very grateful to all my lecturers at Metropolia University of Applied Sciences for sharing their insights over various topics. I especially want to thank my instructor Dr Thomas Rohweder and Dr Marjatta Huhta for their guidance throughout my work on the Thesis.

I also want to thank my wife Emma and my daughter Veera for their encouragement and understanding during this process which has taken a lot of time we could have otherwise spent together.

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Abstract

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Product businesses recognized the benefits of a formalized service development process years ago. In the service industry, however it is not often the case. The benefits of formalized service processes have slipped industry's attention, although companies are looking for cost savings from all possible areas. It is now the time for service businesses to look carefully into these opportunities. With a formalized service development process the lead time of service development projects can be significantly reduced, thus saving resources and leading to more satisfied customers. Even more notable benefits of formalized processes can be achieved with productization. With properly productized services a company needs only a fraction of resources to maintain the services in comparison with customer-tailored solutions.

The objective of this Thesis is to develop a new formalized service design model for the case company. The main goals of the new process are to shorten the service development time and to design well-productized and well-documented services. Since ITIL processes are already in use in the case company, it was natural to apply the service design process based on the ITIL v3 framework.

To achieve this goal, the Thesis starts with the literature review of service development theory and ITIL to develop the necessary framework. After compiling a conceptual framework, the current state analysis of the case company is conducted. The data are gathered from interviews and the researcher's own experiences, based on which the draft version of service design model is constructed. This model is then refined by testing it and subsequently analysing the test results in a brainstorming session.

As its outcome, this Thesis proposes a final service design model for the case company. The model was tested and evaluated during the study and it is supposed to enable the case company to implement a detailed process based on this model. The case company can achieve multiple benefits with the new service design model, including better productization, quality, reduced time to market and resource efficiency.

Key words	Service design, service development, ITIL, productization

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Formalisoidun tuotekehitysprosessin hyödyt on tunnistettu tuoteliiketoiminnassa jo pitkään. Palveluliiketoiminnassa näin ei kuitenkaan usein ole. Formalisoidulla tuotekehitysprosessilla pystytään lyhentämään kehitysprojektien läpimenoaikaa huomattavasti, säästäen samalla resursseja ja kasvattaen asiakastyytyväisyyttä. Tuotteistamisella saadaan vielä huomattavampia hyötyjä. Kunnolla tuotteistettujen palveluiden ylläpitäminen vaatii murto-osan reursseja verrattuna räätälöityihin ratkaisuihin.

Tämän opinnäytetyön tavoitteena on tarjota uusi formalisoitu palvelusuunnittelumalli kohdeorganisaatiolle. Olennaisimmat päämäärät uudelle prosessille ovat tuotekehityksen läpimenoaikojen lyhentäminen ja hyvin suunniteltujen tuotteistettujen palvelujen suunnittelu. ITIL-prosessit ovat jo käytössä kohdeorganisaatiossa, joten oli luonnollista että myös palvelusuunnitteluprosessi pohjautuu ITIL v3 viitekehykseen.

Päättötyö alkaa kirjallisella katsauksella palvelukehityksen teoriasta sekä ITIL-viitekehyksestä. Kun käsitteellinen viitekehys palvelusuunnittelulle on laadittu, niin kohdeorganisaatiolle tehdään nykytila-analyysi. Palvelusuunnittelumallin luonnos rakennetaan pohjautuen haastatteluihin sekä tutkijan omiin kokemuksiin. Tämä luonnos jalostetaan testaamalla ja testituloksia analysoimalla aivoriihessä.

Tämän opinnäytetyön tuloksena on ehdotus uudesta palvelusuunnittelumallista kohdeorganisaatiolle. Malli testattiin sekä arvioitiin työn aikana joka mahdollistaa yksityiskohtaisen prosessin käyttöönoton kohdeorganisaatiossa. Kohdeyritys voi saavuttaa useita hyötyjä uudella palvelusuunnittelumallilla mukaanlukien parempi tuotteistus, laatu, lyhentynyt aika jolla palvelu saadaan markkinoille sekä resurssien käytön tehokkuus.

Avainsanat	Palvelusuunnittelu, palvelukehitys, ITIL, tuotteistaminen

Contents

Preface

Abstract

Table of Contents

List of Figures

Acronyms

1 Introduction 1

1.1 Business Problem 1
1.2 Case Company Background 2
1.3 ITIL Framework 4
1.4 Objective of the Study 5
1.5 Scope and Structure of the Study 7

2 Method and Material 8

2.1 Action Research Approach 8
2.2 Data Collection and Analysis Methods 9
2.2.1 Interviews 9
2.2.2 Brainstorming Sessions 10
2.3 Research Design 11
2.4 Validity and Reliability 12

3 Best Practice of Service Development 13

3.1 Benefits of a Structured Service Development Model 13
3.2 Portfolio Management 15
3.3 Key Success Factors 16
3.4 Key Performance Indicators 18
3.5 Service Development Frameworks 20
3.5.1 ITIL Service Design 20
3.5.2 Productization 25
3.5.3 Service Blueprinting 26
3.5.4 Stage-Gate Model 27
3.5.5 Agile Service Development 28
3.5.6 Design for Six Sigma 29
3.5.7 User-centered Design 31
3.6 Conceptual Framework of Service Development 32

4 Current State Analysis 37

4.1 Current Service Development Model 37
4.2 Analysis of the Current Service Development Model 40
4.3 Findings from Interviews; Challenges and Recommendations 41

5 Development of the New Service Design Model 47

5.1 Recommendations for the New Service Design Model 47
5.2 New Service Development Model 55

6 Testing of the New Service Development Model 62

6.1 Test Description 62
6.2 Test Results 63
6.3 Internal Brainstorming Session 64
6.4 Modifications 65

7 Discussion and Conclusions 67

7.1 Summary 67
7.2 Managerial Implications 68
7.3 Validity and Reliability in This Study 69
7.4 Follow-Up 70

References 71

Appendices
Appendix 1. Interview Framework
Appendix 2. Example SDP Content
Appendix 3. Functional Design
Appendix 4. Technical Design
Appendix 5. Service Delivery Blueprint
Appendix 6. Service Design Package Used in the Test

List of figures

Figure 1. Case company service structure. 3
Figure 2. Action research cycle implemented in this study. 8
Figure 3. Research Design. 11
Figure 4. Life Cycle Costs (Sandberg and Strömberg 1995 328). 13
Figure 5. Challenges in new service development (Cooper et al. 2000 3). 14
Figure 6. Problems in the development portfolios (Cooper 2009 13). 16
Figure 7. The Metrics Tree (Office of Government Commerce 2007 45). 19
Figure 8. ITIL Service design processes (Office of Government Commerce 2012: 83). 21
Figure 9. Stage-gate model (Stevens and Dimitriadis 2005 177). 27
Figure 10. DFSS stages (adapted from Tennant 2002: 57). 30
Figure 11. SAP User-Centered Design (Weissenberger and Fellenz Thompson 2009). 32
Figure 12. Conceptual framework of a service development project (adapted from Office of Government Commerce 2007: 31). 33
Figure 13. Service design process (adapted from Best Management Practice 2009). .. 35
Figure 14. Current service development model in the case company. 38
Figure 15. The current service development project flow in the case company. 40
Figure 16. Business requirements in service development. 48
Figure 17. Change management in service development project. 49
Figure 18. Service level management in service development project. 50
Figure 19. Service design activities in service development project. 52
Figure 20. Service design lifecycle. 56
Figure 21. New service development model. 57
Figure 22. Part 1 of the new service development model. 58
Figure 23. Part 2 of the new service development model. 58
Figure 24. Part 3 of the new service development model. 59
Figure 25. Test layout. 62
Figure 26. Final service design model. 65

Acronyms

CSI	Continuous Service Improvement
CTP	Critical to Process
CTQ	Critical to Quality
DFSS	Design for Six Sigma
ISM	Information Security Management
ITIL	Information Technology Infrastructure Library
ITSCM	Information Technology Service Continuity Management
ITSM	Information Technology Service Management
KPI	Key Performance Indicator
OLA	Operational Level Agreement
QFD	Quality Function Deployment
POC	Proof of Concept
R&D	Research and Development
RFC	Request for Change
SAC	Service Acceptance Criteria
SCDB	Supplier and Contract Database
SDP	Service Design Package
SIP	Service Improvement Plan
SLA	Service Level Agreement
SLM	Service Level Management
SLR	Service Level Requirement
SoR	Statement of Requirements
TTM	Time to Market
UCD	User-Centered Design
WAN	Wide Area Network

1 Introduction

This Thesis focuses on developing a model for the new formalized service design process for the case company operating in the service industry.

1.1 Business Problem

Traditional product business organizations have recognized the benefits of a structured process for product development. In the service industry, this is not usually the case, and services in this sector are typically developed without formalized process. Service companies often perceive the service development as something that cannot be standardized and formalized because of the intangible nature of service products.

The same problem concerns the service development process. There are various models and frameworks for product development but very few of those have been investigated nor implemented in service industry. One of the popular frameworks for service development is ITIL. Information Technology Infrastructure Library (ITIL) service design is used as a reference framework in this study, because the case company has already introduced ITIL processes in the service operation and is willing to spread them to the service development. Other service development frameworks and models are investigated in this Thesis to find out the most efficient solution for the case company.

With a structured service development process an organization can achieve multiple benefits. It can accelerate time to market (TTM), save resources, increase the number of developed services, raise the customer satisfaction and increase sales. There are researches which point out the importance of speed in new product development. For value added services, or any services that use externally provided technology, speed is one of the most important factor. It takes time, first, to develop the technology first to support new features and then additional time is taken for the service development. Therefore, close co-operation with the platform vendor is necessary to be able to react in a timely fashion or even be proactive on the features.

Various researches also point to the benefits of involving the customer into the service development process; it keeps the company close to customer requirements and a step ahead of the competition. Often customer interaction is not formalized and thus, not utilized maximally. Therefore, customer interaction should be included and formalized in the service development process.

Finally, business practitioners know that very few of the initial ideas will eventually evolve into superior services. Therefore, it is important to make the Go/No-Go decision as early as possible in the service development process or restructure the design so that it meets the defined criteria. Having a stage gate process in place, the required business criteria will be evaluated after each step, which will decrease the risk involved in the new service development.

Therefore, to be able to developed productized services and maintain the quality for a service company, there must be a structured process for the service development designed. Moreover, since it is not easy to improve anything that cannot or is not measured it should be such a process that can be measured and improved.

1.2 Case Company Background

The case company is a managed security service provider company founded in 2000. Its service portfolio consists of telecommunication, security and hosting services which are based on a packaged services concept illustrated in Figure 1.

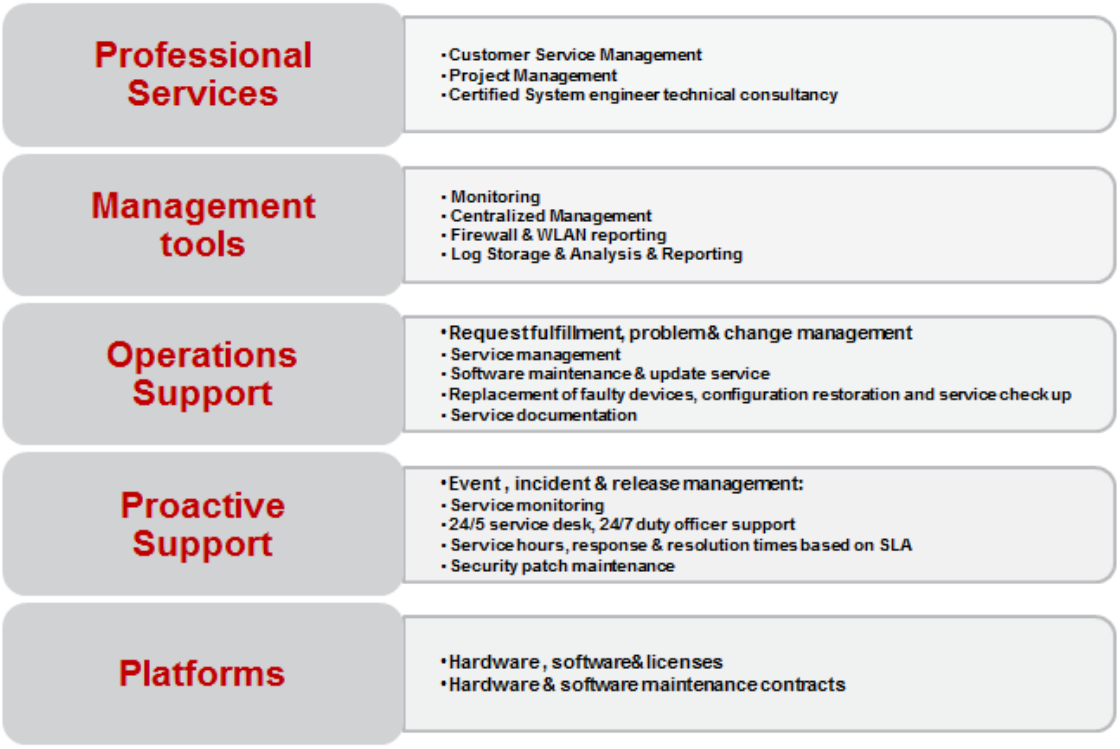

Figure 1. Case company service structure.

As shown in Figure 1, the service consists of a lot more than just the technology or device, which is used as a platform. Customers are able to purchase the platform by themselves, but they are looking for added value from all of the services on top of the platform. Many of these value added services require some amount of manual work from the system engineers.

Presently, the case company employs approximately 40 persons, and it has growth profitably during the whole period of existence. A rapid growth has affected also to the volume of services delivered which has put considerable strain on the company's service development, in terms of the required productization level of services. In addition, in 2011 the company was acquired by one of the leading telecommunication companies in Finland, and the volume of services is expected to increase even more rapidly. Case company has corporate wide responsibilities of key account management for large accounts and R&D of managed security, hosting and wide area network (WAN) services.

In the case company, productization is done well in the service catalogue, pricelist, marketing and sales but when the service is delivered and managed, uniform quality

and the functionality of the service relies only on the expertise of the system engineer. Current model is also hard to manage from the resource planning point of view; and the workload can only be shared with a very limited group of system engineer. Therefore, the service development does not currently meet the productization requirements throughout the service lifecycle.

As for the ITIL processes, they were introduced to the case company's service operation department in 2005. Since then, the processes have been improved and taken into use more comprehensively. In 2011 ITIL compliant continual service improvement (CSI) was introduced so it is natural that next step to continue with this strategy is to introduce service design and transition life cycles as they are tightly linked to each other in ITIL. Next sub-section gives more insights to this framework.

1.3 ITIL Framework

ITIL is a practical IT service management framework that is widely used in the industry. It supports businesses by providing identification, planning, delivery and support of the IT services (Arraj 2010: 3).

> If IT processes and IT services are implemented, managed and supported in the appropriate way, the business will be more successful, suffer less disruption and loss of productive hours, reduce costs, increase revenue, improve public relations and achieve its business objectives (Office of Government Commerce 2007: 3).

The ITIL framework consists of five lifecycle phases: service strategy, service design, service transition, service operation and continual service improvement (Office of Government Commerce 2007). The lifecycle starts with **service strategy**. It determines the customer needs and the service portfolio required to meet those needs. Further on, the IT resources and capabilities needed to successfully deliver and develop the services defined. Throughout the whole service lifecycle the IT must always try to ensure that the cost of the service is consistent with the value it delivers to the customer.

Service design ensures that new and changed services are developed efficiently to address the customers' requirements. The processes needed for service management are part of the service design phase. Additionally, the technology and architecture required to meet the business requirements are central part of this lifecycle phase. Service management systems and tools should be considered in a way that new or modi-

fied services can be monitored and supported in an appropriate level. The needs for measuring the efficiency and effectively of service levels, technology and processes should be considered when choosing the service management systems and tools. (Office of Government Commerce 2007; Arraj 2010)

In the **service transition** phase of the lifecycle, the design is build, tested and transferred to the production. This phase ensures that the service provides desired business value to the customer. Activities involved in the transition phase include change management, asset management, new or modified configuration items, service validation, testing and transition planning. With these activities, the production environment and support personnel are prepared for the service production (Arraj 2010: 3).

When the service is transferred to the production, **service operation** delivers the service on a daily basis, monitoring the functionality and status of the service. Service operation includes disruption management for the service. Incidents are handled in a timely fashion and root-cause analysis is conducted in order to improve the service. Other activities included in the service operation phase are, service asset management, trend analysis for recurring incidents and handling the end-user requests on a daily basis (Office of Government Commerce 2007).

Finally, the **continuous service improvement** (CSI) phase completes the lifecycle circle. It is not a separate phase as others but a continuous phase along the other phases. CSI offers a mechanism for measuring and improving the IT service levels and technology as well improving the efficiency and effectively of the service management processes (Arraj 2010: 4).

This Thesis concentrates mostly on the service design lifecycle of ITIL but also incorporates parts of the service strategy, service transition and CSI lifecycles, as they are closely linked with the service design lifecycle.

1.4 Objective of the Study

The objective of this Thesis is to improve the service development process in the case company to be able to productize the service already in the service development phase of the service lifecycle. At the moment, the final productization is done afterwards,

when the service is already in the production phase, which leads to the situations when services might change after several deliveries. Changing of service after the initial launch leads to protracted delivery projects. This Thesis aims to develop an ITIL-based process structure to make the productization in the service development phase possible, thus shortening the delivery times, saving resources and improving the quality.

The main research question for this Thesis is, thus:

How to improve the service development in case company with formalized process?

To be able to find the most efficient solution for the case company, the following sub-questions need to be answered first.

- What are the key success factors in service development?
- What are the correct metrics to measure the functionality of service development process?
- What are the outputs of service development process?

The outcome of this study consists of a proposal for implementing the ITIL-based service development processes in the case company.

In this study, current best practices in the industry are benchmarked to be able to evaluate the effectiveness of the process in the case company. The current state analysis is conducted in the case company, in order to find out the cause for the ineffectiveness of the current service development model. A draft model is constructed based on the findings from the current state analysis and from the internal stakeholder interviews. The draft model is then evaluated by piloting the new model with an existing service and the results are discussed in the brainstorming session with internal stakeholders.

1.5 Scope and Structure of the Study

The aim of this Thesis is not to provide a detailed process description for the service development, but rather evaluate different aspects of service development and suggest how these aspects could be linked into the ITIL framework in the case organization. Particularly the service design phase of service development is examined.

Therefore, this Thesis does not commit itself to the actual idea generation process and idea selection phase, but concentrates on service development phase. Moreover, an additional is to ease the service transition phase and to provide a framework for continuous service measurement and development. Actual research design, describing the contents of the research and methods used, are presented in the following section.

This Thesis first details the method and material used for this study. This is done in Section 2. Section 3 discusses the best practices of service development found in theory and industrial practice. Different aspects are evaluated and compared to the ITIL framework. A conceptual framework based on the theory research is proposed at the end of Section three. Section 4 analyses the current status in the case company. Section 5 introduces the first draft version of the improved service design model, structured based on the findings in the previous section and further refined based on the interviews with internal stakeholders. This is followed by the test description used to test the draft model and the interpretations of the results from the brainstorming session in Section 6. Finally, the study provides managerial implications for the new service design model and further improvement suggestions in Section 7.

2 Method and Material

This section discusses the method and material used in this Thesis and explains how the data was collected, processed and interpret. The study applies qualitative research approach, and action research is chosen as the major research method.

2.1 Action Research Approach

This study is conducted using the action research approach. Coghlan and Brannick (2005) define action research which takes into account the concerns of the practitioners aiming to improve the organization. McArdle and Reason (2006) point out that action research has traditionally been used in enterprises which are looking for more effective work practices.

In action research, research process is a cyclic process. Coghlan and Brannick (2005) present four basic steps in an action research cycle: diagnostics, planning action, taking action and evaluating action. An action research cycle used in this Thesis is illustrated in Figure 2 and explained more in detail in the following section.

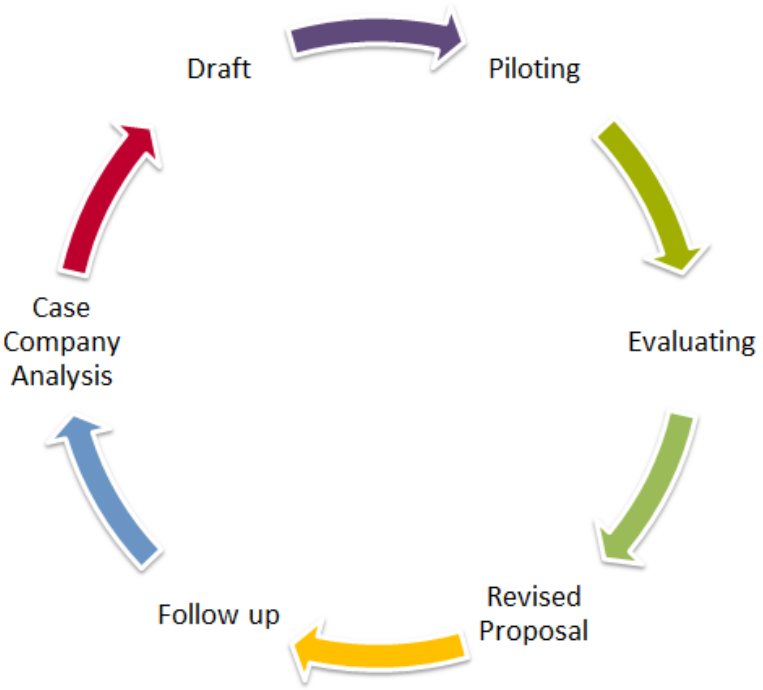

Figure 2. Action research cycle implemented in this study.

As illustrated in Figure 2, this Thesis consists of six consequent action research phases. Within each phase, the data is cyclically processed, analysed and evaluated for the next step.

In this Thesis, the first phase in the action research is the **case company analysis**. The current state analysis is conducted using existing documentation in case company and researcher's own experiences. The second phase is **producing the draft model**. The first draft of a service development model is constructed based on the case company analysis, theory research and the internal stakeholder interviews. The third phase is **testing of the draft model***.* The draft model is tested against an existing service, and the output is **evaluated** in the fifth phase. Further modifications to the draft model are implemented and brainstorming session is held with the internal stakeholders. The sixth phase is the **final proposal**. The final service development model is constructed based on the draft model and revised with the data collected in the testing phase. This phase ends with a **follow-up** which identifies further development needs and implications. These six phases form the action research design utilized in this Thesis. Next subsection describes the layout for the interviews and brainstorming sessions conducted in the first phase.

2.2 Data Collection and Analysis Methods

Interviews and an internal brainstorming session were used to collect date from internal stakeholders. This section explains how the data was collected and analysed from these sessions.

2.2.1 Interviews

To collect the data, four interviews on service development were conducted during the study. The interviewees were selected to represent the whole service development lifecycle from both managerial and operative point of views. The interviews conducted are shown in Table 1.

	Position	**Date**
1.	CTO	22.3.2012 ~ 1’40”
2.	VP Customer Service Operations	26.3.2012 ~ 55”
3.	CSI Manager	22.3.2012 ~ 45”
4.	Service Manager	22.3.2012 ~ 35”

Table 1. Interviews.

Firstly, the CTO, who has business responsibility for the service development and service portfolio, was interviewed. Secondly, the Vice President Customer Service who is responsible for the service operations, and therefore, has an insight to the functionality of the developed services and to the service delivery capability. Thirdly, the Continuous Service Improvement Manager who is in charge of the customer feedback and tracks the improvements proposals. Finally, Service Manager who is responsible for the daily operations in the service production was interviewed. All interviews were conducted during March 2012 in Espoo. The interviews were recorded and the notes were made from the interviews. The questions were provided beforehand to all the interviewees, which are included in Appendix 1.

The following themes were used for an open and in depth interviews: a) business requirements, b) service acceptance criteria, c) service design process, d) service level requirements, e) change management, and f) key performance indicators. The interviews aimed to widen the service development aspects which are important in the case company, and to discuss the concerns and challenges of service development. The interviews are analysed later in this Thesis in Section 5.2.

2.2.2 Brainstorming Sessions

After the first draft of service development model was developed and piloted, a brainstorming session was held to collect opinions on possible improvements and to discuss the draft version. Three of the participants were the same as who were

previously interviewed when the draft model was constructed. Additionally, Support Manager participated in this session.

The brainstorming session was held at the end of March 2012 in Espoo. The output from this session was analysed and compared against the draft model. The suggested improvements were then incorporated to the final service development model. The output from brainstorming session is analysed in Section 6.3.

2.3 Research Design

The study is conducted in the case company where service design and transition processes are assigned to the researcher's responsibility. Figure 3 below outlines the research design of the study.

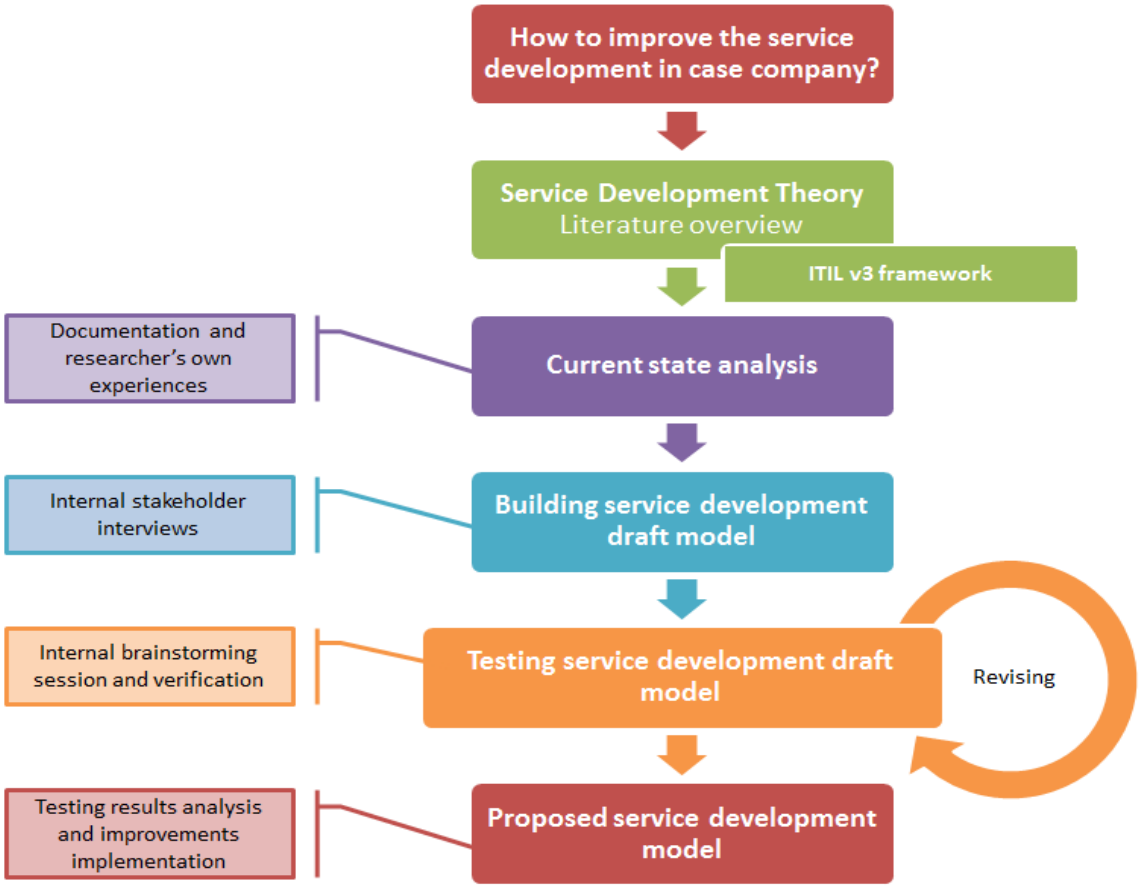

Figure 3. Research Design.

As Figure 3 shows, the researcher firstly examines the service development literature and other studies made in the field of service development and the ITIL v3 framework to form the conceptual framework of the study. Secondly, the current state analysis is conducted. Researcher is working in the case company and responsible for the service

design, and therefore, has access to the information for the analysis. Thirdly, a draft model is constructed based on the interviews with the internal stakeholder. Fourthly, the draft model is tested in practice with an existing service, and the output is analysed. Finally, the improved model is constructed based on the testing results and feedback received from the brainstorming session.

2.4 Validity and Reliability

Patton (1999: 1190) stresses the importance of reliability and validity issues for qualitative research and specifies three variables affecting the validity and reliability of a qualitative research; data gathering methods, credibility of the researcher and philosophical belief in the value of qualitative enquiry.

The validity and reliability can be evaluated with the following facts. First, the action research method used in this Thesis consists of construction, validation and testing phases before the final proposal. The Thesis is based on the existing knowledge and data collected in the case company. Second, the study does not contain only the views of the researcher but the researcher has collected perspectives and views from several people in the case company through interviews and in brainstorming sessions. All themes for the interviewees were provided well beforehand in order to avoid answering hurriedly and to give interviewees some time for consideration. The content of the interviews were reviewed individually during the interviews. Third, the people involved in brainstorming sessions have different amounts of experience in the case company from different aspects of the service development process. Finally, the researcher of this Thesis has worked several years in the case company and has throughout understanding of the current issues of service development. All these factors help to increase the reliability and validity of this study.

The following section presents a theoretical overview of to the industry best practices in service development and outlines the ITIL v3 framework.

3 Best Practice of Service Development

This section examines the fundamentals of service development viewed from different perspective. Additionally, a conceptual service development framework based on the best practices is constructed at the end.

3.1 Benefits of a Structured Service Development Model

Shekar (2007) argues that a formalized process for service development is directly associated with improved performance. He also notes that many companies which develop service development models are rather technology driven. Ojanen et al. (2008) investigate the similarities in the new service development and new product development. They found out that the success and failure factors in new service development (NSD) do not differ significantly from the factors in new product development factors. However, the intangible characteristics of services may have significant influence on the importance of the individual factors compared to the product development.

Decisions made in the R&D phase of service lifecycle may have a huge impact on the costs in future, as illustrated in Figure 4.

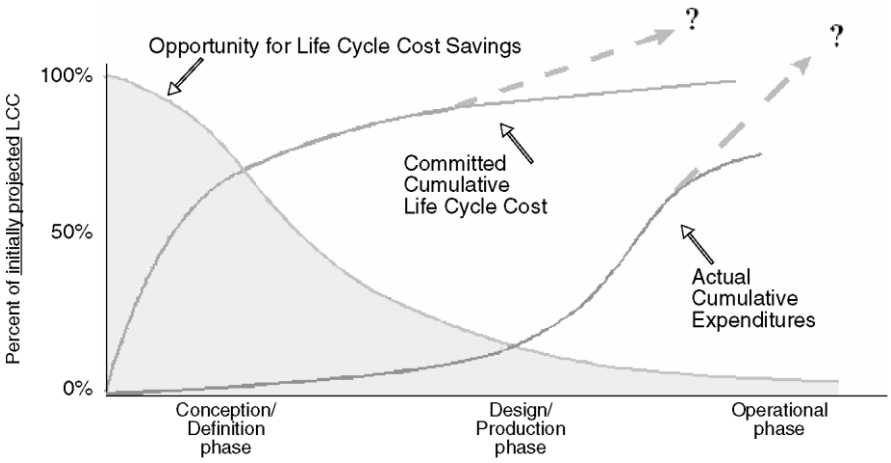

Figure 4. Life Cycle Costs (Sandberg and Strömberg 1995 328).

As seen in Figure 4, this increase in costs may occur due to a too short term decision making. If the lifecycle perspective is included in all stages of the service design, lifecycle costs can be reduced.

In order to achieve the strategic objectives set to the business, the services need to be designed and delivered to support these objectives. Kneller (2010) defines several benefits of a formalized process of service development, especially in ITIL; reduced and controlled costs, increased productivity, improved resource management and improved customer satisfaction.

There are many challenges in service development as illustrated in Figure 5.

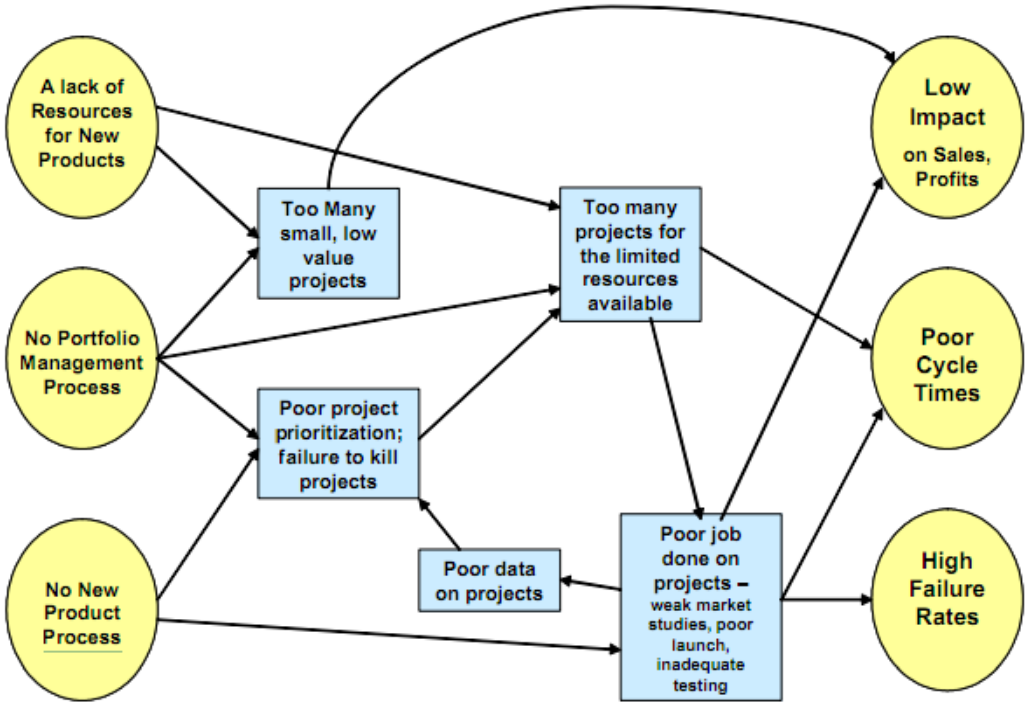

Figure 5. Challenges in new service development (Cooper et al. 2000 3).

As seen in Figure 5, many of the challenges and risks in service development are related to the service portfolio management which is closely linked to the service design phase. First, the service might not sell as well as was expected. Second, the time to market for the new services can be too long resulting to lost profits. Third, the customer does not see the value in the service. One of the main objectives of formalized service development process is to reduce the risk of failure. When success criteria are evaluated at each development stage the risk is reduced throughout the development phase. (Cooper 2008)

Kneller (2010) points out that a proper service design reduces the actual work load to deliver the service and also reduces the rework needed after the service is transferred

to the production. When the productization is done in the service development phase, it saves scarce resources and minimizes the overlapping costs.

3.2 Portfolio Management

Even though portfolio management process is not in the scope of this Thesis, it has significant influence to the actual service development.

An effective new service development process is part of the portfolio management for two reasons. Firstly, regardless of the portfolio processes and tools used, the input data from the service development process must be accurate. Secondly, the process should at minimum effectively discard poor projects. By discarding the non-profitable and labour-intensive ideas, the portfolio is made healthier. Cooper et al. (2000) note that this rarely happens in real life. In many companies, the lack of effective criteria for the service development decisions results in prolonged projects.

Portfolio management can be defined as a decision process which continuously updates and evaluates the list of company's active new product and development projects. This process revises, selects and prioritizes new projects, and re-prioritizes and discards the existing projects. For the active, new and re-evaluated, projects the resources are allocated and re-allocated.

However, the nature of portfolio decision process is uncertain and includes variable information. Choices are often dynamic and the decisions are often strategic which take also into account the relations between projects. The decision process includes or overlaps with the business's decision making process, such as periodic project reviews for all of the projects as a whole, new product strategy creation and making the continuation decision for individual existing projects. Portfolio management is also responsible of the high-level resource allocation. (Cooper et al. 1997; Cooper et al. 1999)

Traditionally, portfolio management methods are divided into four categories. Financial measures, business strategies, portfolio maps and scorecards (Cooper 2006: 23). The main goal of portfolio management is to create and maintain the most efficient and proficient portfolio, which is in-line with the company strategy. To balance the portfo-

lio, the amount, size and risks of the research and development projects should be considered. The problems in portfolio management are illustrated in Figure 6.

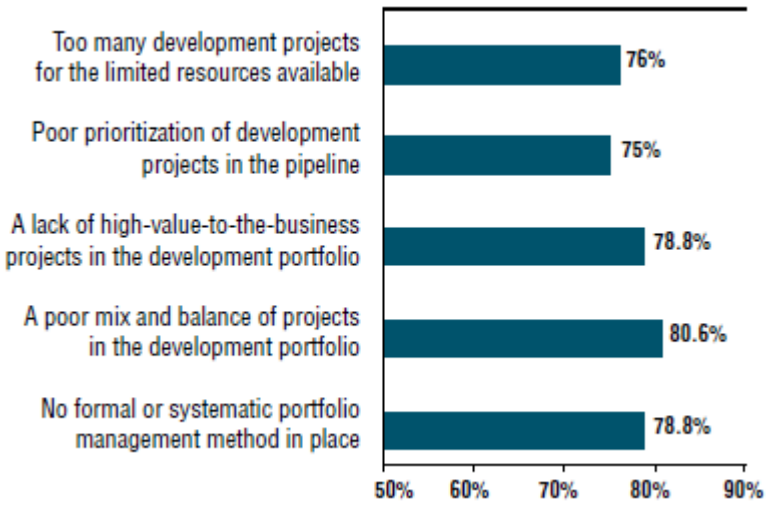

Figure 6. Problems in the development portfolios (Cooper 2009 13).

As visualized in Figure 6, organizations have various problems with portfolio management, which reflect directly to the service development time and resources. Cooper et al. (1997) assess portfolio management as a critical and vital senior management challenge. For many companies, the R&D productivity is the source of competitive advantage. The portfolio management thus aims to maximize the value of the portfolio and to properly and efficiently allocate scarce resources.

3.3 Key Success Factors

Montoya-Weiss and Calantone (1994) define two kinds of success factors in service development projects. The first concerns doing the right projects and the other one doing the projects right. Choosing the right projects means the evaluation of external or environmental factors, to which the project team cannot influence. Such success factors are, for example, the market force, technology and competitors, as well as the ability to exploit the internal capabilities. Despite the fact that the project team cannot influence these factors, they are useful when selecting and prioritizing the projects. Clearness of strategic direction and effectiveness of the service portfolio management are central to successful service product, but these factors lie beyond the scope of this Thesis. Doing the projects right means considering the process factors and action items, of which the project team has control.

Dörner et al. (2011) suggest a different approach. They divide the success factors of service development into two categories. The first factor, people related, refers to the direct involvement of the customer contacts, including the top management. With customer involvement, an in-depth knowledge about the customer needs can be acquired. Additionally, the customer contacts play a key role as they will be the ones who actually deliver the provided service. Their knowledge about the customer needs and the competitive service solutions can be used when defining the service. Additionally, Shekar (2007) weights the importance of interaction with the service staff and users in service development, and Hillebrand et al. (2011) conclude that companies which are closer to their customers can receive feedback and learn more from these customers, enabling them to react more quickly and more efficiently to the customers changing needs. Cooper (1999) recommends customer tests and field trials to achieve customer interaction in the product development.

Froehle et al. (2000) point out the impact of process formalization on service development speed. A formalized service development process can reduce the miscommunication, remove the activities that are not creating value and improve the whole project flow. This is especially the case when the new service is not already familiar to the company.

Gertz and Babtista (1995) revealed that the best performing companies develop new product lines in less than 24 months, while for other companies it took 2 months more. The difference was also noticed in product improvements and in expansions of the product portfolio.

One of the biggest reasons for the unsuccessful products and delays in product launches is the failure to define the service requirements before starting the development project. Target market, concept, benefits, features and specifications must be defined prior to the project initiation. (Cooper 1999: 5).

Other structural factors, as defined by Dörner et al. (2011), can be resource availability and market research and testing. Market testing and launch should be integrated to the new service development process. A formalized new service development process includes pre-defined stages and milestones as part of the process. A formalized pro-

cess will ensure that all the prerequisite information for service development exists and the development project can start. Cooper (1999) examines that too many of the projects transfer from the idea stage directly into the development stage, without doing any prerequisite research.

Service development often includes people with different background, expertise and professionalism. For this reason the service development project can be complex (Lees 2010). Therefore, good organizational planning means projects that are built across the multi-functional teams with a strong project manager (Cooper 1999; Froehle et al. 2000). The project manager should be focused and dedicated, having the responsibility over the whole project from the start to end. With multi-functional teams, views from different business areas can be combined to ensure developed service meets all criteria.

Summing up, the success factors of service development in this Thesis can be roughly divided into three categories; appropriate organization, customer orientation and well defined process. Section 3.4 examines the key performance indicators and how these factors can be measured.

3.4 Key Performance Indicators

In order to manage and control the design processes, key performance indicators (KPIs) have to be monitored and measured. The process measurements selected need to be appropriate for the capability and maturity of the processes being measured. Immature processes are no capable of supporting sophisticated measurements, metrics and measurement methods. (Office of Government Commerce 2007: 213-214)
Ojanen et al. (2008) argue that measurement of service development is significant for the management. Thus, they propose a "self-audit process" for the service development process, which could include questions taking the most crucial success factors into account. Office of Government Commerce (2007) recommends that the primary metrics should always focus on determining the effectiveness and the quality of the solution provided. Secondary metrics can then measure the efficiency of the processes used to produce and manage the solution. The priority should always be to ensure that the processes provide the correct results for the business. Additionally, Froehle et al. (2000) conclude that the speed should not be organization's sole development goal or

primary metric. Pollard and Cater-Steel (2009) recommend changing the type of metrics from traditional technology and application performance metrics to a metrics that are important to the customers. Customer-focused metrics, such as customer satisfactory surveys, can be used to collect valuable information to be used in the service development.

Office of Government Commerce (2007) specifies the "Metrics Tree", or "KPI Tree", as the most effective method of measurement. Many organizations collect measurement in individual area, but fail to aggregate them together and gain the full benefit of the measurements. Figure 7 is illustrative example of a Metrics Tree, which enables everybody within the organization to get a picture of the performance of the organization at the appropriate level.

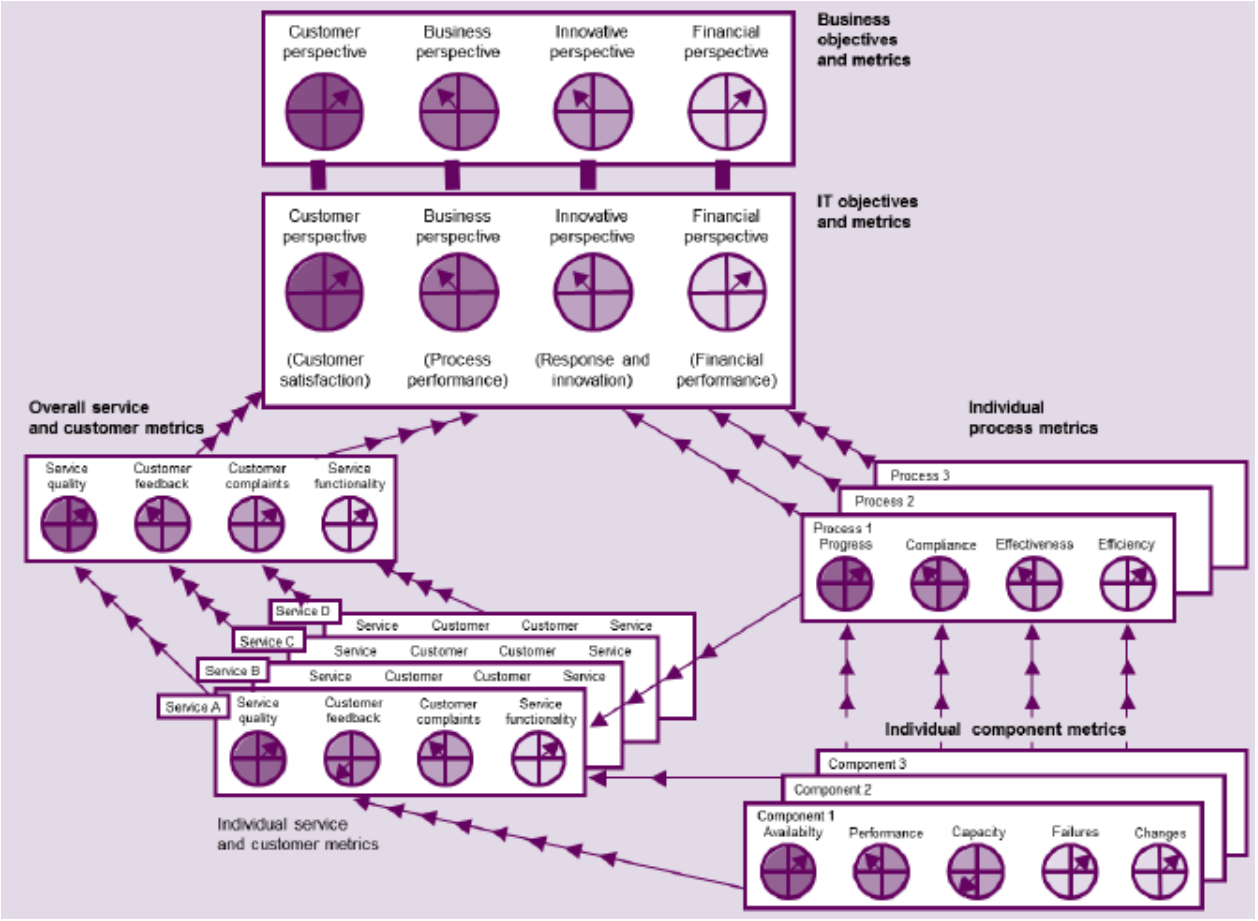

Figure 7. The Metrics Tree (Office of Government Commerce 2007 45).

As shown in Figure 7, the collection, analysis and presentation of this data can be a very labour-intensive activity and therefore should be automated wherever possible. To

be able to measure correct factors, those that are important to business, the service need to be documented properly. The documentation reveals the nodes which are important for a successful service delivery and should be measured.

3.5 Service Development Frameworks

The following subsections examine various industry best practices in the service development area. Frameworks and models are chosen based on the success factors examined in the previous section.

The goal of this Thesis is to build a new service development model. Therefore, the *ITIL service design* phase of service lifecycle is discussed. *Productization* is discussed to find out what the productization actually is and find ways to improve it, since one of the main issues in the current service development model in the case company is the lack of productization. *Blueprinting* is a method for productization and it can also be used to find out the customer interaction points in the process. *Stage-gate process* is widely used in the product manufacturing business and applicability to the service industry is examined. *Agile service development* is investigated to bring flexibility to the service development process. *Design for Six Sigma* (DFSS) and *User-Centered Design* (UCD) are explored to find out tools to take the customer needs and requirements into account in the service development process. All the frameworks help to construct the conceptual framework to meet the key success factors defined in Section 3.3.

3.5.1 ITIL Service Design

Information technology infrastructure library (ITIL) is a practical IT service management framework. According to ITIL, the main goal of service design is to design IT services to meet business needs. The design process should be aligned with the governing IT practices, processes and policies. Eventually, to meet the business needs the service design must fulfil the requirements for the service quality, customer satisfaction and cost-effectiveness. (Office of Government Commerce 2007: 23-26)

New or changed business requirements trigger the service design lifecycle stage and it ends to the designed service solution according to the business needs. That service solution with the service design package is then transferred to the service transition lifecycle stage where the service is evaluated, tested and deployed. Change can be

also to remove the service from the production. When these actions are completed the control is then given to the service operations lifecycle stage.

The processes considered important to successful service design are design coordination, service catalogue management, service level management, availability management, capacity management, IT service continuity management , information security management and supplier management. The on-going management and execution of the processes is considered important to the success of service design. Figure 8 illustrates the processes and their relations.

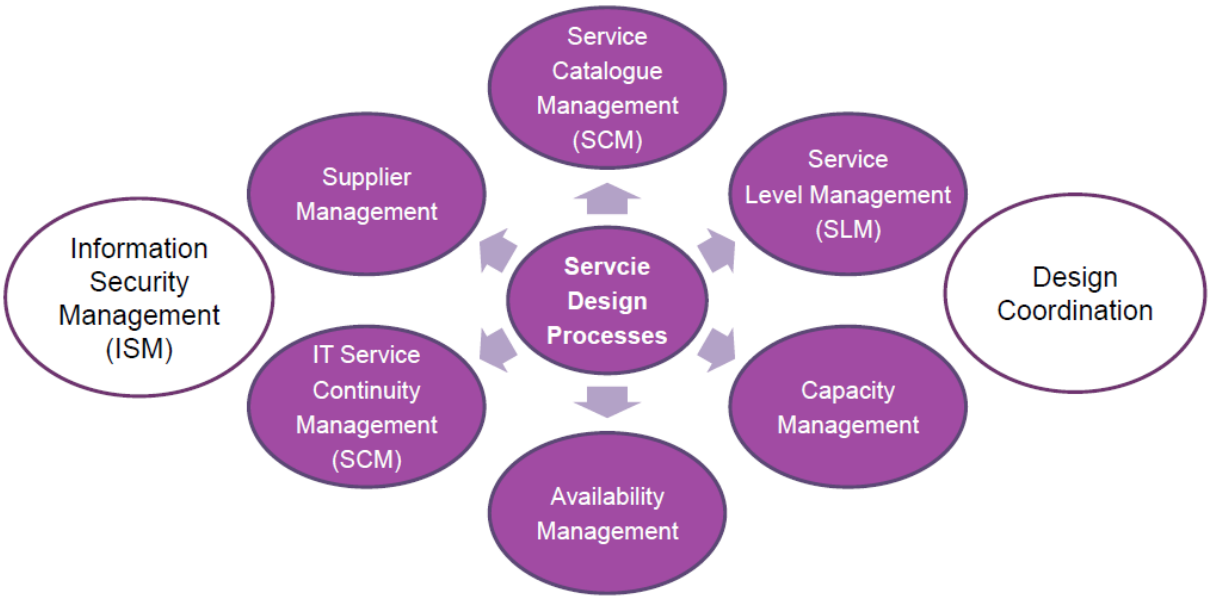

Figure 8. ITIL Service design processes (Office of Government Commerce 2012: 83).

The goal of service design is to design services which satisfy business objectives and which can be easily and efficiently developed and enhanced. Following goals are defined for the service design process and its supporting processes:

- Designing an efficient and effective service management system to manage services through their lifecycle
- Identifying and manage risks so that they can be removed or mitigated before services go live
- Designing secure and resilient IT infrastructures, environments, applications and information resources
- Designing of measurement methods and metrics for assessing the effectiveness and efficiency of the design processes and their deliverables

- Producing and maintain IT plans, processes, policies, architectures, frameworks and documents for the design of quality IT solutions
- Assisting in the development of policies and standards in all area of design and planning of IT services and processes
- Developing the skills and capability within IT by moving strategy and design activities into operational tasks
- Contributing to the improvement of the overall quality of IT service within the imposed design constraints. (Office of Government Commerce 2007: 23-26)

All these sub-processes are taken into account in the service design phase. The sub-processes and their individual goals are discussed below.

Design Coordination Management

The purpose of Design Coordination is to ensure that organizations meet the goals and objectives of Service Design by providing and maintaining a central coordination and control point for all activities and processes within this phase. (Office of Government Commerce 2012: 86-90)

The objective of the design coordination process is to ensure consistent design of appropriate services, service Management information systems, architectures, technology, processes, information, and metrics to meet current and evolving business outcomes and requirements. Design coordination is responsible of design activities across projects, changes, suppliers and support teams, and manage schedules, resources, and conflicts, where required. (Office of Government Commerce 2007: 86-90)

Service Catalogue Management

The purpose of service catalogue management is to provide a single source of consistent information on all of agreed services and ensure that it is widely available to those who are approved to access it. The goal of the service catalogue management process is to ensure that a service catalogue s produced and maintained, containing accurate information on all operational services and those being prepared to be run operationally. (Office of Government Commerce 2007: 60-64)

Service catalogue provides a central place for information about all IT services which the company provides. The information of all service in service catalogue must be ac-

curate and consistent. This information must be available for all business units. Service catalogue includes information that can be presented to the customers, containing the information how the service is designed to be used, business processes the service enables and the service levels that are delivered. (Office of Government Commerce 2007: 60-64)

Service Level Management

Service level management process exists to ensure that consistent measurements are implemented to all operational services. In addition it ensures that the services and provided reporting matches the needs of business and customers. The main aim of service level management process is to ensure the agreed service level is achieved for all provided and upcoming services. Proactive measurements are used to be able to improve the service. (Office of Government Commerce 2007: 65-78)

Availability Management

The goal of availability management process is to ensure that the availability target level of the service, required by the business, is reached in a cost-effective way. The purpose is to provide a central touch point for all availability issues, concerning all services and components. An integral part of availability management is the measurements and reports provided. Availability management is responsible that the availability targets are achieved in all areas and it is not possible without proper monitoring. (Office of Government Commerce 2007: 97-100)

Capacity Management

Capacity management plays an active role throughout the service lifecycle. Nevertheless a key success factor is to include capacity management in the service design lifecycle phase.

Capacity management process aims to secure required amount of cost-justified capacity in all areas of service at a right time. The process ensures that all current and future services have needed capacity available to provide the service according to business requirements. The purpose is to provide a focal point for all capacity and performance related issues concerning all services and service assets. (Office of Government Commerce 2007: 79-83)

IT Service Continuity Management

The goal of IT service continuity management (ITSCM) process is to support the comprehensive business continuity management process. It ensures that all IT required technical components and facilities can be resumed within a time that is agreed and required by the business. Because the IT is a core component of the most business processes, continuity management and high-availability are critical tasks functions for the business survival. This can be achieved by implementing measurements that reduce risks and improving recovery solutions. Successful implementation of ITSCM requires the support of all members in the organization and especially the commitment of top management. The recovery capability requires continuous maintenance in order to be effective. The purpose of ITSCM is to maintain continuous recovery capability in the organization for all IT services and resources. (Office of Government Commerce 2007: 125-128)

Information Security Management

The purpose of information security management (ISM) is to keep the security aligned with the business. It ensures that information security is managed efficiently in all services and service management functions. ISM needs to be considered throughout the whole corporate governance framework. Corporate governance is a set of responsibilities and practices which aim to provide a strategic direction in regards of proper risk management and effective use of resources. The purpose of ISM is to provide a focal point for all IT security aspects and to control all IT security functions. (Office of Government Commerce 2007: 141-146)

Supplier Management

Supplier management process aims to control the suppliers and the services they are providing in a way that quality and cost-effective services can be provided for the business. The purpose of this section is to increase the suppliers' knowledge and understanding of the company's business context and how the supplier can best support the business targets. (Office of Government Commerce 2007: 149-152)

It is crucial that supplier management processes and planning are involved in all stages of the service lifecycle. When complex set of IT services is delivered, to meet the business requirements, many skills and capabilities are needed, therefore the use of suppliers and the services they provide are a central part of any end-to-end solution. Sup-

pliers and the management of suppliers and partners are essential to the provision of quality IT services. (Office of Government Commerce 2007: 149-152)

3.5.2 Productization

Presently, companies are looking for tangibilization of the intangible service structure. Structuring the service products to modules enables a company to combine these service modules to a tailored solution (Bask et al. 2010). When the service structure is clearly defined and documented, the staff has good overview of the service catalogue. In that case, the service delivery, management, development and marketing are made easier. (Sipilä 1996)

The idea behind tangibilization is to present the intangible service assets in a tangible form. With tangibilization the amount of decisions is limited and there are strict limitations set on those. In other words, some of the decisions have been made beforehand so that the activities and decision in the service production are controller. (Hyötyläinen and Möller 2007)

Parantainen (2007) concludes that when standardized courses of action are used it reduces the time needed for project resource planning and a company is able to deliver higher amount of services with the existing resources. Resources needed in the service delivery can be reserved beforehand, if the workflows and previous projects are documented properly.

Even the most inexperienced employees can deliver a productized service project if the service is documented in a detailed level and shared among the employees. Documentation of the service products makes the company independent of an individual employee and eases the training of new personnel. (Sipilä 1996, Parantainen 2007) Determined documentation highlights also the strengths and weaknesses of the service, providing opportunities for service improvements. Even though the service should be documented on a very detailed level it is recommended to leave room for tailoring, to be able to meet the changing needs of a customer. (Parantainen 2007)

3.5.3 Service Blueprinting

Hyötyläinen and Möller (2007) examine the service development method called service blueprinting. Blueprinting includes four stages. First, the service delivery process should be broken into steps and workflows. Second, the points where the performer has too much freedom over the decisions, has to be identified and isolated. These points are potential for failures and errors. Third, appropriate timeframe for the service should be defined. Fourth, service should be analysed, so that workflows and steps which do not generate any profit can be identified.

Dörner et al. (2011) discover that blueprinting of the service delivery process will generate many benefits. The initiation points for creating a blueprint are services which are immediately visible to the customers. First, all the required tasks and quality requirements are defined. The quality requirements for all the actions that are visible to the customer need to be relatively high. The prerequisite information for the service delivery process is determined in order to find out the needed skills and resources. According to Gersch et al. (2011) service management and marketing utilizes blueprinting for visualization, analysing, organizing, control and development of the service delivery process. Service blueprinting pinpoints the parts in the process where the customer interaction between the service provider and customer happens.

Blueprinting process and the document generated from the process gives insight to the interdependencies between the roles and functions throughout the delivery process. Customer actions and interactions are highlighted and the points where the customer experiences quality are revealed. Blueprinting reveals all the points in the service delivery process which are critical for customer requirements and helps the company to identify the points which are potential to cause a service failure. (Bitner et al.2008)

Even though the service blueprinting is designed and mainly used in retail sale services, it can be utilized in the large scale corporate services also. Especially specific parts of the service lifecycle, like service delivery, can be blueprinted to improve the process.

3.5.4 Stage-Gate Model

Cooper et al. (2010) suggest that stage-gate approach can be utilized to balance the portfolio and to observe the research and development projects. Stage-gate consists of stages and gates as named. There are five stages most commonly used as illustrated in Figure 9.

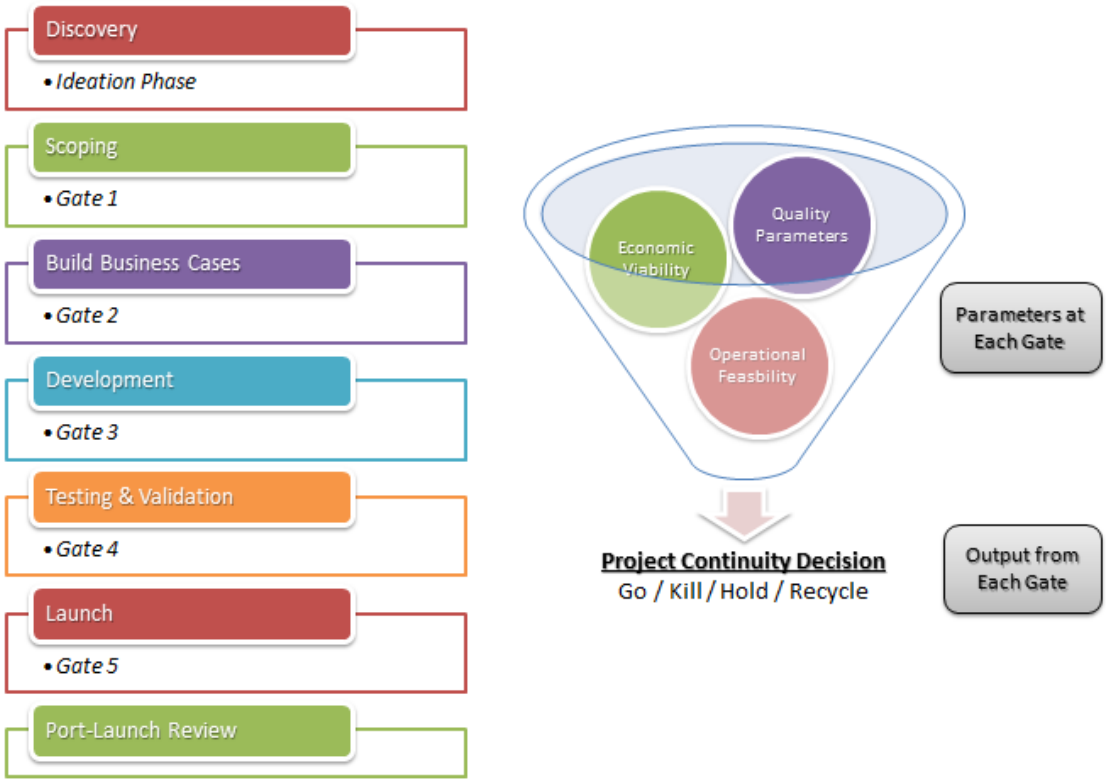

Figure 9. Stage-gate model (Stevens and Dimitriadis 2005 177).

As seen from Figure 9, each stage consists of activities like data collection, service development and design. At each gate data is evaluated against predefined criteria and decision, whether to continue with the development or not, it made. (Cooper 2008)

Every stage is constructed to collect the uncertainty and risk factors in the project. Additionally, the costs are increased at every stage but also the information becomes more accurate which lowers the risk. Not any of the stages are on one organizational unit's responsibility. Some stages are emphasized more to some units, but the idea is that different unit's work in parallel rather than like serial production. (Cooper 2008)

As illustrated in Figure 9, every stage is followed by a gate which functions as a quality control point where collected results are evaluated. If the results are not satisfactory, the project can be quitted or returned to previous stage. (Cooper 2008)

Stage-gate model has also been criticized for the lack of strategic view. Lee et al. (2008) suggests roadmapping as one solution to overcome the limitations in stage-gate model. Cooper et al. (2012) introduces two approaches for evaluating the strategic fit of projects. Bottom-up approach defines the strategic criteria directly into the project selection and prioritization tools. In this case the strategic alignment is evaluated by including numeric criteria in the tools that are used to make the continuation decisions of the projects. Top-down approach starts with the business requirements and the budget is agreed and funds shared among the projects leading to specific set of projects.

Becker (2006) examines that other common concerns related to the stage-gate model are sluggishness and high operating and implementation costs. It is also conceived to treat all projects and products the same way, which kills innovation. Nevertheless Becker (2006) points out that these criticized factors are problems in the way the company has implemented stage-gate process and also that technology development, market development and managing idea pipelines should not be managed like a product development activity.

Usually things are done correctly, but it must be also ensured that correct things are done. In a stage-gate model at each gate criteria are ensured that the development is aligned with the strategy and business requirements.

3.5.5 Agile Service Development

Stage-gate process has been criticized about the formality and inability to adapt changes during the process (Becker 2006: 5). Influences from agile service development can overcome the limitations in the stage-gate model. Preston (2007) defines flexible product development as a tools and strategy which are needed to add flexibility to the new product development process. It aims to improve the responsiveness of the process. According to Preston (2007) the flexibility of a development project can be improved by keeping the option open in development projects and delaying the deci-

sion making. As a result the cost of unexpected changes in the projects can be minimized.

Smith (2008) recommends adding flexibility to the development process. To add flexibility it has to be included already in decision making stage. In practice the decision making is prolonged as long as possible and the decision is made on the last moment it is necessary to make. The data can be gathered and risks reduced all the way to the point when the decision is made. Other tool used for flexibility is the experimentation, including prototyping, testing and simulation. With these methods the service designer is able to examine the new technology and make the decision, whether to use it or not, after testing. Third tool is flexible project management. Unlike traditional project plan, a flexible project defines short term plan and shallow top-level plan.

As Smith (2008) states, the flexible development is not always the most optimum method. It depends on how many changes are likely to be implemented during the development project. If it is unlikely that there will be changes, traditional phased project is more cost-effective and resource-effective. However, if changes are likely, the phased project will probably be more expensive as there will be much re-work and undone decisions. Preston (2007) stresses also, that the flexibility tools and techniques should be implemented selectively to some projects or to portions of projects. Applying flexibility in wrong projects can have drastic consequences to the costs and to the end result.

3.5.6 Design for Six Sigma

According to Tennant (2002) the DFSS methods concerns wider, deeper and more integrated approach for commercial service design. DFSS is based on the DMADV concept and tools. Some of the tools are common for all DFSS methods, because DFSS works with the services and not with the processes. There is a lot of emphasis in customer analysis and how the customer requirements and needs are taken into account in the process. As the service is often completely new, error and failure testing are important, therefore modelling and simulation tools should be concerned to evaluate and measure the service performance. The lifecycle phases in the DFSS project are described in Figure 10.

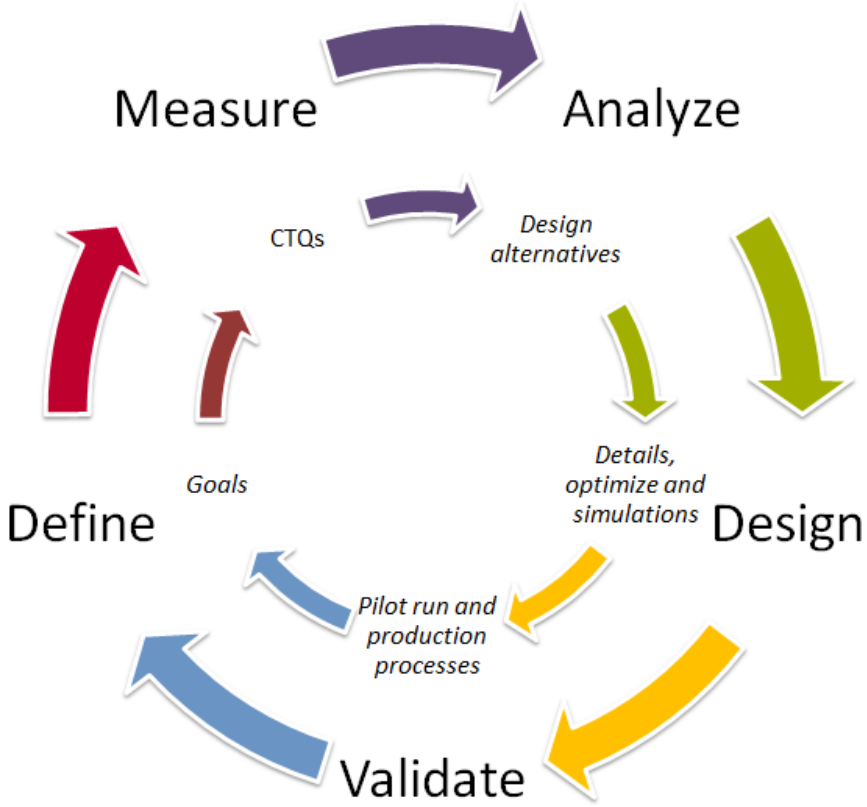

Figure 10. DFSS stages (adapted from Tennant 2002: 57).

As shown in Figure 10, the start of a DFSS project is the **define** phase. It includes benchmarking, customer surveys and analyses. Define phase is followed by the **measure** phase. In this phase the customer and the requirements are collected and analysed. Most of the work in this phase is conducted with a method called quality function design (QFD). QFD is transforms the customer requirements into design quality and in this particular phase the aim is to identify the most important critical to quality (CTQ) factors to measure and evaluate the design. The next phase is **analysis**, which evaluates the concept and requirements which business has produced for the new service. In this phase the design is refined to a functional design and another QFD round is performed to identify the features required to meet the CTQ factors. At the end of analysis phase the CTQ measurements are replaced with critical to process (CTP) measurements. The end result from this phase is a group of design concepts and CTPs which restrict the technical design function. The **design** phase evaluates the functional design using the previously defined CTPs. Project team creates the technical design and refines it to a simplified service solution design. The simulation of the process and the service is an important tool in this phase. The final phase is **validation** in which

the service functionality is tested. The service cannot enter the market without piloting and refining in any circumstances. The team can use piloting or small scale implementation to test and evaluate the performance in a real-life environment. Nevertheless, this phase is only for minor fixes and should not contain any large scale re-designing. Finally, when the whole DFSS circle has been completed the service transforms to the production and the production process owner takes responsibility of the service. Additionally, the CTQ measurements and monitoring are taken into use for the new service. (Mazur n.d.; Tennant 2002)

Unlike the traditional Six Sigma, DFSS tries to prevent a failure rather than just react on failures found. Office of Governance (2007) recommends the use of DMADV for development of new processes at a quality level. DFSS defined methods to include customer or user to the development process and stresses the quality aspects of the service or product.

3.5.7 User-centered Design

There is an international standard (ISO 13407: Human-centered design process) for user-centered design activities. Even though there is a standard for user-centered design (UCD), it does not define any exact methods to be used, but rather suggest general process on how the people related aspects should be taken into account. (Usability Professionals' Association n.d.)

When the need for human centered design has been identified, there are four activities defined for a successful human centered design. First, the context of service is determined. For example, people are identified who will be using the service, how they are going to use it and in which circumstances they are going to use it. Second, the business requirements and the critical success factors are identified. Third, the design solution is constructed. This phase can be divided into separate stages, from the raw concept to a final design. Finally, the proposed design is evaluated. The evaluation phase is the most important part of the process. The evaluation should be performed with the usability testing and ideally should include the actual users. The process is completed when the requirements are fulfilled and the service is ready for the launch. Figure 11 describes the user-centered design used by SAP. (Usability Professionals' Association n.d.)

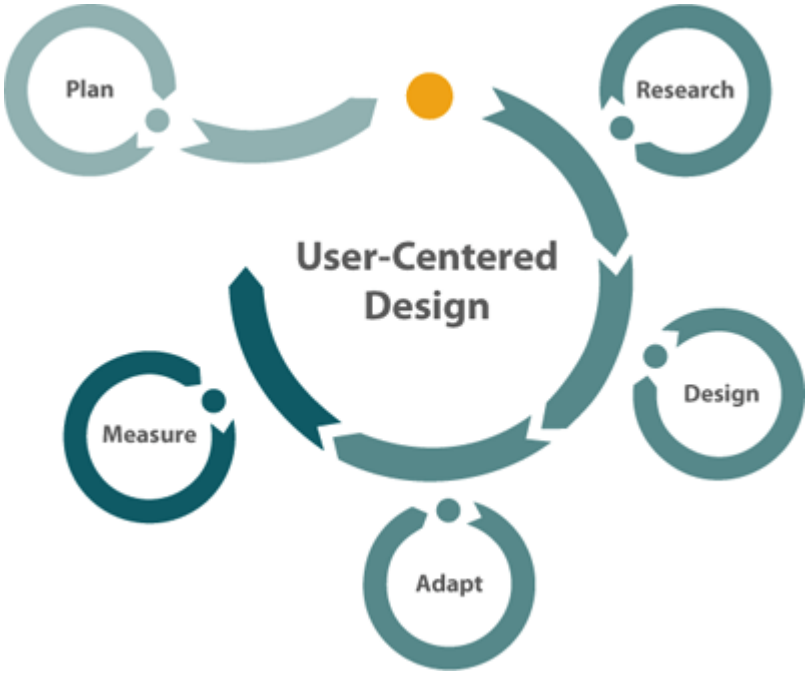

Figure 11. SAP User-Centered Design (Weissenberger and Fellenz Thompson 2009).

As illustrated in Figure 11, the UCD- model can be used to improve the design by running the cycle for multiple times. UCD is similar to the DFSS in many customer involving activities. In the IT services field, this method can be used especially for the services that include high level of user interaction when used, such as web services.

3.6 Conceptual Framework of Service Development

None of the previously discussed frameworks are applicable for a company as they are. The framework needs to be tailored for the needs of the company. Therefore companies should find the appropriate model for them by adjusting the existing frameworks by testing and validation.

Stevens and Dimitriadis (2005) recommend executing every step in the process in a quality manner. To ensure the quality, the risks should be reduced by exploring new combinations and new ways of data gathering. This suggests that the possible solutions are evaluated at each step and to the team to select the most efficient combinations. Therefore, it is important for the service development framework construction to identify the main stages of the process, understand the decision-making criteria and to

identify the patterns that can lead to a general framework. The overall framework for a service development project is illustrated in Figure 12.

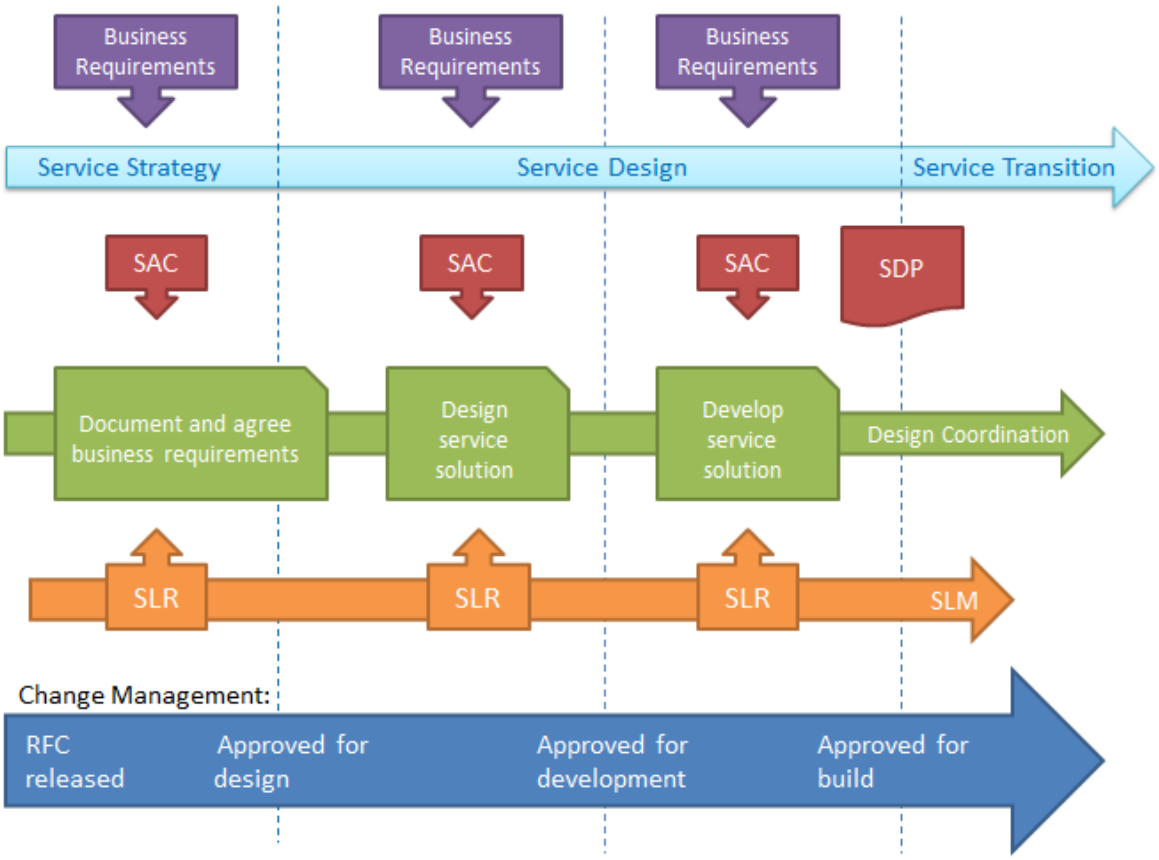

Figure 12. Conceptual framework of a service development project (adapted from Office of Government Commerce 2007: 31).

As shown in Figure 12, firstly business requirements need to be defined and documented in co-operation with Service Strategy stage, and Service Acceptance Criteria (SAC) are defined and evaluated. SAC's are like gates in a stage-gate model, where the criteria are evaluated and the decision whether to move to the next stage is made. The first version of design document is created which defines the business requirements for the service. Secondly, the service solution design is created and again evaluated against SAC's to ensure business requirements are met. In this stage, the design document is refined with the technical aspects of the service and the overall solution is defined. Finally, the service solution design is further development and prepared for the service transition. Here, the design document is further refined, the service solution is blueprinted and all the technical aspects are defined resulting to a Service De-

sign Package (SDP). SDP includes all the information needed in the service transition stage. (Office of Government Commerce 2007: 23-34)

Service design incorporates several supporting functions; capacity management, availability management, continuity management and security management. These supporting functions are involved in the design and development stages in of service development lifecycle. *Design Coordination* has overall responsibility of the whole project and its output. Additionally, business requirements and service level requirements (SLR) are evaluated at each step throughout the service development project. Business requirements define the service level requirements, which then need to be negotiated and agreed by the supplier management process to ensure that SLA can be guaranteed.

Change management is responsible for the decision at each step as described in Figure 12. First, the change management makes the decision if the service is accepted for design. Second, the service is accepted for development. Third, the service is accepted to build, and the service transfers to the service transition phase. The service development project is responsible of the data to the change management process – to which all the decisions are based. (Office of Government Commerce 2007: 23)

Figure 13 illustrates the service development project transfer from the service design lifecycle to the service transition lifecycle.

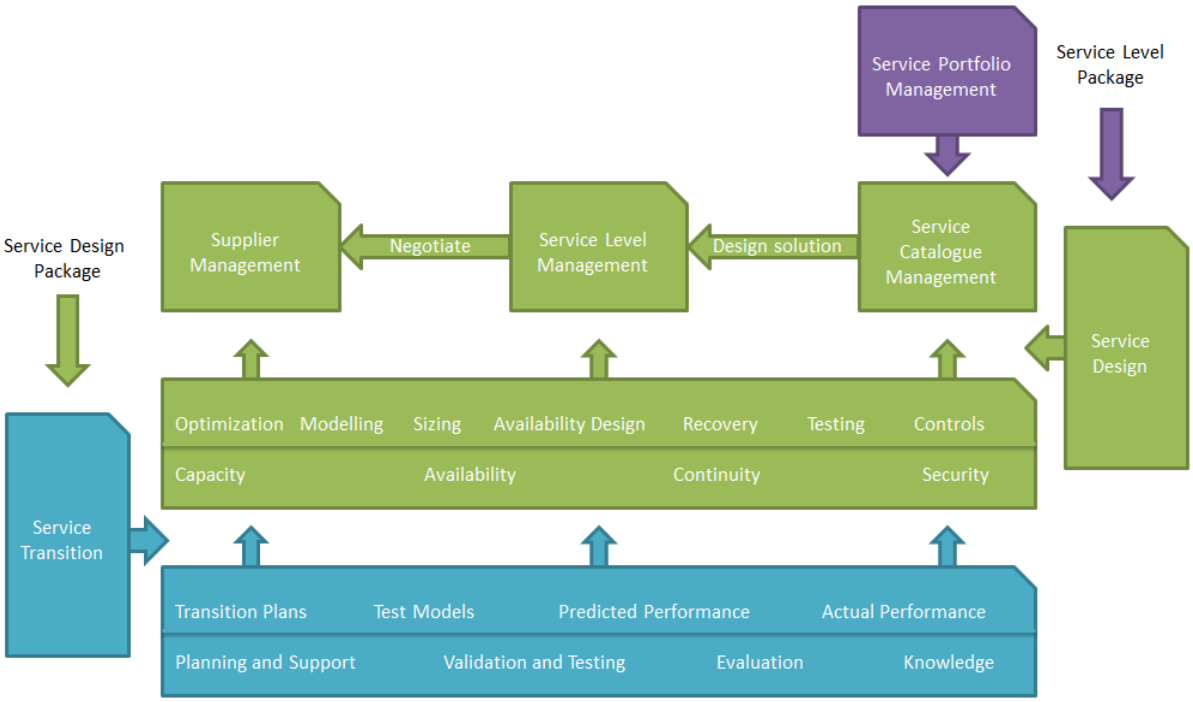

Figure 13. Service design process (adapted from Best Management Practice 2009).

As shown in Figure 13, all aspects of the service are design prior to transferring to the transition phase. The definitions, of what needs to be tested and what tasks need to be performed in order to successfully launch the service, comes from the service design lifecycle. The testing and other necessary actions are performed in the transition phase. As a result of the validation and testing performed in the transition lifecycle, the service can be reverted back to the design phase, as described in Figure 13. (Office of Government Commerce 2007: 30)

Summing up, even though there are many important factors in service development and especially in the service design lifecycle, they can be tackled bearing in mind several key considerations. These key considerations create a conceptual framework which, basically, consists of the following parts. *Portfolio management* is closely linked to the service design and therefore has big influence on the success of service development. *Adequate resources* and *appropriate organization* are the basis for efficient service development; without management support service development cannot be successful. On top of the appropriate organization there have to be a *well-defined process*. This process needs to take into account business requirements which include customer requirements. The process itself and the output from the process need to be well documented to be able to measure the functionality and to exploit the develop-

ment work in the operational level. Finally, an idea turns to an innovation only when it has been successfully implemented and adds value to the customer. It means that the customer perspective and the human resource factor should be taken into account. Additionally, there are several matters, based on ITIL, which need to be taken into account. The sub-processes in ITIL framework ensure that all relevant matters are considered and documented properly. All these together, are needed for a successful service development model.

The next section discusses the current state analysis in the case company and compares the results in this section to the existing case company model.

4 Current State Analysis

This section examines the current service development model in the case company. Subsequently, the current model is compared to the conceptual framework and service design factors introduced in the previous section.

4.1 Current Service Development Model

As previously profiled the case company is fairly small, having approximately 40 employees. Therefore, the resources allocated for service development are limited and there are no dedicated personnel for this function. All roles, with service development responsibilities are virtual, and the tasks are carried out alongside the personnel regular responsibilities. CTO has the responsibility of the service portfolio and the service development strategy, but he has also other responsibilities in the case company. In the service operation departure, there are service owner teams which are responsible of the service functionality, and there is continuous service improvement manager who is, as named, responsible of the improvements to the existing services.

Currently, the case company is providing only packaged services. Compared to many of its competitors, the case company is doing well with the productization. Services are highly productized all the way until the service comes into the service delivery and operation. Currently, the productization is, also performed, but it is rather loosely documented. Therefore, services personify in specific individuals. This has led to a situation when the company is dependent on specific individuals and training of new employees takes a long time. Moreover, the business model is based on the monthly service invoicing so every delayed month is directly out of the cash.

Presently, there is also no formal process in use for service development. The current service development model in the case company is presented in Figure 14.

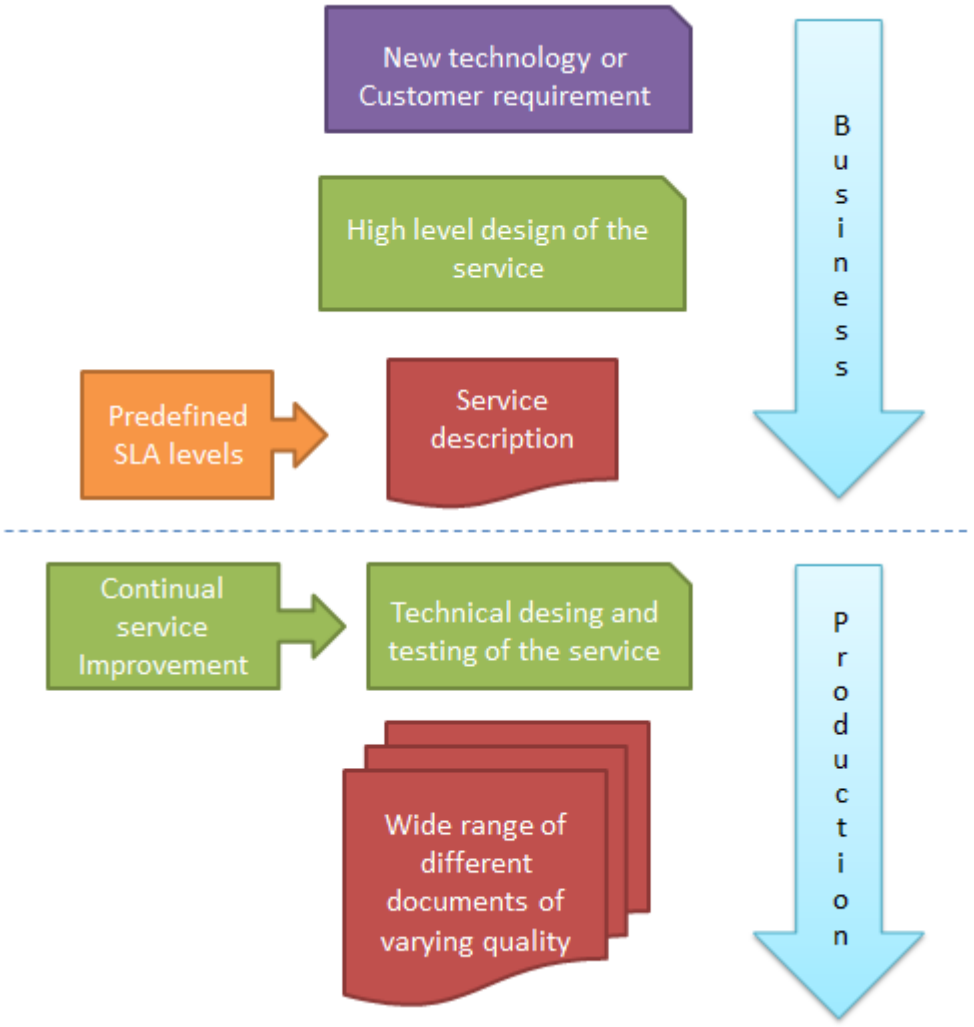

Figure 14. Current service development model in the case company.

As shown in Figure 14, new technology or customer requirement trigger the process. The process starts with the construction of a high-level design based on the vendor material and manuals. Case company uses standardized SLA categories, so there is no need to adjust SLA-levels for the new service. Only the level on which the service can be delivered is determined. Based on the high-level design and the SLA target, the service description is constructed. After the service description is available, the service is incorporated to the price list, and sales team is informed and trained. This is when the new service development is transferred to the production stage (lower part, in Figure 14).

New service development process then proceeds to the production phase where the detailed technical design is constructed based on the high-level design and service de-

scription. When the technical design is ready, there are various operational documents created. However, these documents are not standardized, which has led to a wide range of existing documents.

These documents are mainly developed for the daily maintenance purposes, so they rarely include any basic information about the service. Thus, the service description is the only place where the information about the service is stored. This is problematic for two reasons; first, it is rarely updated after the service has transferred to the production phase; and second, it is a document that is visible to the customers and therefore cannot include a detailed technical description of the service. Because the service operation does not have detailed information how the service is supposed to function, it creates uncertainty and many of the services have personified in individuals.

Currently, there is also no formalized change management process, so that it is done ad hoc when needed. This provides great flexibility to the service development process and an opportunity to make changes to the service during the development. However, because the changes in the service's basic functionality or in service delivery process are not documented anywhere, it is not possible to measure how the changes affect the functionality of the service or track down what has caused the changed behaviour. Finally, when the new service is implemented in the first customer environment, the CSI manager receives feedback from the customer, and the service is improved based on the feedback.

Thus, it can be concluded that, the service development process is currently isolated, and there is a weak connection between business and production. This increases the information exchange back and forth, when instead the information could be documented and shared to the project. Since, the information exchange suffers from the segregation, proper lifecycle management is not possible. It can be said that, presently, the process skips the whole service design part and jumps from service strategy phase directly into the service transition phase. Moreover, the current CSI model is concentrating to the operational functionality of the service. It would provide more benefit if it would look the service as a bigger unity.

Even though there is no formal change management process, it does not mean that the initial design would not change during the service development project. On the contrary, it adds flexibility and agility to the process as the changes can be implemented on the fly. Nevertheless, not all aspects of the service solution get acknowledged and, therefore, the risks of service failure will increase.

4.2 Analysis of the Current Service Development Model

In Figure 15 the current service development model is transformed into the similar frame as the conceptual framework developed in Section 3. There are common parts with ITIL framework, but one major difference is the lack of lifecycle view. The requirements and criteria are not evaluated throughout the lifecycle but as spot check in the beginning.

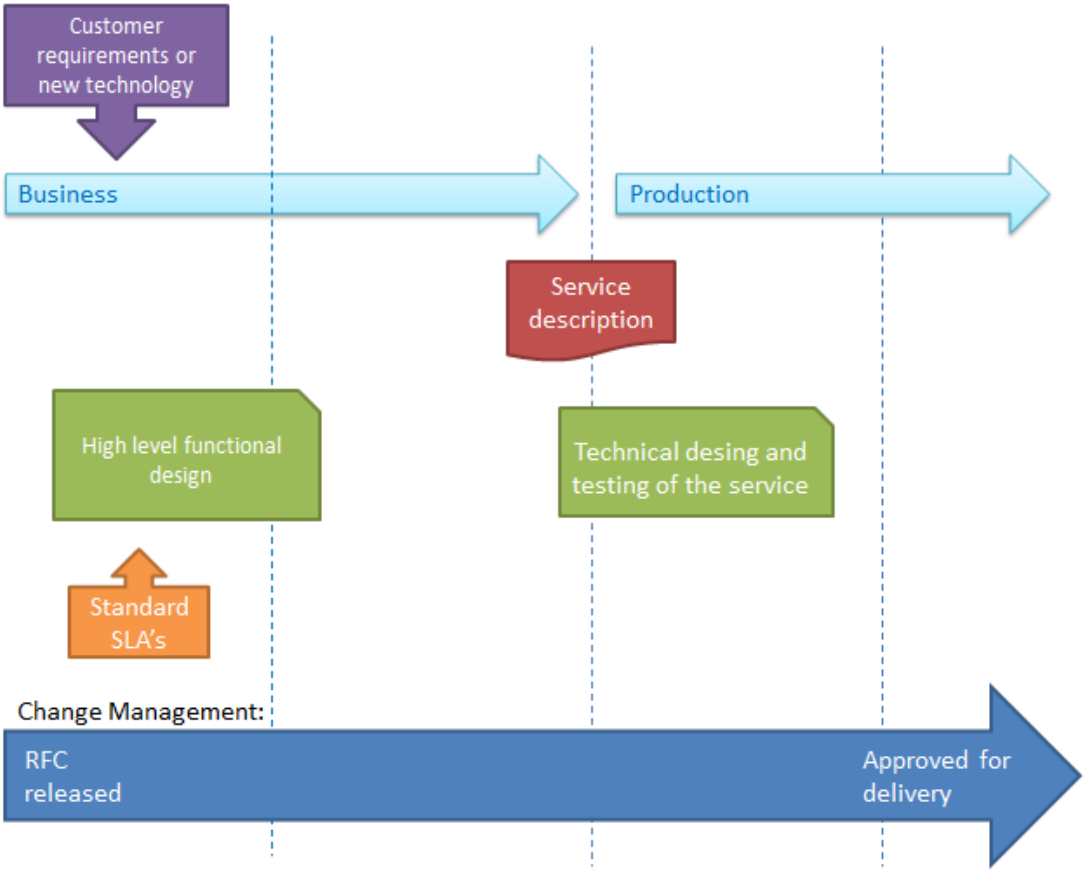

Figure 15. The current service development project flow in the case company.

As Figure 15 illustrates, there are several critical parts missing in the current case company model. The business and customer requirements are currently evaluated only

in the initiation of the project. Additionally, there are no service acceptance criteria evaluated along the project and the change management is shallow.

Currently, this model does not provide any basis for the effective service transition to the operation stage and it solely relies on the hope that everything goes as planned. In the worst case scenario, the developed service does not match the needs defined in the beginning, because those needs are not evaluated in the project. Further on, in case of changes in the service design, they are not managed in a formalized manner.

In order to improve the existing model there are obvious stages and activities to be included in the process. First, it is the documentation of the business requirements. They need to be documented in order to be evaluated later on in the process and to keep the direction to which the service is developed. Second, a major issue is the non-existence of the actual design phase. The solution should be properly designed and the resource needs should be assessed prior to moving, the service to the operations phase. Third, a major shortage is the lack of documentation when transferring from one stage to another. There may be a high risk that the service is not developed into the right direction. Fourth, another area that requires improvement is the change management process. Many of the projects are delayed as there is no proper change management process and action plan defined. The decisions hang in the air and nobody has the responsibility over the next steps.

In the next section, the new service development model is constructed based on the internal stakeholder interviews and the previously presented conceptual framework.

4.3 Findings from Interviews; Challenges and Recommendations

To identify the needs for the documentation and for the process four interviews were conducted in the case company. The output from the interviews is analysed in the next section.

This subsection interprets the output from the interviews. The questions, used for the open end interviews are listed in Appendix 1. The interviewees were selected in order to get a holistic view of the process. Each interviewee has responsibility over some

stage or stages in the service development. Some interviewees emphasized the business perspective, while others paid more attention to the practical development. Tables 2, 3, 4, 5, 6 and 7 below show the answers that were gathered during the theme interview.

Business Requirements

In the interviews, the informants were asked about the existing business requirements. The interviewees generally felt that the business requirements are the most important individual factor in service design phase, but it was also perceived as one of the most difficult areas to manage. It was also mentioned that the business requirements are currently well defined, but they are not properly transferred to the service design phase. Most of the interviewees agreed that the customer should be more involved in the development phase. The informants also made practical suggestions such as using pilot testing with the customer. Table 2 presents the output of the specific questions discussed during the interviews.

Information	*"What is the objective of the service, how does the customer benefit?"* *"The idea should be evaluated with the customer."* *"Target market should be defined."* *"Pros and cons of the service from the customer point of view and from our point of view."* *"Information of the customers who are interested."* *"Big picture and long term goals should be discussed with the management level, improvements for the existing service can be gathered from operational level contacts."*
Customer involvement	*"Customer surveys should be conducted and documented "* *"The customer should be included in the development phase already."* *"There should be always pilot case with the customer when completely new service is developed."*
Documentation	*"Use-cases, what problem the service solves."* *"The information should be included in the initial version of the SDP."*

Table 2. Interviewee views regarding business requirements.

As seen in Table 2, the following topics were gathered from the interviews as matters that should be included in the documented business requirements: use-cases of the service; benefits for the customer; and market conditions. As previously discussed, ITIL highlights the importance of clearly defined business requirements. Therefore, the

topics, which came up in the interviews, present valid considerations for the new service development model. It was also mentioned by the informants that if the business is not able to define the requirements in a detailed level, the development should not proceed until the requirements are defined.

Service Acceptance Criteria

SACs generated a lot of discussion and suggestions. But, as previously pointed out, SACs are modified along the process rather than keep static throughout the lifecycle. Table 3 presents the responses to the questions related to the SACs.

Criteria factors	*"Proper criteria would be vendor selection, whether the new vendor supports all the functionality needed."* *"Has all the relevant legislation been taken into consideration?"* *"All the business requirements should be set as SACs."* *"Do all stakeholders have a common understanding that the service will succeed?"* *"Do we have all the required resources to provide the service?"* *"Are all features tested?"* *"Can all SLA's be provided?"* *"Can all essential billing information be gathered easily?"*
CAB involvement	*"CAB should always make the decision."* *"CAB should only make the decisions when the criteria are not met."* *"The existing tools can be evaluated for documenting the change management process."*
Documentation	*"SACs should be included also in the SDP."* *"They should be in a form that they can be answered yes or no."*

Table 3 Interviewee views regarding SACs.

As seen from Table 3, the interviewees disagreed about the change advisory board involvement in the SACs acceptance. The common opinion was that the SACs on the first stages should strongly include business requirements and along the process the SACs will be more detailed for the service functionality and testing. Therefore, the changing criteria should be taken into account in the service development process and the change management process needs to adapt these changes.

Service Design Phase

Most of the discussed matters for the actual service design phase were related to the documentation, which is natural as the productization is currently one of the main issues. Answers to the service design phase questions are presented in Table 4.

Documentation	*"Service delivery blueprint sound really useful especially for project managers."* *"Work package for service design phase should be created"* *"All documentation should be included in the SDP."* *"Vendor and partner comparison should be conducted and documented in the service design phase."*
Output from sub-processes	*"There should not be separate output from these processes but all processes should be included in the service design package."*

Table 4. Interviewee views regarding service design phase.

As seen in Table 4, all interviewees agreed that in the service solution design stage the functional design is created and when the service solution is developed the technical design is produced. Both designs are then incorporated to the SDP. The final SDP should also include the service delivery blueprint, illustrating steps in the service delivery. Therefore, the SDP needs to be constructed in a way that it is ensured that the service documentation is created properly.

Service Level Requirements

All interviewees agreed that, as there are predefined SLA levels in the case company, there is not much need to define SLAs. There were not many responses to the service level question, but the results are presented in Table 5.

Defining the required service level	*"All defined service levels should be provided if it is possible."* *"All SLA levels should be available."*

Table 5. Interviewee views regarding SLAs.

Common understanding was that all SLA should be available for all new services, as seen in Table 5. Two of the interviewees were concerned about the service level management of the external providers. However, these matters are addressed with the supplier management process.

Change Management

The importance of the documented change management process was stressed by many interviewees. Table 6 presents the responses to the change management questions.

Documentation	*"All changes to processes should be documented as well as all the changes that are visible to the customer."* *"Really hard to accomplish."* *"This definitely should be implemented."*
Participants	*"CAB participants should not be fixed, but vary depending on the change on the table."* *"At least the manager of customer service operations should be included in all decisions."*

Table 6. Interviewee views regarding change management.

As presented in Table 6, common opinion was that the change management process should be better documented. However, many were sceptical that it can be properly implemented. There were doubts that the existing service desk system would not meet the needs for this.

Some of the interviewees stressed the importance of agility in the process, so that the changes should be able to be implemented during the process and not only when moving from a phase to another. Therefore, it is crucial to adapt parts from the agile service development model to the new model. The change management process can ensure that the changes are implemented in a quality manner.

Key Performance Indicators

Generally, all the interviewees found it hard to define the measurements for the service design process. Table 7 shows the responses to the questions regarding KPIs.

Correct measurements for service design process	*"Business requirements should be the measurement for service design process."* *"Measurement is really hard because the success of the service cannot be evaluated in short term."* *"Good measures would be the budget of the project, schedule, does the service meet the requirements and is there many capacity or availability issues in the service."* *"How many improvement proposals received from the customer?"* *"Acceptance rate of the services."*

Table 7. Interviewee views regarding KPIs.

As seen in Table 7, many of the interviewees stressed the difficulty to measure the actual service development process. However, some practical performance indicators were gathered. These performance indicators are following: number of capacity or availability issues in the service, does the service meet business requirements, was the project run on time, number of change requests to the service and resource effectiveness. Unambiguous measurements were not found as the service development process cannot be measured with the figures alone. Service sales figures were discussed as one option but it would take too long to get the measurement data.

Summing up, the interviews generated valuable data for the documentation requirements and measurements. They also confirmed that the conceptual framework suits fairly well to the organization as long as it can be kept light-weight and extra bureaucracy is cut to minimum. In the next section, the new service development model is constructed based on the internal stakeholder interviews and the previously presented conceptual framework.

5 Development of the New Service Design Model

This section presents the new service development model constructed based on the conceptual framework introduced in Section 3 and adjusted for the needs of the company.

5.1 Recommendations for the New Service Design Model

The three success factors defined in Section 3.3 and vital for the construction of the new model are represented by: a) customer perspective, b) appropriate organization, and c) well defined process. These factors are addressed in the new service design model. Importantly, although organizational resourcing is not included in the scope of this Thesis, the resource aspect is taken into account in the new service design model.

First, *involving the customer* already in the service design is crucial for product success. When the customer is part of the development project and possibly the proof of concept (POC) is delivered during the service development phase, it enables the provider to gain use cases and references prior to the official launch of the service. This way the service also better matches to the customer requirements.

Second, *appropriate organization* and sufficient resources enable effective functioning and an open communication in the company. Additionally, it addresses the company culture ensuring that the agreed ways of working are followed and encouraged.

Finally, *a well-defined process* ensures that the agreed procedures are followed and resources are used appropriately. Additionally, the well-defined process ensures that all the indicated steps are performed, thus improving the quality of the produced services. The well-defined process takes all necessary matters into account. The resources are be used efficiently and the bureaucracy is cut to a minimum. Change management has a big impact on the functionality of the process. If the criteria and requirements are not evaluated properly, it increases the risk in the subsequent stages.

When all these three success factors are addressed there is a high possibility to achieve the objectives defined for this project.

In addition to these three fundamental principles, the new service design model also follows the framework described in Sections 3 and 4, and consists of: business requirements; service acceptance criteria; change management; service level requirements; KPIs; and service design phase;.

Firstly, *the business requirements* need to be met and taken into account in every phase of the service development process. These business requirements should include the customer requirements, as there is no business if the customer does not see the value in the service. As described in Figure 16, the business requirements should be documented in the beginning of the project and evaluated throughout the lifecycle.

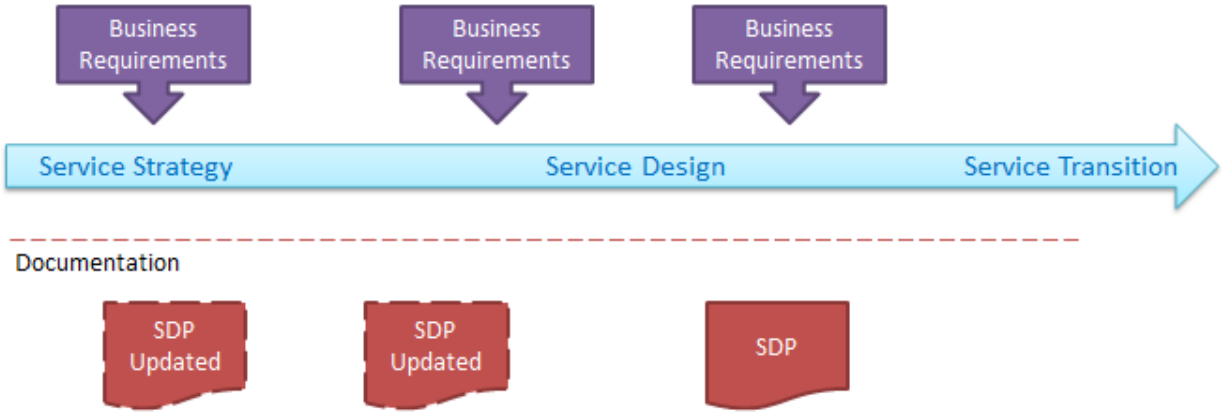

Figure 16. Business requirements in service development.

As shown in Figure 16, any service development project should start from defining the business requirements. Service design package (SDP) is updated whenever there are new business requirements or they are changed. The information flow is suggested to be made bidirectional. If there is a change in the service or an obstacle that would change the functionality of the service, the changed situation needs to be evaluated to asses if the business requirements are met or adjust the requirements accordingly. In these evaluation points, the decision whether to continue the service's development should be made based on the service acceptance criteria.

Secondly, *the service acceptance criteria* need to be built into the initial version of SDP. The SACs can, and should, be modified along the project, so that the decisions are made based on the most accurate and up-to-date information available. Additionally, the progression of the project sets different requirements for the next stage. Figure 17 outlines the change management process in the service development project.

Figure 17. Change management in service development project.

As shown in Figure 17, the service acceptance criteria (SAC) defined in the SDP needs to be evaluated at every stage prior to entering the next stage. The progression decision can be authorized by the change advisory board (CAB) or it can be authorized by the project team. If every stage is authorized by the separate CAB meeting, it bureaucratizes and slows down the project, so that it is advisable to make decisions within the project team. Various deviations can also be agreed, e.g. if the SACs are not met then the decision is made by the CAB. As previously discussed, SACs are similar to the gates in the stage-gate model. Unlike the stage-gate model, in which the gates are only used to approve or kill the project, the SACs are used to develop the service in the right direction.

Thirdly, *change management* includes the release of the request for change (RFC) as the first stage of the process. This RFC can come from the CSI process or from internal research, or as a requirement from the customer. As this first step, the business requirements for the change are evaluated and documented in the SDP, and the first SACs are defined. Based on the results, the approval for design decision is made. In the service design stage, the SACs are modified to prepare for the next stage and, before entering the service development stage, the SACs are evaluated. In the develop-

ment phase, the SACs are again modified for the service transition phase. At the end of the service design phase, the SDP is evaluated and, if accepted, the service is transferred to the next phase.

As discussed in the previous sections, the speed in service design is an important factor. Hence, most of the delays in service development projects are caused by the inability to make decision. Therefore, it is acceptable if the decision is not perfect, as long as it is made based on the information available at that moment. The process ensures that the service is tested and developed according to the current requirements. Subsequently, the CSI process ensures that the service can be further improved after the service has been launched. As important as the decision is defining the next steps how to proceed.

Fourthly, *the service level management (SLM)* ensures that current services and service level agreements (SLAs) are managed. Additionally, it ensures that new or changed services and SLAs are developed according to the business requirements. SLM process is triggered by changes in service catalogue, new or changed agreements, or periodic activities such as monitoring, reporting and CSI functions. The SLM process defines the service level requirements (SLRs) for the new or changed services. SLM process in the service development project is described in Figure 18. It outlines the project flow as regards service level management and pinpoints the documentations that should be updates along the project.

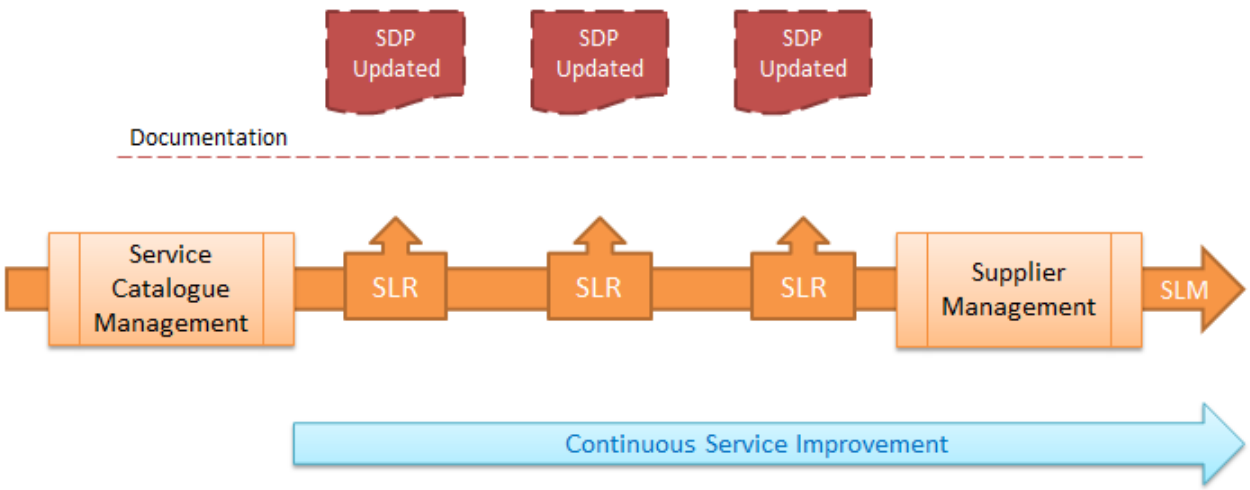

Figure 18. Service level management in service development project.

As described in Figure 18, the SLM process is responsible for updating the SLRs, SLAs and operational level agreements (OLAs) to the SDP. Supplier management process is responsible for agreeing the service levels with the suppliers. Therefore, the SLM process is necessary for the service transition as it defines how the service level is measured and what service level is expected from the external parties.

Fifthly, *the key performance indicators (KPIs)* should be defined. They are necessary to measure, analyse and report the service management and service design processes continuously. As described earlier in Section 3.4, the measurement should be set up to support business objectives. KPIs for the service design process can include: percentage of service design requirement specifications produced on time and on budget; percentage of service design plans produced on time; accuracy of service design; percentage accuracy of the cost estimate of the whole service design phase; and accuracy of SLAs and contracts.

Finally, *the actual service design stage* and its supporting processes need to be reformed. Figure 19 illustrates the project flow in service design phase of service development.

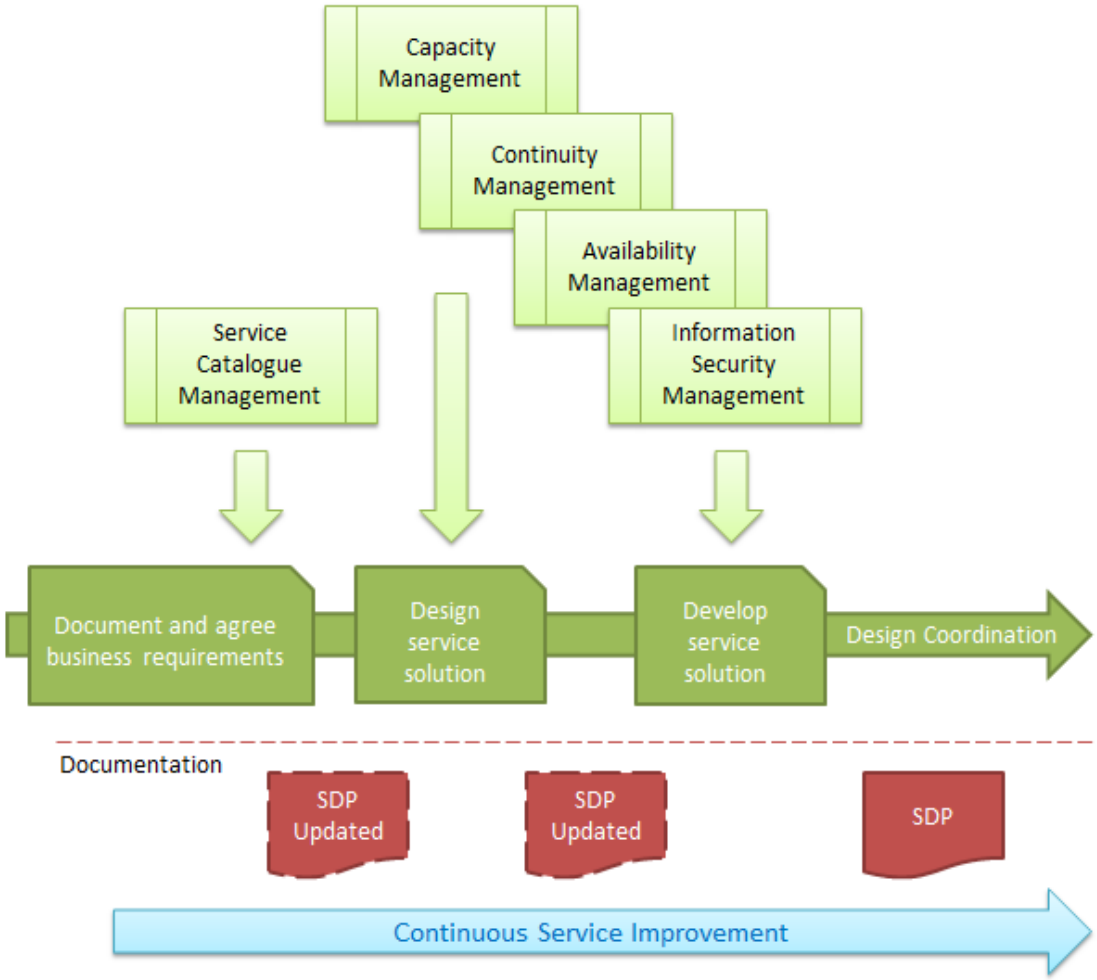

Figure 19. Service design activities in service development project.

As illustrated in Figure 19, supporting processes feed data to the design and development stages, and the data is then updated to the SDP at each stage. In Figure 19, *Design coordination* axis indicates the service design phase which runs throughout the service development project. It ensures that all the aspects, enterprise architecture, management systems and measurement methods, are included in the SDP. Design coordination can be considered as a project management function in the service design phase. By that stage, the service definition document is already created in the current model in the case company, but it is still lacking part of the required data.

Next, *Service catalogue* contains the details, including the interfaces and dependencies, and the status of every service currently provided or the service being currently transferred into the production. Service catalogue is also responsible for the updates of the service portfolio, regarding the current status of the service.

Capacity management is responsible of the human resources to deliver the service, but only in places where a lack of resources could result in a breach of SLA or OLA. As such, capacity management creates the workload analysis of the service delivery and management. In this process, the capacity and performance reports are created and definitions for alerts, and alert threshold are documented into the SDP.

ITSCM policy and strategy is upheld by the *continuity management* process. In the documentation created there ITSCM plans, crisis management plans, emergency response plans and disaster recovery plan are maintained. Additionally, business impact analysis and ITSCM testing should be conducted and reported.

Further on in Figure 19, availability management information system (AMIS) is presented as central part of the *availability management* process. AMIS is a set of tools, data and information that is used to support availability management. This process creates an availability plan for the proactive improvement of the services and technology. SDP is updated with the availability and recovery designs in the development phase. For example, the amount of incident and change requests can be followed-up to analyse if the service is consuming more resources than an average service or a targeted level.

Information security management is responsible of the overall ISM policy. To review this policy, periodically organized security audits and tests are used. In the development phase, the information security management defines the security controls, policies, processes and procedures for the new service and suppliers supporting the service. Any security breaches or major incidents are reviewed and reported.

The actual *service design* creates the service design document and incorporates the data from previously discussed sub-processes into the design. As a result, from the service solution design stage the SDP is updated with the functional design of the service. Functional design describes the service delivery process in high-level detail which is later further refined as a service blueprint.

In the *service development* stage, the service solution is further developed and the detailed technical design is created. Again, as in every step, the criteria are evaluated

and the SDP is finalized for the service transition. Service solution development stage leans solely on the business requirements to achieve customer perspective. Therefore, it would be beneficial to involve the customer already in the development stage where the changes can be implemented with fairly moderate effort.

As can be seen from Figure 19, CSI process is involved throughout the service development project. It means that if there are some features in the service, that cannot be developed currently or would consume excessive amount of time, they will be recorded in the service improvement plan and the CSI process will subsequently follow-up these action points. When the situation changes, these features can be further processed, and the CSI process will trigger the service development process.

As described previously, the productization is a central part of case company's service delivery model. Productization includes basically two basic dimensions; service packaging and service documentation. Service packaging is covered in the service strategy and service catalogue management. It is currently in a fairly good level in the case company, but the problems are located in the documentation stage. Therefore, the new model should to tackle the lack of documentation created during the service development phase. The SDP itself is a comprehensive set of information about the new service. The documents for the daily maintenance tasks need to be created in the service transition phase but SDP provides a good starting point for those documents also. Even more important than just the number of documents created is the quality of those documents. Change management process ensures that all the necessary documents are created in a quality fashion at each stage.

As for the documentation, many of the documents do not need to be recreated every time a changed or new service is developed. But the design coordination ensures that the documents exist and they are created in a reliable manner. At the end of service design lifecycle, the SDP should include the topics listed in the Appendix 2. All the documentation from the service design phase should be gathered to the service design package. The only exception is the change management process which can be documented in a change management system. Importantly, there is no such system in use currently in the case company. The SDP is the heart of service design phase. It gathers the aspects from all sub-processes as well as the requirements from various sources

for the development of the service design. SDP has to be stored in a place where it can be later accessed, if the service is further developed. In this case, the service design phase can lean on the previous data and update the applicable parts of the document.

Summing up, the most critical parts for the new service development model are defining the business requirements and the change management process. The business requirements define the direction to which the service should be developed and therefore, have a significant impact on the end result. The change management process ensures that all steps are conducted in a quality manner, taking all necessary matters into account.

5.2 New Service Development Model

Based on the conceptual framework and the recommendations for the model design discussed in Section 5.1, as well as modifications according to the feedback from the interview sessions, the following service design model was finally developed.

Overview of the New Model

The development of the new or changed service starts with a request for change, describing what needs to be changed or developed. Change management makes the decisions whether evaluate the RFC in a larger scope. If the decision is positive, the request enters the service strategy phase. As discussed previously, the business requirements need to be documented and agreed with the business in the service strategy phase. In this **service strategy** stage, the initial SDP is created describing the business requirements and the overview of the developed service.

The first set of service acceptance criteria is included in the SDP. When the business requirements and SACs are updated to the SDP, the change management process can make the decision whether to proceed to the service design phase. If there is no formalized change management process implement for these kind of changes, and it would require a lot of work and time to implement one, it is carried out similarly as before. However, the decisions and changes made should be documented into the SDP during the project.

The project then proceeds to the **service design** phase. The service design lifecycle is described in Figure 20.

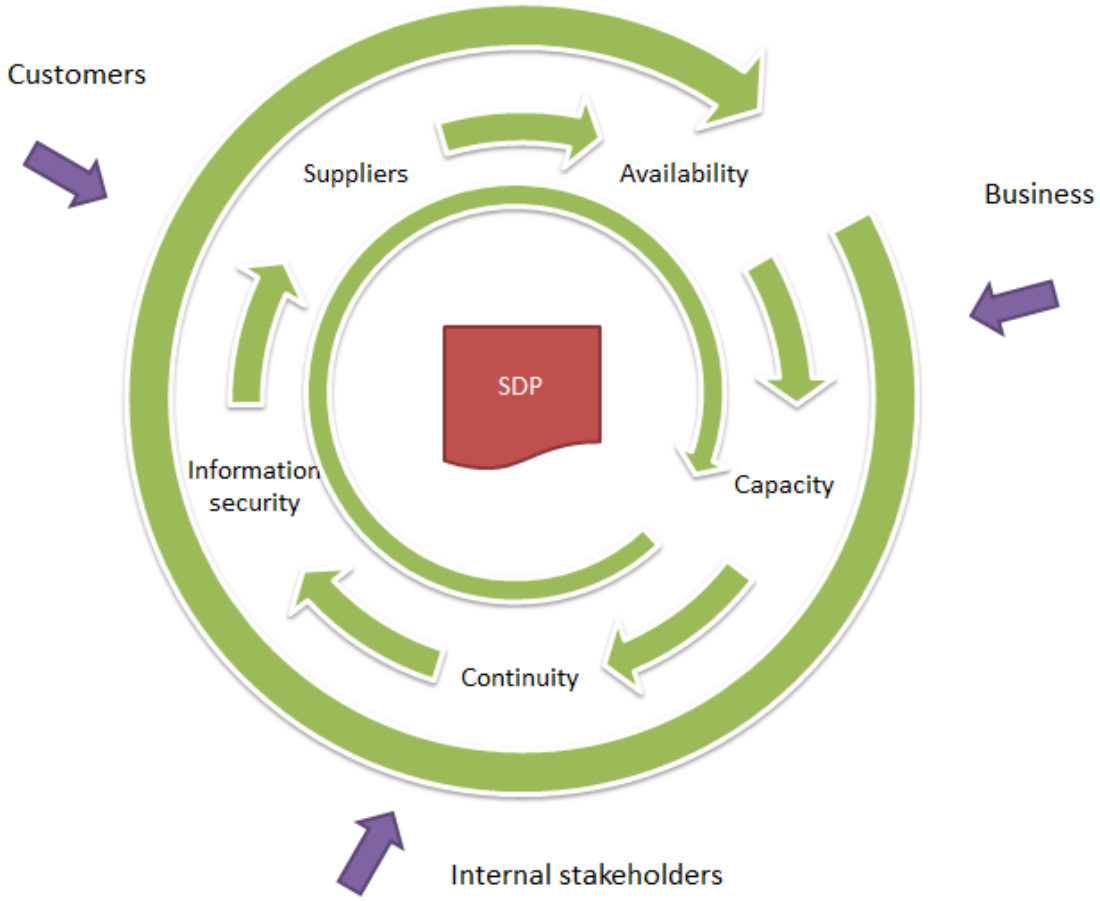

Figure 20. Service design lifecycle.

As illustrated in Figure 20, the input and requirements are gathered from the customers, business and internal stakeholders. The service design package (SDP) is the heart of service design process. All the sub-processes refine and filter the data from various sources and document's it into the SDP. This stage is divided into two separate stages; design and development. The design stage receives the initial SDP as an input from the service strategy phase and then starts to refine it. The service design phase includes multiple sub-processes as described earlier in this Thesis. Because the case company is rather small and the resources available for the service development are limited, it is advisable that all the matters, which the sub-processes are responsible of, should be included and handled in one process. The SDP then includes a section for each of the features that should be considered during the process. With this proce-

dure, the case company can ensure that all the necessary features are considered, at the same time keeping the process as light-weight as possible. The whole service development project is depicted in Figure 21.

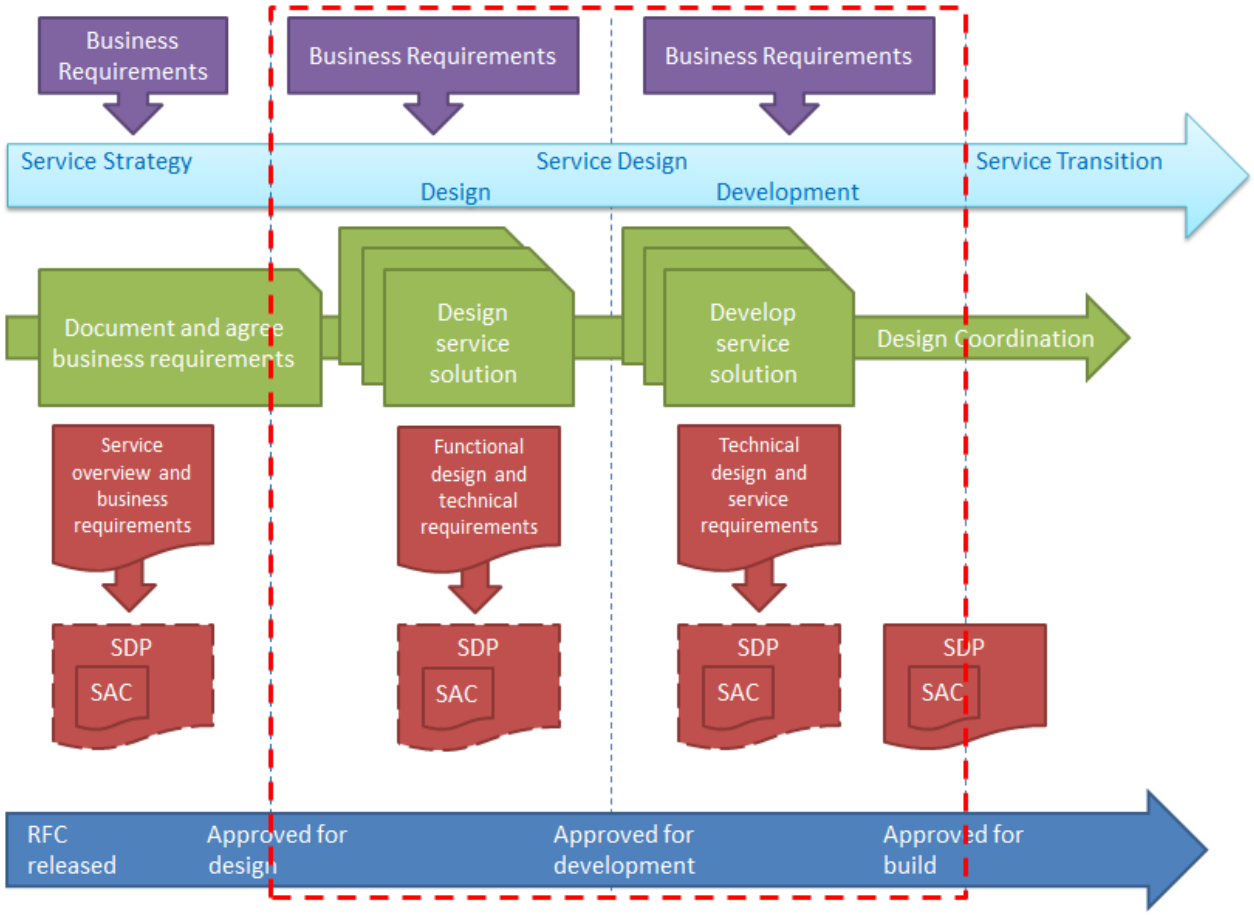

Figure 21. New service development model.

As described in Figure 21, the service design phase consists of two separate stages, design and development. Additionally there are several processes that are involved throughout the whole service lifecycle. The new model concentrates on the parts that are ultimately in the service design lifecycle phase.

Model Description

The new model suggested in this section is divided into three parts. **Part 1** is shared with the *service strategy* lifecycle phase and, therefore, does not include as many service design duties as other parts. This first part of the service design lifecycle is described in Figure 22.

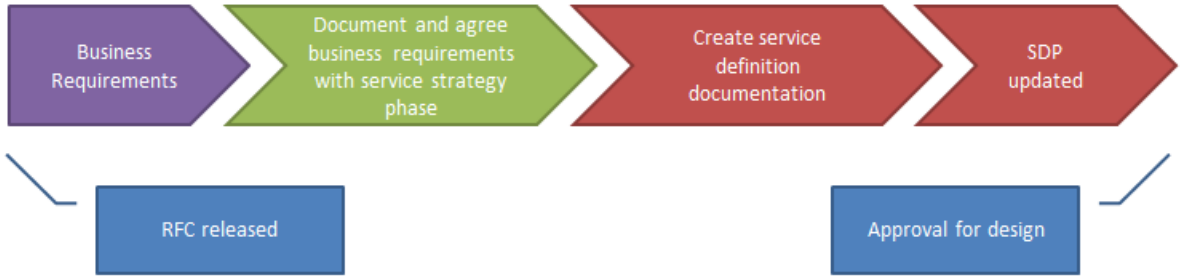

Figure 22. Part 1 of the new service development model.

As illustrated in Figure 22, the main function of the first part is to collect, agree and document the business requirements, after the request for change has been released by change management. High level service definition is created and updated to the SDP. The change management process then evaluates whether the SDP meets the criteria and approves the service development to progress to the design phase. **Part 2** of the service design is desribed in Figure 23.

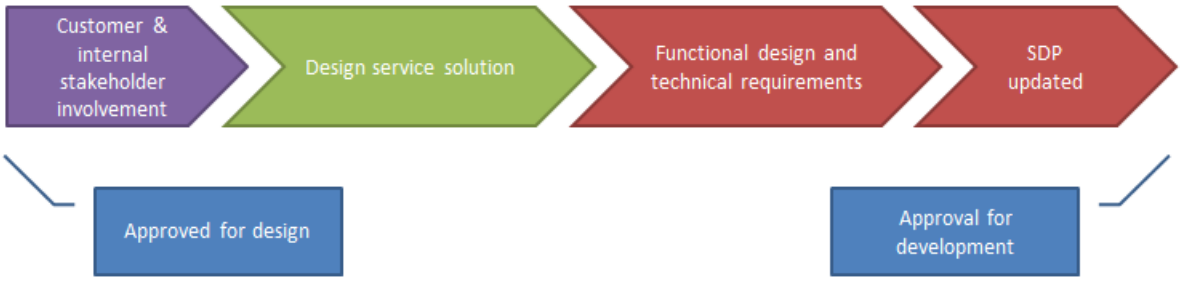

Figure 23. Part 2 of the new service development model.

As shown in Figure 23, functional design is made of the *design stage*. It includes all the necessary information to create the technical design in the development stage. The data for the functional design is collected from the internal stakeholders, customers and SDP provided from the Part 1. The functional design represents an overview of how the service should function and which integrations are needed to provide the service. As an example, the functional design picture is presented in the Appendix 3. The functional design is then incorporated to the SDP, as well as the updated SACs for the development stage. The change management ensures that all of the requirements and criteria are met and then makes a decision whether to approve the design to the development of the service solution. The **Part 3** of the service design phase is described in Figure 24.

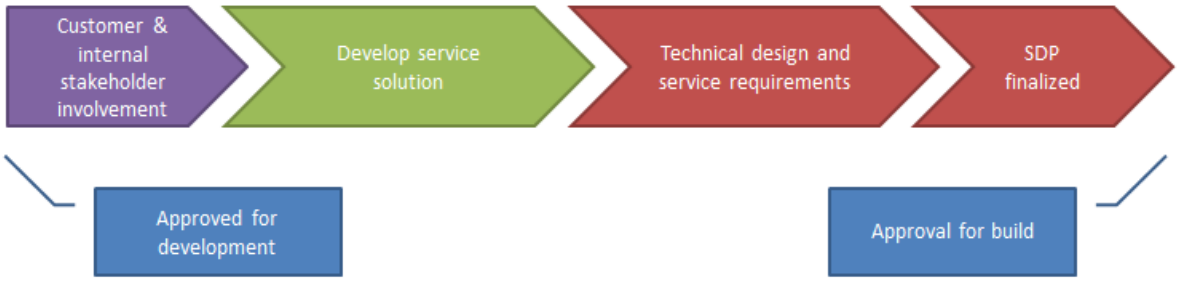

Figure 24. Part 3 of the new service development model.

As illustrated in Figure 24, the change management approves the service to the *development stage.* It receives the updated service design package (SDP) as an input and starts to refine the service design to a service solution which can be transferred to the production. The development stage creates the final service solution design and the SACs for the service transition phase. After this stage, the SDP includes all the information needed to put the service into production. The technical design and the service delivery blueprint are created and updated to the SDP. As an example, a technical design picture is presented in the Appendix 4 and a service delivery blueprint in Appendix 5. All supplier, capacity, availability, information security and continuity issues are cleared in this stage, and the project does not proceed until all the requirements are met. This stage tests the individual components and technology, but not the whole service. If there are features that cannot be included into the developed service at this stage, they are recorded into the service improvement plan (SIP), and the CSI process takes the responsibility of further development. Once the technical design is incorporated to the SDP and the SACs are updated, the change management process evaluates whether the design can be handed over to the *service transition* phase for testing and implementation.

Benefits of the New Model

Previously in this Thesis, four main deficiencies were detected in the current model of the case company which are addressed in this new suggested model. These four deficiencies were as follows. Firstly, the documentation of the business requirements is not on an acceptable level. In the new model, the business requirements are recorded into the SDP and the project does not proceed to the design phase until the SDP has been updated. Secondly, the current model basically skips the design phase almost totally, hence, the service operation has to struggle because of the design failures. In the new model, the service design phase is responsible for the SDP, so that no services should

be developed without a proper prior planning. Thirdly, the level of documentation for the service transition phase is not sufficient to successfully test and implement the service. Fourthly, the formalized change management process is necessary in order to asses if all the necessary information is included in the SDP. Failure to implement the change management process at any level would pose the project at a high risk, as not all the stages in the service development would be taken into account.

Additionally, the suggested new model places particular attention on and makes full use of the following two issues.

Implementation Considerations

The suggested new model stresses the importance of implementation consideration, with the distribution of roles and responsibilities in particular. It is essential for the project success to define roles and responsibilities to successfully implement service design in the organization. It has to be clear who has the input, who decides and who takes action when decisions have to be made. The new model will enable the company to make right decisions quickly and execute them effectively by applying more extensively the traditional RACI model. RACI is an acronym for the roles which are responsible, accountable, consulted and informed. An example of RACI-model for change management in all parts of the case company process is illustrated in Table 8.

	Customer Service Manager	Service Operations Manager	Security Manager	Service Support Manager
Activity 1	AR	C	I	I
Activity 2	A	R	C	C
Activity 3	I	A	I	R
Activity 4	I	R	C	A

Table 8. Example RACI matrix.

As can be seen from Table 8, the RACI-model can serve as an effective tool for decision making. The RACI matrix ensures that for each activity in the suggested process, there is a person accountable and responsible of it. In the case company, it can also be used to enhance the communication so that all applicable parties are clearly established and informed. It will also enhance the usage of the resources as only the concerned parties will be invited to the meetings for decision making and the ones that need to be consulted.

Measurements

Another important feature of the service development process stressed by the new model is the enhanced use of measurements. When the new service is developed and subsequently implemented, it needs to be measured. The following key performance indicators are stressed in the new model that can be used in the case company and benefit the service development process. These measurements are: percentage of service design plans produced on time; accuracy of service design; and resource utilization of the service design. The first one, the percentage of service design plans produced on time, is simply a measurement of the projects being run on time and using the resources that were planned to be used for it. The second and third ones, the accuracy of service design and the resource utilization of the service design, can be split into smaller factors. These smaller variables are short term measures, for example, the measurement of how well the developed service matches the business requirements defined. In the longer term perspective, such variables as the availability issues and capacity issues, related to the service design, can be measured.

The next section will describe the trial test conducted to try the suggested new service design model and the modification requirements identified to improve it.

6 Testing of the New Service Development Model

New service development model was evaluated by testing it on the existing case company service. This section describes the test results and conclusions which were subsequently analysed in the internal brainstorming session. The suggested modifications were then incorporated into the model based on the testing results.

6.1 Test Description

The test aims the reconstruct the service development project with a service that is in production already. Although most of the information is available, some hypothetical information has to be used in a much more generalized form than it would be in the actual development phase. Therefore, the results of testing have to be treated with caution. The test layout is shown in Figure 25.

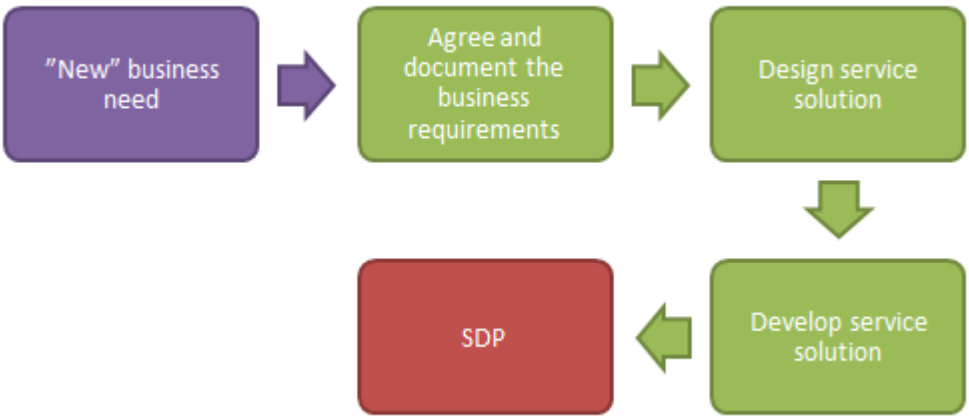

Figure 25. Test layout.

As described in Figure 25, the existing service starts with a business need. Service design stage then indicates and documents the business and other requirements. The test progresses through the service design stage, resulting in a service design solution. Finally, the output from the service design stage is represented by the SDP. Appendix 6 illustrates the SDP used to test the model with this existing case company service.

Subsequently, the processes were evaluated during the project flow and the documents were reviewed at the end of the project. Appendix 5 contains the SDP template

that was used in the testing of the model. The results were then compared to the existing service documentation and the documentation templates provided by ITIL. The following subsection describes the test results obtained from this testing procedure.

6.2 Test Results

It should be noted that, as the test was conducted within an existing case company service, there were some aspects of the model that could not be properly tested. For example, the customer could not be involved in the trial, but the test made particular efforts to identify the point in which the customer would have been involved in the real life scenario. Additionally, the full functionality of the process could not be tested either, as there are no real roles yet allocated for the process. In the test case, change management was also not included as well as there was not much communication with internal stakeholders. The researcher, however, is aware of the importance on these issues, especially those such as communication, which will play a considerable role in a real situation, when the suggested model is implemented. The abovementioned limitations, therefore, need to be taken into account when considering the results of the implemented testing.

The output from the test was a SDP refined during the hypothetical service design project. The SDP was modified for the proposed model so that it matched with the case company requirements. The testing confirmed that the new model is light-weight enough for the case company, and the suggested model can be utilized in the service transition phase. However, if the service transition phase is not properly defined, many benefits anticipated from the use of the new model may be lost. Additionally, the documentation created during the test also met the productization objectives set by the new model.

Overall, as its major outcome, the testing revealed the needs for incorporating the service strategy phase into the service development process. The next subsection overviews the results from the internal brainstorming session which discussed the proposed model and the test results.

6.3 Internal Brainstorming Session

This brainstorming session discussed the new model and interpreted the output form the test results and the gathered data. Three of the participants were the same who were previously interviewed when the draft model was constructed. Additionally, Support Manager participated in this session. The agenda for the meeting included: a) service design according to the new model, b) content of the service design package; c) definition of the practical service acceptance criteria used to accept the service into production; d) discussion on the possibilities to implement change management process/practice in the new service development process.

First, the new service design model was presented. Second, the content of the service design package as gathered from the test was discussed to ensure that it includes all the necessary information. Third, the service acceptance criteria, when the service is transferred to the service transition lifecycle phase, were defined in a practical level. Since these criteria do not vary significantly between the services, it was decided that they can be defined beforehand, while SACs for other stages can be created during the project. Fourth, the possibilities to implement the suggested model and documented change management process were discussed.

There were three main topics that generated most discussion. It was proposed that, in the business requirements stage, the benefits that the service provides to the customer should be clearly defined. Until these are defined, the service development should not proceed. Communication was another topic that was highlighted. It was suggested that the internal stakeholders should be informed about the progression in the service development, and the timetable should be officially announced when the service is expected to be ready for production. It was proposed that the SDP would include a communication plan in the deployment policy section. The progression could also be presented in the monthly sales meeting. The third topic that was raised was the introduction of a "restrictions and limitations" section into the SDP, especially concerning the service improvements which might affect the existing service.

Other comments brought up in the brainstorming session were related to the change management process and more precisely how it can be implemented in the case com-

pany. It was agreed that the approach of utilizing the existing servicedesk system for the change management should be further investigated. All the parties also confirmed the importance to implement the service transition phase.

Overall, the attendees were satisfied with the process developed in the new model and the results of its testing, and expressed their belief that that the new model will improve the present situation. The next section presents the modifications made to the initial service design model based on results of the brainstorming session.

6.4 Modifications

The final modifications to the new service design model, based on the conceptual framework, interviews, testing and brainstorming session, were made as follows.

As shown in Figure 26, there were only small modifications introduced in the service design model after the brainstorming session. They were not structural changes but rather changes in the way that some certain issues should be stressed.

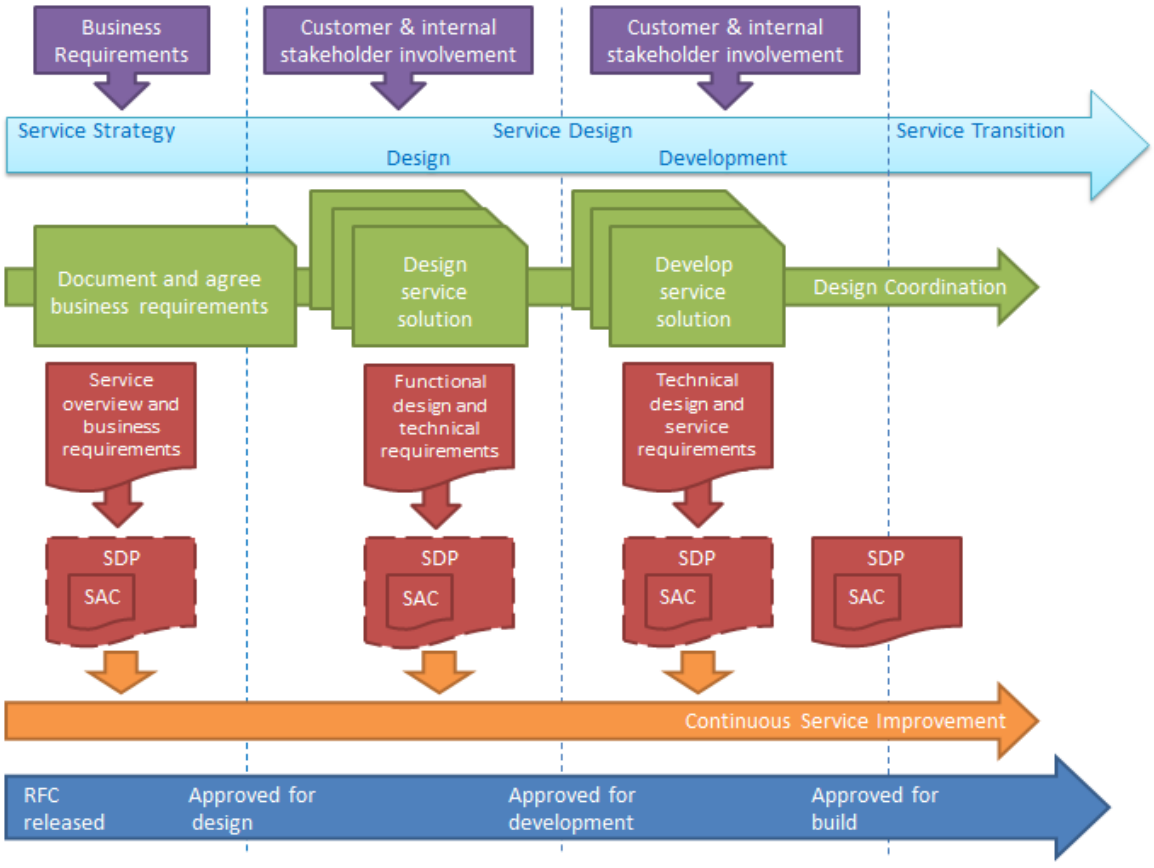

Figure 26. Final service design model.

As shown in Figure 26, the broader involvement of internal stakeholders is now highlighted. This includes the communication to the internal parties about the progress and about the new service, as well as the feedback for the actual service development. For example, the sales team which communicates with the customers a lot may have valuable information about their situation and needs from the very beginning of the service development process. Another change introduced into the model is that the CSI process is represented and thus taken into account at every stage. It was discussed in the brainstorming session that all features and functionalities that were in the initial requirements should be recorded into the CSI service improvement plan, as well as all new features and ideas generated during the service development project. Therefore, these changes were introduced into the final version of the model.

Overall, the draft version was evaluated as matching fairly well the needs of the case company, though some modifications were suggested to improve it. The following section overviews the conclusions of the study and provides further development options for the development of the service design model and suggests a number of managerial implications.

7 Discussion and Conclusions

This section discusses the new service design model and concludes this Thesis.

7.1 Summary

In today's business practice, the volume of delivered IT services has increased rapidly and this growth is expected to accelerate. For this reason, the daily maintenance of IT services should be as straightforward and well-defined as possible. To achieve this, services have to be developed and productized effectively. Currently, the challenge in the case company is that the productization is not done thoroughly enough throughout the service development project, leading to the jumps in quality and prolonged delivery time of the projects.

The objective of this Thesis is to improve the service development process in the case company to be able to package the service product already in the service development phase of the service lifecycle. At the moment, the final productization is done much later, when the service is already in the production, which often leads to a situation when the service content may change after a couple of deliveries. Changing the service after the initial launch leads to protracted delivery of the projects which may create a problem for the company reputation. This Thesis aims to solve this problem by developing an ITIL-based process model and introduce productization in the service development phase, thus shortening the delivery times, saving resources and improving the quality of the case company IT services.

To meet these objectives and to answer the research question, this study suggested introducing a formalized ITIL v3 based process for service design. A new service design model was developed based on the ITIL framework and in-depth theory analysis, as well as the case company current state analysis to formulate a service development proposal. It was done in cooperation with internal employees in the form of research interviews and the final brainstorming session conducted in the case company for the proposal evaluation. The first draft version of new service development model was tested with an existing case company service. The final service development model was constructed based on the test results and the feedback from internal stakeholders.

By implementing this new model, the company can achieve benefits for its service design phase, at the same time maintaining the light-weight and flexibility of the traditional development process previously used in the case company. These benefits include: better productized services, reduced time to market interval and resource efficiency, and eventually higher quality of the service. These factors will directly address the business problem posed in the beginning of the Thesis. If the service is productized as suggested, the delivery time may be shortened and the profits can be generated faster with less invested resources. Additionally, new services can be launched faster which may provide an advantage against the slower competitors.

7.2 Managerial Implications

To put the proposed model into practice, a number of managerial implications need to be taken into consideration. They are even more important since last year the case company was acquired by one of the leading telecommunication provider in Finland, and it currently strives to offer solid, properly productized services. The volume of the delivered services is also likely to increase rapidly. Therefore, to put the new service design model into practice, the recommended approach for the managers of the case company would be to consider implementing the following issues.

1. Appoint an owner for the implementation project. This project manager has to be authorized by the managers to make the required changes.

2. Provide support to implement a change management process. Implementing a proper change management process requires internal training and commitment. Additionally, the tools need to be developed to support this process.

3. Place the emphasis on targets in a way that encourages quality documentation, open communication and following the agreed processes, instead of concentrating merely on the speed of delivery.

4. Other service lifecycle phases need to be implemented in order to fully utilize the new service design model.

5. Managers need to actively participate and dedicate time in the service strategy stage, when the business requirements are being agreed. It is the only way to guarantee success for the new service.

There are also other, minor factors which have directive influence on the efficiency of the service development process. Among them, for example, the measurements for the service development activities which should be defined in a way that the actual process can be improved. Additionally, the CSI role should be involved in order to make the process even more effective. Even though they are not directly considered as managerial implications, they need approval and support from the management side.

7.3 Validity and Reliability in This Study

The study was directed and conducted in a way to meet the objectives set in the beginning of the Thesis. The objective was to improve the service development in the case company by introducing a formalized service development process. At an early stage of the study, the researcher realized that all the benefits could only be achieved by introducing a more formalized processes to other lifecycle phases, too. However, the results of this Thesis were positive even for the part of the lifecycle only, and provide solution to the research question formulated as: *How to improve the service development in case company with formalized process?.* The solution was tested in a real life environment which proved its functionality.

The reliability and validity assumptions made in the Section 2.4 were adhered to. To enhance objectivity, different data sources were utilized, thus ensuring triangulation of the employed data. The interviewees were selected from different levels in the case company hierarchy. The new service design model is also composed based on a broad theory review. Although a hypothetical source information had to be used in the test, the assumptions were made based on the historical data and the best knowledge and data available in the case company. The reliability of the Thesis could have been increased by testing the model on more services and adding more rounds to the action research. However, this was not possible because of the limited time frame reserved for the study. The best option would be to evaluate the new model in the real life development project, which is planned to be done in the case company subsequent to finishing of this Thesis.

7.4 Follow-Up

The scope of this Thesis was to improve the service development model in the case company. The final service design model introduced in this study has been accepted in the case company and will be taken into use. The implementation will include also the service transition phase to get the most out of the new service development model.

There are many improvements that can be done in future for the suggested service design model. For example, marketing and sales departments can participate already in the service development phase. By doing so the company can further shorten the time to market interval as the marketing and sales material can be constructed in the development project. By incorporating sales, the project can also get valuable feedback from the customers as the sales team are discussing with them regularly. To achieve full benefit from the service design model, it is advisable to introduce a formalized structure in the service strategy phase of service lifecycle.

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Appendix 1. Interview Framework

I will first go through the documentation that ITIL proposes and the conceptual framework introduced in Thesis. Based on those the following topics and questions are discussed.

Business Requirements

Business requirements define the strategy how the service will be developed.

What information should be included?

How the customer needs can be included?

In which form the requirements should be documented?

Service Acceptance Criteria

SAC's define whenever to proceed with the service development.

What factors should be included?

Should the acceptance decision be always made by Change Advisory Board (CAB)?

In which form the criteria should be documented?

Service Design Phase

Service design has several sub-processes; Design coordination, Service catalogue management, Service level management, Availability management, Capacity management, IT service continuity management, Information security management and Supplier management. Documentation; technical design, functional design, service process blueprint, service design package.

Which documents should be created?

Which factors should be measured?

What should be the output from the sub-processes?

Service Level Requirements

There are predefined SLA levels so requirements are static.

Which of the SLA levels should be included in new services?

Change Management

Change management is responsible for accepting services for design and development and makes the decisions whenever needed in the service development process.

How the change management should be documented?

Who participates in the CAB?

Key Performance Indicators

Measurements should primarily support the business objectives

Which factor should be measured?

Appendix 2. Example SDP Content

Requirements

Business Requirements

- The initial agreed and documented business requirements

Service applicability

- This defines how and where the service would be used. This could reference business, customer and user requirements for internal services

Service contacts

- The business contacts, customer contacts and stakeholders in the service

Service Design

Service functional requirements

- The changed functionality of the new or changed service, including its planned outcomes and deliverables, in a formally agreed Statement of Requirements (SoR)

Service Level Requirements

- The SLR, revised or new SLA, including service and quality targets

Service and operational managerial requirements

- Management requirements to manage the new or changed service and its components, including all supporting services and agreements, control, operation, monitoring, measuring and reporting

Service Design and topology

- The design, transition and subsequent implementation and operation of the service solution and its supporting components, including:
    - The service definition and model, for transition and operation
    - All service components and infrastructure (including H/W, S/W, networks, environments, data, applications, technology, tools, documentation), including version numbers and relationships, preferably within the CMS
    - All user, business, service, component, transition, support and operational documentation
    - Processes, procedures, measurements, metrics and reports
    - Supporting products, services, agreements and suppliers

Organizational Readiness Assessment

- Organizational Readiness Assessment' report and plan, including: business benefit, financial assessment, technical assessment, resource assessment and organizational assessment, together with details of all new skills, competences, capabilities required of the service provider organization, its suppliers, supporting services and contracts

Service Lifecycle Plan

Service Program

- An overall program or plan covering all stages of the lifecycle of Plan the service, including the timescales and phasing, for the transition, operation and subsequent improvement of the new service including:
    - Management, coordination and integration with any other projects, or new or changed activities, services or processes
    - Management of risks and issues
    - Scope, objectives and components of the service
    - Skills, competences, roles and responsibilities
    - Processes required
    - Interfaces and dependencies with other services
    - Management of teams, resources, tools, technology, budgets, facilities required
    - Management of suppliers and contracts
    - Progress reports, reviews and revision of the program and plans
    - Communication plans and training plans
    - Timescales, deliverables, targets and quality targets for each stage

Service Transition Plan

- Overall transition strategy, objectives, policy, risk assessment and plans including:
    - Build policy, plans and requirements, including service and component build plans, specifications, control and environments, technology, tools, processes, methods and mechanisms, including all platforms
    - Testing policy, plans and requirements, including test environments, technology, tools, processes, methods and mechanisms
    - Testing must include:
        - Functional testing

- Component testing, including all suppliers, contracts and externally provided supporting products and services
- User acceptance and usability testing
- System compatibility and integration testing
- Service and component performance and capacity testing
- Resilience and continuity testing
- Failure, alarm and event categorization, processing and testing
- Service and component, security and integrity testing
- Logistics, release and distribution testing
- Management testing, including control, monitoring, measuring and reporting, together with backup, recovery and all batch scheduling and processing
- Deployment policy, release policy, plans and requirements, including logistics, deployment, roll-out, staging, deployment environments, cultural change, organizational change, technology, tools, processes, approach, methods and mechanisms, including all platforms, knowledge, skill and competence transfer and development, supplier and contract transition, data migration and conversion

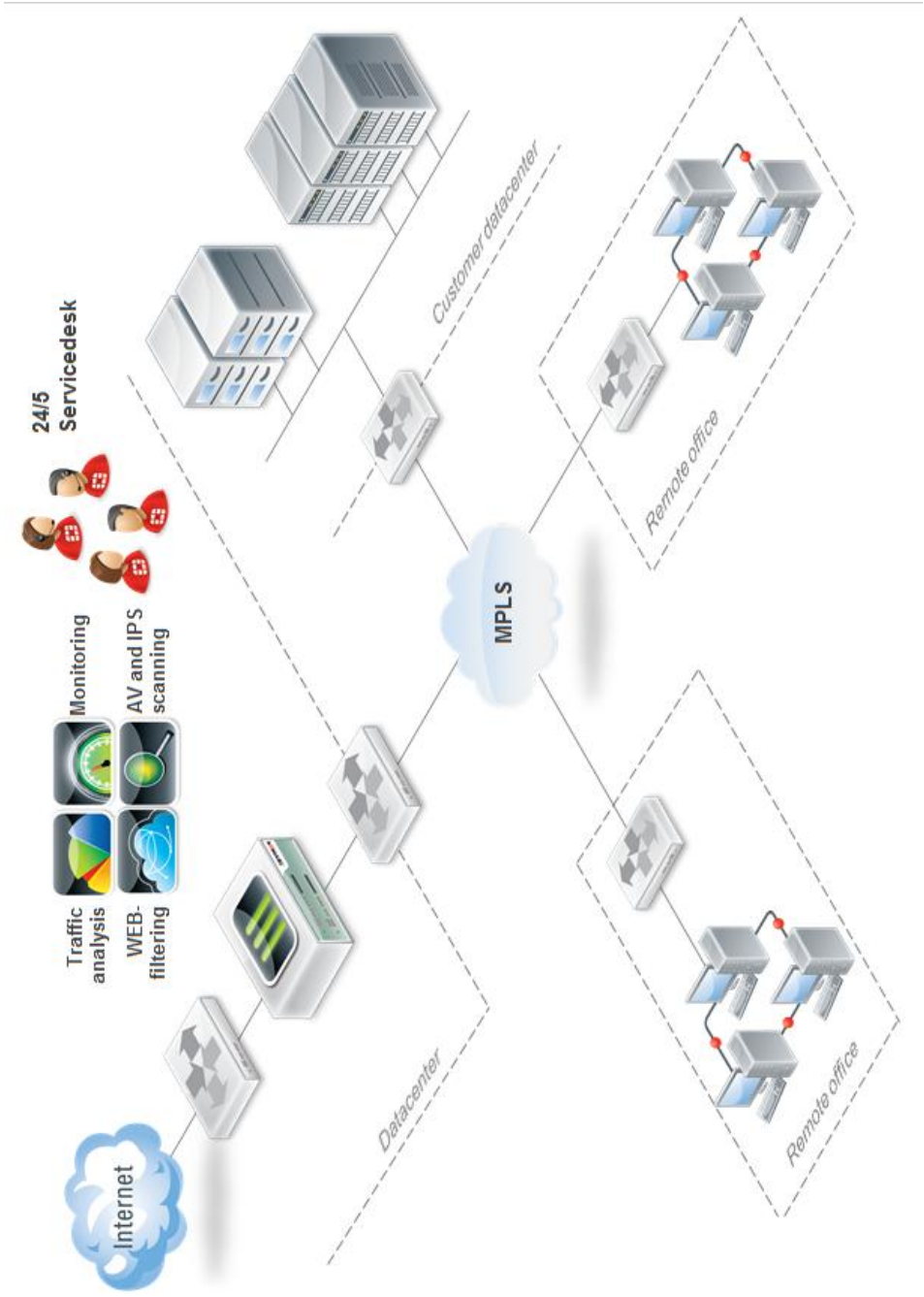
Service Operational Acceptance Plan

- Overall operational strategy, objectives, policy, risk assessment and plans including:
  - Interface and dependency management and planning
  - Events, reports, service issues, including all changes, releases, resolved incidents, problems and known errors, included within the service and any errors, issues or non-conformances within the new service
  - Final service acceptance

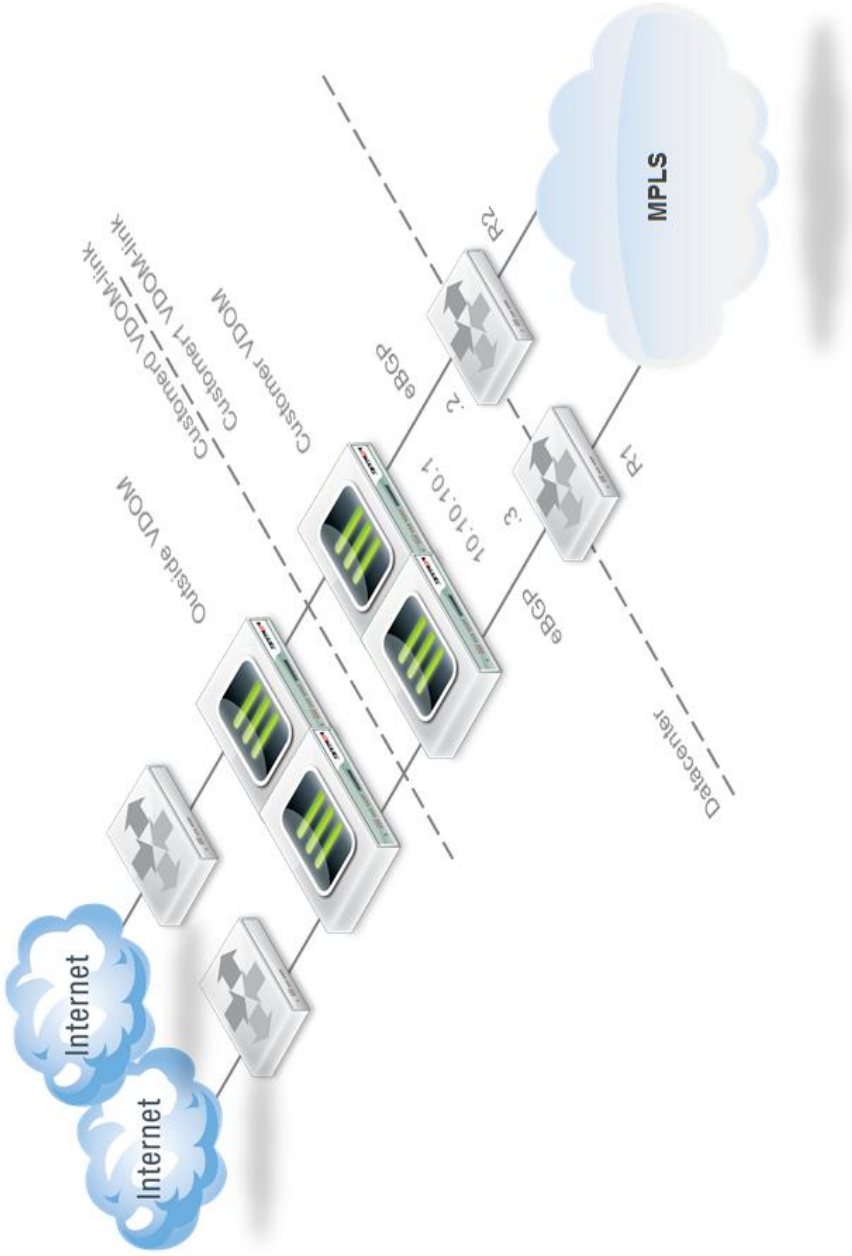
Service Acceptance Criteria

- Development and use of Service Acceptance Criteria (SAC) for progression through each stage of the Service Lifecycle, including:
  - All environments
  - Guarantee and pilot criteria and periods

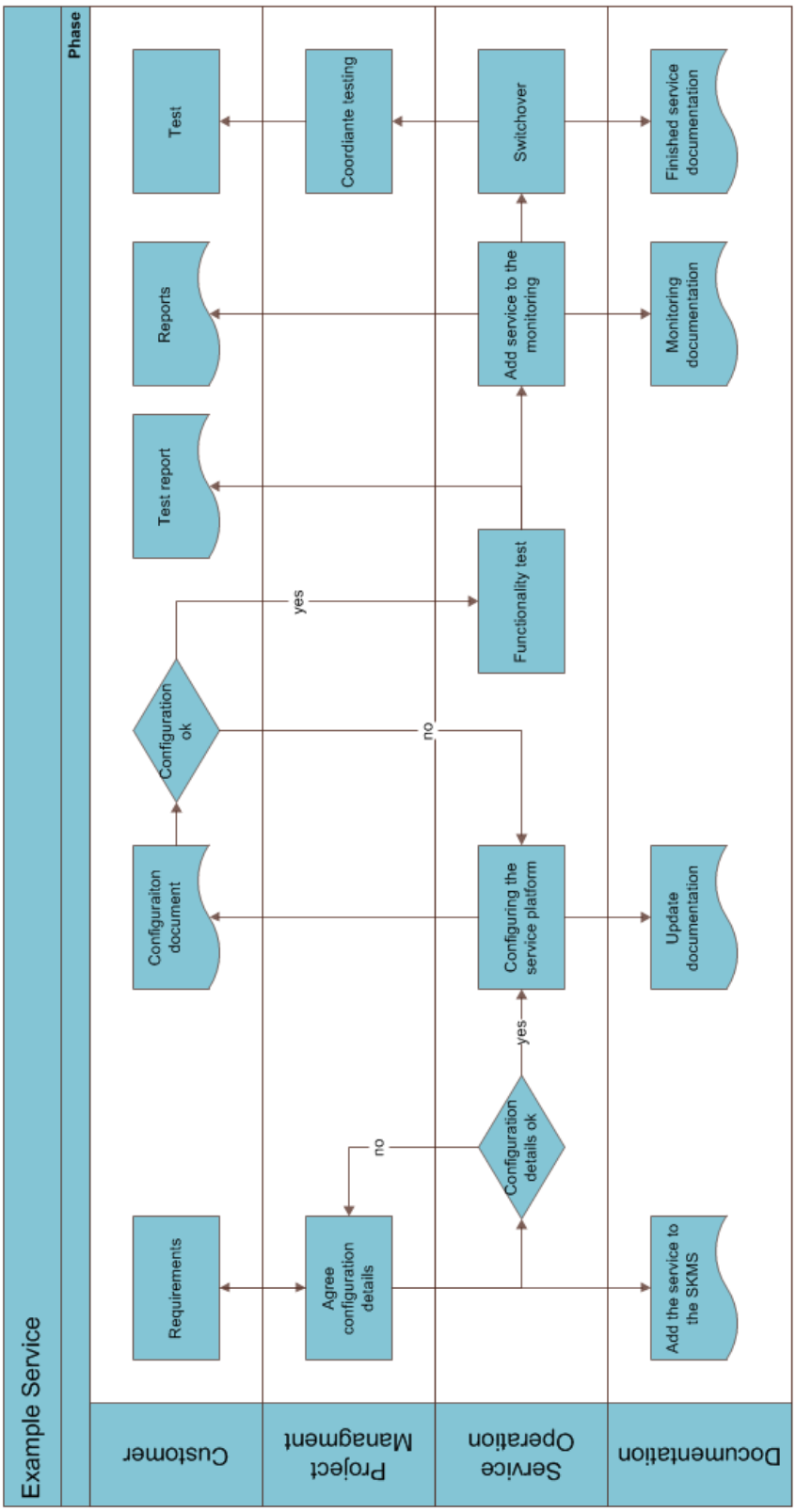
Appendix 3. Functional Design



Appendix 4. Technical Design



Appenidx 5. Service Delivery Blueprint



Appendix 6. Service Design Package Used in the Test

1.	**Requirements**
1.1	Business Requirements
1.2	Service Applicability
1.3	Service Contacts
2.	**Service Design**
2.1	Statement of Work
2.2	Service and Operational Managerial Requirements
2.2.1	Suppliers
2.2.2	Capacity
2.2.3	Availability and Continuity
2.2.4	Information Security
2.3	Service Design and Topology
2.4	Delivery
3.	**Organizational Readiness Assessment**
4.	**Risks and Issues**
4.1	Service Transition Plan
4.1.1	Testing Policy
4.1.2	Deployment Policy
4.2	Service Acceptance Criteria